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In homage to all doctors in our world

Editorial

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This the last issue for this year for the journal. We would like to send a special thanks for the authors who submitted papers to the journal, our readers, reviewers and production staff headed by our publishing manager and the editorial office.

This issue is rich with various papers from the World and touch different themes of interest to primary care. Dr. Basheikh did a Cross sectional analysis of anonymous adults in Saudi Arabia participated in an electronic format questionnaire by social media to measure the awareness toward witnessed seizure in prehospital setting. The correct reaction toward a seizing patient was only chosen by 18 participants (4.3%). The author conclude that the study results suggest that general public awareness about reaction to seizures in Saudi Arabia is inadequate and in need for increasing awareness.

A number of paper looked at issues related to Diabetes in the region which is very high in the Gulf. The prevalence of diabetes mellitus (DM), in Saudi Arabia, is growing at a fast rate. About 25% of the 30 – 70 years old subjects suffer from DM; this figure is further predicted to double by the year 2030. El-Gamal, et al., did a cross-sectional study to investigate the occurrence of DM among different age groups, and explore the determinants, risk factors and clinical aspects of DM among Saudis in Jeddah. The study included 1106 subjects. The authors concluded that DM is a major health problem among Saudis in Jeddah city. Our results demonstrate the need for major intervention to reduce this burden and to engage other sectors of the government and the community in these efforts. Al-Mallah, et al., evaluated the effectiveness of clinical pharmacist intervention in lifestyle modification to improve glycemic control and diabetic peripheral neuropathic symptoms. The authors concluded that the provision of lifestyle modification has positive effects on glycemic control and a clinically effective approach for patients with DPN that improves peripheral neuropathic symptoms, its severity, and pain interference.

Aldhabaan. Et al., did a descriptive cross-sectional study to assessed the knowledge, attitude and practice of diabetic retinopathy among the Diabetic Patients in Aseer Region. A total sample of 915 participants was included in the study with nearly half of them aged 40 years or more. The authors concluded that the study revealed that the patients' awareness level and practice regarding diabetic retinopathy was intermediate. The patients who were recently diagnosed were more compliant for periodic checkup and had higher awareness level. More effort should be paid to improve patients' awareness regarding diabetes as a chronic health problem and its related complications nature. Dr. Almoutaz & Almulla tried to assess the magnitude of economic burden of diabetes care in low- and middle-income African countries. Literature review using systematic approach was conducted for the evidences on the cost of diabetes in low- and middle-income African countries. The authors concluded that there is a considerable economic burden associated with diabetes mellitus. Future researches should focus on standardization of the methodologies for cost calculation, enhancing the interpretation of study findings and facilitating comparisons between studies.

In two papers diabetic foot disease were discussed. Dr Ahmed, reviewed diabetic foot disease and its management. She stressed that Diabetic foot ulcer (DFU) without treatment and regular review will progress from an ulcer to an infection. An estimated 10-15% of people with diabetes will have a DFU at some point in their lives. More than 80% of the amputations in patients with diabetes are due to DFU. Hassan et al., did a study to assess the effect of honey use in treating diabetic foot ulcer on Saudi diabetic patients. Thirty-two diabetic patients having diabetic foot infections were included in this study. The study proved that honey can be used as an effective, cheap, easily available, non-toxic adjuvant without adverse side effects in treatment of diabetic foot infections.

Dr. Sheikh, looked at Sulfonylureas and Mortality Risk. He stressed that Sulfonylureas have been used as second line option after metformin worldwide for better glycaemic control since last few decades. Recently newer evidence has emerged highlighting the adverse effects of sulfonylureas in terms of increased cardiovascular risks, stroke risk and increased mortality overall. His review This focused on literature review giving evidence around sulfonylurea and associated mortality risks. Dr. Musallam did a quality project for Improving albuminuria screening in Type 2 diabetes mellitus patients. She stressed that Diabetic kidney disease, which occurs in 20–40% of diabetic patients. The author concluded that the intervention showed improvement in the percentages of albuminuria screenings in type 2 diabetic patients.

Almalki et al., followed a cross-sectional study was done on 398 diabetic women to assess the prevalence for UI in women with diabetes. The prevalence of UI was 34%. Participants with an age ≥ 50 year, having DM type 2, UTI, Ovarian cyst, neuropathy higher levels of HbA1 and FBG had a significant higher percent of those having UI. The author concluded that there is a need of educating diabetic women about UI and methods of management. Dr . Alfaifi did a retrospective cohort study design was applied through record reviewing of type 2 diabetic patients at the Armed Forces Hospital. The author concluded that a considerable proportion of type 2 diabetic patients have thyroid dysfunction. Screening for early detection of thyroid dysfunction in patients with type 2 diabetes mellitus should be done routinely in all places taking care of those patients .

A paper from Canada looked at myths with diuretic. The authors mentioned that observational data suggest an association between hydrochlorothiazide and the risk of Squamous Cell Carcinoma. He reviewed 55 patients who were on HTCZ already. The author concluded that This unproven link direct us to start a discussion of skin cancer patients (as one of my patients was taking HTCZ and getting recurrent SCC) link to HTCZ and lawsuit against manufacturers. It also lead us to think whether any other kind of medication subjected to cause skin lesions or cancers, which required more observation and research in future.

A cross sectional hospital based study done in Saudi Arabia during the period from January 2010 to December 2011 to study the clinical pattern of tuberculosis in malnourished children below five years of age admitted as diagnosed cases of tuberculosis. The author concluded that the clinical diagnostic scores are sensitive but they use non-specific parameters. Screening of children with adult TB contact and sufficient rehabilitation of malnourished children before labelling them as tuberculous is recommended.

Alfaya et al., did a descriptive cross-sectional tried to assess the general population awareness regarding club foot in Aseer region. A total of 744 participants

were included in the survey. The authors concluded that, the survey revealed that public awareness regarding club foot in Aseer region was very low especially among females with high level of education. Also, health care providers had no role in improving this public awareness

A paper from Saudi Arabia evaluated communication skills of resident physicians at different health care facilities in Saudi Arabia through a cross-sectional, questionnaire-based study. A total of 210 resident doctors participated, of which 31.4% were internal medicine trainees, and 27.1% were family medicine trainees. Results of this study point towards a lingering need to focus on training of physicians in effective communication and efforts should be made to include it as a core competency in medical curriculum.

In two paper colorectal cancer was discussed. Farsi, et al., did a cross-sectional study to assess medical students' attitude and knowledge toward CRC screening and to determine the obstacles that they face. The authors concluded that medical students have not reached their full potential as CRC screening proponents for a variety of reasons, including inadequate knowledge and suboptimal attitudes, as well as the presence of various barriers that hinder them. El-Gamal et al., did a cross sectional survey to study the pattern of Knowledge, Attitude, and Practice (KAP), of CRC in Jeddah city, SA. The total number enrolled was 364 subjects. The authors concluded that although CRC is a major cause of morbidity and mortality in KSA, yet the KAP of the studied subjects were defective. There is an urgent need to implement health education programs to raise the KAP standards of the community about CRC. More researches, about this issue, in different regions of the Kingdom need to be conducted.

A number of papers looked at awareness issues. Dr. Al-Hefdhi, did An interviewer-administered questionnaire was used to study infant-feeding knowledge and practice. This study explores some of the factors related to knowledge and practice of infant feeding which are: mother's age and her level of education, father's age and his educational level and occupational status, family size and monthly income, prenatal plan and prenatal health education of infant feeding and practice of breastfeeding with the previous child. Alhazmi et al., did a cross sectional study was done on 620 Saudi children to assess the relationship between using alcohol swab cleaning of umbilical cord and the time of healing of the umbilicus till cord separation and associated complications. The authors concluded that further studies that include a larger sample of children is required, and heath educational programs regarding umbilical cord directed to pregnant mothers during antenatal visits is needed. Shehata et al., did a descriptive cross-sectional study was used to assess awareness, attitude, and practice regarding E-cigarettes among students at King Khalid University, Saudi Arabia. The authors concluded that, the current study revealed that half of the students were knowledgeable regarding E-cigarettes and its effect. Also, using E-cigarettes was not high (less than one fifth) especially among young female students.

Wani et al., did a record based retrospective cohort study to determine the incidence of dyspnoea and/or bleeding as side effects of ticagrelor and compare it with commonly used P2Y12 platelet receptor inhibitors, clopidogrel. The authors concluded that significant number of patients who are started on ticagrelor develop dyspnoea but not compromising the therapeutic superiority of drug as compared to clopidogrel and can be replaced as first line drug in Saudi population Other side effect profiles of ticagrelor are comparable to conventional anti platelet drugs with no significant statistical variability.

Dr Ahmed, presented a case of Of hyperemesis gravidarum. The patient a 24years old lady, Gravida 2 parity 1 with one previous vaginal delivery recurrently presented to her health center from 7 to 10 weeks gestation with symptoms of nausea and vomiting up to 10 times/day. Antenatal USS showed a viable pregnancy with fetal growth consistent with the gestational age at 11 weeks. After 10days, she was discharged home with oral pantoprazole and general advice regarding symptoms management and return if symptoms of nausea and vomiting recurred. A paper from Yemen did a retrospective medical charts of patients presenting to the ENT Units of two private hospitals in Aden, to describe the characteristics of the patients and to evaluate the endoscopic septoplasty: outcome and complications. The author concluded that endoscopic septoplasty is an effective technique that can be performed safely.

Dr. Alshyarba, followed a retrospective approach, of all patients who underwent nephrectomy from January 2008 to December 2017. Data were reviewed with regards to clinical presentation, nephrectomy indication, and histopathological report. The author conclude that although, the non-functioning kidney is still the leading indication of nephrectomy in this series, RCC cases have significantly increased to almost four times what being reported from this institute over twenty years. This mandates immediate and long term heath policy planning to address this shift. AlKhayat, et al., followed a cross sectional study was done on 340 primary school children to assess the prevalence of pediatric OSA and its association with school performance among Saudi children. The prevalence of OSA was 9%, where children > 12 years, obese, those having RTI, allergy, had a significant higher percent of having OSA. on the other hand, a non-significant difference was found between the presence of OSA and children overall academic level. There is a need for future school-based studies done on a larger sample to confirm the observed associations found in the present study.

Al-Towairqi et al., conducted a cross section study to determine the prevalence of GERD and their risk factors Among Female at Medical college. The authors concluded that this study demonstrated a high GERD prevalence among studied students. There is a need to increase awareness of university students about modifiable risk factors of GERD. Dr Sumathipala stressed that thyroid nodules are a common condition and family medicine clinicians are likely to encounter them not least as incidental findings from a variety of imaging modalities. Most of these nodules are benign but often investigations will need to be undertaken to exclude malignancy. Therefore, family medicine clinician will need to know how to manage thyroid nodules, including how to assess for malignancy, including an understanding of the investigations required and what follow up is necessary.

A number of papers discussed Covid 19 issues in the region. Filfilan et al., did a cross-sectional study to assess the effects of COVID-19 on the psychological health of family physicians in Saudi Arabia. The study showed that this pandemic has created many high concerns among Family physicians about their health, family's health and also the public health. Moussa et al., surveyed the impact of Covid 19 on the healthcare sector. Results from this survey showed that family medicine residents got benefited from their experience as front-line staff managing patients during the covid-19 pandemic mostly in social, behavioral and skills aspects and to a minor degree in professional aspect. on the other hand, the family medicine educational aspect was negatively impacted. Haseeb, et al., discussed the challenge of virtual consultation in diagnosing acute medical conditions in primary care. .....

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Prevalence of thyroid dysfunction among Type 2 Diabetic Patients

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Abstract

Background: Hypothyroidism is prevalent in patients with type 2 diabetes mellitus (DM).

Objectives: To assess the prevalence and the factors associated with hypothyroidism among type 2 DM patients.

Subjects and methods: A retrospective cohort study design was applied through record reviewing of type 2 diabetic patients at the Armed Forces Hospital, Southern Region (AFHSR), Khamis Mushayt, Saudi Arabia. All type 2 diabetics registered at the Diabetes Center of the AFHSR constituted the study population. A data collection sheet was used, which included personal characteristics, diabetes assessment, thyroid function assessment, and other possible risk factors.

Results: The study included 251 type 2 diabetic patients. Their mean age was 38.6±23.5 years with 39.6% of them aged 50 years or more. Slightly more than half of participants (52.4%) were females. Uncontrolled diabetes, manifested by having HbA1c ≥7%, was observed among 60.4% of patients. The mean duration of diabetes was 11.1±7.49 years. Thyroid disease was reported among 14.8% of type 2 diabetics. None of them reported family history of thyroid dysfunction. Factors significantly associated with thyroid disorders were female gender, (p=0.007), obese patients (p=0.014), being treated with oral hypoglycemic agents and insulin or insulin alone (p=0.049).

Conclusion: A considerable proportion of type 2 diabetic patients have thyroid dysfunction. Screening for early detection of thyroid dysfunction in patients with type 2 diabetes mellitus should be done routinely in all places taking care of those patients in Khamis Mushait.

Key words: Type 2 Diabetes, Hypothyroidism, Risk factors, Saudi Arabia.

Introduction

Diabetes mellitus (DM) is one of the common endocrine disorders which affects multiple organs and systems and can cause significant complications ending by undesirable and significant morbidity and mortality. One of the organs negatively affected by diabetes is the thyroid gland and its function (1).

Hypothyroidism is considered to be the most common thyroid disorder among adults, especially older women. It is frequently autoimmune in origin, presenting as either primary atrophic hypothyroidism or Hashimoto's thyroiditis. Thyroid failure secondary to radioactive iodine therapy or thyroid surgery is also common. Hypothyroidism and subclinical hypothyroidism have major prevalence in patients with type 2 DM, and it is possible that hypothyroidism is a risk factor for the development of DM (2).

In diabetes patients, there are alterations in the hypothalamus-pituitary-thyroid axis. Hypothalamic and plasma thyroid releasing hormone (TRH), pituitary and plasma thyroid stimulating hormone (TSH), as well as TSH secretion rates are reduced and the TSH response to TRH is decreased despite normal peripheral TSH metabolism. Triiodothyronine (T3) and thyroxine (T4) production and iodide uptake by the thyroid are diminished (3).

Insulin and thyroid hormones are both involved in cellular metabolism. Therefore, excess or deficit of either of these hormones could result in the functional derangement of the other, i.e., hyperthyroidism can result in hyperglycemia and hypothyroidism can result in hypoglycemia (4). Moreover, it has to be reported that thyroid hormones exert profound effects on the regulation of glucose homeostasis, which includes modifications of the circulating levels of insulin and counter-regulatory hormones, intestinal absorption, hepatic production and peripheral tissue uptake of glucose (5).

Thyroid diseases and diabetes mellitus are the two most common endocrine disorders encountered in clinical practice. They mutually influence each other and the associations between these two conditions (thyroid diseases and diabetes) have been reported (6). Thyroid disease is common in the general population, and its prevalence increases with age. However, there is reported higher prevalence of thyroid dysfunction among type 2 diabetics than in the general population (7). On the other hand, unrecognized thyroid dysfunction can impair metabolic control among diabetics. Prompt detection and treatment may reduce risk of cellular metabolism derangement in DM and can help achieve metabolic control in diabetes (8).

Unrecognized thyroid dysfunction may impair glycemic control by causing hypoglycemia or hyperglycemia. Continuing deterioration of endocrine control exacerbates the metabolic disturbances and leads primarily to hyperglycemia as is the case if one has hyperthyroidism. It has been noted that sustained reduction of hyperglycemia will decrease the risk of developing microvascular complications and most likely reduce the risk of macrovascular complications in patients with type 2 DM (9).

Despite the increasing interest toward exploring the possible interaction between thyroid dysfunction and insulin resistance, studies that explore the association between thyroid dysfunction and diabetes mellitus in Saudi Arabia are still very scarce.

The present study aimed to assess prevalence and the associated factors of hypothyroidism among type 2 DM patients.

Patients and Methods

The present study followed a retrospective cohort research design through reviewing electronic health records of type 2 diabetic patients registered at the Armed Forces Hospital, Southern Region (AFHSR), Khamis Mushayt City, Saudi Arabia. The total number of registered type 2 diabetic patients during 2015-2017 was 8,965 patients. A data collection sheet was constructed by the researcher. It included patients' characteristics; data related to thyroid function assessment.

Assuming that the prevalence of thyroid dysfunction among diabetics is 30%, 4.5% absolute error (15% of prevalence) and a finite population correction, at 95% level of confidence, the single proportion equation for dichotomous variables in Epi-Info 6.04 Software Package, the required sample size was calculated to be 231 patients. However, after adjustment for a dropout rate of about 5%, the sample size was increased to 250 patients. A systematic random sample with one-tenth sampling fraction, was followed to collect the necessary number of health records.

Data were entered into a personal computer and were analyzed using the Statistical Package for Social Sciences (IBM, SPSS version 25). Tests of significance, (i.e., Chi-square, and t-test) were applied. P-values less than 0.05 were considered as statistically significant.

All the necessary official approvals to conduct this study (e.g., the Ethical Committee, hospital administration, academic supervisors) were fulfilled. All collected data were kept confidential and were not used except for research purposes.

Results

The study included 250 type 2 diabetic patients. Their characteristics are summarized in Table (1). Their mean age was 38.6±23.5 years with 39.6% of them aged 50 years or more. Slightly more than half of patients (52.4%) were females. Almost one-quarter (24.4%) were illiterate, whereas 17.6% were university graduated. The majority were non-smokers (90.8%), while the prevalence of active smoking was 7.6%. The mean body mass index (BMI) was 27.64±8.6 kg/m2 with a prevalence of overweight and obesity of 18% and 20.8%, respectively. Oral hypoglycemic

agents were received by 44% of patients, whereas 14% were treated by insulin alone and the remaining 42% were treated by a combination of both. Uncontrolled diabetes, manifested by having HbA1c ≥7% levels, was present among 60.4% of patients. The mean duration of diabetes was 11.1±7.5 years.

Table (2) shows that thyroid dysfunction was found among 14.8% of type 2 diabetic patients. None of them had positive family history of thyroid dysfunction. The mean values of T3, FT4 and TSH were 5.1 ± 1.32, 13.02 ± 3.02 and 2.89 ± 2.56, respectively.

As shown in Table (3), female patients had significantly higher prevalence of thyroid dysfunction than male patients (20.6% and 8.4%, respectively, p=0.007). Obese patients had the highest rate of thyroid diseases (26.9%), whereas underweight patients had the lowest rate (2.3%). Overall, the association between history of thyroid diseases and BMI was statistically significant (p=0.014). 21% of type 2 diabetic patients were treated with a combination of insulin and oral hypoglycemic compared to 14.3% of those treated with insulin only and 9.1% of patients treated with oral hypoglycemic only had a history of thyroid diseases. The association between type of diabetic medication and history of thyroid diseases was significant (p=0.049). There was no statistically significant association between history of thyroid dysfunction and type 2 DM control. Although history of thyroid diseases was more reported among type 2 diabetics with longer duration of the disease than those with shorter duration (13.3±8.5 versus 10.7±7.3 years), the difference was not statistically significant.

Table 1: Characteristics of type 2 diabetic patients

Variables	No.	%
Age category		
• <50 years	151	60.4
• ≥50 years	99	39.6
• Mean ±SD	38.6 ±23.5	
Gender		
• Male	119	47.6
• Female	131	52.4
Educational level		
• Illiterate	61	24.4
• Primary	57	22.8
• Intermediate	20	8.0
• Secondary	68	27.2
• University	44	17.6
Smoking		
• Non-smoker	227	90.8
• Active Smoker	19	7.6
• Ex-Smoker	4	1.6
BMI category (kg/m²)		
• <18.5	44	17.6
• 18.5-24.9	56	22.4
• 25-29.9	53	21.2 %
• 30-34.9	45	18.0 %
• >35	52	20.8 %
• Mean ±SD	27.6 ±8.6	
Received medication		
• Insulin	35	14.0
• Oral hypoglycemic agents	110	44.0
• Both	105	42.0
HbA1c Category		
• < 7%	99	39.6
• ≥ 7%	151	60.4
• Mean ±SD	8.58 ±2.69	
Duration of diabetes (Mean ± SD)	11.1 ±7.49 years	

Table 2: Medical characteristics of the studied patients regarding thyroid dysfunction

Variables	No.	%
Present history of thyroid dysfunction		
• Yes	37	14.8
• No	213	85.2
Family history of thyroid disease	0	0.0
Serum hormone levels (Mean ± SD)		
• T3	5.1 ±1.32 µg/dL	
• FT4	13.02 ±3.02 ng/dL	
• TSH	2.89 ±2.56 mU/L	

Table 3: Type 2 diabetic patients' demographic and medical characteristics according to their present history of thyroid diseases

Variables		History of thyroid disease		P value
		Yes (n=37) No. (%)	No (n=213) No. (%)	
Age Group	• <50 years	20 (13.2)	131 (86.8)	0.393
	• ≥50 years	17 (17.2)	82 (82.8)	
Gender	• Male	10 (8.4)	109 (91.6)	0.007
	• Female	27 (20.6)	104 (79.4)	
Level of education	• Illiterate	7 (11.5)	54 (88.5)	0.728
	• Primary	7 (12.3)	50 (87.7)	
	• Intermediate	3 (15.0)	17 (85.0)	
	• Secondary	11 (16.2)	57 (83.8)	
	• University	9 (20.5)	35 (79.5)	
Smoking status	• Non-smoker	35 (15.4)	192 (84.6)	0.308
	• Active smoker	1 (5.3)	18 (94.7)	
	• Ex-smoker	1 (25.0)	3 (75.0)	
BMI (kg/m²)	• lessthan18.5	1 (2.3)	43 (97.7)	0.014
	• 18.5-24.9	6 (10.7)	50 (89.3)	
	• 25-29.9	9 (17.0)	44 (83.0)	
	• 30-34.9	7 (15.6)	38 (84.4)	
	• ≥35 52)	14 (26.9)	38 (73.1)	
Type of medication	• Insulin	5 (14.3)	30 (85.7)	0.049
	• Oral hypoglycemic agents	10 (9.1)	100 (90.9)	
	• Both	22 (21.0)	83 (79.0)	
HbA1c level	• ≥7%	18 (12.1)	131 (87.9)	0.141
	• <7%	19 (18.8)	82 (81.2)	
Duration of diabetes	• Mean±SD	13.3±8.5	10.7±7.3	0.069

Discussion

Results of the current study revealed a prevalence of 14.8% of thyroid dysfunction among type 2 diabetic patients.

Different figures have been reported from various studies carried out locally and worldwide. Al-Geffari et al. (10) reported that prevalence of thyroid dysfunction among Saudi Type 2 diabetic patients was 28.5%. In Jeddah, Saudi Arabia, thyroid autoimmunity was detected in 10% of diabetics versus 5% among controls, while thyroid dysfunction was found in 16% and 7%, respectively (11).

The prevalence reported in the current study is not so high compared to that reported by Geffari et al. (10) and slightly lower than that reported in Jeddah (11) despite the high prevalence of latent autoimmune diabetes of adults among Saudi Type 2 diabetics (26%) (11).

In India, Geetha et al. (12) reported that 25.1% of type 2 diabetic patients showed abnormal thyroid function (21.9% had hypothyroidism and 3.2% had hyperthyroidism) and 74.89% showed normal thyroid hormone level. The ability to diagnose and treat unsuspected hypothyroidism in type 2 diabetic patients may result in better control of diabetes, thereby greatly enhancing the quality of life. Their study justified the view that all type 2 diabetic patients should be screened for hypothyroidism.

In UK, Smithson (13) reported that the prevalence of thyroid disease in the entire population of diabetic patients registered in the general practice was 10.8%. Devi et al. (14) observed that serum T3 and T4 levels among type 2 diabetic patients were significantly lower than that of the controls, while TSH level was higher. They concluded that type 2 diabetic patients were significantly more associated with hypothyroidism than controls.

In Punjab, Khurana et al. (15) reported a prevalence of 16% of thyroid disorders in patients of type 2 diabetes mellitus; 7.5% were subclinical cases. In another Indian study, Uppal et al. (16) reported a prevalence of 24.5% of thyroid dysfunction among diabetic patients; 17 % hypothyroidism and 7.5 hyperthyroidism.

In Argentina, Maxzud et al. (17) reported that prevalence of thyroid dysfunction in type 2 diabetic patients was 48%, with 8% subclinical hypothyroidism. In Jordan, Radaideh et al. (18) reported a prevalence of 12.5% among type 2 diabetics. In Nepal, Khatiwada et al. (19) reported a very high prevalence of thyroid dysfunctions (36%) among diabetic patients. In Greece, thyroid dysfunction prevalence among type 2 diabetic patients was 12.3%.(20).

In the present study, female type 2 diabetic patients had higher significant rate of thyroid dysfunction compared to males. The same finding has been reported among Saudi type 2 diabetics by Al-Geffari et al (2013) (10). In Nepal (19), higher prevalence of thyroid dysfunction in females (42.9%) than in males (30%) was reported. Similar findings have been reported in India (20) Punjab (15) and Greece(21).

In accordance with what has been documented by Al-Geffari et al in Saudi Arabia,(10) age was not associated with thyroid dysfunction among type 2 diabetic patients. This contradicts what has been reported by several studies that age is a significant risk factor for thyroid dysfunction (15,22,23).

Obesity was associated with a higher rate of thyroid dysfunction among type 2 diabetic patients in the present study. Similarly, Khurana et al. (15) found that subclinical hypothyroidism was observed in obese diabetic patients.

However, there was no significant association between smoking and thyroid dysfunction among type 2 diabetic patients which disagrees with findings of Vestergaard et al. (24) and Khatiwada et al., (19) who stated that smoking is a significant risk factor for thyroid dysfunction. In agreement with our finding, Al-Geffari et al (10) found no association between smoking and thyroid dysfunction.

The present study revealed no association between level of HbA1c and prevalence of thyroid dysfunction among type 2 diabetic patients. Bhattacharjee et al. (25) suggested that cautions should be taken while interpreting HbA1c data in patients with hypothyroidism as they hypothesized that HbA1c levels may be altered due to change in the thyroid status, mainly due to changes in red blood cells turnover (26) and observed that baseline HbA1c levels were significantly higher in hypothyroid patients, and then reduced significantly after achievement of euthyroidism without any change in glucose levels. Khurana et al. (15) reported that patients with uncontrolled diabetes, i.e., HbA1c $\geq$7%, were at a higher risk for subclinical hypothyroidism. In India, Geetha et al. (12) reported that the ability to diagnose and treat unsuspected hypothyroidism in type 2 diabetic patients may result in better control of the diabetic status.

Type 2 diabetic patients treated with a combination of insulin and oral hypoglycemic and those treated with insulin alone had a higher rate of thyroid dysfunction as opposed to those treated with oral hypoglycemic alone. Khurana et al. (15) found that subclinical hypothyroidism was observed in diabetic patients on insulin.

Duration of type 2 diabetes was not a significant predictor for thyroid dysfunction in the present study. This is in accordance with those reported by other studies carried out in Spain (22) and China (27). However, in another Saudi study,(10) diabetic patients with longer duration of the disease (more than 10 years) were more likely to have thyroid dysfunction.

The possible limitations of the present study include its retrospective research design that depends on reviewing of medical records. In addition, the iodine status of the study participants was not assessed. Finally, conduction of the study in only one health institution could affect the generalizability of results.

Conclusion

A considerable proportion of type 2 diabetic patients have thyroid dysfunction. Females, obese, and those treated with a combination of oral hypoglycemic and insulin or insulin alone are at higher risk to develop thyroid dysfunction. Diabetes control, as evidenced by glycated hemoglobin, and duration of diabetes are not associated with thyroid dysfunction in type 2 diabetic patients.

Therefore, screening of type 2 diabetic patients for early detection of thyroid dysfunction should be routinely done, particularly females, obese and those treated with insulin. Further studies are needed in other places taking care of diabetic patients to confirm the present study`s findings.

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Prevalence and risk factors for urinary incontinence among women with diabetes in Taif city, Saudi Arabia

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Abstract

Background: Urinary incontinence is a detected complication of diabetes mellitus. Studies about UI among diabetic women in Saudi Arabia are limited. The aim of this study was to assess the prevalence of UI in women with diabetes in Taif city, Saudi Arabia and to determine its risk factors.

Methods: A cross-sectional study was done on 398 diabetic women who attended the diabetes clinic at Prince Mansour Military Hospital, Taif city, Saudi Arabia. A checklist was used gathering data about socio-demographic characteristics, type and duration of diabetes, chronic diseases, parity, BMI, presence of neuropathy, retinopathy and nephropathy, level of HbA1c and fasting blood glucose (FBG).

Results: The prevalence of UI was 34%. In the last four weeks, 48.9%, 25.9%, 6,7%, 12.6% and 34.1% of studied women had frequent urination, urine leakage drops, difficulty in urinating or emptying, pain or discomfort in lower abdomen, leakage related to urgency, and leakage related to physical activity, respectively. Among them, 11.1%, 11.9%, 12,6%. 19.3%, 15.6%, 19.3%, and 20.7% suffered effects of UI on the ability to do household chores, physical recreation, entertaining activities, ability to travel in car or bus more than 30 minutes, participation in social activities outside, emotional health, and feeling frustrated, respectively. Participants with an age ≥ 50 year, and having DM type 2, UTI, Ovarian cyst, and neuropathy higher levels of HbA1 and FBG, had a significantly higher percentage of those having UI. Participants' older age and high HbA1c level were independent predictors for UI.

Conclusion: There is a need for educating diabetic women about UI and methods of management.

Key words: Prevalence, risk, urinary, incontinence, women Taif

Introduction

Urine incontinence (UI) is a common health problem in the population and has social and economic impacts (1). It is defined by the International Continence Society as "the complaint of any involuntary leakage of urine" (2). The prevalence of urinary incontinence according to the health and social service agencies was 0.2% in women (3). The prevalence markedly increases with age and the median level of prevalence gives a picture of increasing prevalence during young adult life (20–30%), a broad peak around middle age (30–40%), and then a steady increase in the elderly population (30–50%) (2).

Urinary incontinence has many risk factors proven in many studies such as previous urological disorders, pelvic traumas, parity, recurrent urinary infections, vaginal deliveries and obstetric trauma in women (4). Several other factors have a role in urinary incontinence such as alcohol and coffee consumption (4). Diabetes mellitus is a chronic illness that can lead to various complications; the commonest are retinopathy, neuropathy and nephropathy. One of the under-detected complications is urinary incontinence (5).

A previous study suggests that incontinence may be a microvascular complication, possibly because of disturbance of the nerve supply that causes urethral sphincter damage (6,7,8,9,10,11,12,13). Another study was done in the United Arab Emirates and found that 64.3% of studied women were suffering from incontinence, 48.7% had stress incontinence and 52.4% had symptoms of urge incontinence. The study found that the most significant risk factor was diabetes (4). Another cross-sectional population-based study done in Norway found that out of 21,057 women 638 were found to be diabetics and those who were suffering from diabetes had higher prevalence of urinary incontinence than those who weren't diabetic, with a percentage of 39% and 25.8% respectively (14). A study that was conducted in America found that one-unit increase of hemoglobin A1C was associated with a 13% increase for any type of urinary incontinence and a 34% increase in risk for stress incontinence (15). Another study in the USA stated that obesity was the strongest modifiable risk factor and other risk factors were hysterectomy and urinary tract infections (UTI) (16).

In the Kingdom of Saudi Arabia (KSA), a study was done in 2012 to assess UI risk factors among Saudi women. The study found that the prevalence of UI was 41.4%, urinary leakage was reported daily by 17.2%, and 25.5% experienced leakage more than once a week. Risk factors for UI were increased age, parity greater than 5, menopause and history of vaginal gynecologic surgery (17). Another study was done in 2017 to assess the prevalence of urinary incontinence in Saudi females and its associated risk factors. The study found that the most common risk factors for urinary incontinence were older age, menopause and high parity (18). The aim of the present study was to estimate the prevalence of UI in women with diabetes in Taif city, Saudi Arabia and to determine its risk factors.

Methods

Study design, setting and time frame: a cross-sectional single-center study was conducted on 398 diabetic female patients who attended the diabetes clinic at Prince Mansour Military Hospital, Taif city, Saudi Arabia. The study was done during the period from 1st of November 2019 to the 31th of January 2020.

Sampling methodology: according to the rate of patients attending the center the sample size required was 377 and the sample size was calculated by using the following formula n = N /(1+N * e2), where n = sample size, N = population size, e= margin of error (5%). The inclusion criteria were all women with diabetes who were not pregnant with an age older than 18 years, and the exclusion criteria were those who were non-diabetic, pregnant or with an age outside the mentioned range.

Study instrument: a checklist was prepared for every patient and data collected included socio-demographic data such as: (age, marital status, Smoking, Physical exercise), history including: (type and duration of diabetes, any chronic diseases, number of parity, mode of delivery, Surgery), examination involving (Height, Weight, BMI, presence of neuropathy, retinopathy and nephropathy), investigations such as (hemoglobin A1C (HbA1c) and fasting blood glucose (FBG).

Ethical considerations: informed written and verbal consent was signed by patients and the data collected by direct interview.

Statistical analysis: Data were coded, tabulated and analyzed using (SPSS) version 25 (Armonk, NY: IBM Corp.). Qualitative data was expressed as numbers and percentages, and Chi-squared test ($\chi 2$) was applied to test the relationship between variables. Quantitative data was expressed as mean and standard deviation (Mean ± SD). Mann-Whitney and Kruskal Wallis Tests were applied for non-parametric variables. A p-value of <0.05 was considered as statistically significant.

Results

The aim of this study was to estimate the prevalence and risk factors for urinary incontinence in women with diabetes in Taif city, Saudi Arabia. Our study included a total of 398 participants. The participants' mean age was 57.65 ± 11.78 (mean ± SD). Only females were recruited. Most of the participants (81.9%) were 50 years old and more, 62.1% were married, 37.9% were practicing physical activity, 1% were smokers, 94.9% had DM type 2, and 48% were hypertensive. Of the participants, 13.1% had hyperlipidemia, 7.8% had asthma, 25.4 had UTI, 0,.5% had ovarian cyst, 13.6% had thyroid dysfunction, 13.1% had hypothyroidism, and 0.3% had anemia and anxiety. Only 0.5% of the participants had liver disorders, 0.8% had renal stones, 0.3% had SLE, and 53.3% had previous surgeries. As for their obstetric history, 45.6% had > 5 children, and 68.9% had vaginal mode of delivery. About 40%

(40.2%) had 1st degree obesity, 66.1% had neuropathy, 50.3% had retinopathy and 8.3% had nephropathy. The mean age, vaginal delivery, CS, BMI, FBG and HbA1c of the participants were (57.65± 11.76 years, 7.20 ± 6.98 deliveries , 0.55 ± 1.02 deliveries, 33.48 ± 8.06 kg/m2, 10.05 ± 5.17, and 9.0 ± 2.16) respectively (Table 1).

Figure 1 shows that the prevalence of UI among the studied participants was 34%. In the last four weeks, 48.9%, 25.9%, 6,7%, 12.6% and 34.1% of females having UI suffered frequent urination, urine leakage drops, difficulty in urinating or emptying, pain or discomfort in lower abdomen, leakage related to urgency, and leakage related to physical activity respectively. Among them, the percentage of those who suffered effects of UI on: the ability to do household chores, physical recreation, entertaining activities, ability to travel in car or bus more than 30 minutes, participation in social activities outside, emotional health, and feeling frustrated was 11.1%, 11.9%, 12,6%. 19.3%, 15.6%, 19.3%, and 20.7% respectively (Table 2).

Table 3 shows that participants with an age ≥ 50 years, having DM type 2, UTI and Ovarian cyst had a significant higher percentage of those who had UI (P=< 0.05). On the other hand, a non-significant relationship was found between having UI and participants' marital status, smoking, physical activity, having HTN, hyperlipidemia, asthma, thyroid dysfunction, hypothyroidism, anemia and anxiety (p=> 0.05).

Table 4 shows that participants who had neuropathy as a diabetic complication had a significantly higher percentage of those having UI (p=< 0.05). However, a non-significant difference was found between the presence of UI and having liver disorder, SLE, renal stone, retinopathy, nephropathy, or ovarian cyst. The same non-significant difference was found between UI presence and participants' parity, mode of delivery, BMI, and previous surgeries (p=> 0.05). Table 5 shows that participants who had higher level of HbA1 and FBG had a significant higher percentage of those having UI (p=< 0.05). A non-significant difference was found between the presence of UI and participants' diabetes duration and number of vaginal or CS deliveries.

Table 6 shows that by doing binary logistic regression analysis of the studied variables, participants' age and HbA1c level were independent predictors of UI.

Table 1. Distribution of the studied participants according to their personal and clinical data

Variable	No (%)	Variable	No (%)
Age		Asthma	
less than 50 years	71 (18.1)	Yes	31 (7.8)
≥ 50 years	326 (81.9)	No	368 (92.2)
Marital status		UTI	
Married	247 (62.1)	Yes	101 (25.4)
Unmarried	151 (37.9)	No	297 (74.9)
Smoking		Ovarian cyst	
Yes	4 (1)	Yes	4 (0.5)
No	394 (99)	No	396 (99.5)
Physical activity		Thyroid dysfunction	
Yes	151 (37.9)	Yes	54 (13.6)
No	247 (62.1)	No	344 (68.4)
Diabetes		Hypothyroidism	
Type 1	21 (5.3)	Yes	52 (13.1)
type 2	377 (94.7)	No	346 (86.9)
Hypertension		Anaemia	
Yes	191 (48)	Yes	1 (0.3)
No	207 (52)	No	397 (99.7)
Hyperlipidemia		Anxiety	
Yes	52 (13.1)	Yes	1 (0.3)
No	346 (86.9)	No	397 (99.7)

Table 1. Distribution of the studied participants according to their characteristics, clinical data and obstetric history (continued)

Variable	No (%)	Variable	No (%)
Liver disorder		SLE	
Yes	2 (0.5)	Yes	1 (0.3)
No	397 (99.5)	No	397 (99.7)
Renal stone		Mode of delivery	
Yes	3 (0.8)	Vaginal	262 (68.9)
No	396 (99.2)	CS	17 (4.5)
		Both	101 (26.6)
Parity		BMI	
< 5 children	85 (21.4)	Body weight deficit	2 (0.5)
> 5 children	301 (45.6)	Normal weight	22 (5.5)
Nulliparity	12 (3)	Over weight	85 (21.4)
		1st degree obesity	160 (40.2)
		2nd degree obesity	84 (21.1)
		3rd degree obesity	45 (11.3)
Surgeries		Retinopathy	
Yes	212 (53.3)	Yes	200 (50.3)
No	186 (46.7)	No	198 (49.9)
Neuropathy		Nephropathy	
Yes	263 (66.1)	Yes	33 (8.3)
No	135 (33.9)	No	365 (91.7)
Age	57.65 ± 11.76	BMI	33.48 ± 8.06
No. vaginal deliveries	7.20 ± 6.98	FBG	10.05± 5.17
No. CS	0.55 ± 1.02	HbA1c	9.0± 2.16

Figure 1: Prevalence of UI among studied females

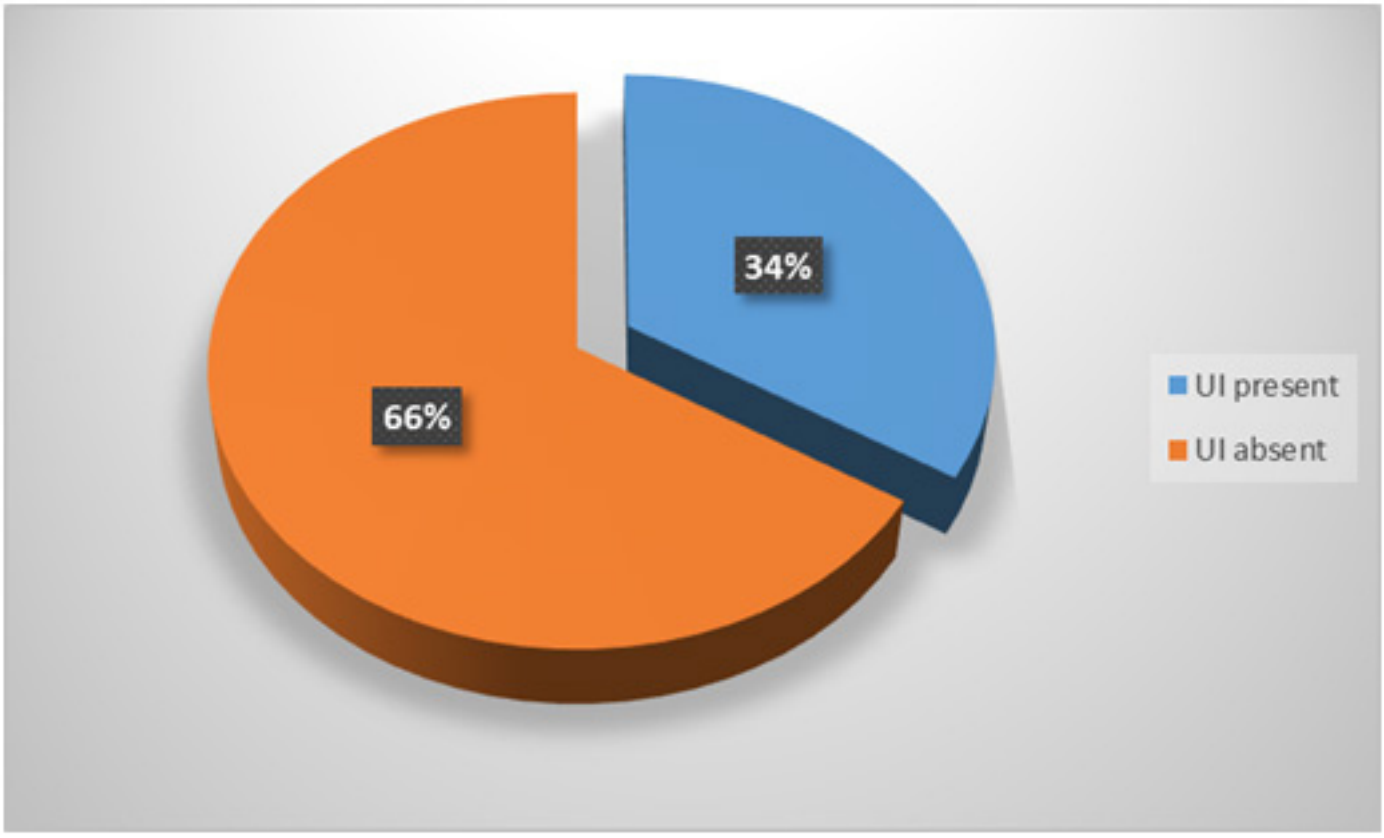

Table 2. Distribution of factors associated with UI among females suffering from it in the last four weeks:

Effects of incontinence	Not at all	A little bit	Moderately	Greatly
	No. (%)	No. (%)	No. (%)	No. (%)
Frequent urination	15 (11.1)	14 (10.4)	40 (29.6)	66 (48.9)
Leakage related to urgency	20 (14.8)	2 (8.9)	57 (42.2)	46 (34.1)
Leakage related to physical activity	55 (40.7)	15 (11.1)	57 (42.2)	46 (34.1)
Urine leakage drops	17 (12.6)	44 (32.6)	39 (28.9)	35 (25.9)
Difficulty in urinating or emptying	99 (73.3)	8 (5.9)	19 (14.1)	9 (6.7)
Pain or discomfort lower abdominal	77 (57)	13 (9.6)	28 (20.7)	17 (12.6)
Affected Ability household chores	96 (71.1)	14 (10.4)	10 (7.4)	15 (11.1)
Affected Physical recreation	90 (66.7)	16 (11.9)	13 (9.6)	16 (11.9)
Affected Entertaining activities	86 (63.7)	14 (10.4)	18 (13.3)	17 (12.6)
Affected Ability to travel in car or bus more than 30 minutes	78 (57.8)	13 (9.6)	18 (13.3)	29 (19.3)
Affected Participation social activities outside	86 (63.7)	13 (9.6)	15 (11.1)	21 (15.6)
Affected emotional health	79 (58.5)	12 (8.9)	18 (13.3)	29 (19.3)
Feeling frustrated	82 (60.7)	9 (6.7)	16 (11.9)	28 (20.7)
All questions regarding previous 4 weeks.				

Table 3. Relationship between urinary incontinence and participants' characteristics and clinical data

Variable	UI present	UI absent	χ2	p-value
	No (%)	No (%)		
Age				
less than 50 years	14 (19.4)	58 (80.6)	8.21	0.004
≥ 50 years	121 (37.1)	205 (62.9)		
Marital status				
Married	78 (30.8)	171 (69.2)	2.88	0.09
Unmarried	59 (39.1)	92 (60.9)		
Smoking				
Yes	3 (75)	1 (25)	3.04	0.08
No	132 (33.5)	262 (66.5)		
Physical activity				
Yes	47 (31.1)	104 (68.9)	0.84	0.35
No	88 (35.6)	159 (64.4)		
Diabetes				
Type 1	2 (9.5)	19 (90.5)	5.88	0.01
Type 2	133 (35.3)	244 (64.7)		
Hypertension				
Yes	67 (35.1)	124 (64.9)	0.22	0.63
No	68 (32.9)	139 (67.1)		
Hyperlipidemia				
Yes	97 (36.7)	167 (63.3)	2.78	0.09
No	38 (28.4)	96 (71.6)		
Asthma				
Yes	12 (38.7)	19 (61.3)	0.34	0.55
No	123 (33.5)	244 (66.5)		
UTI				
Yes	53 (52.5)	48 (47.5)	20.79	< 0.001
No	82 (27.6)	215 (72.4)		
Ovarian cyst				
Yes	2 (100)	0 (0.0)	3.91	0.04
No	133 (33.6)	263 (66.4)		
Thyroid dysfunction	18 (33.3)	36 (66.7)	0.01	0.92
Yes	117 (34)	227 (66)		
No				
Hypothyroidism				
Yes	18 (34.6)	34 (65.4)	0.01	0.91
No	117 (33.8)	229 (66.2)		
Anaemia				
Yes	1 (100)	0 (0.0)	1.95	0.16
No	134 (33.8)	263 (66.2)		
Anxiety				
Yes	1 (100)	0 (0.0)	1.95	0.16
No	134 (33.8)	263 (66.2)		

Table 4. Relationship between urinary incontinence and participants characteristics and clinical data

Variable	UI present	Absent	χ2	p-value
	No (%)	No (%)		
Liver disorder				
Yes	0 (0.0)	2 (100)	1.03	0.31
No	135 (34.1)	261 (65.9)		
SLE				
Yes	1 (100)	0 (0.0)	1.95	0.16
No	134 (33.8)	263 (66.2)		
Renal stone				
Yes	1 (33.3)	2 (66.7)	0.001	0.98
No	134 (33.9)	261 (66.1)		
Parity				
< 5 children	25 (29.4)	60 (70.6)	4.98	0.08
> 5 children	109 (36.2)	192 (63.8)		
Nulliparity	1 (8.3)	11 (91.7)		
Mode of delivery				
Vaginal	95 (36.3)	167 (63.7)	1.7	0.42
CS	30 (29.7)	71 (70.3)		
Both	7 (41.2)	10 (58.8)		
BMI				
Body weight deficit	20 (44.5)	25 (55.6)	8.36	0.13
Normal weight	32 (38.1)	52 (61.9)		
Over weight	54 (33.8)	106 (66.3)		
1st degree obesity	26 (30.6)	59 (69.4)		
2nd degree	3 (13.6)	19 (86.4)		
3rd degree	0 (0.0)	2 (100)		
Surgeries				
Yes	72 (34)	140 (66)	0.001	0.98
No	63 (33.9)	123 (63.1)		
Neuropathy				
Yes	101 (38.4)	162 (61.6)	6.95	0.008
No	34 (25.2)	101 (74.8)		
Retinopathy				
Yes	74 (37)	126 (63)	1.7	0.19
No	61 (30.8)	137 (69.2)		
Nephropathy				
Yes	11 (33.3)	22 (66.7)	0.006	0.94
No	124 (34)	241 (66)		

Table 5. Relationship between urinary incontinence and participants characteristics and clinical data

Variable	UI present	UI absent	Test*	p-value
	No (%)	No (%)		
HbA1	9.94 ± 2.1	8.86 ± 2.17	2.93	0.003
Diabetes duration	14.67 ± 8.45	13.1 ± 8.52	1.74	0.08
No. vaginal deliveries	8.39 ± 10.85	6.57 ± 3.32	1.65	0.09
No. CS	0.49 ± 0.98	0.58 ± 1.03	1.01	0.3
FBG	10.53 ± 4.4	9.8 ± 5.51	2.24	0.02

N.B.: Mann-Whitney test*

Table 6. Binary logistic regression analysis of UI independent predictors

Variable	B	Wald	p-value
Age	0.75	4.87	0.02
Diabetes type	1.17	2.23	0.13
Presence of ovarian cyst	9.7	15.56	0.99
Neuropathy	20.7	2.96	0.08
HbA1c	0.15	6.2	0.01
FBG	0.01	0.33	0.56

Discussion

This study aimed at estimating the prevalence and risk factors for UI among diabetic women who attended the PHCCs in Taif city, Saudi Arabia. The study included a total of 398 participants. The overall prevalence of UI in the present study was 34%, a figure that is lower than that found in a similar study conducted in Palestine (34% versus 43.2%) (19).

At the same time the observed prevalence in the present study is also lower than that revealed from studies done on diabetic women in Jordan (44%) (20) and Turkey (41%) (21), United Arab Emirates (63%) (4) and Kuwait (95.2%) (22). At the same time this prevalence is also lower than that reported in a national study done in Jazan city, Saudi Arabia where the prevalence was (44.2%) (18). The higher prevalence of UI reported in the Jazan study could be explained by including all healthy women in childbearing age. This observed variability in results done across countries could be attributed to many factors such as the difference in study design, study population, sample size, variation in UI definition, different inclusion criteria, different settings and data collection tools.

Age was found to be associated to decreased elasticity and capacity of the bladder, decreased sensation, detrusor muscle mass causing UI (23). In this study participants with an age ≥ 50 years had an increased risk of having UI. The same result was found in previous studies (4,20,21). Results from 2 studies that took place in Saudi Arabia agreed with ours where in the first one 66.3% of female whose ages were 50 years and above were UI patients (18) and in the second female UI was found to be more prevalent among older women (17). Women over the age of 45 years were 3.8 times as likely to report UI than those who were younger according to a study in Kuwait (24).

DM type 2 was found to be a risk factor of UI in this work. This was explained by the microvascular damage to bladder innervations and urethral sphincter, in addition to sphincter dysfunction, bladder instability, urinary retention, and elevated postvoid residual urine volume that leads to an overflow of UI (25,26), as shown in Table 3 which links diabetes as a significant risk factor for UI in females. The results of a study that was conducted in Jeddah, Saudi Arabia on the prevalence of urinary incontinence in females, risk factors and barriers to health seeking classified diabetes as a risk factor for UI as 60 out of the 379 females interviewed (15.8%) had diabetes mellitus (17). An opposite finding was present in a previous study, where diabetes was not a risk factor for UI (27).

Another risk factor for UI among the studied participants was UTI. The same result was found in previous studies (17,19). A study on the incidence and risk factors of urinary incontinence in women visiting family health centers in Turkey agreed with ours that urogenital infection had a significant correlation with UI and that to eliminate the negative effects of UI on quality of life it is essential to focus on the prevention of UI's risk factors such as urogenital infection (27). A history of recurrent UTIs was found to be the main risk factor and predictor of UI amongst the diabetic women and tripled the risk of UI in a Palestinian study (19) and other studies (17,18,24).

This study found that a non-significant difference was present between UI and participants' parity. This finding disagrees with a previous study where women who had more than 5 children had a higher risk of having UI (17). It also disagrees with the study done by Kılıç, 2016, where the number of children, the duration of deliveries and POP were the most significant risk factors for UI (27).

In the present work, 12.6% of females having UI suffered leakage related to urgency. A previous study found that 31.8 % of UI was of the urgency type (27). Another study found that most of the participants had a small amount of urinary leakage (28).

In the last four weeks, 48.9%, 25.9%, 6,7%, 12.6% and 34.1% of studied women in this study had frequent urination, urine leakage drops, difficulty in urinating or emptying, pain or discomfort in lower abdomen, leakage related to urgency, and leakage related to physical activity respectively. Among them, 11.1%, 11.9%, 12,6%. 19.3%, 15.6%, 19.3%, and 20.7% suffered effects of UI on the ability to do household chores, physical recreation, entertaining activities, ability to travel in car or bus more than 30 minutes, participation in social activities outside, emotional health, and feeling frustrated respectively. This result agrees with that found in another study, where only a small number of the patients were greatly bothered by the incontinence (19). This effect on daily life activities reported by the participants in the present study is somewhat lower than that observed in a study done by Ghafouri et al. (2014) (28) and Al-Badr et al (17) who found that the percentages of women who UI had a great effect on their daily life were 34 % and 49.8% respectively.

A non-significant relationship was found between smoking and UI (p=> 0.05). In agreement with this result is that revealed from another Saudi study where smoking was not a risk factors for UI (17). In contrast to our results is that reported by Donforth et al. where there was an association between smoking and UI (29).

In this study it was observed that patients suffering from diabetic neuropathy and those who had an ovarian cyst had a significantly higher percentage of UI. A study done in Palestinian women found that diabetic nephropathy and ovarian cysts were not risk factors for UI (19). The higher the HbA1C and FBG in diabetic patients in this study was associated with a higher risk of getting UI, a result that was observed in a study done in Jeddah (30).

A non-significant relationship was found between vaginal or CS deliveries and UI in the present study, while in Jazan's study, UI prevalence was significantly higher in females who delivered vaginally than who delivered via CS (18).

Limitations

Using a cross sectional study had the limitation of observing the relationship between studied variables without the detection of the cause-effect relationship.

Conclusions

The prevalence of UI among studied participants was 34%. Participants with an age ≥ 50 year, having DM type 2, UTI, Ovarian cyst, neuropathy, higher levels of HbA1 and FBG had a significantly higher percentage of those having UI. Binary logistic regression analysis found that participants' older age and high HbA1c level were independent predictors for UI. The study calls for health education of all diabetic women about UI. As this problem is often neglected, all diabetic women suffering UI should be targeted by the caring physician to be treated.

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The Side Effects of TICAGRELOR among Saudi Patients and comparison with conventional anti-platelet drug clopidogrel at Aseer Central Hospital, Southwest of Saudi Arabia

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Abstract

Background: P2Y12 platelet receptor inhibitors (i.e., clopidogrel, prasugrel and ticagrelor) Ticagrelor are an oral, reversible, direct-acting inhibitor of the adenosine diphosphate receptor P2Y12 that has a more rapid onset and more pronounced platelet inhibition than clopidogrel. The P2Y12 platelet receptor inhibitors are the cornerstone of treatment of ACS patients. The common adverse effects include upper gastrointestinal (GI) bleeding, ecchymosis, haematuria, epistaxis, and possibility of ticagrelor-induced Thrombotic thrombocytopenia purpura (TTP).

Aim: This study was conducted to determine the incidence of dyspnoea and/or bleeding as side effects of ticagrelor and compare it with commonly used P2Y12 platelet receptor inhibitors, clopidogrel.

Methods: A record based retrospective cohort study was conducted including all patients using ticagrelor or clopidogrel for clinical indications attending The Cardiology Outpatient Clinics at Aseer Central Hospital. Patients were classified into cohorts based on type of drug received. Patients' files were prospectively reviewed to extract data. Data were extracted using pre-structured data extraction format to avoid errors, missing and inter rater bias.

Results: The study included 200 patients; 100 (50%) received PLAVIX (clopidogrel) medication (group 1) and 100 (50%) received BRILINTA (ticagrelor) medication (group 2). Exactly 38% of group 1 cases aged 60 years or more were compared to 39% of group 2 patients with no statistical significance. As for gender, 58 (58%) of group 1 cases were males in comparison to 89 (89%) of group 2 cases (P=.001). Also, 18% of group 1 cases were smokers compared to 32.1% of group 2 cases (P=.026). Hypertension was reported among 46% of group 1 cases compared to 56% of group 2 patients (P=.179). Also, hypercholesterolemia was detected among 29% of group 1 cases compared to 41.7% of group 2 (P=.072). Considering DM, it was diagnosed among 50% of group 1 patients in comparison to 51% of group 2 patients (P=.872). History of bleeding was reported among 9 cases of group 1 compared to 5 cases in group 2 (P=.437).

Conclusion: A significant number of patients who were started on ticagrelor develop dyspnoea but not compromising the therapeutic superiority of the drug as compared to clopidogrel and can be replaced as first line drug in the Saudi population. Other side effect profiles of ticagrelor are comparable to conventional anti platelet drugs with no significant statistical variability.

Key words: TICAGRELOR, P2Y12 platelet receptor inhibitors, side effects, adverse events, MI, ACS

Background

Anti-platelet therapy is a cornerstone component of treatment of acute coronary syndrome (ACS). It has been well acknowledged that development of ACS has a strong link to platelet aggregation, hence standard treatment has been established with the use of dual anti-platelet therapy (DAPT) with P2Y12 receptor inhibitor and aspirin for ACS patients regardless of previous treatments such as medical management or percutaneous coronary intervention (PCI) [1,2]. The management strategies of ACS have evolved over recent decades with the development of more potent anti-platelet agents. Trials on ACS have shown the newer anti-platelets can more effectively reduce cardiovascular events. However, a narrow window between safety and efficacy, beyond which the risk of bleeding and other adverse effects can outweigh the benefits of anti-platelet therapy remains the major challenge and striking a balance between them remains a concern for clinicians. The common adverse effects of anti-platelet therapy include upper gastrointestinal bleeding, ecchymosis, haematuria, epistaxis and dyspnea. Aspirin and clopidogrel have been the mainstay of treatment for ACS for many years, however, a substantial number of ACS patients continue to experience recurrent ischemic events during DAPT with aspirin and clopidogrel. It has been reported that the platelet inhibitory effect of clopidogrel is diminished in patients who carry a genetic variant, loss-of-function CYP2C19 allele, due to significantly lower levels of the active metabolite of clopidogrel [3], leading to developing more potent anti-platelet agents for ACS. Currently, a new generation P2Y12 inhibitors including ticagrelor and prasugrel have replaced clopidogrel as first-line anti-platelet agents for ACS treatment, but the risks of bleeding and other adverse effects have been reported with more potent anti-platelet agents, especially in elderly patients [4]. And these adverse effects need a detailed clinical review and research to make sure the benefit and adverse effect balance is equalized for a better outcome. The common adverse effects include upper gastrointestinal (GI) bleeding, ecchymosis, haematuria, epistaxis and dyspnea. Among the newer anti platelets ticagrelor is a direct-acting oral antagonist of P2Y12-adenosine diphosphate (ADP) receptor blocker, does not have catabolite activation pathway and has reversibility as compared to clopidogrel making its action faster and with greater platelet inhibition than clopidogrel [5,6]. Ticagrelor proved to have more beneficial outcomes in reversible long-term P2Y12 inhibition than clopidogrel in the total death, cardiovascular prevention, stent thrombosis as well as myocardial infarction without increasing the major bleeding rates in a wide ACS patient population, according to the Phase III PLATO (Platelet Inhibition and Patient Outcomes) trial [7]. Based on these outcomes several trials and cardiological associations suggest that ticagrelor could be a valid replacement and associated with superior effects over clopidogrel for P2Y12 inhibition in ACS patients [8,9]. Earlier studies have been published for the assessment of safety and efficacy of ticagrelor versus clopidogrel in ACS patients Nevertheless, given the differences of genetic backgrounds, comorbidities, disease patterns, and demographics, patients tend to show various prognostic results with uncertain bleed-ing risk [10,11]. Keeping these things in mind and along with previous scarce data on safety profile of these anti platelet drugs in the Saudi population a lot of inpatient based and population based studies need to be done especially after a few studies show a high rate of clopidogrel in-vitro nonresponse among the Saudi population undergoing coronary angiography as shown by a population based study showing two-thirds of our patients undergoing coronary angiography were clopidogrel non-responders [12].

Aims and Objectives

1- Determine the incidence of major side effects bleeding and dyspnea of ticagrelor and compare it with commonly used P2Y12 platelet receptor inhibitors, clopidogrel.
2- To compare our findings with the internationally published data.
3- To assess knowledge towards the side effects of ticagrelor among Saudi patient users of ticagrelor in Abha city, Saudi Arabia.

Methodology

A record based retrospective cohort study was conducted including all patients using ticagrelor or clopidogrel for clinical indications attending the Cardiology Outpatient Clinics at Aseer Central Hospital, southwest of Saudi Arabia during the period from Dec 2019 to June 2020. Patients were classified into cohorts based on type of drug received with initial collection of personal data, clinical data, and drug use indications. Then, files for each cohort were explored retrospectively to assess reported side effects and laboratory findings. Data were extracted using pre-structured data extraction format to avoid errors, missing, and interrater bias. An oral consent from all participants was taken before being included in the study either directly or using mobile phone calls after confirming their data confidentiality.

INCLUSION CRITERIA:
Patients using ticagrelor or clopidogrel for clinical indications attending the Cardiology inpatient and Outpatient departments.

EXCLUSION CRITERIA:
Patients with history of recent surgery (major) and trauma (major), LVEF <45%, Significant valve lesions, Chronic lung diseases, Chronic liver disease, Chronic kidney disease (creatinine >2.0mg/dl) were excluded from the study.

Data analysis
After data were extracted, it was revised, coded, and fed to statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL). All statistical analysis was done using two tailed tests. P value less than 0.05 was statistically significant. Comparative analysis between study cohorts was done for all variables including patient's

bio-demographic data, drug indications, and complications and was used based on cross tabulation. Significance of relations in cross tabulation was tested using Pearson chi-square test for categorical parameters while scale variables (laboratory investigations and ECHO) were compared using independent samples t-test. To control for smoking as confounder for relation between type of drug and developing shortness of breath, stratified analysis was done with estimating magnitude of relation with each stratum (smokers and non-smokers) based on Odds ratio with 95% confidence interval.

Results

The study included 200 patients; 100 (50%) received PLAVIX (clopidogrel) medication (group 1) and 100 (50%) received BRILINTA (ticagrelor) medication (group 2). Exactly 38% of group 1 cases aged 60 years or more were compared to 39% of group 2 patients with no statistical significance. As for gender, 58 (58%) of group 1 cases were males in comparison to 89 (89%) of group 2 cases (P=.001). Also, 18% of group 1 cases were smokers compared to 32.1% of group 2 cases (P=.026). Hypertension was reported among 46% of group 1 cases compared to 56% of group 2 patients (P=.179). Also, hypercholesteremia was detected among 29% of group 1 cases compared to 41.7% of group 2 (P=.072). Considering DM, it was diagnosed among 50% of group 1 patients in comparison to 51% of group 2 patients (P=.872). History of bleeding was reported among 9 cases of group 1 compared to 5 cases in group 2 (P=.437). Considering indications of drug use, the most reported among group 1 patients who received PLAVIX were MI (51%), ACS (22%), and unstable angina (11%). The most reported indications among group 2 patients who received BRILINTA were MI (53.6%) followed by ACS (17.9%), and HF (8.3%) (Table 1).

Table 2 illustrates drug use associated complications among study groups. Exactly 5 patients (5%) of group 1 had bleeding in comparison to 3 cases (3%) of group 2 patients with no recorded statistical significance (P=.355). The most reported source of bleeding among group 1 cases were epistaxis (3 cases), hemoptysis (1 case), and wound (1 case). The most reported among group 2 patients were epistaxis (1 case) and punctured wound (1 case). Shortness in breath was reported among 10 patients in group 1 (10%) compared to 22 (22%) of group 2 patients with recorded statiscal significance (P=0.032). Orthopnea was diagnosed among 9 cases of group 1 compared to 6 cases in group 2 (P=.674) while 7 cases in group 1 had PND compared to 6 cases in group 2 (P=.447).

Table 3 demonstrates association of shortness of breath by study groups according to smoking status. Among smokers, BRILINTA drug intake was significantly associated with 4 fold more likelihood for developing shortness of breath compared to PLAVIX drug (OR=4.1; 95% CI: 1.1-30.6; P=.046). Among non-smokers, the likelihood was decreased to twice fold with no statistical significance (OR=2.1; 95% CI: 0.53-26.7; P=.219).

Table 4 shows laboratory findings among study groups. LDL was insignificantly higher among group 2 patients compared to group 1 (126.2 vs. 114.8, respectively; P=.425). HDL was insignificantly higher among group 1 patients compared to group 2 (41.7 vs. 38.1, respectively; P=.307). Magnesium level was nearly the same among the two groups (mean value of 2 for both). Random blood sugar (RBS) was insignificantly higher among group 1 than group 2 (190.3 and 144.3, respectively; P=.116).

Discussion

Our study was performed with a purpose of data collection and population based formulation of anti-platelet drug therapy in acute coronary syndrome and confirming the drug profile of ticagrelor along with the adverse effects of the drug on the Saudi population as was needed because of documentation of higher clopidogrel non responders in the Saudi population Haitham I. Sakr et al [12]. Since the PLATO trial [7] has clearly shown treatment with ticagrelor as compared to clopidogrel in patients of acute coronary syndrome significantly reduced the rate of death from vascular causes, MI, and these therapeutic effects were achieved without increase in the rate of major bleeding as was demonstrated in our study we documented the incidence of bleeding in our study group was around 3% of patients who had bleeding diathesis as compared to 5% in clopidogrel, with no statistically significance most reported source of bleeding being epistaxis in both groups , our results were in accordance with the PLATO trial as well as seen by Husted S, et al [7]. In our study we also concentrated on the much discussed adverse effect of Ticagrelor associated dyspnoea which was seen in 22% of patients taking ticagrelor as compared to clopidogrel where only 10% the findings were statistically significant and usually patients developed dyspnea in the first week of starting the drug our findings coincided with findings by Cannon CP et al [13]. While drug substitution and discontinuation of ticagrelor because of drug associated dyspnea was seen in 1% of patients, as the adverse effect is pronounced further therapeutic monitoring and relation of dyspnoea with the drug plasma concentration needs to be done in the Saudi population. Ruling out other causes of dyspnoea in these patients vis a vis heart failure, respiratory causes and other systemic disease was done and we went a step further and close review demonstrated the incidence of dyspnoea increased four fold in smokers taking ticagrelor as compared to smokers taking clopidogrel with an odds ratio of 4.1 and statistically significant p value as also seen by Parodi G et al [14]. Our study had a par-allel relation with the PLATO trial hence giving a complementary data to further validate the trial especially in the Saudi Arabian population regarding the adverse effect comparison arm of the original trials. Further studies are still needed at tertiary care level to find the risk factors associated with a slightly higher percentage of dyspnoea in the Saudi population on ticagrelor.

Table 1. Bio-demographic data of study groups

Bio-demographic data		Group				P-value
		PLAVIX		BRILINTA		
		No	%	No	%	
Age in years	< 50 Yrs.	23	23.0%	22	22%	.984
	50-60	39	39.0%	38	38%	
	> 60 Yrs.	38	38.0%	39	39%	
Gender	Male	58	58.0%	89	89%	.001*
	Female	42	42.0%	11	11%	
Smoking	Yes	18	18.0%	32	32%	.026*
	No	82	82.0%	68	68%	
Hypertension	Yes	46	46.0%	56	56.0%	.179
	No	54	54.0%	44	44.0%	
Hypercholesterolemia	Yes	29	29.0%	42	42%	.072
	No	71	71.0%	58	58%	
DM	Yes	50	50.0%	51	51%	.872
	No	50	50.0%	49	49%	
History of chronic lung disease	Yes	0	0.0%	2	2%	.121
	No	100	100.0%	97	97%	
History of bleeding	Yes	9	9.0%	6	6.0%	.437
	No	91	91.0%	94	94.0%	
Indications of use	ACS	22	22.0%	18	18%	.061#
	HF	5	5.0%	8	8%	
	IHD	2	2.0%	7	7.%	
	MI	51	51.0%	54	54%	
	No	3	3.0%	2	2%	
	NSTEMI	0	0.0%	4	4%	
	S/P PCI TO LAD	3	3.0%	0	0.0%	
	STABLE ANGINA	2	2.0%	0	0.0%	
	STEMI	1	1.0%	2	2%	
	UNSTABLE ANGINA	11	11.0%	3	3%	

P: Pearson X^2 test; #: P: Exact probability test; * P < 0.05 (significant)

Table 2: Drug use associated complications among study groups

Associated Complications	Group				P-value
	PLAVIX		BRILINTA		
	No	%	No	%	
Suffered bleeding	5	5.0%	3	3%	.355
Source of bleeding					
HEMOPTYSIS	1	20.0%	0	0.0%	
EPIXTAXIS	3	60.0%	1	50.0%	.344
PUNCTURED WOUND	0	0.0%	1	50.0%	
WOUND	1	20.0%	0	0.0%	
Shortness in breath	10	10%	22	22%	.032*
Orthopnea	9	9.0%	7	7%	.674
PND	7	7.0%	6	6.0%	.447
ECHO (Mean ± SD)	43.6 ± 12.0		47.1 ± 12.6		.066 $

P: Exact probability test; $: independent t-test; * P < 0.05 (significant)

Table 3. Association of shortness of breath by study groups according to smoking statu

Group	Shortness in breath				OR (95% CI)
	Yes		No		
	No	%	No	%	
PLAVIX	1	1.0%	18	100.0 %	ref
BRILINTA	7	18.5%	22	81.5%	4.1 (1.1-30.6) *
PLAVIX	9	12.2%	72	87.8%	ref
BRILINTA	13	22.8%	44	77.2%	2.1 (0.53-26.7)

OR: Odds ratio CI: Confidence interval * P < 0.05 (significant)

Table 4. Laboratory findings among study groups

Group	Shortness in breath				OR (95% CI)
	Yes		No		
	No	%	No	%	
PLAVIX	1	1.0%	18	100.0 %	ref
BRILINTA	7	18.5%	22	81.5%	4.1 (1.1-30.6) *
PLAVIX	9	12.2%	72	87.8%	ref
BRILINTA	13	22.8%	44	77.2%	2.1 (0.53-26.7)

P: independent t-test

Conclusion

At the end of this retrospective registry-based study we came to a conclusion that

1. A significant number of patients who are started on ticagrelor develop Dyspnoea but not com-promising the therapeutic superiority of the drug as compared to clopidogrel and can be replaced as first line drug in the Saudi population
2. Our study gives a complimentary validation of the PLATO trial regarding adverse effects of the drug in comparison with clopidrogel in the Saudi population
3. Further studies need to be commenced in various tertiary care settings in the Kingdom of Saudi Arabia to formulate the risk factors in development of adverse effects of Ticagrelor in patients.
4. Other side effect profiles of ticagrelor are comparable to conventional anti platelet drugs with no significant statistical variability.

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Nephrectomy indications from a Tertiary Care Center in Abha, Saudi Arabia: The implications of the paradigm shift

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Abstract

Objectives: The study aims to evaluate if there are changing trends in the indications of nephrectomy in Aseer Central Hospital over the last two decades.

Methods: In a retrospective approach, all patients who underwent nephrectomy from January 2008 to December 2017 in our institute were enrolled. Data were reviewed with regards to clinical presentation, nephrectomy indication, and histopathological report. The results were compared with another study done in the same institute 20 years earlier.

Results: During the 10-year study period, the total number of nephrectomies performed in our institute were 115 cases. The mean age ± S.D. (years) (51.45 ±18.5). 69 (60%) were male and 46 (40%) were female. Flank pain and hematuria were the commonest presentation of 63 (55%) and 31 (27%), respectively. 105 patients (91%) underwent total nephrectomy while 10 patients (9%) underwent partial nephrectomy. Laparoscopic and robotic approach were used in 10 (9%) and 7 (6%) patients, respectively. Non-functioning kidney was the main indication of nephrectomy in 46 patients (40%). Renal cell carcinoma (RCC), however, was the second main indication in 43 patients (37%). All results were compared with the other study done twenty years ago in the same institute.

Conclusion: Although, the non-functioning kidney is still the leading indication of nephrectomy in this series, RCC cases have significantly increased to almost four times what was being reported from this institute over twenty years ago. This mandates immediate and long term health policy planning to address this shift.

Key words: Benign, Indications, Nephrectomy, Renal Tumors, Robotic assisted partial nephrectomy.

Introduction

Kidney can be affected by both neoplastic and non-neoplastic conditions that require nephrectomy. Gustav Simon, in 1869 and 1870, performed planned nephrectomy for urinary fistula and partial nephrectomy for hydronephrosis respectively(1). Non-neoplastic lesions are seen in 90% of nephrectomy specimens removed(2). The first report of transperitoneal laparoscopic nephrectomy was presented by clayman RV et al.(3) in 1991 and retroperitoneal approach using a dissecting balloon was reported by Gaur et al.(4) in 1993. Laparoscopy has emerged as the standard of care for benign renal disease requiring surgical intervention.

In the genitourinary tract, kidney cancer serves as renowned neoplasms and is considered as one of the most common types of cancer among certain patients. Alkhateeb SS et al.(5) indicated that the treatment and diagnosis of the given problem is entirely dependent on the analysis of the cancer stages which includes primary and secondary stages. The first involves the primary tumor and regional lymph node, while later involves metastasis and distant metastasis. The study further illustrated some of the major symptoms that are associated with the given problem including old age, gender, increased blood pressure, diabetes mellitus, smoking, unhealthy diet along with the medical history of any such disease.

The advancement of modern imaging and surgical technologies have provided greater benefits to medical expertise. These techniques, therefore, boosted valuable and greater patient outcomes (6,7). Robotic assisted partial nephrectomy (RPN) technique of treating kidney cancers has gained high level attention in comparison to laparoscopic partial nephrectomy (LPN). This has changed the trends of providing previously established treatments. Seyam et al. illustrated that the RPN serves greater advantages in different surgical dimensions of warm ischemia time (WIT), surgical boundaries, time duration of hospital stay, and other issues related to the perioperative complications (8).

We observed an increased incidence of renal tumors in the last few years. The objective of this study is to determine whether there is changing trends in nephrectomy indications over two periodical intervals in our institute or not. The study will highlight the presentation and different techniques that are routinely performed in Aseer central Hospital, Abha, Saudi Arabia. Furthermore, it should entail adopting recommendations for future healthcare and training plans in our institute.

Methods

A retrospective design was followed in the given study. Medical records of all adult patients who underwent nephrectomy over a ten years period from January 2008 to December 2017 were reviewed. Data extracted included sex, age, clinical presentation, indication for nephrectomy, histopathological report, the surgical approaches, complications and the outcome of our study cohort patients were evaluated.

All adult nephrectomy cases done in our institute over the last ten years were enrolled in this study. The outcome results from this current study are compared with another study done in our institute in the interval between 1987 and 1995.

The data were analyzed using frequency/percentage analysis for the descriptive data. Paired t-test and Chi-square tests were used to compare the variables between the two studies as appropriate. P-value ≤ 0.05 was considered of a statistical significance. IBM Statistical Package for the Social Sciences (SPSS) for Windows (Version 22.0) was used in the analysis.

Results

During the 10-year study period, the total numbers of nephrectomies performed in our institute were 115 adult cases. 69 (60%) patients were males and 46 (40%) were females with a male: female ratio 1.5: 1.0. Flank pain and hematuria were the commonest presentation of 63 (55%) and 31 (27%) patients in this cohort, respectively. Incidental renal tumor, however, was the finding in 9 (9%) patients of the study group. Other symptoms were the presentation in 12 (10%) patients. 105 (91%) patients underwent total nephrectomy while 10 (9%) patients underwent partial nephrectomy. After introduction of the laparoscopy to the institute, it was the mode of therapy in 14 (12%) patients and robotic assisted nephrectomy approach was used in 3 (2.6%) patients. The overall complications were about 5% and were all minor and were managed conservatively. Fortunately, no surgery related death was reported in the whole series (Table 1).

Non-functioning kidney was the main indication of nephrectomy in 46 (40%) patients. Renal cell carcinoma (RCC) was the second leading indication in 43 (37%) patients. Other malignant non-RCC was the diagnosis in 3 (3%) patients. Benign renal tumors were, however, seen only in 7 (6%) patients. 5 (4%) patients had shattered kidney secondary to road traffic accidents-imposed nephrectomy. Other rare indications of nephrectomy were infectious conditions like emphysematous pyelonephritis, transplant nephrectomy for chronic rejection and renal artery aneurysm rupture with retroperitoneal hematoma. They were reported collectively in 11 (9%) patients in this study as illustrated in (Table 2).

Table 1: Demographic and operative parameters of patients in the two studies from our institute

The study interval	The current study (2008- 2017)	El Fadil et al. study (1987- 1995)	p-value
Total No. of nephrectomies	115	85	
Mean age ±S.D (years)	51.45 ±18.5	44 ±16	0.08057
Sex			
Male	69 (60%)	56 (66%)	
Female	46 (40%)	29 (34%)	0.242
M/F ratio	1.5:1.0	1.9:1.0	
Presentation:			
Flank pain	63 (55%)	59 (69%)	0.0454*
Hematuria	31 (27%)	14 (17%)	0.09
Incidental	9 (9%)	Not identified	-
Others	12 (10%)	12 (14%)	0.38
Operative procedure:			
Total	105 (91%)	85 (100%)	
Partial	10 (9%)	0 (00%)	0.003*
Laparoscopic	14 (12%)	0 (00%)	
Robotic	3 (2.6%)	0 (00%)	-
Complications:			
Wound infection	4 (3%)	3 (3.5%)	0.84
Pulmonary embolism	2 (1.7%)	1 (1.2%)	0.77
Hemorrhage	1 (0.9%)	1 (1.2%)	0.83
Death	0 (00%)	2 (2.3%)	-

* Significant at 95%

Table 2: The indications of the nephrectomy in the two studies

Results of histopathology	The current Study (115 cases)	Elfadil et al. Study (88 cases)	p-value
Non-functioning kidney	46 (40%)	69 (78%)	0.05*
RCC	43 (37%)	11 (13%)	0.001*
Non-RCC: malignant	3 (3%)	8 (9%)	0.12
Benign renal masses	7 (6%)	Not identified	----------
Shattered kidney RTA	5 (4%)	Not identified	----------
Others	11 (9%)	Not identified	----------

* Significant at 95%

Discussion

Nephrectomy is done for both benign and malignant lesions of the kidney. Recent advances in early diagnosis and management of renal disease have miraculously reduced the number of nephrectomies performed for renal diseases in general and for benign renal diseases in particular(9-11). In the modern era, minimally invasive surgery has become the standard treatment for most of the urological pathologies(12). The laparoscopic approach to nephrectomy gained widespread acceptance both in the urologic and surgical procedures (13). In fact, laparoscopic partial nephrectomy represents the standard of care for small low stage renal cell carcinoma (14).

In this study, 115 adult nephrectomies were performed in the institute over a 10 year-interval. Even though the nonfunctioning kidney is the foremost indication of nephrectomy in 46 (40%) patients in this series, it has been noticed, especially in the last five years to be an increase in the incidence of renal tumors that are diagnosed. Out of 54 solid renal masses, 43 (37%) with renal cell carcinoma (RCC) have undergone nephrectomy. This is in contrast to what has been reported by El Fadil et al.(15) twenty years ago from the same institute. They reported only 11 (13%) RCC cases in their series which is almost a quarter the incidence of this study' findings [Table 2]. This significant increase in RCC diagnosis in the current study is basically attributed to the routine use of ultrasound in recent years. This has increased the incidental discovery of low stage renal cell carcinoma with a favorable overall prognosis. This routine use of imaging was not feasible twenty years ago. This presumption was supported by multiple studies that noticed an increase in the incidental renal tumor's diagnosis (16,17).

Another significant observation in our results was the emerging and evolving established minimally invasive procedure services in our institute over the last five years. A total of 14 (12%) and 3 (2.6%) patients underwent laparoscopic and robotic-assisted nephrectomy, respectively. Partial nephrectomy was done in 10 (9%) patients in the series. Twenty years ago, during Elfadil et al.'s study, all these minimal invasive nephrectomy procedures were not feasible. Regarding the complications, there were no major life-threatening complications reported in the study. All complications were managed conservatively.

The benign renal tumors like oncocytoma, angiomyolipoma and cortical adenoma in the current series were in 7 (6%) patients. This is essentially similar to the incidence being reported from regional and worldwide series (18,19). The incidence of benign tumor in El Fadil et al. (15) series, however, was not reported.

In reviewing the overall indications of nephrectomy, studies show variations regarding the indications for nephrectomy. A study from Akmal, Mirza and Murtaza(20) and Eke and Echem(21) found radical nephrectomy for malignant renal tumors constituted an approximate ratio of 53.3% and 67%, respectively. Zelhof et al.(22) provided data according to which overall 1,093 nephrectomies were undertaken, from which few were related to the cases of benign conditions while the majority of them were dedicated to non-functioning kidneys. In another review of 47 nephrectomies from Karachi,(23) 52% were for stone-related etiology and 26% were for tumors. These studies are thus supporting an observed regional variation in the indications for nephrectomies. The socioeconomic condition and availability of health care facilities are probably the main factors behind this variation.

This observed paradigm shift is affirmed and supported by other studies from other worldwide centers. It is not only geographical interval variations but a time interval variation, too. In a large US-population renal tumors data review, SEER cancer review found that the incidence of RCC has increased in recent decades almost 3% annually from 1975 to 2007 (24). This RCC incidence increase is multifactorial. It is potentially in large due to increased use of imaging modalities. Another study from Riyadh Saudi Arabia by Alkhateeb et al.(5) found an increasing incidence of kidney cancer patients over the last two decades. Another study by Gupta et al.(25) in a comparative study found an increase of incidental renal tumor from (10.67%) to (27.63%) over a 20 years interval ($P = 0.001$). So, renal tumors with lower stage and grade have led to a surge in laparoscopic and open nephron sparing surgeries. Our center proudly has started these minimal invasive approaches and is perusing training to the junior urologists to adopt these evolving techniques.

This study has certain limitations. It is a retrospective review with possible selection and methodology bias. The second limitation of our study is that the overall survival was not addressed in this study. This is because of the heterogeneity of our sample. The study sample was not only for pure malignant cases to measure overall and cancer-free survival. It is rather mixed benign and malignant renal disorders making the survival estimates unlogic.

Conclusion

Though nonfunctioning kidney is the leading indication of nephrectomy in our series, renal tumors are a leaping indication of nephrectomy in recent years. This significant paradigm shift urges immediate and long-term health planning for this uprising issue. Increasing the awareness of healthcare givers through conferences and workshops is compelling. Furthermore, an increase in laparoscopic training is recommended for the young urologists to promote their expertise with nephron-sparing surgeries as they are the evolving standard of care for patients with such conditions.

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The effectiveness of alcohol swab in umbilical cord care in Taif city, Saudi Arabia

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Abstract

Background: Many neonatal deaths are caused by infections that may be caused by the newly cut umbilical cord stump.

Objectives: To assess the relationship between using alcohol swab cleaning of umbilical cord and the time of healing of the umbilicus till cord separation and associated complications.

Methods: A cross sectional study was done on 620 Saudi children from Taif city, Saudi Arabia. A checklist was used that included items to collect data about the children's gender, current age, place of delivery, umbilical cord status, catheter use, umbilical cord color, umbilical discharge, skin around cord, materials used for umbilical cord care, frequency of care, time of separation of the cord and source of information for mother about cord care.

Results: 91.9% of studied children had an intact umbilical cord, 9% of children had an umbilical discharge, and 69.2% had a cord separation within a week. A significant higher percentage of mothers who reported that their children had an intact umbilical cord were using Chlorhexidine for cord care, and a significant high percentage of those who had a cord discharge were treated with a medical powder. Umbilical cord care by alcohol had a significant higher percentage of time of separation, within days, compared to other modalities.

Conclusion: Further studies that include a larger sample of children is required, and health educational programs regarding umbilical cord directed to pregnant mothers during antenatal visits is needed.

Key words: Effectiveness, Alcohol swab, Umbilical, Care, Taif.

Introduction

The umbilical cord (UC) is the tube that connects an unborn baby to its mother, through which it receives oxygen and food. The fully developed umbilical cord normally contains two umbilical arteries (1). After the birth of the fetus, the doctor cuts the umbilical cord during the third stage of labor, and makes sure to cut the umbilical cord carefully, while taking care not to tighten the rope (1). There will be residue of umbilical cord on the newborn, which is supposed to be separated after drying and healing in 5 to 15 days one month later, if the umbilical cord stump does not fall, it will cause several complications (1,2).

The care of umbilical cord is done through variable antiseptic powders and solutions. The most frequently used powders are zinc oxide, talcum, starch, alum, hexachlorophene, and chlorhexidine, while the most commonly used solutions are alcohol, triple sulfa, tincture of iodine, silver sulfadiazine, and chlorhexidine (3). However, there is no agreement over the most effective agent for cord care. The World Health Organization recommended dry cord care, while there are great disagreements about this method (2). Cleaning and drying the stump (UC) of the newborn by the antiseptic agent after birth has been abandoned by many neonatal units in support of dry cord care (1).

An Egyptian study done in 2005 showed that the incidence of cord infection was significantly lower in the natural drying group with no signs of systemic illness, while there was increase of bacterial colonization in the alcohol group (44%) (8). The mean time of cord separation was longer in the alcohol group (6.4 +/- 2.4 days), as compared with the natural drying group (4.7 +/- 1.9 days) and traditional methods group (3.4 +/- 0.7 days) (4). An Iranian study was done in 2009 to compare cord bacterial colonization and cord separation time among newborns whose cords were treated with alcohol 70% versus dry cord care. The study found no significant correlation between separation time of umbilical cord and the two methods of the care. Based on that study, bacterial colonization was higher in the dry cord care group (5).

Another study done in 2013 found that the use of human milk as topical therapy can decrease separation time in neonates compared with other methods (6). A study was performed in India in 2013 to see the impact of chlorhexidine cleansing of the umbilical cord on cord separation time and neonatal mortality in comparison to dry cord care (7). The study found that among the chlorhexidine group, 71.42% of the babies, against only 47.14% in the control group had their cord fallen by the 9th day of life. The mean time to cord separation was 8.92 days in the chlorhexidine group vs 10.31 days in the dry care group (7). A study was carried out in Italy in 2015 to compare the occurrence of adverse events and time to cord separation among newborns treated with dry cord care versus 70% alcohol. The study identified that the dry cord care is an easy, straight-forward, and safe method of handling the umbilical cord in healthy newborn infants born in a high-income hospital setting (1). In a systematic review done in 2016, Chlorhexidine application to the cord was found to reduce the risk of neonatal mortality (8).

The only published study in the Kingdom of Saudi Arabia regarding this issue was a study done in 2006 in Abha city. The study found that infants in the alcohol group had a shorter time for cord separation compared to the Beniktol group and concluded that the use of alcohol is safe and cost-effective for cord care (9).

As studies dealing with umbilical cord care in KSA are limited, the aim of this study was to assess the relationship between using alcohol swab cleaning of umbilical stamp and the time of healing of the umbilicus till cord separation and complications related to it.

Methods

A cross sectional study was done from January to April 2020. The study settings were King Abdulaziz Specialist Hospital in Children's Hospital, and King Faisal Medical Complex in Taif. city, KSA. The inclusion criteria were Saudi new-born in nursery and NICU of the study settings, and the exclusion criteria were non-Saudi children.

Mothers of children in the study settings during the study period were included. The study sample was 620 children. The study instrument was a checklist that was prepared which included items to collect data about the children' gender, and age, place of delivery, UC status, catheter use, UC color, umbilical discharge, skin around cord, materials used for UC care, frequency of care, time of separation of the cord and source of information for mother about cord care.

Data analysis: Data analysis was performed by using SPSS version 24. Qualitative data was expressed as numbers and percentages and chi-squared test was used to determine the association between variables. Quantitative data was expressed as mean and standard deviation (Mean ± SD).

Results

Table 1 shows that 50.8% of the studied children were females, 79.5% had an age less than one year, and for 96.9% of their mothers the place of delivery was the hospital.

Table 2 shows that most of the studied children (91.9%) had an intact UC, 5.3% had a swollen one and 2.7% had omphalocele. Of them 97.4% had a UAC catheter. About half of children (50.5%) had a white cord color, 30.2% had a yellow/green one and 19.4% had a red one. Only 9% of children had an umbilical discharge, of those 42.9% had a yellow discharge and 33.9% had a red one. Most children (91.5%) had normal skin around cord and 34.7% of mothers reported that the frequency of the cords care daily is three times with a mean frequency of 2.81±0.96 times. According to the time of separation of the cord, most studied children (69.2%) had a cord separation within a week.

Figure 1 shows that most mothers (45.3%) reported their use of Chlorhexidine for cord care. And the source of information for mother about cord care was the family members among most of the participants (37.4%), followed by a physician (26.5%), and daily practice of cord care (18.9%) (Figure 2).

Table 3 shows that a significant difference was found between the type of umbilical cord care and status of the cord, as a high percentage of mothers who reported that their children had an intact umbilical cord were using Chlorhexidine for cord care (p=0.02).

Table 4 shows that a significant high percentage of those who had a cord discharge used a medical powder for cord care (23.1%), while only 11.4% of those cared by Chlorhexidine had a cord discharge (p=0.004).

Table 5 shows that umbilical cord care by alcohol had a significantly higher percentage of time to cord separation. within days (13.9%) compared to other modalities of care (p=< 0.05).

Table 1. Distribution of the studied participants according to place of delivery and their children's gender and age

Variable	No. (%)
Gender	
Male	305 (49.2)
female	315 (50.8)
Age	
Lessthan 1 year	493 (79.5)
1- ≤ 2 years	55 (8.9)
> 2 years	72 (11.6)
Place of delivery	
Hospital	601 (96.9)
home	19 (3.1)

Figure 1. Distribution of the studied children according to the type of umbilical cord care

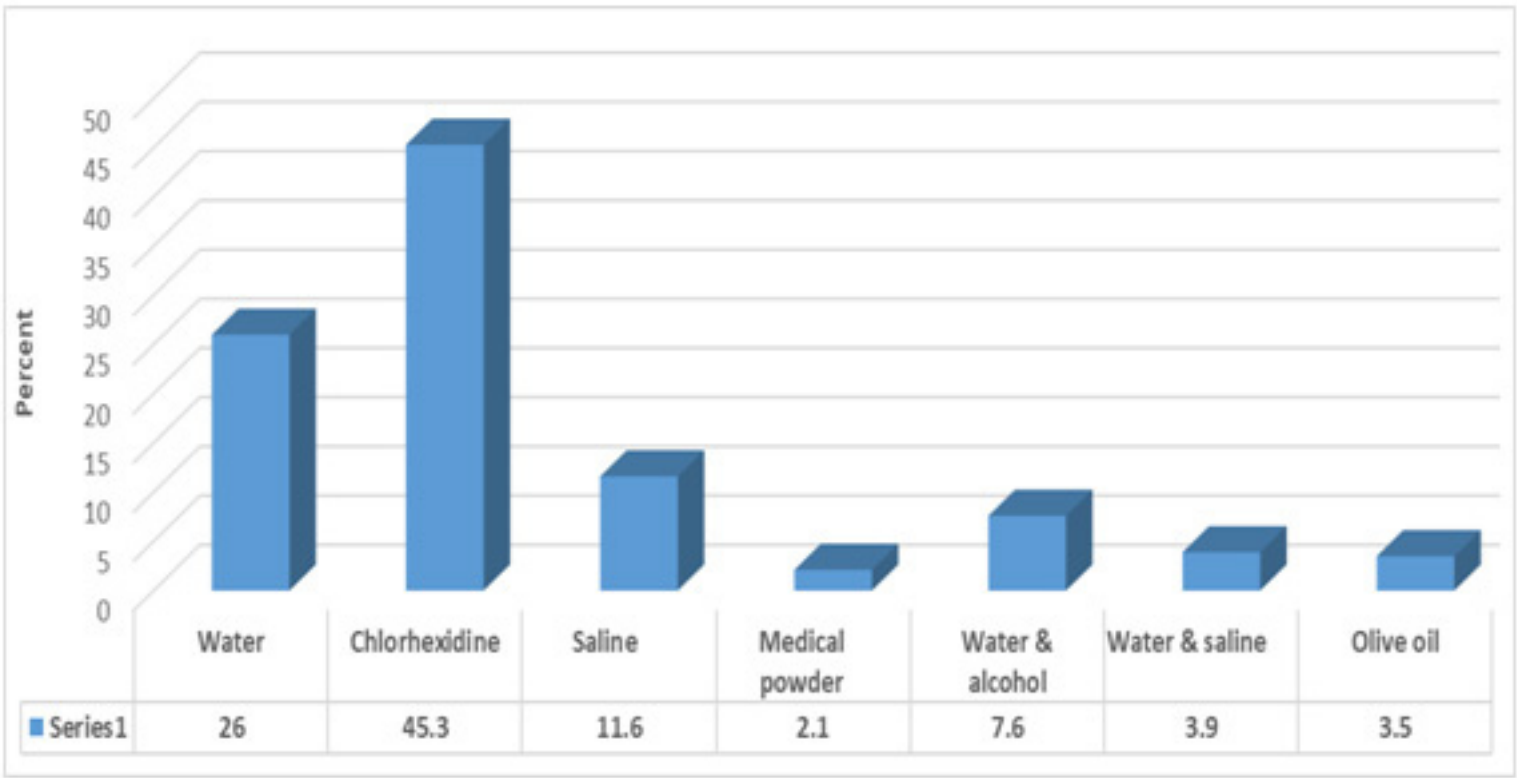

Table 2. Distribution of the studied participants according to conditions related the umbilical cord

Variable	No. (%)
Umbilical cord status	
Intact	570 (91.9)
Swollen	33 (5.3)
Visible intestine (omphalocele)	17(2.7)
Catheter inserted	
UVC	16 (2.6)
UAC	604 (97.4)
Cord color	
White	313 (50.5)
Yellow/Green	187 (30.2)
Red (hematoma)	120(19.4)
Presence of umbilical discharge	
Yes	56 (9)
No	564 (91)
Discharge color (No.: 56)	
Yellow	24 (42.9)
Red	19 (33.9)
White	6 (10.7)
Brown	7 (12.5)
Status of the cord	
Normal	567 (91.5)
Red (inflamed)	36 (5.8)
Indurated (swollen)	17(2.7)
Frequency of care	
Once daily	64 (10.3)
Twice	163 (26.3)
Three times	215 (34.7)
Four times	178(28.7)
Frequency of care (mean±SD)	2.81±0.96
Time of separation of the cord	
Within days	72 (11.6)
Within a week	433 (69.2)
Within 2 weeks	79 (12.7)
Within month	36 (5.8)

Figure 2. Distribution of the studied children according to the source of information about umbilical cord care

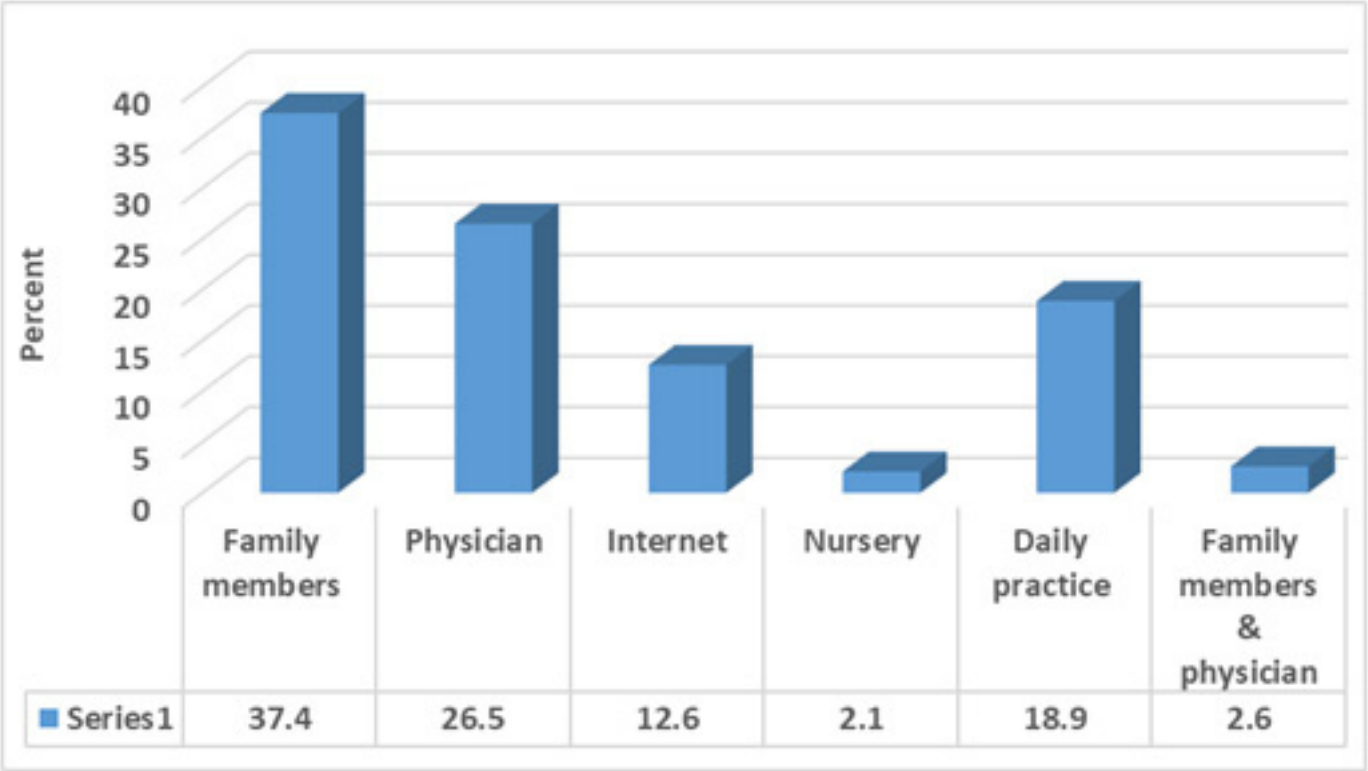

Table 3. Relationship between the type of the umbilical cord care and status of the cord

Variable	Intact	Swollen	Visible intestine	Chi-squared test	P-value
	No. (%)	No. (%)	No. (%)		
Type of the umbilical cord care					
Water	146 (90.7)	9 (5.6)	6 (3.7)		
Alcohol	266 (94.7)	11 (3.9)	4 (1.4)	25.8	0.02
Saline	62 (86.1)	6 (8.3)	4 (5.6)		
Medical powder	9 (69.2)	2 (15.4)	2 (15.4)		
Alcohol & saline	17 (94.4)	1 (5.6)	0 (0.0)		
Water & alcohol	43 (91.5)	4 (8.5)	0 (0.0)		
Water & saline	21 (87.5)	3 (12.5)	0 (0.0)		
Olive oil	20 (90.9)	1 (4.5)	1 (4,5)		

Table 4. Relationship between the type of the umbilical cord care and the presence of umbilical discharge

Variable	Discharge present	Discharge absent	Chi-squared test	P-value
	No. (%)	No. (%)		
Type of the umbilical cord care				
Water	6 (3.7)	55 (96.3)		
Alcohol	32 (11.4)	249 (88.6)		
Saline	12 (16.7)	60 (83.3)	20.77	0.004
Medical powder	3 (23.1)	10 (76.9)		
Water & alcohol	2 (4.3)	45 (95.7)		
Water & saline	0 (0.0)	24 (100)		
Olive oil	1 (14.5)	21 (95.5)		

Table 5. Relationship between the type of umbilical cord care and the time of separation of the cord

Variable	A	B	C	D	Chi-squared test	P-value
	No. (%)	No. (%)	No. (%)	No. (%)		
Cord care						
Water	20 (12.4)	101 (62.7)	16 (9.9)	24 (14.9)		
Alcohol	39 (13.9)	207 (73.7)	9 (3.2)	26 (9.3)		
Saline	6 (8.3)	52 (72.2)	5 (6.9)	9 (12.5)	33.41	0.01
Medical powder	1 (7.7)	10 (76.9)	0 (0.0)	2 (15.4)		
Water & alcohol	2 (4.3)	35 (74.5)	2 (4.3)	8 (17)		
Water & saline	1 (4.2)	12 (50)	4 (16.7)	7 (29.2)		
Olive oil	3 (13.6)	16 (72.7)	0 (0.0)	3 (13.6)		

N.B.: "A= within days, B= within a week, C= within 2 weeks, D= within a month"

Discussion

The umbilical cord is the tube that connects an unborn baby to its mother, through which it receives oxygen and food (1). A previous study was done in Egypt and demonstrated that dry cord care technique was very effective in healing of the umbilical cord stump, decreasing risk of cord infection and decreasing the time of cord separation compared with 70% by alcohol technique (10).

Dry cord care is an easy, straightforward, and safe method of handling the UC in healthy newborn infants born in a high-income hospital setting (1). In this study 9% of children had an umbilical discharge which is higher than that reported from a previous Saudi study where discharge from the UC was present in 2.6% and 5.3% in the alcohol and Beniktol group respectively (9).

In our study we found that umbilical cord care by alcohol had a significantly higher percentage of time of separation within days (13.9%) compared to other modalities of care. The same was present in a study done in Abha city which demonstrated that care with alcohol swab resulted in a significantly shorter time of umbilical cord separation than with Beniktol spray (9). In contrast with this result an Egyptian study where topical application of mother's milk on umbilical cord care lead to rapid cord separation time and diminished umbilical cord infection as it can be used as an easy, cheap and non-invasive way for cord care (11).

This study revealed that a high percentage of children who had an intact umbilical cord were using Chlorhexidine for cord care and a significantly high percentage of those who had a cord discharge were cared for by a medical powder compared to those cared for by Chlorhexidine. Similar results were observed in previous studies (9,12). In addition, a systematic review found that Chlorhexidine application to the cord reduces the risk of neonatal mortality and omphalitis in infants. This review recommended routine chlorhexidine application daily for 7 - 10 days after birth (8).

The time of separation of the cord, in the present study for 69.2% of children was within a week and UC cared for by alcohol had a significantly higher percentage of time of separation within days compared to other modalities. The mean UC separation time ranged from 4 - 16 days (13,14,15,16,17) and in studies that reported using nothing for cord care had mean separation times of about 9 days (18,19). The significantly shorter UC separation

time reported in the present study was observed in previous studies (7,8,9, 16,17). These studies found that Chlorhexidine cleansing of infants' UC can save lives and reduces the risk of omphalitis and neonatal mortality. On the other hand, this result disagrees with other previous studies (4,5). One of these studies was a meta-analysis which found that cord separation is prolonged in the alcohol group but there was no significant difference (20). Families prefer rapid UC separation as a delay in the separation is associated with making mothers anxious, and increases the number of home domiciliary midwife visits (21.22).

Limitations: Being a cross-sectional study prevents the detection of the cause-effect relationship. In addition, the included participants were only of Saudi nationality, so results cannot be generalized to other cultures.

Conclusion

Most of the studied children (91.9%) had an intact UC, only 9% of children had an umbilical discharge, 69.2% had a cord separation within a week, and 45.3% of mothers used Chlorhexidine for cord care. A significant higher percentage of mothers who reported that their children had an intact umbilical cord were using Chlorhexidine for cord care, and a significantly high percentage of those who had a cord discharge were cared for by a medical powder. UC cared for by alcohol had a significantly higher percentage of time to separation within days compared to other modalities. Further studies including a larger sample of children is required, and health educational programs regarding UC directed to pregnant mothers during antenatal visits is needed.

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Population-level Investigation of the Public Awareness Level Toward Witnessed Seizures in Saudi Arabia

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Abstract

Overview: Epilepsy is a common brain disorder with prevalence in Saudi Arabia of about 6.54 per 1,000 population.

The outcome of a seizure can be affected by the measures taken by witnesses in the prehospital setting; incorrect measures toward a seizure can cause serious harm to the seizing patient or the person trying to help them.

Methods: Cross sectional analysis of anonymous adults in Saudi Arabia who participated in an electronic format questionnaire distributed between May 2020 – August 2020 by social media to measure the awareness toward witnessed seizure in prehospital setting. Data collection included demographics and knowledge about epilepsy, appropriate approach toward a seizing patient and the expectation about the duration of most seizure attacks. Any workers in the health sector or any relatives or close friends of patients known to have epilepsy were excluded from the analysis.

Results: 416 participants met the inclusion criteria for this study with 52% being between 30 – 49 years of age and 52% males. 97% have heard about epilepsy before. 48.1% have seen at least one seizure before. 58% reported that they are willing to help seizing patients. The correct reaction toward a seizing patient was only chosen by 18 participants (4.3%). 79.6% will call the ambulance and 35.6% will try to put a hard object in the patient's mouth. Only 26% will put the patient on their right side. 32% thought that duration of most seizures was between 2-5 minutes.

Conclusion: The study results suggest that general public awareness about reaction to seizures in Saudi Arabia is inadequate and in need of increasing awareness.

Key words: public awareness, seizures, Saudi Arabia

Introduction

Epilepsy is defined as a brain disorder characterized by an enduring predisposition to generate epileptic seizures resulting in cognitive, psychological, and social consequences. An epileptic seizure is a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain [1].

Worldwide at least 50 million people live with epilepsy with almost 90% of the cases in developing countries. 5–10 per 1,000 people in developing countries are reported to have active epilepsy [2].

In Saudi Arabia, the estimate prevalence is about 6.54 per 1,000 population, which raises the importance of public awareness of this neurological disorder [3].

Correct measures taken by a witness in the acute setting can have a good impact on the outcome [4].

In contrast, incorrect measures toward a seizure such as: spray water over the patient's face, holding their tongue or fixing of the position, in addition to having no clear benefit to the patient, these actions can cause serious harm to the seizing patient or the person trying to help them [5].

This research is intended to assess the common knowledge and misconceptions of the general population in Saudi Arabia about proper reaction toward an ongoing seizure outside of a hospital setting.

Methods

A cross sectional analysis of anonymous adults in Saudi Arabia participated in an electronic format questionnaire distributed electronically by the author through social media to measure the awareness toward witnessed seizures in the prehospital setting between May 2020 – August 2020.

The data collection included participants' demographics, knowledge about epilepsy, professional background, general conception about the correct measures to follow and finally expectation regarding average time of a seizure attack (Table 1). No personal data that can identify the participants was required in this survey.

The correct answer for the helpful actions to be taken when witnessing a convulsion was defined as choosing the 2 answers of "putting the patient on their side" and "calling the ambulance" witout picking any of the other wrong answers (spray water over the patient's face, put a hard object in the patient's mouth, try to hold the patient's tongue to prevent tongue swallowing or holding the patient tight and try preventing them from seizing).

Exclusion criteria were having relatives or close friends diagnosed with epilepsy, or medical field employment.
Statistical analysis using "IBM SPSS statistics ver. 20.0" was applied to evaluate and test the hypothesis. Simple/ cross tabulation frequency tables and percentages. Chi square test was used to test and describe the relation between two categorized variables. The level $P<0.05$ was used as the cut-off value for significance.

Ethical approval was obtained from the Research Ethics Committee of the University of Jeddah. All methods were performed in accordance with: the University's Research Criteria, the national law of ethics of research on living things by Bureau of Experts at the Saudi Council of ministries and national committee of bioethics at King Abdulaziz City of Science and Technology.

Results

416 participants met the inclusion criteria for this study. The majority of them were between 30 – 39 & 40 - 49 years of old (28.2% and 24.5% respectively), with no significant difference in gender as males represented 52.9% and females 47.1%. Table 2 shows the details of the demographic characteristics.

Most of the participants have heard about epilepsy with 400 responding with yes (96.2%). (Figure 1).

When asked whether they have ever witnessed a seizure attack, 48.1% reported that they have witnessed at least 1 seizure before.

242 participants (58.2%) reported that they are willing to help if they see a seizing patient, 34.1% stated that they don't know and the minority with 7.7 % stated that they will not help in the acute setting (Table 3).

In regards to what actions should be taken when witnessing a patient having a seizure, the correct answer was defined as choosing the 2 answers of putting the patient on their side and calling the ambulance without picking any of the other wrong answers .

Only 18 participants (4.3%) chose the correct answer. An additional 63 participants (15.1%) chose the correct answer with at least one wrong action. When looking at the correct answers separately, 79.6% reported that they would call the ambulance, however only 26.4% chose to put the seizing patients on their side.

There was no statistically significant difference in getting the correct answer among different age groups or different genders.

Among the wrong choices, putting a hard object (e.g. piece of fabric) in the patient's mouth was the most frequently chosen by 148 participants (35.6%) followed by trying to hold the patient tight to prevent them from seizing (16.6%).

14.7% reported that they would try to hold the patient's tongue to prevent tongue swallowing. 7.9% will spray water on the patient's face.

2.2% of participants will try other measures which include religious and spiritual practices like reading segments of the Holy Quran.

Finally, only 0.5% reported that they will not try to do any of the previous measures, and they would leave the location.

Table 4 and Figure 2 show more details about actions taken by the participants in the survey.

The final aspect of the questionnaire was knowledge about estimated duration of most seizure attacks.

As shown in Table 5, 32.7% of the participants thought that the duration is between 2 – 5 minutes, while an almost similar percentage (32.5%) responded that they do not know. Only 22.4% expected that the duration is less than 2 minutes.

Table 1: Questions about knowledge toward convulsions included in the questionnaire given to participants

Question	Response
Have you ever heard about epilepsy disease?	• Yes • No • I don't know
Have you ever witnessed a seizure attack?	• Yes • No
If you witness a seizure attack, would you be more likely to try to help the seizing patient?	• Yes • No • I don't know
Which of the following actions do you think is helpful when trying to help a seizing patient outside a hospital environment? (you can choose more than one answer)	• Spray water over the patient's face • Put a hard object in the patient's mouth (like a piece of fabric) • Try to hold the patient's tongue to prevent it from swallowing • Put the patient on his/her right side • Hold the patient tight and try to prevent them from seizing • Call the ambulance • Do not do anything and leave the location • other
How long do you think most epileptic convulsions last?	• Less than 2 minutes • Between 2 to 5 minutes • Between 5 to 10 minutes • More than 10 minutes

Table 2: participants' demographics

Age	Frequency	Percent
less than 18 years	9	2.2
19-29 years	80	19.2
30-39 years	117	28.2
40-49 years	102	24.5
50-60 years	72	17.2
greater than 60 years	36	8.7
Total	416	100.0
Gender		
Males	220	52.9%
Females	196	47.1%

Figure 1: percentage of participants who have heard about epilepsy

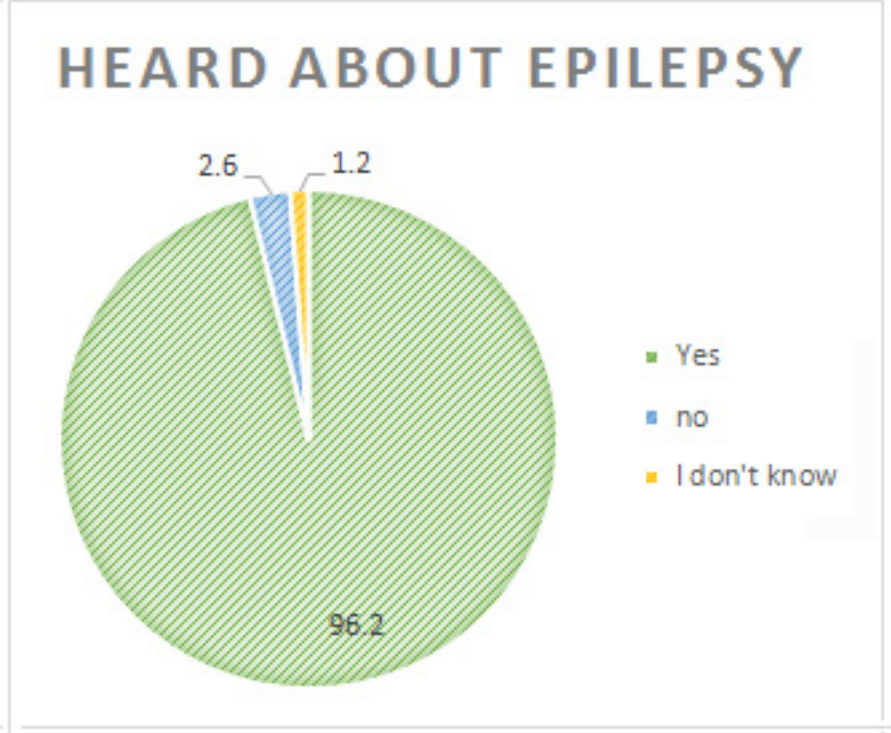


Table 3: The participants' responses regarding helping in the acute setting when there is a seizing patient

Would you try to help?	Frequency	Percent
No	32	7.7
Yes	242	58.2
I don't know	142	34.1
Total	416	100.0

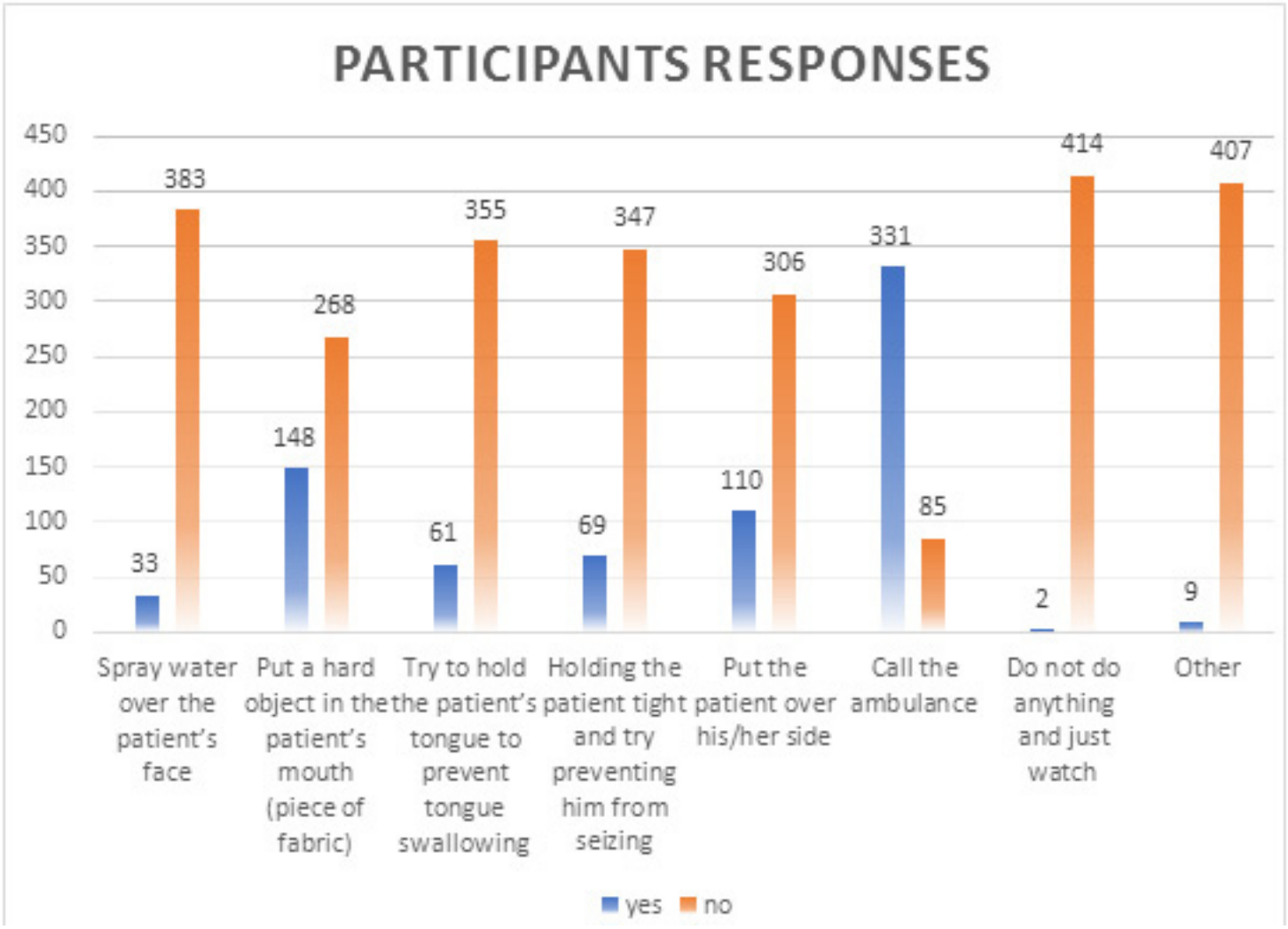
Table 4 shows the different response (corrects and incorrect) chosen by participants.

Action(s)	Response		total
	Yes	No	
	Number (percent)		Number (percent)
Spray water over the patient's face	33 (7.9%)	383 (92.1%)	416 (100%)
Put a hard object in the patient's mouth (piece of fabric)	148 (35.6%)	268 (64.4%)	416 (100%)
Try to hold the patient's tongue to prevent tongue swallowing	61 (14.7%)	355 (85.3%)	416 (100%)
Holding the patient tight and try preventing them from seizing	69 (16.6%)	347 (83.4%)	416 (100%)
Put the patient on his/her side	110 (26.4%)	306 (73.6%)	416 (100%)
Call the ambulance	331 (79.6%)	85 (20.4%)	416 (100%)
Do not do anything and just watch	2 (0.5%)	414 (99.5%)	416 (100%)
Other	9 (2.2%)	407 (97.8%)	416 (100%)

Table 5: response upon asking your expectation about duration of the seizure?

Duration of the attack	Frequency	Percent
Less than 2 minutes	93	22.4
Between 2 to 5 minutes	136	32.7
Between 5 to 10 minutes	43	10.3
More than 10 minutes	9	2.2
I do not know	135	32.5
Total	416	100.0

Figure 2 shows actual number of different responses by the participant



Discussion

Since the knowledge about epilepsy and its emergencies is important, identifying the general misconceptions in the general population is an important step to increase public awareness which eventually will be reflected on the outcome by reducing possible harm to patients and their community.

In regards to familiarity with epilepsy, the majority of the participants (96%) have heard about it which is not significantly different compared to previous studies done in Saudi Arabia (94.79%)[6], Sudan (90%)[7] and Jordan[8].

About 48.1% of the participants in this survey have witnessed at least one seizure attack. This compares closely to a previous study done in Al-Kharj, Saudi Arabia which found a similar percentage (49.5%)[6], and markedly higher than a study done in UAE with only 34% of the participants having witnessed a seizure [9].

Most of the participants, regardless of their age, would try to help (58%) with the majority of remaining responding by the (I don't know) option, reflecting the helping nature of the Saudi society. Based on these findings increasing awareness would be important to ensure correct actions get taken instead of potentially harmful ones.

A significant percentage of the participants chose one or more actions that are considered wrong and potentially harmful. The most commonly chosen was "putting a hard object (e.g. piece of fabric) in the mouth" (35.6%) which can lead to obstruction of the airway by choking or teeth fracture, which counters the most important aspect to ensure in first place which is airway patency [10].

Others will try to hold the tongue to prevent swallowing (14.7%) which is one of the major myths in the subject of epilepsy and its emergencies, as tongue swallowing during a convulsion is considered to be impossible because the convulsive state is a hypertonic state not hypotonic [11].

16.6% stated that they will try to hold the patient tight and prevent them from seizing. This may cause injuries to the spine, ribs and joints leading to fractures or dislocations and such actions should be avoided [7].

Only 26.7% of the participants said that they will put the patient on their side. This is a particularly important step as the recovery position ensures patency of the airways preventing events of hypoxia and reduces the risk of aspiration [10][12].

In addition to the previously mentioned options, the witness should try to remove any harmful objects from the patient's surrounding along with documentation of the seizure's duration [10][12].

Only 22.4% of the participants thought that most seizures last less than 2 minutes which is the correct answer for most seizures [13].

A striking minority (4.9%) chose the correct approach without choosing any of the wrong / non beneficial actions which indicates the urgent need to improve awareness on how to react toward a seizing patient. Awareness can be enhanced to the mass population through traditional media like television, public campaigns, and integrated into the educational process, (e.g. schools and universities) or by using modern social media applications which allow easy access to the public and which can have a great impact on the society [14].

One limitation of this study is using an electronic questionnaire distributed through social media. The reason behind this was that this study was conducted during the COVID-19 pandemic where social distancing was a necessity.

Conclusion

The results of this study are strongly suggestive that the knowledge of the population in Saudi Arabia on how to react when seeing an actively seizing patient is inadequate and further efforts to increase the awareness are needed.

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Obstructive sleep apnea and association with poor school performance in primary school children, Taif city, in KSA, 2020

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Abstract

Background: Studies have found an association between obstructive sleep apnea (OSA) and children's academic performance.

Objectives: The aim of this study was to assess the prevalence of pediatric OSA and its association with school performance among Saudi children.

Methods: A cross sectional study was done on 340 primary school children. A questionnaire was filled in by parents that included items on sociodemographic variables, nocturnal enuresis, sleeping habits, child academic level. The sleep related breathing disorder scale (SRBD) was used to assess the risk of pediatric SRBD which is an indicator of OSA.

Results: The prevalence of OSA was 9%, with children > 12 years; obese children, those having RTI, and allergy had a significantly higher percentage of those having OSA. A non-significant difference was found between the presence of OSA and children's overall academic level or their levels in different school subjects. A highly significant negative correlation was found between general academic level and SRBD scores.

Conclusion: The prevalence of OSA was 9%, where children > 12 years, obese, those having RTI, and allergy had a significantly higher percentage of having OSA. On the other hand, a non-significant difference was found between the presence of OSA and children's overall academic level. There is a need for future school-based studies done on a larger sample to confirm the observed associations found in the present study.

Key words: Obstructive, sleep, apnea, association, school, performance, Saudi Arabia

Introduction

Obstructive sleep apnea (OSA) is a common chronic illness worldwide which could lead to sleep-disordered breathing (SDB) in adults and children (1). Recently, OSA causes have been divided into "anatomical compromise" episodic upper airway collapse and narrowing during sleep, and "non-anatomical causes" including impaired function of pharyngeal dilator muscle, poor breathing control (high gain loop) and low aerosol threshold. However, patients may have variable degrees of upper airway impairment (2,3,4,5). Most frequent symptoms of OSA are headache, memory loss, excessive sleepiness during the daytime, nocturia and fatigue (6,7). The prevalence in children is estimated in the range of 2%–4% in western countries (8). The prevalence is increasing and is probably underrepresented in the view of the pediatric obesity epidemic (9). The American Academy of Pediatrics recently reiterated its recommendations that children with symptoms and signs suggestive of OSA should be investigated with polysomnography (PSG), and treated accordingly (10). However, treatment decisions should not only be guided by PSG results, but should also integrate the magnitude of symptoms and the presence or absence of risk factors and signs of OSA morbidity [10], and metabolic disorders and cardiovascular disease (11,12,13).

A previous meta-analysis was done in 2015 to evaluate the strength of the relationships between sleep disorder breathing (SDB) and school performance. The study showed a significant association between SDB and poorer academic performance in school-age children (14). Another study done in 2016 in India to assess the prevalence of primary mono-symptomatic nocturnal enuresis (PMNE) in children aged 5-10 years and to find its association with sleep disordered breathing (SDB) by using a 22-item pediatric sleep related breathing disorder (SRBD) scale. Results showed sleep disordered breathing, inappropriate toilet training and a history of childhood NE in fathers were found to be significant risk factors for PMNE (15).

In 2016, a prospective study was done and found that tonsillectomy and/or adenoidectomy significantly improved health-related quality of life in all children with SDB and NE(16). Another study was done to estimate the prevalence of OSA in school children aged 5–10 years and its association with academic performance. This study found that students with positive SRBD questionnaire were more probable to have poorer grades than their counterparts with negative SRBD (17). Also among university students, self-reported snoring and being at high risk for OSA were associated with poor academic performance in a previous study (18).

In the Kingdom of Saudi Arabia, a study was done in 2018 to assess excessive daytime sleepiness which is a common symptom of undiagnosed OSA in Saudi Arabia. The study found that 5.5% were diagnosed with OSA and 44% felt that they had sleep problems (19). Another study done in 2019 found that obesity was a considerable risk factor for developing OSA (20). Among Saudi children, a study was done in 2019 to evaluate associations between sleep-disordered breathing and respiratory conditions/ orofacial symptoms among primary school children in Riyadh city. The study found that 21% of Saudi children are at risk of sleep-disordered breathing, and there was a strong association between sleep-disordered breathing symptoms and the presence of respiratory conditions or orofacial symptoms (21).

A careful literature search has found that no Saudi study has been done to assess the relationship between OSA and the academic performance among Saudi children. That is why this study aimed to assess the prevalence of pediatric OSA and its association with enuresis, obesity, socioeconomic factors, and school grades among children in Taif city, Saudi Arabia.

Methods

Study design, time frame and setting: a cross sectional study was done between May to August 2019 in Taif city, Saudi Arabia

Sampling and population: One primary school in Taif city was selected by simple random sampling methodology and a sample of 340 primary school children in all grades wer the study participants. The inclusion criteria were Saudi children aged 6 - 12 years of both genders, and the exclusion criteria were non-Saudi children, any child with an age outside the previous range, and children with known syndromes or compromised craniofacial anomalies.

Tool of data collection: A self-administered questionnaire filled in by children's parents was used for data collection. The questionnaire sought information regarding sociodemographic variables, NE frequency, sleeping habits. The questionnaire included items on the child's general academic level and his grades in various subjects (Mathematics, Science, Arabic language, Drawing) in the first semester. Their level was graded and given scores: excellent (a score of 4), good (a score of 3), fair (a score of 2), and failing (a score of 1). The questionnaire included the sleep related breathing disorder scale (SRBD) that contains 22 symptom items regarding snoring frequency, loud snoring, difficulty in breathing during sleeping, observed apneas, daytime sleepiness, inattentive, or hyperactive behavior. Each of these items was found to correlate with child OSA that was confirmed by polysomnography (22,23) Every item in the scale has three options: yes = 1, no = 0, or don't know = missing. The number of symptom-items that were reported as positive ("yes") was divided by the number of all 22 items. Items with missing responses and items answered as don't know were excluded. Thus the result of the scale is a proportion ranging from 0.0 - 1.0. Scores more than 0.33 are considered positive and suggest a high risk for a pediatric SRBD and taken as an indicator of OSA (2,23).

Ethical considerations: the study was approved by the research ethics committee of Taif university and written consents were taken from all children's parents.

Statistical analysis: Data were coded, tabulated and analyzed using (SPSS) version 20 (Armonk, NY: IBM Corp.). Qualitative data was expressed as numbers and percentages, and Chi- squared test ($\chi 2$) was applied to test the relationship between variables. Quantitative data was expressed as mean and standard deviation (Mean ± SD). A p-value of <0.05 was considered as statistically significant.

Results

Table 1 shows that 52.1% of the participants were males, 50.9% of fathers had a bachelor's degree of education, 65.9% had a mother with a bachelor's degree of education, and 89.7% and 45.9% of fathers and mothers were employed, respectively. The age of 37.6% of children ranged from 6-< 9 years, 5.9% had Down syndrome, 24.7% were obese, 72.9% were in a governmental school, 30% had a school in the northern region of Taif city, and 24.7% were in the 1st grade.

Table 2 shows that 85.9% of children had a sleep duration of 9 hours or below, 56.5% were sleeping after 22 pm (10pm), 10.9% had RTI, 17.4% had allergy, and 7.9% had tonsillectomy. Most children (50.9%) had no episodes of stopped breathing during sleep (more than 10 seconds) per hour, and 5.6% had previous sleep planning. Of the children, 5.6%, 9.1%, 2.6%, 12.1% and 5% were talking, gnashing teeth, walking, sweating and having restless legs during sleep respectively.

Figure 1 shows that the prevalence of a score of SRBD >0.33 is suggestive of high risk pediatric SRBD which is an indicator of OSA, was in 9%.

Table 3 shows that children > 12 years old, obese children, those having RTI, and allergy, had a significant higher percentage of those having OSA. At the same time, children who walk and sweat during sleep had the same significantly higher percentage of those having OSA (P=< 0.05). On the other hand, a non-significant difference was found between OSA presence and children's school type and position, grade level, sleep duration and time, number of episodes of stopped breathing during sleep and walking during sleep, previous tonsillectomy, previous sleep planning, talking, gnashing teeth and having restless legs during sleep (P=> 0.05). Table 4 shows that a non-significant difference was found between the presence of OSA and children's overall academic level or their levels in different school subjects (p=> 0.05).

Figure 1 shows that Spearman correlation analysis between general academic level and SRBD scores showed a highly significant negative correlation between them NB: (r= -0.199, p=< 0.001).

Table 1: Distribution of the studied participants according to their characters and child age, obesity, school type and location, grade level and presence of Down syndrome

Variable	No (%)
Gender	
Male	163 (47.9)
Female	177 (52.1)
Father education	
Illiterate	7(2.1)
Primary ed.	18 (5.3)
Preparatory edu.	29 (8.5)
Secondary edu.	84(24.7)
Bachelor degree	173(50.9)
Higher then bachelor edu.	29 (8.5)
Father employment	
Employed	305(89.7)
Unemployed	35 (10.3)
Mother education	
Illiterate	16 (4.7)
Primary ed.	14(4.1)
Preparatory edu.	12 (3.5)
secondary edu.	65(19.1)
Bachelor's degree	224 (65.9)
Higher then bachelor edu.	9 (2.6)
Mother employment	
Employed	156 (45.9)
Unemployed	184(54.1)
Age of child:	
<6	54 (15.9)
6-< 9	128 (37.6)
9-12	112(32.9)
>12	46 (13.5)
Child having Down syndrome	
Yes	20(5.9)
No	320 (94.1)
Obese child	
No	84 (24.7)
Yes	256 (73.3)
School type	
Private	92 (27.1)
Governmental	248(72.9)
School location	
eastern region	88 (25.9)
western region	93 (27.4)
northern region	102 (30)
southern region	57(16.8)
Grade level	
1st	84 (24.7)
2nd	46 (13.5)
3rd	53 (15.6)
4th	46 (13.5)
5th	45 (13.2)
6th	66(19.4)

Table 2. Distribution of the studied children according to parameters related to their sleep, having RTI, allergy previous tonsillectomy and mean score of SRBD scale

Variable	No (%)
Sleep duration	
9 hours or below	231 (58.9)
Above 9 hours	109 (32.1)
Sleep time	
Before or at 22 p.m.	148 (43.5)
After 22 p.m.	192 (56.5)
RTI	
Yes	37(10.9)
No	303 (89.1)
Allergy	
Yes	59 (17.4)
No	281 (82.6)
Tonsillectomy	
Yes	27(7.9)
No	313(92.1)
Number of episodes of stopped breathing during sleep (more than 10 seconds) per hour	173 (50.9)
0	27(7.9)
<5	5 (1.5)
5-15	2 (0.6)
15-30	6 (1.8)
>30	127(37.4)
I Don't Know	
Previous sleep planning	
Yes	19 (5.6)
No	321 (94.4)
Talk during sleep	
Yes	19(5.6)
No	213 (6 2.6)
I don't know	108 (31.8)
Gnashing teeth during sleep	
Yes	31 (9.1)
No	246 (72.4)
I don't know	63 (18.5)
Walk during sleep	
Yes	9 (2.6)
No	300 (88.2)
I don't know	31 (9.1)
Sweat during sleep	
Yes	41 (12.1)
No	213 (62.6)
I don't know	86 (25.3)
Restless leg during sleep	
Yes	17(5)
No	233 (68.5)
I don't know	90 (26.5)
Mean (SRBD) scale	0.12 ± 0.13

Table 3. Relationship between the presence of OSA and children's characteristics (age, obesity, school type and location, grade level and presence of Down syndrome), parameters related to their sleep, having RTI, allergy and previous tonsillectomy)

Variable	OSA		χ^2	p-value
	Present No (%)	Absent No (%)		
Age of child				
<6	7 (13)	47 (87)	11.68	0.009
6-< 9	5 (3.9)	123 (96.1)		
9-12	9 (8)	103 (92)		
>12	9 (13.6)	37 (80.4)		
Obese child				
No	9 (18.4)	40 (81.6)	6.48	0.01
Yes	21 (7.2)	270 (92.2)		
School type				
Private	7 (7.2)	85 (92.4)	0.23	0.63
Governmental	23 (9.3)	225 (90.7)		
School location				
eastern region	6 (6.8)	82 (93.2)	1.22	0.74
western region	10 (10.8)	83 (89.2)		
northern region	10 (9.8)	92 (90.2)		
southern region	4 (7)	53 (93)		
Grade level				
1st	5 (6)	79 (94)	4.38	4.8
2nd	2 (4.3)	44 (95.7)		
3rd	4 (7.5)	49 (92.5)		
4th	5 (10.9)	41 (89.1)		
5th	6 (13.3)	39 (86.7)		
6th	8 (12.1)	58 (87.9)		
Sleep duration				
9 hour or below	19 (8.2)	212 (91.8)	0.32	0.57
Above 9 hours	11(10.1)	98 (89.9)		
Sleep time				
Before or at 22 p.m.	8 (5.4)	140 (94.6)	3.8	0.05
After 22 p.m.	22 (11.5)	170 (88.5)		
RTI				
Yes	6 (16.2)	31 (83.8)	2.82	0.009
No	24 (7.9)	279 (92.1)		
Allergy				
Yes	10 (16.9)	49 (83.1)	5.85	0.01
No	20 (7.1)	261 (92.9)		
Tonsillectomy				
Yes	4 (14.8)	23 (85.2)	1.3	0.25
No	26 (8.3)	287 (91.7)		
Number of episodes of stopped breathing during sleep (more than 10 seconds) per hour				
0	11 (6.4)	162 (93.6)	4.82	0.43
<5	4 (14.8)	23 (85.2)		
5-15	1 (20)	4 (80)		
15-30	0 (0.0)	2 (100)		
>30	0 (0.0)	6 (100)		
I Don't Know	14 (11)	113 (89)		
Previous sleep planning				
Yes	3 (15.8)	16 (84.2)	1.21	0.27
No	27 (8.4)	294 (91.6)		

Table 3. Relationship between the presence of OSA and children's characteristics (age, obesity, school type and location, grade level and presence of Down syndrome), parameters related to their sleep, having RTI, allergy and previous tonsillectomy) (continued)

Talk during sleep				
Yes	2 (10.5)	7 (89.5)	1.22	0.45
No	16 (17.5)	197 (92.2)		
I don't know	12 (11.1)	96 (88.9)		
Gnashing teeth during sleep				
Yes	6 (19.4)	25 (80.6)	5.8	0.05
No	17 (6.9)	229 (93.1)		
I don't know	7 (11.1)	56 (88.9)		
Walk during sleep				
Yes	3 (33.3)	6 (66.7)	12.23	0.002
No	21 (7)	279 (93)		
I don't know	6 (19.4)	25 (80.6)		
Sweat during sleep				
Yes	7 (17.1)	34 (82.9)	9.82	0.007
No	11 (5.2)	202 (94.8)		
I don't know	12 (14)	74 (86)		
Restless legs during sleep				
Yes	4 (23.5)	13 (76.5)	5.4	0.07
No	17 (7.3)	216 (92.7)		
I don't know	9 (10)	81 (90)		

Figure 1: Prevalence of OSA among studied children

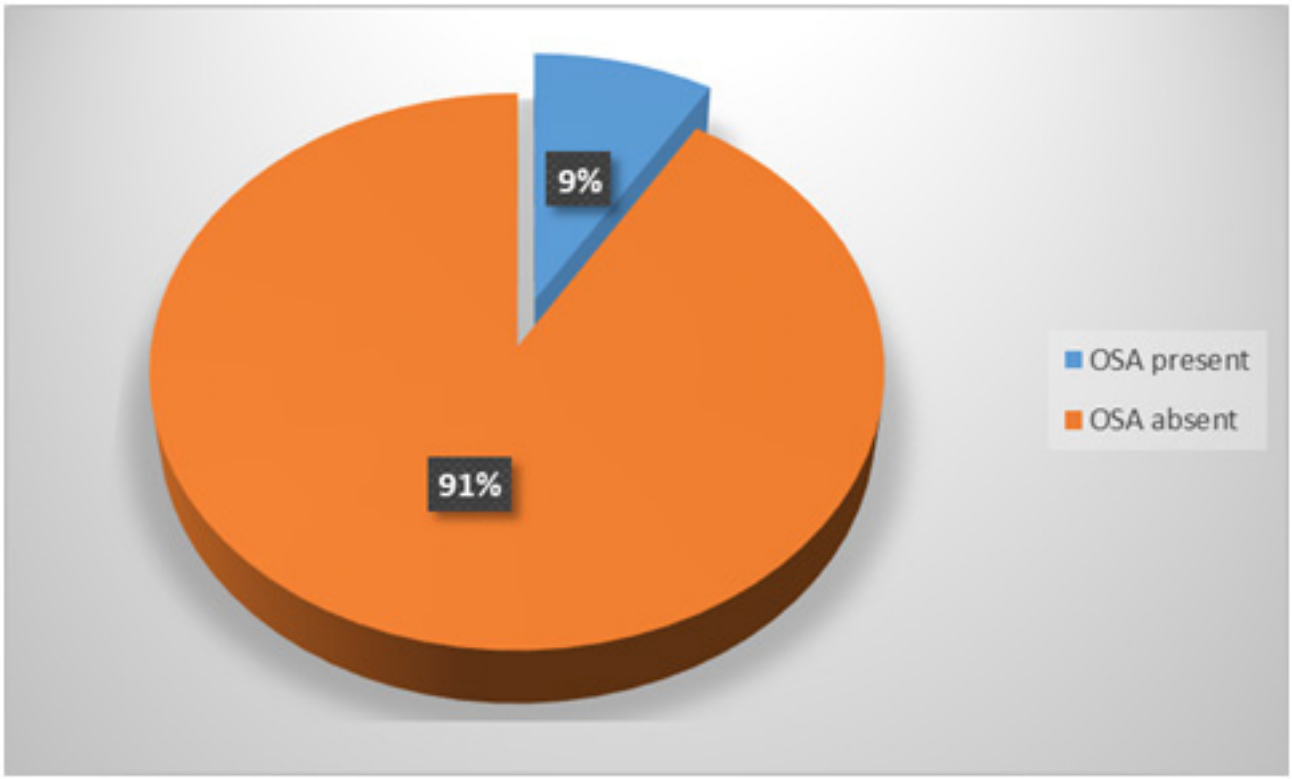

Figure 1. Spearman correlation between general academic level and SRBD scores

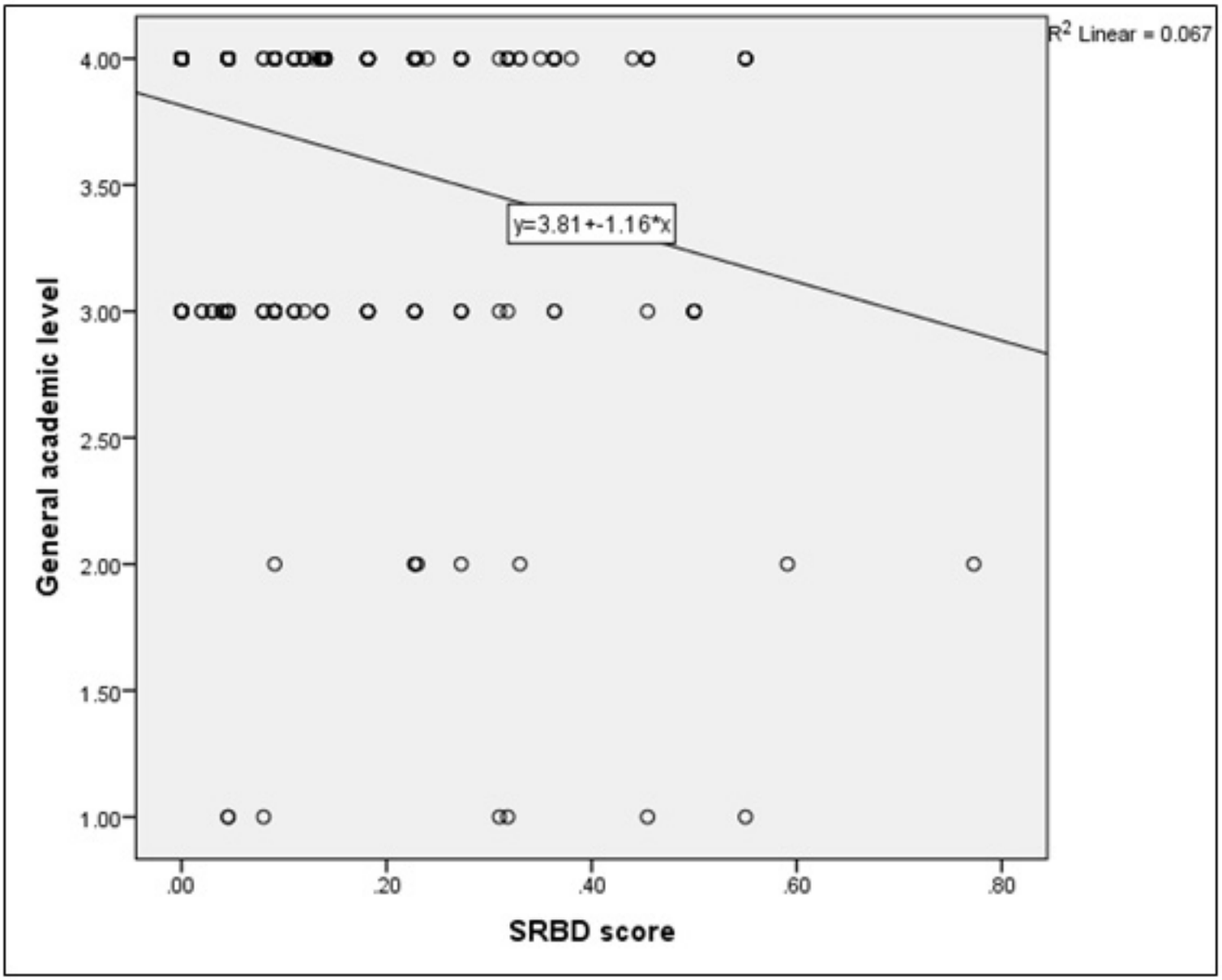

Table 4. Relationship between the presence of OSA and children's general academic level and level in school subjects

Variable	OSA		χ^2	p-value
	Present No (%)	Absent No (%)		
Overall school grade				
Excellent	2 (28.6)	5 (71.4)	6.52	0.08
Good	2 (25)	6 (75)		
Fair	7 (9.5)	67 (90.5)		
Failing	19 (7.6)	232 (92.4)		
Mathematics				
Excellent	16 (7.2)	206 (92.8)	5.82	0.12
Good	10 (11.6)	76 (88.4)		
Fair	3 (10)	27 (90)		
Failing	1 (50)	1 (50)		
Science				
Excellent	20 (7.9)	232 (92.1)	2.15	0.54
Good	9 (13)	60 (87)		
Fair	1 (5.9)	16 (94.1)		
Failing	0 (0.0)	2 (100)		
Arabic language:				
Excellent	17 (7.4)	213 (92.6)	3.01	0.39
Good	10 (10.8)	83 (98.2)		
Fair	2 (15.1)	11 (84.6)		
Failing	1 (25)	3 (75)		
Drawing				
Excellent	20 (8.4)	219 (91.6)	1.54	0.67
Good	9 (11.7)	68 (88)		
Fair	1 (4.5)	21 (95.5)		
Failing	0 (0.0)	2 (100)		

Discussion

The present cross-sectional study aimed to assess the prevalence of pediatric OSA and its association with enuresis, obesity, socioeconomic characters and school performance among children in Taif city, Saudi Arabia. In this study, the prevalence of OSA was 9% in studied children which was assessed by a score of SRBD >0.33. This result is lower than that reported from a study done in Riyadh, Saudi Arabia (21), where the prevalence of children who were at high risk of sleep disordered breathing was 21% by using pediatric sleep questionnaire. Also, in another study done in Kirkuk in Iraq, 25% of children were at high risk of having at least one type of sleep disorder(24).

Regarding obesity, the normal BMI among children varies according to age and gender thus it is difficult to identify and label the weight status (25,26). This study revealed that children > 12 years old, obese children, those having RTI, and allergy, had a significantly higher percentage of those having OSA. At the same time, children who walk and sweat during sleep had the same significantly higher percentage of those having OSA. Previous studies agreed with our results as it showed that overweight children have high risk to develop OSA compared to normal weight children (25,27). At the same time, it was found that OSA can induce obesity pathogenesis by increasing ghrelin secretion and leptin resistance; these hormones play major role in appetite regulation (10,28).

Our finding demonstrated that a non-significant association was found between the presence of OSA among studied children and the overall school performance or their grades in Mathematics, Science, Arabic and Arts. There have been numerous studies on the association between pediatric SRBD and school performance (14,29,30,31,32,33). These studies found different results as some of them revealed an association between SDB and poor school performance (14,29,30,31), and some did not (32,33). Despite the predominance of studies that proved the association, the difference could be attributed to the different settings. Previous studies observed the association between sleepwalking in children and obstructive sleep apnea (34). In the present study, children with positive OSA were more probable for sleep walking; this could be explained by the lack of sleep due to OSA (34).

Quite a number of children with OSA were found to have nocturnal enuresis (NE) (35). In this study we found a strong relationship between NE and children with OSA. It has been assumed that increased enuresis may be due

to the diminishing effects of OSA on arousal responses, to changes in bladder pressure, or potentially associated with hormonal changes involved in fluid regulation. In a meta-analysis of 14 studies, NE was significantly associated with OSA (36). So, it is essential to ask any patient suspected of having OSA about history of NE and vice versa.

A limitation of this study could be the cross-sectional study used that can reveal the association between variables without revealing the causal relationship

Conclusion

This study found that the prevalence of a score of SRBD >0.33 was suggestive of high risk pediatric SRBD which as an indicator of OSA was 9%. Children > 12 years, obese children, those having RTI, and allergy, had a significantly higher percentage of those having OSA. On the other hand, a non-significant difference was found between the presence of OSA and children's overall academic level or their levels in different school subjects. A highly significant negative correlation was found between general academic level and SRBD scores. There is a need for future school-based studies done on a larger sample to confirm the observed associations found in the present study.

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Improving albuminuria screening in Type 2 diabetes mellitus patients, at West Bay Health Center, Qatar

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Introduction

Chronic kidney disease (CKD) is diagnosed by the persistent presence of elevated urinary albumin excretion (albuminuria), low estimated glomerular filtration rate (eGFR), or other manifestations of kidney damage" (1). Diabetic kidney disease occurs in 20–40% of diabetic patients. CKD typically develops after diabetes duration of 10 years in type 1 diabetes but is also present at diagnosis of type 2 diabetes. CKD can reach end-stage renal disease (ESRD) requiring dialysis or kidney transplantation and is the leading explanation for ESRD within ESRD in the U.S. Additionally, among people with type 1 or 2 diabetes, the presence of CKD markedly increases cardiovascular risk and health care costs (2). Screening for albuminuria is usually recommended a minimum of once a year, to assess urinary albumin (e.g., spot urinary albumin-to-creatinine ratio).

"Normal urine albumin creatinine ratio is defined as <30 mg/g Cr, and high urinary albumin excretion is defined as ≥30 mg/g Cr" (1). To verify the diagnosis of albuminuria, the test has to be repeated by using two to three specimens of UACR within a 3- to 6-month interval because of high variability between UACR excretion measurement (1).

In our health center, only 62.20% of patients with type 2 diabetes mellitus, underwent screening for it, which reflects the need for improving albuminuria screening.

Therefore, this project was conducted to improve the percentage of albuminuria screening in type 2 diabetes mellitus patients from 62.2 % to 93.2% which is 30% from baseline, over a 4-month period, by the completion of July 2018.

Methodology

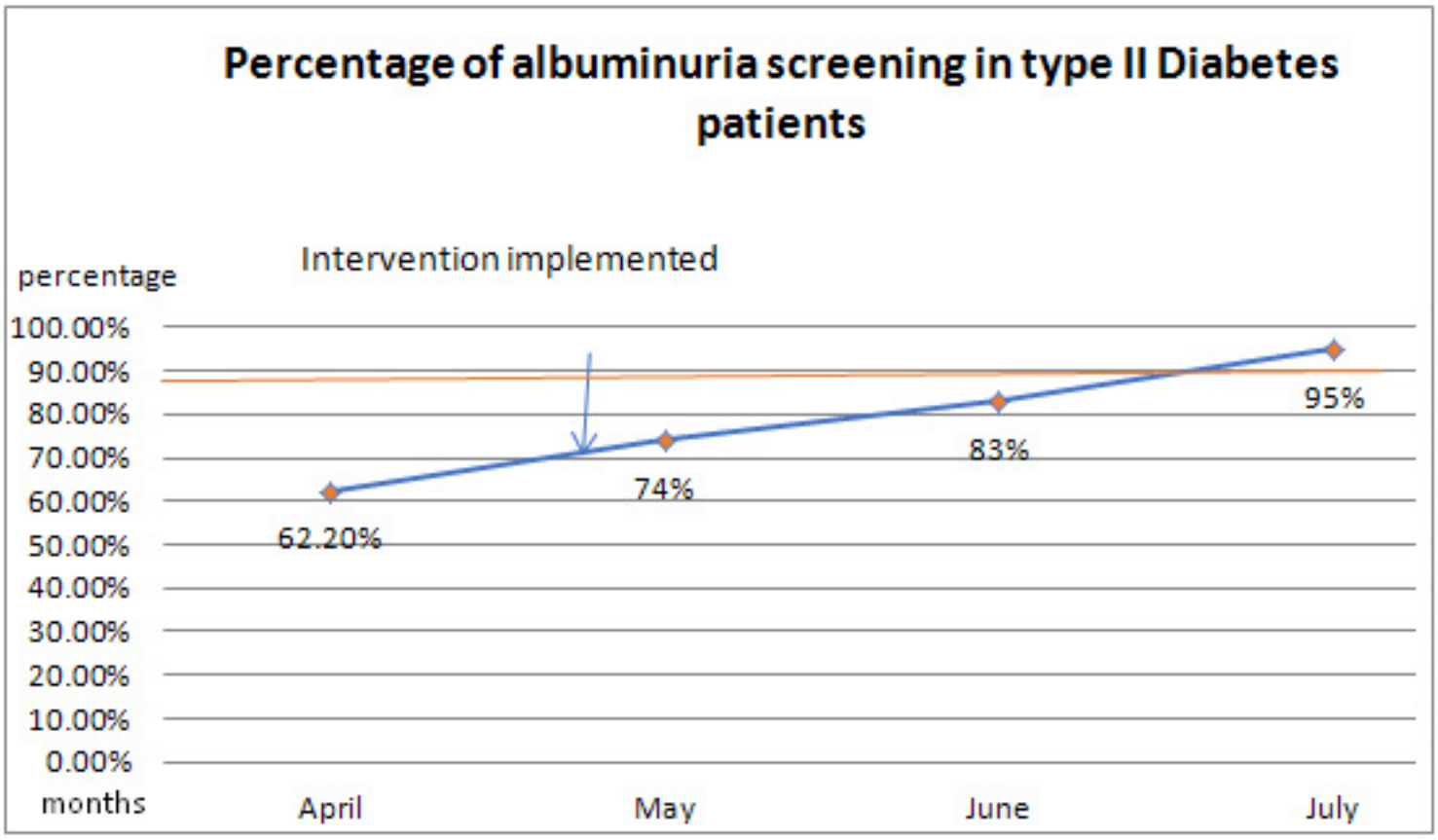
Initially, we got the approval from our health Centre Manager, to start our project. We introduced our project to our physician in our Health Centre General Clinic. Then, we reminded the physician verbally in each Inter-Professional Education Meeting and each other Physicians Gatherings about Albuminuria screening and confirmation and Initiation of treatment. Furthermore, we mailed a reminder email for albuminuria screening and confirmation of the test to all doctors in the General clinic. We then developed a reminder card and distributed it in all clinics and we fixed it to each clinic desk. Then monthly we monitored our progress by data collection till we completed the 4-month interval.

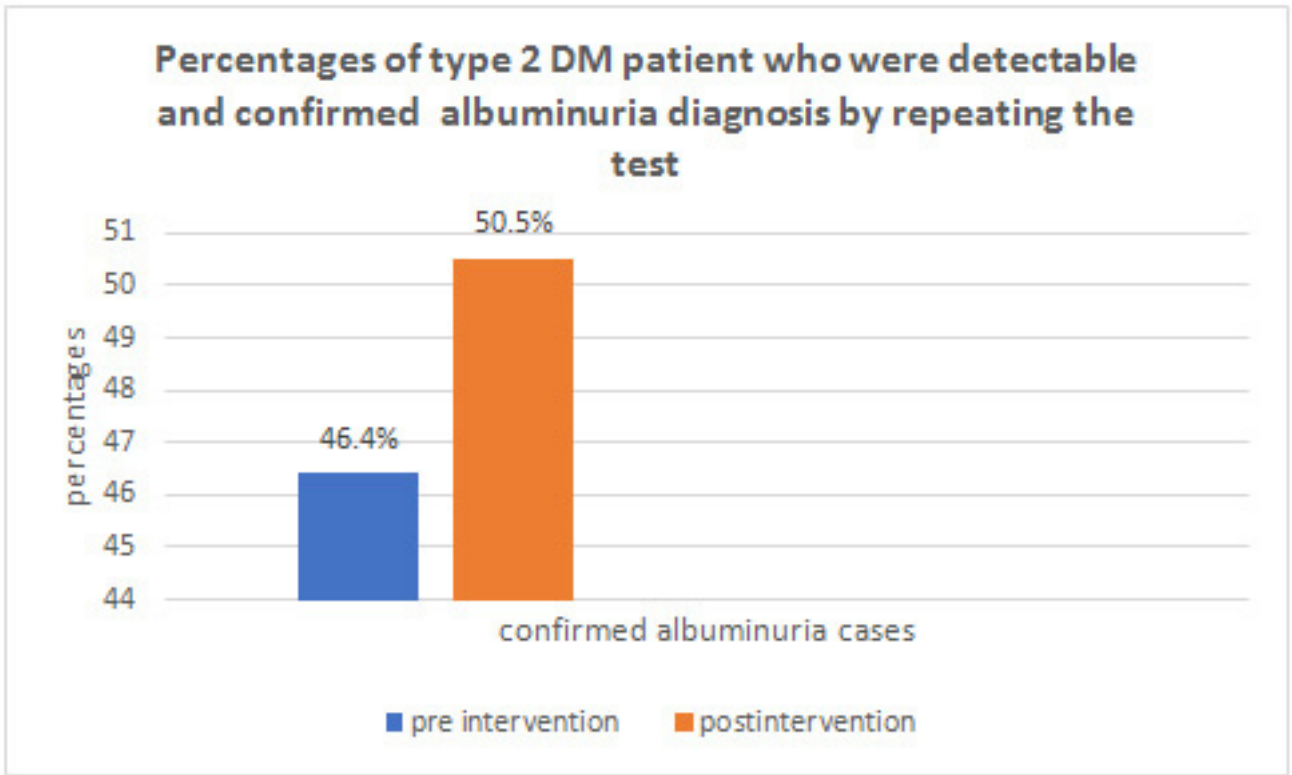
Results

• The Percentage of type 2 diabetes patients who were screened for albuminuria improved from 62.2% to 95% over a 4-month period.

• The Percentage of type 2 DM patients who were detectable and confirmed with an albuminuria diagnosis by repeating the test, improved from 46.4 % to 50.5%.

Key Words:
Type 2 diabetes mellitus, albuminuria, screening, nephropathy and chronic disease.


Percentage of albuminuria screening in type II Diabetes patients
Intervention implemented
percentage
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
months
April
May
June
July
62.20%
74%
83%
95%


Percentages of type 2 DM patient who were detectable and confirmed albuminuria diagnosis by repeating the test
51
50
49
48
47
46
45
44
percentages
46.4%
50.5%
confirmed albuminuria cases
pre intervention
postintervention

Discussion

Our project showed 32% improvement in the screening of albuminuria in type 2 diabetes mellitus, and our aim was to increase the percentage by 30 % from baseline. According to the WHO, the prevalence of diabetes in Qatar is 17%. In supported of this fact we carried out on our project to reduce the burden of diabetes on the health care system, and early identification of diabetes complications like chronic kidney disease. In addition, the degree of albuminuria is related to risk of cardiovascular disease and chronic nephropathy progression and mortality (1).

Conclusion

To conclude, our intervention showed improvement in the percentages of albuminuria screenings in type 2 diabetic patients. Additionally, our intervention showed further detection and confirmation of albuminuria diagnosis. Altogether, these changes will serve to improve early detection of microalbuminuria in type 2 diabetes mellitus and prompt treatment initiation for those cases with confirmed diagnoses of albuminuria.

We will adopt the change, as the results of pre- and post-intervention analysis which clearly showed improvement in albuminuria screening in type 2 diabetes mellitus, and we will generalize our intervention to other health centers and will keep educating and reminding our physicians about the importance of albuminuria screening. The subsequent step will proceed to the second cycle. This project , will assist early detection of chronic kidney disease in type 2 diabetes mellitus, and prevent progression of albuminuria and subsequently minimize CKD burden and cost. Furthermore, it aids to detect people who are at increased risk for cardiovascular disease.

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Psychological Impact of Acne Vulgaris among Female Secondary Students in Tabuk City, Saudi Arabia

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Abstract

Background: Acne vulgaris is an inflammatory skin condition that most commonly affects young people. Acne has many negative consequences for youthful people. Acne may affect personal satisfaction and affect personal confidence.

Aim: To estimate the psychological impact of acne vulgaris among female secondary school students.

Method: This study is cross-sectional, and it was conducted on female secondary schools in 5 random schools in Tabuk city. The study used a structured questionnaire to investigate the socio-demographics of females and to assess the psychological impact of acne. Statistical Package for Social Sciences program version 20 (SPSS Inc, Chicago, IL, USA) was used to analyze the data; P-value < 0.05 was considered for significance.

Results: This study included 388 females; there were 93.5% Saudi, 98.7% single females, and 87.9% in secondary school. Shyness and embarrassment were the most common impact affecting females very much (20.4%). There were 33.5% who showed low psychological impact, 17.3% showed no impact, 1.5% showed severe impact.

Conclusion: Acne has a significant psychological impact on female students with varying degrees that were affected by age and education of students.

Key words: Acne, Psychological impact, Females, Secondary school

Introduction

The term skin acne comes from the Greek word 'acme' and it has the feeling of skin ejection or eruption and "vulgaris" signifies "normal." Acne is considered as a chronic disease associated with inflammation of the pilosebaceous organs (1). It is described by knobs, papules, comedones, pustules, growths, and incidentally scars. It incorporates follicular sebaceous hypersecretion and hyper keratinization because of androgen incitement and follicular colonization caused by propionibacterium acnes and insusceptible and incendiary reactions. It influences special parts of the body including the face, foremost chest, and upper back (2).

Acne is an exceptionally common overall skin issue (3). It is most generally experienced by young people, proposing a hormonal impact. About 80% of young people have skin break out of acne due to hormonal theory (4). Different investigations report predominance in young people extending from 29% to 91% (5).

During youth, skin acne will in general be more typical in boys than in young girls. It apparently happens among 95% to 100% of boys aged from 16 to 17 years and 83% to 85% of young ladies in a similar age group (4). Acne is the fourth most normal explanation behind looking for medicinal therapies among patients aging from 11 to 21 years, and it represents 4% of all visits from patients aged from 15 to 19 in the USA (6).

Acne vulgaris includes significant anatomic, immunologic, biochemical, hereditary, and physiologic factors (4). It is supposed to have social impact and mental and psychological effects on patients including tension, discouragement, anxiety and depression (7, 8).

Acne vulgaris is a typical inflammatory sickness of skin influencing around 9.4% of the total populace with the most elevated occurrence in young people. It influences over 80% of females and 90% of males in every single ethnic gathering (9, 10). The commonness of acne in young people and grown-ups changes among nations and ethnic group (11).

The pervasiveness of acne was reported among 85% of young people in the USA (12). A study led on acne among students in medical colleges in Malaysia, announced predominance of skin inflammation was 68.1% (13). Also, the general pervasiveness among matured youths was between 13–19 years was 60.7% in Turkey (14).

The prevalence of acne among female adolescents in Saudi Arabia showed a variation in incidence of acne between different research studies but its prevalence was generally high (15).

Also, in Riyadh city higher prevalence was discovered among females (adolescent and youth) with an average of 68.2% (16) and it was 56.6% in Mekkah (17).

Lately, skin inflammation has been seen in more youthful patients because of earlier adolescence (18). Acne is increasingly normal in young ladies in the age scope of 12 years and more, yet it displays more in young men in the age scope of 15 years or more. Acne vanishes among most cases during the mid-twenties; but it may continue into adulthood which as a rule happens all the more regularly in females (19).

Acne has many negative consequences for young people. It causes uneasiness, peer pressure, deformation and even permanent scarring to the skin. It might likewise cause nervousness and shame in patients and may reduce the patient's physiological and social prosperity (20, 21). A few elements may initiate acne generation or increment its seriousness. A portion of these components incorporate hereditary qualities, the male gender, youth, stress and smoking, some prescriptions, and pore obstructing beauty care products. Research suggests that hereditary impact along with comedogenic hormones produce irregular volumes of sebum which add to skin inflammation sores (19, 22). At present, there is a connection found between diet and Acne vulgaris (23).

In spite of being a common disease, acne is neither perilous nor physically incapacitating, yet it can influence social and mental health of affected patients and lead to disintegration of their personal satisfaction and quality of life. Some acne injuries may leave hyper pigmentation or potentially atrophic scars that can influence the personal satisfaction and lead to decreased confidence, and less social communication with others. Additionally, it can prompt uneasiness, discouragement, and injury that compromises personal satisfaction (24).

Subjects and methods

I. Research Design
It is a cross sectional study.

II. Study Population
The study included female secondary schools in Tabuk City.

ELIGIBILITY CRITERIA
a. Inclusion criteria
The inclusion criteria are Saudi secondary school girls suffering from Acne vulgaris.
b. Exclusion criteria
- Non-Saudi subjects
- Not suffering from acne

Study Area
This study was conducted in Tabuk City at 5 random female secondary schools during the period from February 2020 to August 2020.

The schools were randomly chosen from different parts of Tabuk city.

Sample size
The sample size was designed established on the equation with a margin of error (5%) and a confidence level (95%) (25). It was proposed to include 400 girls.

Data collection tool (instrument)
The study was carried out using a structured questionnaire which was tested and verified based on a previous study conducted in Arar City, Saudi Arabia (26). The questionnaire \consisted of 2 parts. Section one consisted of information regarding socio-demographic variables of the PHCPs (age, marital status, nationality). Section two consisted of questions to assess the psychological impact of acne.

Data Collection technique
Data was collected electronically through questionnaire among students in 5 schools.

DATA ENTRY AND ANALYSIS
The statistical analysis was done using the Statistical Package for Social Sciences version 20 (SPSS Inc., Chicago, IL, USA). P –value < 0.05 was considered for significance.

Results

A total of 540 questionnaires were obtained from respondent females to the online questionnaire; the mean ± SD age of respondents was 17.9 ± SD 2.8 years, with an age range of 15-49 years old, only 388 females were included as they were suffering from acne, whereas 152 respondents were excluded. The large majority of females were Saudi 363 (93.5%) and single 383 (98.7%). There were 341 (87.9%) females who had secondary education, whereas only 46 (12.1%) had a bachelor's degree, (Table 1).

The psychological impact of acne was investigated through 10 questions; there were 177 (45.6%) who reported little experience of pain or itchiness because of their skin. There were 127 (32.7%) who reported feeling shyness or embarrassment because of their skin. More than half of females 225 (58%) reported never facing difficulties in doing daily activities like shopping or home care. More than half of participants 246 (63.4%) reported that their skin condition never affected the way they dress. Less than half 190 (48.9%) reported that their skin condition never affected their social activity. There were 273 (70.4%) who reported that their skin condition never affected their physical activity. The large majority of females 370 (95.4%) reported that their skin condition never hinders their studies. There were 266 (72.7%) participants who reported that their skin condition never affected their ability to study. More than half 230 (59.3%) reported that their skin condition never affected their relationship with friends and family. Also, more than half of participants 205 (52.8%) stated that their skin condition never affected their time management and their home conditions. The details of the females\'answers are shown in (Table 2).

The overall psychological impact was estimated, and it was as follows; 67 (17.3%) had no effect, 130 (33.5%) had a low effect, 92 (23.7%) had a moderate effect, 93 (24%) had a high effect, and 6 (1.5%) had a severe effect, (Figure 1).

There were significant correlations between the mean age of participants and each of experiencing pain (P=0.0003), feeling shyness (P=0.01), affecting their social activity (P=0.001), affecting physical activity (P=0.006), and affecting the relationships with family and friends (P=0.002). Regarding education, there were significant correlations between the level of education and each of feeling shyness (P=0.04), and affecting social activity (P=0.01), (Table 3).

Table 1: Socio-demographics of participants

Item	N	%
Nationality		
Saudi	363	93.5
Non-Saudi	25	6.5
Marital status		
Single	383	98.7
Married	5	1.3
Education		
Secondary	341	87.9
Bachelor degree	46	12.1

Table 2: answers to the questionnaire

Question	Never		Little		Much		Very much	
How much did you experience pain or itchiness because of your skin?	103	26.5%	177	45.6%	70	18%	38	9.8%
How much did you feel shyness or embarrassment because of your skin?	108	27.8%	127	32.7%	74	19.1%	79	20.4%
How much difficulty did you face to do daily activities like shopping or home care?	225	58%	90	23.2%	56	14.4%	17	4.4%
How much did your skin condition affect the way you dress?	246	63.4%	87	22.4%	27	6.9%	28	7.2%
How much did your skin condition affect your social activity?	190	48.9%	86	22.1%	77	19.8%	35	9%
How much did your skin condition affect your physical activity?	273	70.4%	72	18.5%	30	7.7%	13	3.3%
Did your skin condition hinder your studies?	370	95.4%	0	0%	18	4.6%	0	0%
How much did your skin condition affect your ability to study?	266	72.7%	67	18.3%	33	9%	0	0%
How much did your skin condition affect relations with friends and family?	230	59.3%	84	21.6%	48	12.4%	26	6.7%
How much did your skin condition affect your time management and your home conditions?	205	52.8%	103	26.5%	57	14.7%	23	5.9%

Figure 1: Distribution of psychological impact among participants

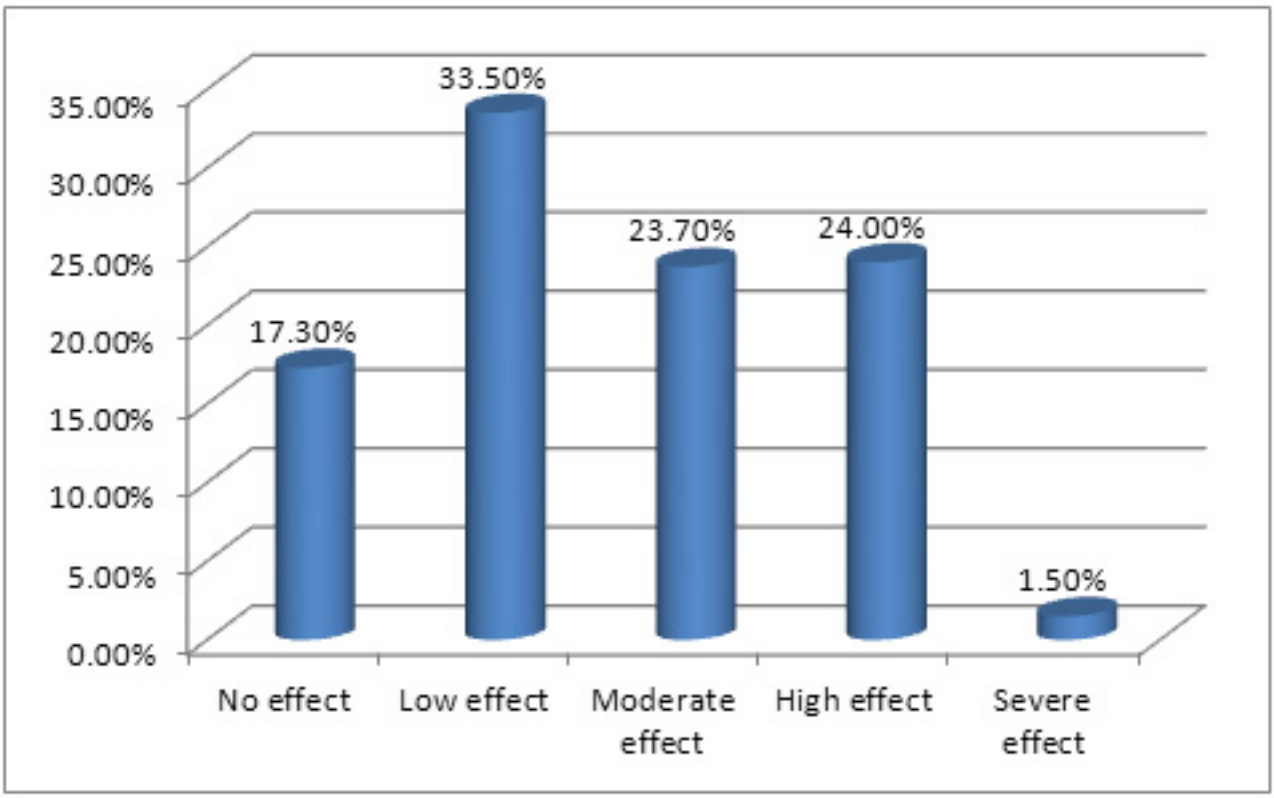

Table 3: Correlations regarding mean age and education of participants

Variables	Answers				P-value
Age (Mean age)	Never	Little	Much	Very much	
How much did you experience pain or itchiness because of your skin?	17.2	18.2	17.5	18.4	0.0003
How much did you feel shyness or embarrassment because of your skin?	17.4	17.9	18.6	17.7	0.01
How much did your skin condition affect your social activity?	17.4	18.8	17.6	18.2	0.001
How much did your skin condition affect your physical activity?	17.5	18.8	18.3	18.2	0.006
How much did your skin condition affect relations with friends and family?	17.6	18.9	17.8	17.5	0.002
Education					
How much did you feel shyness or embarrassment because of your skin? Secondary Bachelor degree	 99 9	 114 13	 58 16	 70 9	0.04
How much did your skin condition affect your social activity? Secondary Bachelor degree	 166 24	 72 14	 75 2	 28 7	0.01

Discussion

This study was established to investigate the psychological impact of acne on females. We included 388 females, where the large majority were Saudi and singles. The largest proportion of participants (33.5%) reported overall low effect, followed by moderate effect (23.7%), then high effect (24%), and no effect (17.3%), whereas the severe effect was found among 1.5% only of participants. In a previous Saudi study conducted on females of secondary school, it was found that 14.5% had a large impact, more than half, 56.3% had small to moderate impact, and 29% had no impact [26]. The proportions in our study varied from that of the previous Saudi study [26], where we found a high impact of 24% vs. 14.5% of the Saudi study, no effect among 17.3% of our participants vs. 29% of the previous Saudi study, whereas moderate impact was higher in the previous Saudi study compared to our findings, this may return to the variation in the area of study, and other demographics between the two studies.

In our study, we found that 82.7% were affected psychologically by acne with varying degrees which ranged from low to severe, compared to 71% in the previous Saudi study [26]. A close percentage to our findings was reported by another Saudi study [27] where it was found that 84.6% of university students of both genders reported that acne had a negative impact on their life, and there was a social stigma associated with it.

A lower proportion was reported by Hazarika and Archana, who reported that 66% of acne cases were affected by acne [28]. A much lower proportion of 30.8% was reported from a Chinese study, where this percentage was affected by acne [29]. A study from India revealed that acne had significant impact on the patient' 'psychological life, especially self-image [30].

The most-reported impact of acne in this study was feeling shy because of their skin, followed by the experience of pain and itching, the impact of acne on the way the females dress, then the impact of acne on relations with friends and family. In a previous Saudi study [31], the most reported impact of acne included willingness to get married, followed by spouse relationship, then the impact on friendship. A study from Egypt [32] demonstrated that acne affected severely the emotional state, perception, and social activities of patients, where the most affected social activity was interacting with the other sex.

This study revealed that the age and education of participants affected the psychological impact. The mean age of participants was significantly associated with feeling pain very much, feeling shy very much, little effect on social activity, physical activity, and relations with family and friends. This indicates that participants with the age of 17.9 were more prone to experience pain and shyness, whereas their social and physical activities and family correlations were affected little. Regarding the education level, both feeling little shyness and no effect on social activity were significantly associated with secondary students. In a previous Saudi study, it was found that the impact wasn't affected by the age of participants [26]. In another Saudi study [31], it was found that more females were significantly affected by stress compared to males.

Limitations and Recommendations:

There were few studies conducted on this subject, so few comparisons between the previous findings and our findings were performed. Also, the studies had different study design, investigated different demographics, and were conducted on different subjects, which made comparison not perfect. Further studies should be conducted in Saudi Arabia, and they should include the whole kingdom as there were variations between the Saudi studies from different regions, so a large study will provide general findings that can be reference data.

Conclusion

This study revealed that acne had a significant psychological impact on female students, and this impact varied between females depending on their demographics. Early treatment of acne may lead to the early disappearance of such acne and reduce the psychological impact on females.

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The value of honey dressing in the treatment of diabetic foot infections

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Abstract

Background: Diabetic foot ulcer is one of the commonest complications of DM. Honey could be used effectively on diabetic foot ulcers.

Objectives: The aim of the present study was to assess the effect of use of honey in treating diabetic foot ulcer on Saudi diabetic patients.

Methods: Thirty-two diabetic patients with diabetic foot infections were included in this study. Initial assessment was done for the diabetic foot ulcer and follow up assessment for three months was done for the site, size, grade and stage of ulcer and for the presence of inflammatory signs after application of honey dressing.

Results: Of the participants, 56.6% were males, 90.6% had diabetes type 2, 40.6% had an ulcer at the plantar fore foot, and 46.9% had an ulcer size of 6-10 cm2. A significant decrease was found in the mean ulcer size after one (22.18 ±32.66), two (15.32± 24.44) and three months (10.47 ± 19.55), compared to its mean size at the base line (27.19± 37.24). Most patients had an ulcer grade and stage of (1-b) at the base line, after one-month (59.4%) had the (2-a) stage, after two months (53.1%) had the (1-a) ulcer grade, and after the third month, (46.9%) had the (0-a) stage. A significant difference was found between the presence of ulcer inflammation signs at the base line (43.8%), and after one month (9.4%).

Conclusion: The study proved that honey can be used as an effective, cheap, easily available, non-toxic adjuvant without adverse side effects in treatment of diabetic foot infections.

Key words: value, honey, dressing, treatment, diabetic, foot

Introduction

Honey was used in ancient times in medicinal purposes and was mentioned for healing purposes in the Holy books (1). The economic benefit of honey in wound dressing could be a direct cost saving through the rapid healing rates compared to conventional treatments (2).

In diabetes mellitus (DM) foot, soft tissue infections are considered the most common soft tissue complications (3). Wound size, existence of dead tissue and infection, the extent of vascular compromise, quality of diabetic management, and degree of patient compliance to treatment should be taken into consideration in management of diabetic foot ulcer (4).

Honey dressing was found to draw lymph out of interstitial tissues, a matter that enhances edema relief and better healing though better blood supply (osmosis) (14). Osmosis also delivers a moist healing environment and granulation and epithelialization activity, leading to ultimate rapid healing with negligible scarring (5). Another property of honey is its ability to stimulate the immune system activity, through enhancing the proliferation of peripheral blood B and T lymphocytes and activate phagocytes. That is why honey was found to be effective against antibiotic-resistant bacteria; as it prevents bacterial growth even if wounds are heavily infected (6). With honey, there is no dressing adhesion; no pain or tissue damage on changing the dressings (7).

In 2011, a study found that the use of honey-coated bandages improved the outcome of malignant wounds (2). Another study done in 2013, titled “Efficacy of honey gel in the treatment of chronic lower leg ulcers: A prospective study” found that honey-based dressings appear to be an efficient and easy to use treatment for leg ulcers (8).

In 2013, Yaghoobi et al., found that Honey has almost equal or slightly superior effects when compared with conventional treatments for acute wounds and superficial partial thickness burns (9). A systematic review published in 2016 found that honey dressing is safer for treatment of diabetic foot ulcer but there is insufficient good quality data to realistically conclude on the efficacy of honey on diabetic foot ulcers (10).

A study done in 2015 found that honey has a proven safety for use when compared to glucose and sucrose as it has lower glycemic and incremental indices in type I DM patients. It was reported in this study that honey has simple sugars that are absorbed directly into bloodstream without digestion and can serve as an athletic aid (1).

Another study published in 2015 found that honey used in wound-care products can withstand dilution with substantial amounts of wound exudate and still maintain enough activity to inhibit the growth of bacteria. In addition, the study stated that honey has bioactivities that stimulate the immune response (thus promoting the growth of tissues for wound repair), suppress inflammation, and bring about rapid autolytic debridement (5).

In the Kingdom of Saudi Arabia (KSA), a prospective double-blind, randomized clinical trial was conducted at the King Abdul Aziz Specialist Hospital in Taif city in 2013. The aim of this study was to compare the efficacy of Manuka honey combined with conventional modalities to that of conventional treatment alone in the treatment of diabetic foot ulcers.

The study found that the mean time to eradicate infection and the hospital stay were significantly reduced in the honey treatment group compared to control group (11). Another study was done in 2014 to assess the role of honey in wound dressing in diabetic foot ulcer in Al-Noor Specialist hospital, Holly Makkah city. The study found that the use of honey significantly reduced rate of amputation and improved wound healing when used for wound dressing in chronic diabetic foot ulcers (12).

As studies about the effect of honey dressing in the treatment of diabetic foot infections in KSA are limited, this study aimed to investigate the value of honey as a topical treatment of diabetic foot infections. And to study its affect on diabetic wound healing in duration of diabetes, type of diabetes and anti-diabetic therapy.

Methods

The collection of data and management for the studied group started at the beginning till the end of the study duration. At each visit, the time of data collection and dressing technique ranged between 30-45 minutes for each patient.

At the initial meeting, assessment of patient’s condition was done where personal data was gathered , and physical examinations, and laboratory investigations were done. Wound care was done every visit. Each patient was assessed for general condition and sign of septicemia: (i.e. fever, shivering). The old dressing was removed slowly and the occurrence of pain during dressing removal was noted.

Assessing the condition of the foot for pulsation, skin colour, hotness and swelling were done. Assessing the wound was done for: Site of the ulcer which was determined by dividing the foot into: dorsum and plantar, heel, mid foot, medial and lateral malleolus and fingers. Size of the ulcer was measured by tracing the dimension of the wound by using transparent ruler. Grade of ulcer was assessed according to the University of Texas Diabetic Wound Classification (7).

Type of the tissue of the floor of ulcer was examined and was determined if closed (resurfaced), healthy granulation tissue, epithelial tissue, yellow or gray or white (slough, necrotic tissue) or black (gangrenous) tissue.

Assessment of the surrounding area of the ulcer for the presence of signs of inflammatory response (redness, hotness, tenderness, swelling and loss of function) was carefully done. Debridement of all necrotic tissue (if present) and removing calluses around the ulcer by

scalpel blade until the floor of ulcer bled and the edges oozed, was done. Then the wound was washed with normal saline solution 0.9% and drying of the wound and surrounding area with dry sterile gauze.

Honey application: The honey was applied on absorbent dressing prior to its application. Sheets of cotton gauze that lay vertically were put loose in a jar of honey with their ends overhanging the jar rim. Any depressions or cavities in the wound bed were filled with honey using honey-impregnated gauze. This was to ensure the antibacterial components of the honey diffuse into the wound tissues. Honey was inserted into cavities and sinuses. Honey dressings were extended beyond the inflamed area surrounding the wound if present. Finally, it was covered with appropriate dressing and secured in place by regular bandage. The frequency of dressing changes depended on how rapidly the honey was being diluted by exudates, if there were no exudates, dressing was changed once daily till complete healing or for 3 months.

At the end of the study the evaluation of the healing of the ulcer was done if complete healing (resurfaced wound), partial healing (healthy granulation tissue, for spontaneous healing in small wound (> 2 inches) or preparing for skin graft in the larger wound) or no healing (unhealthy granulation tissue; presence of severe infection and or massive necrotic tissue).

Data analysis: Data were analyzed using (SPSS) version 25. Qualitative data were presented as frequencies and percentages and Chi squared test was applied to assess the relationship between variables. Quantitative data were expressed as mean and standard deviation and Wilcoxon test was applied to assess the relationship between related variables. A p-value of <0.05 was considered as statistically significant.

Ethical considerations: Written and verbal consent was obtained from patients before inclusion in the study and each patient was informed about the purpose of the study.

Results

Table 1 shows that in the present study, among the studied 32 participants, 56.6% were males, 53.1% were unemployed, 40.6% were illiterate, and 12.5% were smokers. Among the patients, 90.6% had diabetes type 2, 62.5% had diabetes duration more than ten years, and most of them (62.5%) were on both insulin and oral hypoglycemic drug therapy. About 9% (9.4%) of patients had diabetes complications, and 12.5% had chronic vascular disease. Dorsalis pedis pulse was palpable in 87.5% of patients and posterior tibial pulse was palpable in 93.8% of them. All studied patients had palpable popliteal and femoral pulse. All vital signs (temperature, pulse and respiratory rate) were normal with a mean value of (36.86± 0.27, 74.5 ±7.2, and 15.68± 1.63 respectively). All patients had normal abdominal and chest examination and only one patient (3.1%) had abnormal cardiac examination.
Figure 1 shows that most patients (40.6%) had an ulcer at the plantar fore foot, and most of them (46.9%) had an ulcer size of 6-10 cm^2.

Figure 2 shows that in comparison between the ulcer size at the base line and during the follow up period (3 months), a highly significant difference was found between the ulcer size at the base line and its size after one, two and three months (p= < 0.001). Most patients at the base line had an ulcer size of 6-10 cm2, after one month 34.4% of them had an ulcer size of 6-10 cm^2, while 15.6% showed complete healing. After 2 months, 34.4% of patients had an ulcer size of less than 5 cm2 and 25% showed complete healing. After 3 months, 25% of patients had an ulcer size of less than 5 cm^2, while 46.9% showed complete healing.

Table 2 shows that in comparison between the ulcer size at the base line and during the follow up period (3 months), a highly significant decrease was found in the mean ulcer size after one (22.18 ±32.66), two (15.32±24.44) and three months (10.47 ± 19.55), compared to its mean size at the base line (27.19± 37.24) (p= < 0.001).

Figure 3 shows that a significant difference was found between the ulcer grade and stage at the base line and during the follow up period (3 months). Most patients had an ulcer grade and stage of (1-b) at the base line, and after one month the majority (59.4%) had the (2-a) stage (p=0.042). After two months most of the patients (53.1%) had the (1-a) ulcer grade (p=0.036), and after the third month, (46.9%) had the (0-a) stage (p=0.029).

Figure 4 shows that significant difference was found between the presence of ulcer inflammation signs at the base line (43.8%), and after one month (9.4%) (p=0.39).

Variable	No (%)
Age (mean±SD)	63.37 ±5.93
Gender	
- Male	21 (56.6)
- Female	11 (34.4)
Employment	
- Employed	15 (46.9)
- Unemployed	17 (53.1)
Education	
- Illiterate	13 (40.6)
- Read and write	11 (34.4)
- Basic and secondary	3 (9.4)
- University	5 (15.6)
Smoking	
- Smoker	4 (12.5)
- Non-smoker	28 (87.5)
(mean ±SD) of smoked packets	2 ± 0.81
Diabetes type	
- Type 1	3 (9.4)
- Type 2	29 (90.6)
Diabetes duration	
- < 10 years	12 (37.5)
- > 10 years	20 (62.5)
Type of diabetes therapy	
- Insulin	7 (21.9)
- Oral hypoglycemic drugs	5 (15.6)
- Both	20 (62.5)
Presence of diabetes complications	
- Yes	3 (9.4)
- No	29 (90.6)
Presence of chronic vascular disease	
- Yes	4 (12.5)
- No	28 (87.5)
Dorsalis pedis pulse	
- Palpable	28 (87.5)
- Not palpable	4 (12.5)
Posterior tibial pulse	
- Palpable	30 (93.8)
- Not palpable	2 (6.3)
Result of blood analysis	
- Fasting blood glucose	98.81 ±10
- RBCs count (mcl)	5.28 ±1.67
- WBCs count (mcl)	8968.75 ± 2206.79
- Hemoglobin level	14.47±1.95
- SGOT level (unit/L)	41 ±10.49
- SGPT level (unitlL)	42.9± 8.62
- Urea level (mgldl)	15.69± 3.54
- Creatinine level	0.91± 0.11
- Albumin level	4.35± 0.5
- Blood (Na) level (mEq/L)	139.84± 2.59
- Blood (K) level (mEq/L)	4.29 ±0.47

Table 1: Disruption of the studied patients according to their demographic characters and conditions related to their diabetic status, pulsation status, and results of blood analysis

Figure 1. Disruption of the studied patients according to their ulcer site and size at the base line (cm^2)

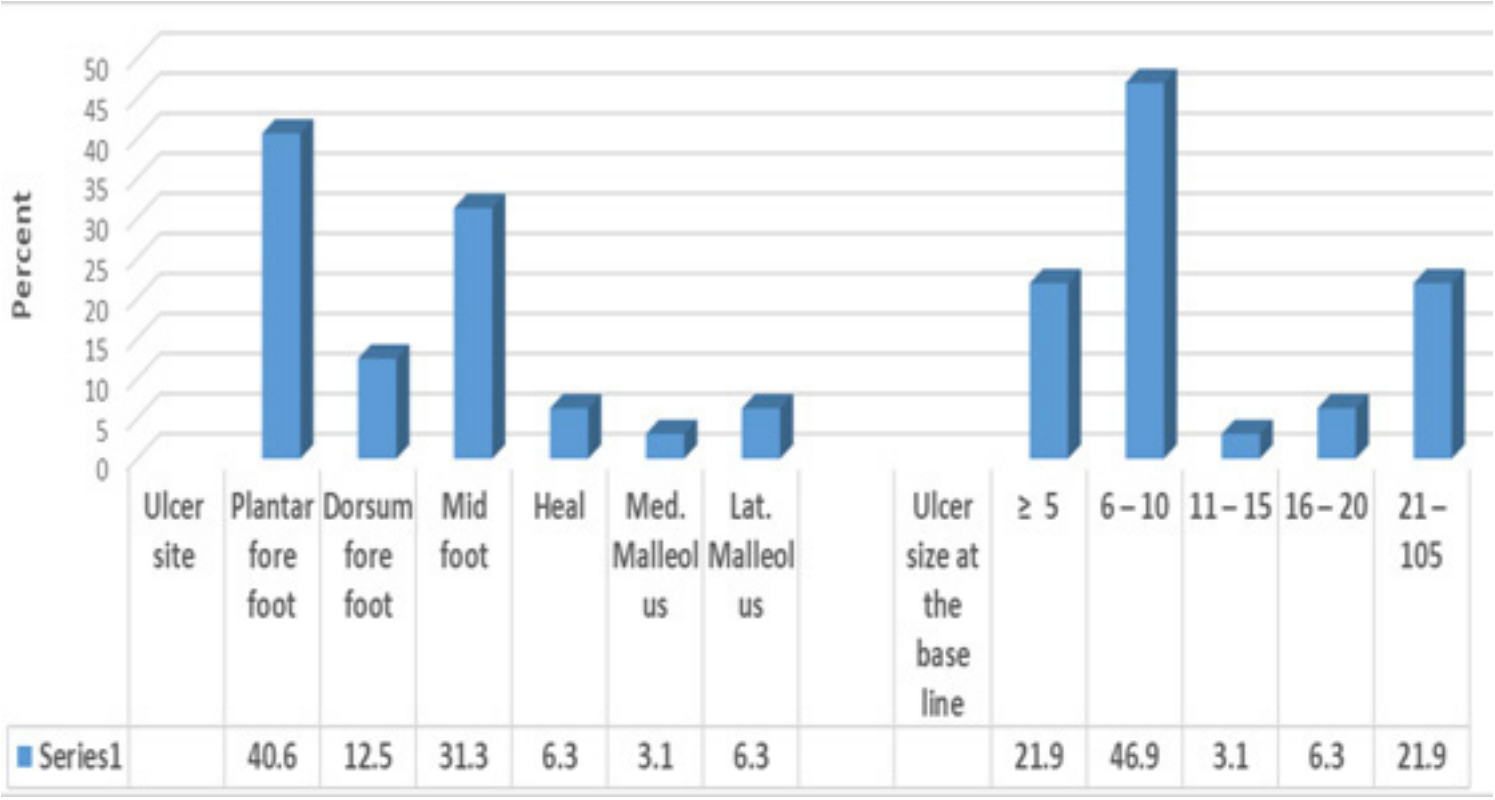
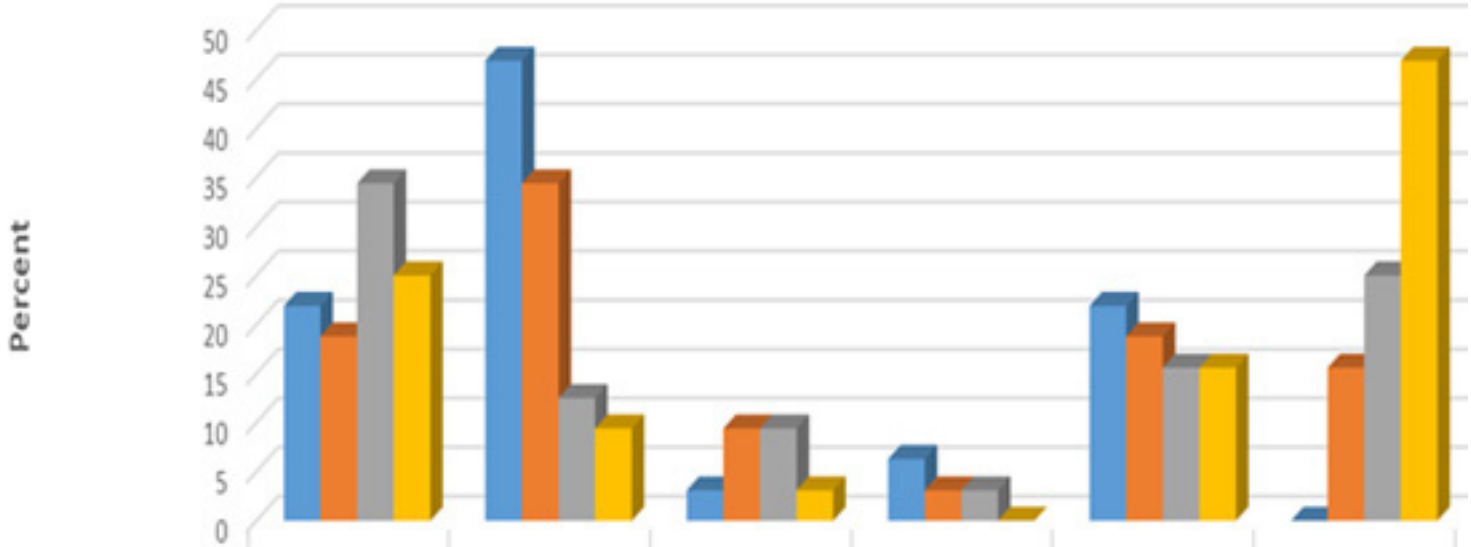


Figure 2. Relationship between ulcer size at the base line, after one, two and three months among the studied patients (cm^2)



	>5	6 – 10	11 – 15	16 – 20	21 – 105	zero
At base- line	21.9	46.9	3.1	6.3	21.9	0
After one month	18.8	34.4	9.4	3.1	18.8	15.6
After 2 months	34.4	12.5	9.4	3.1	15.6	25
After 3 months	25	9.4	3.1	0	15.6	46.9

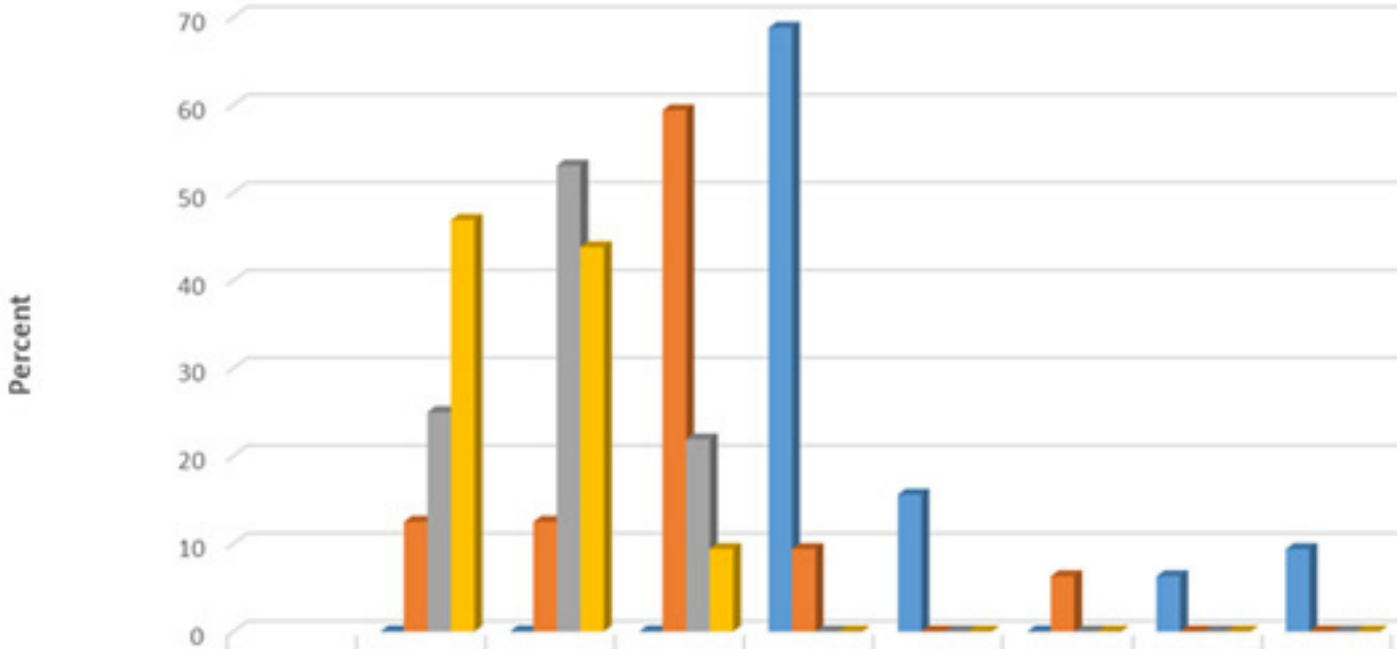
N.B.: Between ulcer size at the base line and after one month ($\chi 2$= 87.06 & p-value = <0.001)
N.B.: Between ulcer size at the base line and after one month ($\chi 2$= 65.14 & p-value = <0.001)
N.B.: Between ulcer size at the base line and after one month ($\chi 2$= 54.94 & p-value = <0.001)

Table 2: Comparison between the mean ulcer size at the base line and its mean after one, two and three months (cm^2)

Variable	Ulcer size after one month (cm^2)	Test* (p-value)	Ulcer size after 2 months (cm^2)	Test* (p-value)	Ulcer size after 3 months (cm^2)	Test* (p-value)
Ulcer size at base line (cm^2) (Mean SD) (27.19± 37.24)	22.18±32.66	4.82 (< 0.001)	15.32± 24.44	4.93 (< 0.001)	10.47 ± 19.55	5.13 (< 0.001)

N.B.: Test is Wilcoxon test

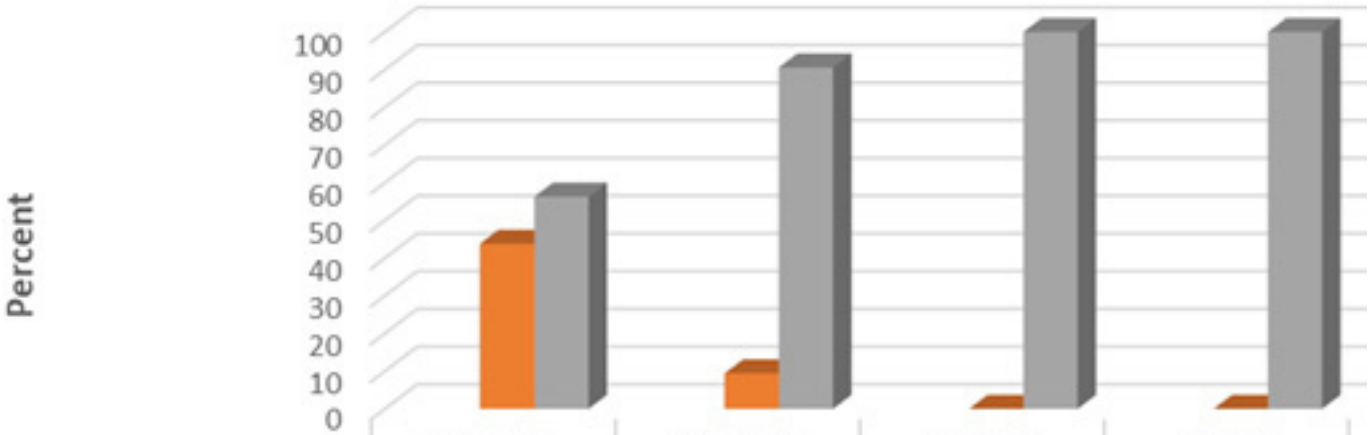
Figure 3. Relationship between ulcer grade and stage at the base line and during the follow up period among the studied patients



Grade and stage of ulcers	0 – a	1 – a	2 – a	1 – b	2 – b	2 – c	2 – d	3 - d
At base- line	0	0	0	68.8	15.6	0	6.3	9.4
After one month	12.5	12.5	59.4	9.4	0	6.3	0	0
After 2 months	25	53.1	21.9	0	0	0	0	0
After 3 months	46.9	43.8	9.4	0	0	0	0	0

N.B.: Between grade and stage at the base line and at the base line and after one month ($\chi 2$= 20.43 & p-value = 0.042)
N.B.: Between ulcer size at the base line and after one month ($\chi 2$= 13.5& p-value = 0.036)
N.B.: Between ulcer size at the base line and after one month ($\chi 2$= 14.02& p-value = 0.029)

Figure 4. Relationship between the presence of ulcer inflammation signs at the baseline and during the follow-up period among the studied patients



Inflammation signs	At base-line	After one month	After 2 months	After 3 months
Present	43.8	9.4	0	0
Absent	56.3	90.6	100	100

N.B.: Between grade and stage at the base line and at the base line and after one month ($\chi 2$= 4.25& p-value = 0.039)

Discussion

In the present study, most patients were males. The increased incidence in males might be contributed to the fact that males are more active; working in manual work and some of them work as teachers, guard and drivers which lead to continuous pressure on feet (13,14). In addition, men are at risk of developing lower extremities problems much more than females (13, 14,15,16).

This study showed that most patients had type II diabetes more than ten years, a finding that agrees with other studies reporting increased risk of foot ulceration and amputation with type II diabetes and longer duration of diabetes (13, 17).

The most common sites of ulcers in the studied group were in the plantar aspect of the foot. This was consistent with other studies testifying the increase of plantar foot pressure is the leading cause of ulceration in the diabetic population (13, 18).

The highest percentage of ulcer size in the studied group ranged from 5 – 10 cm2, a result that is consistent with other studies where the classical diabetic foot ulcer measures 10 cm2 or less in surface area on the plantar surface of the foot (forefoot) due to elevated pressure on the foot and neuropathy (13).

In the present study, a highly significant decrease in the ulcer size was found between the ulcer size at the base line and its size after one, two and three months. It was reported that honey stimulates the formation of clean, healthy granulation tissue and re–epithelialization, and provokes the healing process in chronic wounds (10, 19). (Mohd 2007), reported effective use of honey dressing in converting diabetic foot infected ulcers into sterile ones (20).

The present study showed that most patients had an ulcer grade and stage of (1-b) at the base line, and after one month the majority (59.4%) had the (2-a) stage, after two months most of the patients (53.1%) had the (1-a) ulcer grade, and after the third month, (46.9%) had the (0-a) stage. This finding could be explained by the ability of honey dressing to draw lymph out of interstitial tissues, a matter that enhances edema relief and better healing though better blood supply (osmosis) (5). Honey was found to prevent bacterial growth (6) and stimulate new tissue growth as it contains bee proteins, pollen, and enzymes, and it was found to prevent infection; absorb pus, and relieve pain, irritation and odour (21).

Studies have found that the application of honey topically allows clearance of the infected wound and fast healing of deeply infected wounds (19). It was reported that honey endorses autolytic debridement to allow rapid development of a clean wound bed (22). In addition, through its osmotic action, it creates a moist wound environment through drawing out lymph from wound tissues. This osmotic action allows the rapid painless debridement through production of proteases enzymes at the wound bed (23).

Oluwatosin reported the advantage of topical honey in the treatment of chronic leg ulcers when compared to the phenytoin effect (24) a matter that was observed in another

study (25). Another study done in 2013 found that honey-based dressings appear to be an efficient and easy to use treatment for leg ulcers (8). A systematic review published in 2016 found that honey dressing is safer for treatment of diabetic foot ulcer (10).

A study done in 2015 found that honey has a proven safety for use as it contains simple sugars that are absorbed directly into the bloodstream without digestion and can serve as an athletic aid (1). The present work showed that a significant difference was found between the presence of ulcer inflammation signs at the base line (43.8%), and after one month (9.4%), with complete disappearance of inflammation signs in all patients during the second month. Sugar in honey provides a high osmotic pressure around microorganisms and thus eliminates them from water and prevents their growth. In honey, the enzymatic oxidation of glucose produces hydrogen peroxide, and when used topically, the release of hydrogen peroxide and phenolic acid has an antiseptic effect (13).

The results of this study demonstrate the powerful action of honey even in the presence of infection. This is supported by the findings of another study which found that honey provides a moist healing environment and atthe same time it prevents bacterial growth even when wounds are heavily infected (26). It is a very effective means of quickly rendering heavily infected wounds sterile, without the side effects of antibiotics. This was constant with reports that used generic honey as a topical application to clear existing wound infection rapidly (13).

Limitations

The cross-sectional nature of the present study could reveal the associations between variables without assessing the causal relationships.

Conclusion

The present study revealed that a highly significant decrease in the ulcer size was found after the application of honey when comparing its size at the base line and during the follow up period. A significant difference was found between the ulcer grade and stage at the base line and during the follow up period as most of patients had an ulcer grade and stage of (1-b) at the base line, and after one month the majority (59.4%) had the (2-a) stage (p=0.042). After two months most of the patients (53.1%) had the (1-a) ulcer grade, and after the third month, (46.9%) had the (0-a) stage. A significant difference was found between the presence of ulcer inflammation signs at the base line (43.8%), and after one month (9.4%). The study showed that honey can be used as an effective, cheap, easily available, non-toxic, extremely useful, and reliable adjuvant without any adverse side effects in the treatment of diabetic foot infections.

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Prevalence and risk factors of gastroesophageal reflux disease among female Medical students at Taif University, Saudi Arabia

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Abstract

Background: Gastroesophageal Reflux Disease (GERD) is one of the most common chronic gastrointestinal disorder in adults.

Objectives: to determine the prevalence of GERD and its risk factors among females at Medical college of Taif university, Saudi Arabia.

Methods: A cross sectional study was conducted at Taif university and data was collected by a structured questionnaire. The sample was 240 female medical students who had GERD. Data about age, burning sensation pain in stomach, nausea, trouble sleeping, medication taken, having non-vegetarian diet, snacks, skipping breakfast, drinking tea, sleeping hours, smoking, and exercises were collected.
Results: Out of the studied students, 29.3% had symptomatic GERD. Only frequent consumption of tea or coffee had a statistically significant association with symptomatic GERD.

Conclusion: This study demonstrated a high GERD prevalence among studied students. There is a need to increase awareness of university students about modifiable risk factors of GERD.

Key words: Prevalence, risk, gastroesophageal, reflux, students, Taif

Introduction

Gastroesophageal reflux disease (GERD) is one of the most common chronic gastrointestinal disorder in adults (1). It develops as a result of lower esophageal sphincter dysfunction and/or large hiatal hernia when the stomach contents reflux and rise up into the esophagus (2). The symptoms and complications of GERD are a result of stomach acid that touches the lining of the esophagus (2).

The standard symptoms of GERD include heartburn, regurgitation, rarely sore throat and cough, and mucosal damage (3). There are more serious complications from permanent acid reflux, for example esophagitis, esophageal strictures, and Barrett's esophagus (4,5). Several risk factors have been associated with GERD, such as analgesics intake (e.g., nonsteroidal anti-inflammatory drugs (NSAIDs), types of food, types of drinks, smoking, family history, high body mass index (BMI), physical activities, salt, or pickles consumption with meals and fast food. Accordingly, the life style of patient is the main cause of GERD (6,7).

A survey of nocturnal reflux in patients with gastroesophageal reflux disease was done in China. In this survey, outpatients with nGER were selected and relevant data were collected by using a questionnaire. The symptoms of heartburn and regurgitation were more severe during nighttime than daytime (8). In China, a study included 4,978 individuals where symptoms of heartburn and regurgitation were more severe during nighttime than daytime; age and body mass index were positively correlated with reflux severity in daytime and nighttime. This study found that a positive correlation was found between GERD severity and lifestyle factors such as smoking, high-fat diet, carbonated beverages, late supper (later than 9 pm), and snoring during sleeping, nighttime heartburn and regurgitation were positively correlated with sleep disorder (9).

In the Kingdom of Saudi Arabia (KSA), a cross-sectional study was designed to assess GERD's risk factors among the community of Saudi Arabia. In this study, the characteristics and behaviors of participants statistically significant with GERD were positive family history (39.3%), obese (body mass index > 30 kg/m2), not performing weekly regular physical activities ≥ 30 min and smoking. GERD was commonly noticed in participants on analgesics, not taking fiber, drinking tea, eating greasy and fast food (10).

Another study was done the same year to assess gastroesophageal reflux disease prevalence among school teachers of Saudi Arabia and its impact on their daily life activities. In this study, 55% of the participants reported to have GERD, 3% of them had blood group O +ve and 7.8% reported symptoms which affected their daily life activity (11). A study done in 2018 found no association between GERD's prevalence and gender, age, residence status, education level, occupation, and blood group (12).

Studies about GERD prevalence and their risk factors among female medical students in KSA are limited. This study aimed to determine the prevalence of GERD and its risk factors among females at medical college of Taif university, Saudi Arabia.

Methodology

Study design, setting and time frame: A cross sectional study was conducted at Taif university from 1/ 1/2019 April to 30/ 4/2020 in Taif city, KSA.

Sample: Sample was 256 female medical students in all years. The inclusion criteria were all female students at the medical college of Taif university, and the exclusion criteria were all students outside the medical college university and male medical students and those who had no history of GERD.

Data collection: The data were collected by using structured questionnaires. The following data were obtained from each student: age in years and the Gastroesophageal reflux disease questionnaire (GERDQ). The GERDQ, enquired about burning sensation, pain in stomach, nauseated, trouble sleeping, taking medication, non-vegetarian diet, snacks, skipping breakfast, drinking tea, sleeping hours, smoking and exercise.

The third part included the Gastroesophageal reflux disease questionnaire (GERDQ). The questionnaire included 6 Questions about: (1) burning sensation behind the breast bone (heartburn), (2) stomach material going up to the throat or mouth (regurgitation), (3) pain in the middle of the upper stomach region, (4) nausea, (5) trouble getting a good night's sleep due to heartburn or regurgitation, (6) and previous need for over-the-counter medication for heartburn or regurgitation (6,7). Each of the six items questioned about their weekly frequency and each item had four options with the following score:
Score 0: Occurs on 0 days, score 1: Occurs on 1 day, score 2: Occurs on 2-3 days, and score 3: Occurs on 4-7 days. After each item score for each participant was summated, a participant with a score of 8 was considered to have GERD. In other trials, this score cutoff value was used and had strong sensitivity and precision when detecting esophagitis and excluding functional heartburn (13,14,15).

Data analysis: Data entry was performed by using Microsoft Excel. Data were statistically analyzed by Statistical Package for Social Sciences (SPSS) program version 25. Qualitative data were presented by frequency and percentage, while quantitative data were presented by median and standard deviation. Chi-square test was used to assess the association variables. A p-value less than 0.05 was considered as statistically significant.
Ethical considerations: The study was approved by the research Ethical Committee of Taif University, KSA. An electronically signed consent was obtained from every student before participating in the study.

Result

Out of 256 online questionnaires distributed, 256 were fully completed leading to a 100% response rate. The risk factors for these participants are presented in Table 1. Smokers were 14 (5.5%) while 242 (80.5%) were nonsmokers, 170 (66.7%) of them had Non-vegetarian diet, and 206 (80.5%) exercise less than 5 times per week. Of them, 180 (60.3%) sleep less than 6 hours at night

Half of the participants, 130 (50.8%) frequently skip breakfast, 140 (55.3%) eat snacks at night, and 103 (40.6%) drink tea or coffee regularly. As for medication, 67 (26.3%) had frequent use of analgesics, and antacid users were 56 (22.0%) (Table 1). Out of the 256 students, 75 (29.3%) had symptomatic GERD (Figure 1). (Table 2) shows that only frequent consumption of tea or coffee had statistical significance and association ($P < 0.05$) with symptomatic GERD. However, all other risk factors did not show a statistical significance in relation to GERD ($P > 0.05$).

Table 1: Risk factor of 256 students

Parameters	N (%)
Smoking	14 (5.5%)
No smoking	242 (80.5%)
Non-vegetarian diet	170 (66.7%)
Frequent night snacks	140 (55.3%)
Frequently skips breakfast	130 (50.8%)
Inadequate sleep	180 (60.3%)
Frequent use of analgesics	67 (26.3%)
Frequent consumption of tea or coffee	103 (40.6%)
Physical activity (per week)	
>5 times	50 (19.5%)
<5 times	206 (80.5%)
GERD symptoms	75 (29.3%)

Figure 1: Percentage distribution of GERD prevalence among the participants

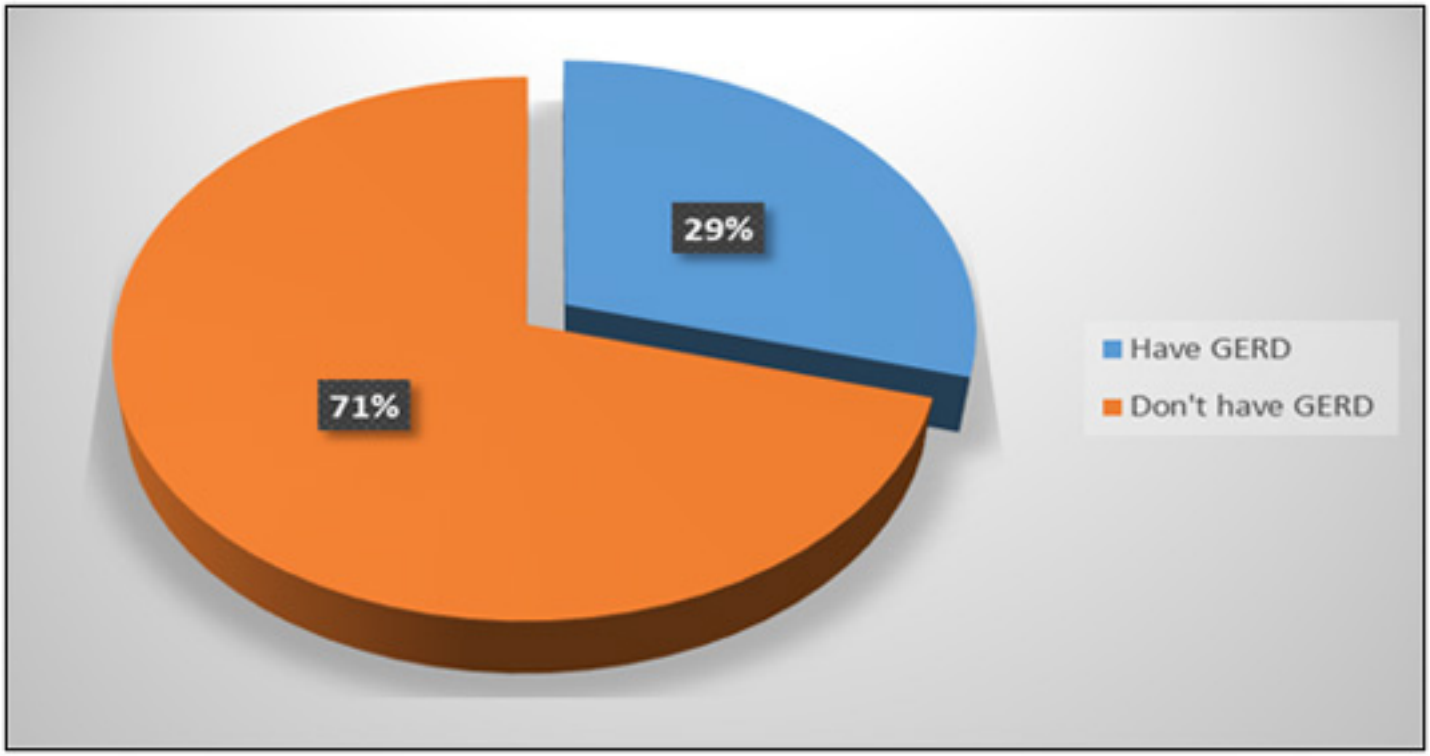

Table 2. Variables associated with GERD

Risk factor	GERD (n=75)	No GERD (n=181)	P
Smoking	5 (35.71%)	9 (64.29%)	0.398
Non-vegetarian diet	57 (21.76%)	113 (78.24%)	0.128
Frequent night snacks	45 (32.14%)	95 (67.86%)	0.647
Frequently skips breakfast	46 (35.38%)	84 (64.62%)	0.125
Inadequate sleep	60 (33.33%)	120 (66.67%)	0.105
Frequent use of analgesics	24 (35.82%)	43 (64.18%)	0.178
Frequent consumption of tea or coffee	39 (37.86%)	64 (62.14%)	0.025*
Physical activity (per week)			
<5 times	12 (4.0%)	38 (96.0%)	0.715

* Statistically significant

Discussion

Gastroesophageal reflux disease (GERD) is one of the major gastrointestinal disorders affecting adults worldwide. Our study results revealed that GERD is a common problem in Taif University students with a prevalence of (29.3%).

In our study we found that consumption of tea and coffee are significantly associated with GERD symptoms 103(40.6%), however a study in Shaqra university (16) conducted on 435 participants reported 203(50%) were associated with frequent consumption of coffee (16). Another study among students of Jouf (17) university in Saudi Arabia included 500 participants and found coffee consumption was 205 (41%) in their students.

Our results show that GERD is a prevalent problem among female medical college students at Taif university as it affects about one third (29.3%) of the students. This figure is lower than the prevalence of (33.2%) reported among college students in southwestern Saudi Arabia (18), but higher than the prevalence reported in Shaqra university (23.8%), Saudi Arabia (16).

In our study, there was an association between GERD symptoms and Frequent consumption of tea or coffee ($p<0.025$), However one study done among medical students in Jeddah (4) has shown tea and coffee were not associated with symptoms of GERD.

Our results were lower than those reported in a study conducted among University students in the western region of Saudi Arabia (19), who reported a higher prevalence rate of GERD among smokers (68.3%) which was significantly higher ($p<0.001$) than that among nonsmokers (47.6%), while our study showed that smoking is an insignificant risk factor of GERD, (p value 0.398), and the prevalence of GERD in smokers was (35.71%).

In the present study, 12.6% of the college students, however, who had inadequate sleep, was not related to GERD in this study and according to a Shaqra University study[5] in 2019, inadequate sleep did not show statistical significance in relation with GERD ($P > 0.05$).

The relationship between physical activity and GERD was found not significant in the current study ($p>0.05$). However, another study revealed that regular physical exercise is an associated risk factor for acid reflux. The same result was revealed from another study (20).

Limitations

A limitation of the present study is using a self-reported questionnaire that could have a recall bias.

Conclusion

The findings of the present study demonstrated a high GERD prevalence among studied female medical students. There is a need to increase awareness of university students about modifiable risk factors of GERD through conducting awareness campaigns.

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Perceptions of the Phenomena of Quarantine as Experienced by Saudi Arabian COVID-19 Patients

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Abstract

Background: During the early stages of the COVID-19 pandemic, which affected Saudi Arabia, vacated hotels were employed to provide care for positive-testing patients and their contacts. Contact tracing and quarantine of positive and suspected cases were employed to limit community spread of COVID-19 infections. Each patient was isolated separately in a hotel room until they were deemed non-contagious. The present study aimed to gain insights into personal perceptions of the quarantine experience and was undertaken with the hope of providing illumination to health care providers concerning this experience.

Methods: Semi-structured interviews with these patients via telephone were used to extract themes and concepts related to their quarantine experience.

Results: Results were conceptual themes that fell into two broad categories – positive and negative beliefs and experiences. Positive aspects were: commitment to serving society, safety derived through faith, social support from families, and desire to learn ways to gain access to media for information and family interaction. Negative impact categories were: psychological stress, financial and social stress, physical effects, and fear.

Conclusions: Difficulties with media use for communication with loved ones and access to entertainment were considered important concerns among patients.

Key words: Quarantine; Saudi Arabia; social interaction; digital communication; COVID-19; patients

Background

The COVID-19 (Covid) pandemic, caused by a novel virus, has spread to nearly every locale in the world since its outbreak. The World Health Organization indicated that as of October 3, 2020, the incidence of COVID-19 virus and deaths were 34,161,721 recorded cases and 1,016,986 deaths worldwide and 335,097 cases and 4,794 deaths in Saudi Arabia, respectively(1). While the origins of this pandemic are undetermined, its effects on a world in individuals, societies, and economies are highly connected and continue to be manifested.

Nations and regions of the world have approached control of infection in a variety of ways. Among modalities employed in attempts to control contagions are quarantine and isolation of infected patients and their contacts. Quantitative data from the present COVID-19, SARS, and MERS, H1N1, and other viral epidemics and pandemics of the early 21st century have assessed the impact of quarantine on populations in a variety of locales(2). The present study employs qualitative data to illuminate perceptions, concepts, and felt needs of those patients and their contacts who were confined to quarantine during the early stages of the COVID-19 pandemic in Saudi Arabia.

Effects of quarantine and lockdown

Quarantine and lockdown conditions have been historically identified as being mentally stressful for participants. Depression, fear, denial, anxiety, irritability, stress, suicidal thoughts, panic attacks, post-traumatic syndrome, dysthymia, anger, Post-traumatic Stress Syndrome (PTSS), stigma, and forced re-location of living arrangements have been identified in various locales as a result of Covid. In other pandemics studied (3,4,5,6,7,8,9,10) an end-of-the-world mentality and panic was reported among Wuhan residents during the onset phase of the Covid-19 pandemic lockdown (11,12).

During the early phases of the pandemic, various studies were conducted using the Impact of Event Scale-Revised and Depression, Anxiety, and Stress Scale to assess depression, anxiety, and stress feelings (28.3, 24, and 22.3% respectively) among community-dwelling residents of Saudi Arabia (9,13,14). This rate of depression may be compared with rates of depression in Saudi Arabia, which has an overall rate of 20% and 39%, respectively, with the lowest rates among adults aged 45 -65 years of age at 7.1%(15,16). These data contrast with rates of 55.5%, 40.5%, and 55.5% for depression, anxiety, and stress feelings, respectively, in a cross-sectional study of Saudi quarantine residents(17).

To assess factors during the initial stage in China, the study found that during severe lockdown, 16.5, 28.8, and 8.1% of residents during early days of the Wuhan outbreak experienced moderate to severe depression, anxiety, or stress symptoms respectively compared with Spanish residents of Covid residential lockdown who experienced 25, 41, and 41% anxiety, depression, and stress respectively suggesting that the lockdown experience or perception of it may vary in different locales(2). Satisfaction with the information provided concerning COVID, self-perception of good health, and pursuit of leisure activities such as physical activity, reading, or use of digital media was negatively associated with anxiety (r=-11), depression (r=0.14), and stress (r=-.011) in Spain(18) .

Chronic loneliness and boredom have been identified as detrimental to physical and mental well-being (19). Longer periods of quarantine have been associated with higher levels of PTTS (Post-Traumatic Stress Symptoms), avoidance behaviours, and anger, especially among patients confined for periods of more than ten days. Other stressors identified are the history of psychiatric illness, fear of infection, frustration, boredom, lack of available authoritative information, anticipated social stigma, and concern about disruption of personal financial status (20). Certain vulnerable groups may experience anxiety or changes in health status at higher rates than the general population in response to an epidemic or pandemic. In a sample gathered from 1,156 non-quarantined Saudi outpatients under treatment for inflammatory bowel disease, 48.4 % had scores consistent with anxiety in their responses to the Hospital Anxiety and Depression Scale at the time of the Ccovid-19 lockdown (21). Changes in lifestyle, including exercise and diet, have also been discussed as potential threats to patients' well-being confined to quarantine in who suffer from chronic conditions such as obesity, diabetes, and cardiovascular disease (22,23).

Effect on Social Interaction and Lifestyles during Periods of Quarantine:

Changes in the way people interact with each other in reaction to mass communicable infections have been observed. Patterns of interaction are mediated by norms and therefore are expected to vary between populations, thus making it necessary to be aware of the social perspectives in a particular society(24) .

Interpersonal relationships may have been affected by social interaction changes, which have resulted from quarantine and lockdown. Dynamics between persons who necessarily interact, such as children and parents and married couples, may undergo changes based on altered family functioning as an outcome of quarantine and lockdown (25) . These changes may cause or exacerbate family conflict and failure of communication (19,26).

In public interaction, avoidance behaviors and fear of becoming ill have been observed to vary between locales. Shoppers in Jeddah, Saudi Arabia, during the MERS-CoV epidemic expressed anxiety regarding that epidemic 57% of the time. Participants' probability of becoming infected was perceived to be 58.6, 27.2, and 13.8, as unlikely, likely, and very likely, respectively (27).

Similar data from Pakistan showed daily pandemic-related anxiety reported among 62.5% of Pakistanis studied, resulting in a reduction in physical contact and increased frequency of hand washing in 85.5 and 87%, respectively.

Fear of going out of the home and increased vigilance of family members' health was reported among 88.8% and 94.5% of this group, respectively (28).

Self-perception of health may also be altered during quarantine and lockdown. Hospitals in Wuhan experienced surges of low-risk patients clamouring for testing, suggesting deterioration of residents' self-confidence in their health (8) Fragility of self-perceived health may be vulnerable to threats based on rumours, loss of control, and a sense of being trapped(8,14). Appropriate communication may ameliorate similar problems as illustrated by an inquiry which found that Spanish community-dwelling elderly participating in television-based health education during lockdown reported overall self-rated good health and sleep quality of 61 and 70% respectively. However, 18 % of the sample who had been forced by COVID lockdown measures to change their living arrangements and participants who lived alone reported more negative feelings and lower sleep quality (8,4).

Saudi Arabian Measures in Addressing the Covid Pandemic:

Practice in epidemic control is not new to Saudi Arabia (29). The Coronaviruses - SARS (Severe Acute Respiratory Syndrome) and MERS (Middle East Respiratory Syndrome), have been addressed in Saudi Arabia during the earlier years of this century, thereby giving healthcare professionals experience in dealing with the control of viral epidemics and establishment of protocols for dealing with this type of emergency. Consequently, at the onset of Covid, these protocols developed and used during the previous viral epidemics were available for use in addressing the new threat. A complete lockdown of daily activities throughout Saudi Arabia was instituted very early in order to limit contagion (29,30).

Starting in February, travel from China and all Covid affected countries was stopped, but on March 2, the first case of the virus was detected in a Saudi who had traveled from Iran via Bahrain. Within a week, the complete lockdown of all non-essential activities, including the stay at home order for all residents, was implemented(30). All patients who presented for care based on Covid symptoms, their traced contacts, and all incoming travelers were quarantined for 14 days in hotels that had been prepared for this purpose in an attempt to stem the spread(29). Contact tracing was considered extremely important in limiting the virus based on the expectation that the presence of asymptomatic individuals and those in a prodromal period might be vehicles for further contagion.

Saudi Arabia began implementing its pandemic disaster plan to blunt the rise of disease incidence by mid-March 2020. A lockdown of all institutions except for grocery stores and pharmacies was applied. Residents were required to remain at home except for emergent situations subject to permission from the authorities. Transportation was halted between towns and cities, including international departures and arrivals. Children were instructed to begin online education in their homes after a 2-day weekend hiatus. Health care facilities began structuring their operations to address preparation for the anticipated wave of critically ill patients. Non-critical healthcare services were converted to Covid care.

During the ensuing months, the total lockdown has been gradually eased until the first week in July when life returned to normal functioning, except for international travel. Social distancing and mandatory use of masks in all public venues are enforced with robust fines, and large gatherings are prohibited.

Testing for Covid active cases continues with the quarantine of positive or suspected cases in special centers replaced by voluntary self-isolation at home for 14 days with retest after that period. Residents who require care for complications of infection or other medical emergencies receive it through the healthcare system. Segments of the population which have conditions suggesting that they may be at high risk for complications such as advanced age, hypertension, diabetes, obesity, compromised immunity, cancer, and poor general health have been advised to remain within their living arrangements as much as possible or are provided with the hotel or hospital-based quarantine care(9,17).

Theoretical Outlooks:

Stuart proposed a model for analysis and delivery of care while moving through the crisis, acute, maintenance, and health promotion stages of care(31). It was proposed for use in psychiatric settings but seems particularly appropriate for quarantine care. In approaching clients in quarantine, the assessment and appraisal of coping resources and coping responses enable the nurse to identify a nursing diagnosis from which a care plan may be formulated. Identification of cognitive, affective, physiological, behavioural, and social stressors are employed. Subsequently, resources are drawn from personal abilities, social support, material assets, and positive beliefs to address the quarantine experience's challenge (32).

Pyszczynski et al., employing the Terror Management Theory (TMT), proposed that the Covid pandemic has brought an awareness of death into sharper focus for many, thereby influencing attitudes and behavior (33). When death is brought into consciousness, as in the Covid pandemic, the individual's defences tend to focus on faith, self-esteem, and maintenance of an optimistic worldview. Therefore, the quarantine environment needs to consider the presence of these emotions and how they may influence attitudes, behaviour, and care of patients confined to quarantine.

Pender's Health Promotion Model may be appropriate for developing positive beliefs, personal abilities, and self-help capabilities when a care plan has been formulated(34). Modification of cognitions about disease states, prevention, and treatment is a key concept of this theory.

Pender proposes that cognitions and attitudes through reflective self-awareness and change toward desired behaviour are best achieved when persons are not

distracted by competing interests, which may have a stronger appeal (32). While loneliness and boredom are dominant emotions during quarantine, opportunities for participants' access to activities that are usually overshadowed by demands of daily living may make quarantine a constructive point of access for health-education related activities(20).

Research Gap and Aim of the Study: Evidence-based description of the quarantine experience and its various implications for those confined has not been undertaken for the Saudi population. Data gathered from this inquiry may be useful in the organization and implementation of best practices in ongoing and future quarantines in Saudi Arabia and perhaps other locales.

Method

A descriptive phenomenological method was employed to illuminate the pattern and structure of quarantine experience among Saudi Arabian Covid patients. The true meaning of this phenomenon is rooted in the life of these patients as they experience it. The process of phenomenological descriptive inquiry is conducted by formulating questions which capture the essence of the experience being investigated, collecting and analysis of transcripts for significant statements, and extracting meaning from these statements(35). Statements are then grouped and defined into evolving themes, employing member checking in the final stage to validate content.

Setting: The Saudi Arabian Ministry of Health organized quarantine facilities in large hotels that were vacated to accommodate large numbers of citizens, residents, and visitors who were either Covid positive, awaiting test results, or contacts of individuals who had tested positive or who were already ill. Positive cases were housed in separate hotels from those awaiting test results, unaffected family members, and other contacts.

Telephone-based interviews were used by the principal investigator to gain data.

Sample: The sample consisted of 28 adult male and female patients ranging from 15 to 63 years in the positive quarantine section.

Ethical Considerations: The study plan was reviewed and approved by the central IRB-MOH (Institutional Review Board - Ministry of Health – Kingdom of Saudi Arabia) with log No.20-73M. Informed consent was obtained at the time of admission, including the study's purpose, statement of confidentiality of data, and the ability to withdraw from the study at any time. Data were anonymized before transcription.

Data Collection: Semi-structured interviews of approximately 30 minutes were conducted over the in-house telephone system of the hotel. Digital recording was used to preserve data for transcription. The interviews were initiated with subjective probes related to the concerns and experiences of the participants. Initial probes included but were not limited to:

1. How did you feel when you received your positive result?
2. How is your family coping in your absence? How do they feel? How do you communicate with them?
3. If you could have prepared for this experience, what would you have done?
4. Are you worried about anything?
5. Is this disease and quarantine affecting you economically? Socially?
6. Do you have any previous experience in meeting a similar problem?
7. Have you received enough information about your present situation? When will it end? What to do when the quarantine is finished?
8. What would you tell those who are running this quarantine? Would you suggest any changes?

Analysis of Data: These data were used to formulate themes and illumination of experiences and concerns of the participants during their quarantine. Digitally recorded narratives were gathered from each subject, transcribed, and saved as Word documents stored on the principal investigator's laptop and a flash memory drive. Hard copies were stored in a locked facility.

Transcripts were reviewed independently by the principal and co-investigator to extract inductive themes. To enhance rigour Colizzi's descriptive phenomenological method was employed. The investigators engaged participants in automatic validation of the meaning of their input during the termination phase of the interviews (36). All data were examined with no limitations. NVivo software was employed to extract axial themes. This analysis's output was further reviewed and organized by the investigators into major themes and sub-themes, which were used to illuminate concepts extracted from the narratives about the lived quarantine experience.

Personal opinion and normative standards were not implied to the participants in order to prevent bias. Questions were non-directive and open-ended, and neutrality of language was carefully maintained. Credibility and trustworthiness were enhanced by member checking during data collection and peer review.

Results

In an analysis of the Covid quarantine experience in Saudi Arabia, several aspects of the phenomenon emerged from guided interviews. Results were divided into conceptual themes that fell into two broad categories – positive and negative beliefs and experiences that impact the client quarantine. The positive impact categories were: faith and duty, social support, and cognitive changes. Negative impact categories were: psychic, financial, social stress, physical, and fear.

Themes which described the nature of the Covid quarantine experience from the viewpoint of participants were extracted from the data and reviewed:

Faith and National Duty: Saudi Arabia is a theocracy. As such, many aspects of the society are viewed through the lens of Islam supplemented by humanitarian utilitarianism when rationalizing the need for participation in the quarantine.

Subject 4 said: "We are all in this together (referring to the pandemic), there is no escape…We have to do what is good for everyone."
Subject 7 said: "Thank Allah that our government was aware and locked down everything before it got too bad… Look at some of the other countries! Most people won't be careful unless they are forced to."
Subject 22: "I am happy to serve everybody in this simple way even though it's difficult for me."
Subject 26: "Everything is in Allah's hands. We have to be trustful of this wisdom and accept it… may all of us be healed with Allah's permission."

Social support: Participants confirmed strongly that they were missing their families critically. Many of the participants were parents and others were children or grandparents. The abrupt rupture in the family constellation was sorely felt by them.
Subject 17: "I miss them so much. It's like my arm has been cut off."
Subject 19: "My only consolation in being away from my family is that Lord willing I will see them soon and we're protecting them."
Subject 11: We are able to talk to them and see them on Zoom. That's the only thing that makes it bearable. "

Cognitive factors: At the time of the quarantine information concerning the nature of the source of infection and ways to address it was limited. Participants desired to know more about modes of transmission, length of infection, and appropriate methods of prevention and safety precautions required. These concerns were tempered by participants' level of education but addressed prevention with an empirical attitude:
Subject 22: I just would like to know how I got it!"
Subject 13: Before we go to our families we have to be sure we're safe. Allah forbid I would pass it on to somebody."
Subject 2: We need to know how it travels around so we can avoid it. Some people are washing their groceries… Do you think that helps? Maybe it's like that camel flu thing."
Subject 5: I need help in using this electronic media. My kids always helped me to get tuned in right but now it's the only contact I have with them and I'm not doing so well with it."

Psychological implications: Participants uniformly expressed feelings of low mood, anxiety, boredom, loneliness, and stress since each was restricted to a single room with parents, older children, and spouses housed in separate rooms. Only young children who also tested positive were permitted to remain with the infected parent. The only direct human contact during the confinement was from nurses in personal protective equipment (PPE) who entered rooms to assess patients and provide for all physical needs.
Subject 4: "I know this is to protect everyone but it's so boring and lonely…I really need to know how many days are left."
Subject 6: "If we could just go for a walk! We could stay away from each other!"
Subject 10: I'm afraid I won't test negative and have to do it all over again….what if I have to be on a ventilator? I don't want to die."
Subject 3: Outside of TV and social media, eating is the only entertainment ….I'll probably gain 10 kilos!"

Financial concerns: The lockdown of all sectors of the economy except major hospitals, grocery stores, and pharmacies was instituted overnight. Small business owners and their employees, those providing services such as barbers, hairdressers, sales personnel, dentists, travel industry employees, taxi drivers, and so many others were out of work and wondering how long the lay-off would last. While food was plentifully available those who were out of work worried how they would be able to pay daily necessities.
Subject 1: "This is a hard time for us. Our families can't go to work and we have very little money saved for emergencies.
Subject 18: "We had just moved here from another town and now this. Our family is far away and are in the same shape as us."
Subject 3: "We're from a village so there's nobody to help us out. My husband and I are both in quarantine. He needs to get back to work too."

Stressful social circumstances: Participants reported that they were concerned with the situation of their families while in quarantine. These problems were especially common with families which were headed by divorced or separated parents, living in areas away from their extended families, caring for a disabled or elderly relative, and parents of teenagers. They were concerned about how their leadership role was being carried out in their absence.
Subject 12: "My mom lives with me and needs constant care. There's a helper who's supposed to take care of her but I'm afraid she won't get her medicines right or on time. I tried to supervise on the telephone but the helper just says "ok mama" and I'm not satisfied. I have to be there!"
Subject 14: "It's good there's a lockdown or my son would be out with his friends in the car getting into trouble with no one to check on him."

Physical Symptoms: Physical symptoms were reported as fever, myalgia, bone pain, headache, and tightness of the chest. Medical care was available including a medical clinic on site which was equipped to handle most emergent conditions and stood ready to transfer patients

to critical care healthcare units as needed.
Subject 12: The worst part of this thing is the cough. I can't get much rest and it feels tight in my airways.
Subject 13: I have asthma and this cough makes me feel like I'm choking. I hope they don't put me on one of those machines in the hospital.
Subject 4: This really isn't any worse than the regular flu.

Fear and anger: Participants expressed anger toward the necessity for being confined in quarantine and were fearful of the uncertain outcome. There were also rumours of uncontrolled contagion being spread intentionally by certain sectors of society. Anger was also expressed at the supposed source of the original infection.
Subject. 3: "These outdoor markets they say caused this disease have to be stopped. And it came all the way here to us? How can people eat all of those strange animals? It's forbidden and unnatural anyway to eat them. The people who do it are being punished by Allah for their habits."
Subject 27: "We heard people who know they have it are spreading it on purpose by spitting on things so more people will get sick."

Discussion

The present study endeavoured to better understand participants' quarantine experiences that may not have been discovered or discussed previously. Emotional reactions and effects on social interactions during confinement are essential factors in the quarantine experience's quality of participants.

Use of the qualitative inquiry method may have conferred a potential to extract highly useful insights into the phenomenon of quarantine by providing participants with the opportunity to freely express a wide variety of concerns, some of which may not have emerged when inquiries were conducted in a quantitative manner which necessarily quantifies concepts which have already been identified rather than expose new aspects. The provision of this perspective may be useful to the healthcare community in successfully approaching the planning and execution of quarantines by better addressing participants' psychological, emotional, social, and physical needs and their reference group.

Discussion is structured on review and analysis of the themes which have emerged from the data provided by the participants.

Religion and Sense of Duty:
There is wide general support for medical care, including quarantine. This support is partially supported by religious tenets, which provide broad social support of health care. This concept is reflected in a Hadith saying: "Yes, you should seek medical treatment, because Allah, the Exalted, has let no disease exist without providing for its cure, except for one ailment, namely, old age" (4,37).

An important theme that emerged from the data was the altruistic motive of participants about their role in the quarantine. Desire to serve the community by sacrificing personal comfort coupled with faith in the wisdom of Allah, belief in divine design which orders individual, and society's destiny was expressed.

This readiness to participate in quarantine was also supported among participants based on the concept of expiation of sin. This concept is stated in the Hadith of Prophet Mohammed (peace to him) as: "No fatigue, nor disease, nor sorrow, nor sadness, nor hurt, nor distress befalls a Muslim, even if it were the prick he receives from a thorn, but that Allah expiates some of his sins for that" (4). Thus, based on this worldview, the quarantined person feels that they have personally gained from the experience.

The first principle of Islamic medical ethic percept's is: "Whosoever saves a human life, saves the life of the whole of mankind (Holy Quran, Chapter 5, verse 32). This is followed by Prophet Mohammad (peace to him) who said in Sayings Related to Faith: "Seek treatment, for God the Exalted did not create a disease for which He did not create a treatment, except senility (4,37). Use of these instruments and others have led to the formulation of the following Islamic medical ethics rules: 1. Necessity overrides prohibition. 2. Harm has to be removed at every cost if possible. 3. Accept the less of the two harms if both cannot be avoided. 4. Public interest overrides the individual interest. (37)

Alternatively, the Biblical model supplies a complete guide to ethical questions for the researcher. Leviticus, Chapter 19, verse 18, requires each person to "love your neighbor as yourself." In Matthew, Chapter 7, verse 12, Jesus (peace to him) stated: "So in everything, do to others what you would have them do to you, for this sums up the Law and the prophets." (38) Similar outlooks based on humanistic ways of viewing quarantine are Utilitarian, Rights, Fairness, Common Good, and Virtue Approaches(39). Among the models which use these approaches are the Philosophical, Laura Nash, Mary Guy, Rion, Langenderfer, and Rockness Models (39).

Implications for healthcare providers are the application of non-judgmental caring accompanied by acceptable knowledge levels about religious beliefs and practices, self-awareness, and empathy. Nurses need to be aware of their comfort level in providing spiritual care and understand the patient and caregiver's spiritual needs. This individualization enables the nurse to plan for the delivery of routine spiritual care from various sources within and outside the healthcare community (8,26).

Social Support: Participants shared their concerns about how restriction during quarantine has affected their social interactions. Multi-generational living arrangements are the norm in Saudi Arabia. This pattern of living may confer an aspect of quarantine not found elsewhere. Participants referred to the support they received from siblings,

children, spouses, and parents during their confinement. They expressed a longing to be with family members and concern over the adequacy of the care of members of their intimate family group who might need their special care, including elderly parents, infants, the handicapped, and young children who are traditionally cared for within the family setting (40).

Data related to social support in other locales have not yet been well reported. However, rates of anxiety, depression, and stress observed may need to be further explored through the lens of the effect of social support on quarantined residents.

For example, data from the first week of lockdown in Spain found mild to severe anxiety, depression, and stress to be 25, 41, and 41%, respectively. Stress, anxiety, and depression experienced during the Covid pandemic in Iran were reported in a meta-analysis at rates of 26.9, 31.9, and 33.5, respectively (9). Rate of depression in the United States of America unrelated to the Covid pandemic was found to be 14.8, 4.52, 1.8, and 0.6 % mild, moderate, moderately severe, and severe, respectively (41).

Cognitive Aspects:
Discussion with residents of Saudi Covid quarantines under study showed that the pandemic information was essential to residents. These concerns are shared among various populations studied who expressed infection fears, anxiety, depression, frustration, boredom, inadequate access to reliable information, financial worries, and fear of stigma (20)

Among the Saudi quarantine, residents were especially concerned with the disease's characteristics and modes of contagion. Several studies found that inaccurate information or lack of transparency exacerbates negative emotions (9,20,28).

Residents of lockdown in Spain have well received positive efforts at education. Goodman-Casanova found that telehealth services offering information about the Covid pandemic were requested and well-accepted 30 and 39 % of the time, respectively (4).

Participants in the present study expressed dissatisfaction about their ability to communicate with loved ones, access to pandemic-related information, and entertainment such as television and social media. Other studies expressed similar concerns, all of whom suggested that digital platforms should be available for residents to provide health promotion, online mental health services, and social connectedness, emphasizing that compliance is enhanced by appropriate information (4,7,8,20, 42,43).

Training of quarantine residents in social media mechanics such as WhatsApp, Snap Chat, Zoom, and SMS plus ways to access streaming entertainment may seem a frivolous use of resources. However, a desire to acquire this skill was expressed by a large portion of the sample. It would seem to be a priority to meet their felt needs, thereby assisting them and providing comfort during the quarantine process.

Psychological elements – fear, anger, depression, anxiety, and stress:
These factors have been discussed by previous quantitative method inquiries, although suggestions for amelioration have been noticeably absent. Data from various locales reflect a constellation of similar emotions and concerns of residents and caregivers, echoed in the present study.

Banerjee and Rai contrast solitude with loneliness(19). They found that prolonged isolation is incredibly difficult for individuals who are not familiar with living in isolation and suggest that emotional preparedness for solitude is a learned skill. Therefore, to achieve relief from boredom and loneliness necessitates efforts to provide experiences for quarantined patients, which are individualized to meet their needs. This awareness among healthcare providers is essential, although the application may not be a practical possibility in all settings.

Also, Brooks et al. review 24 inquiries related to the psychological impact of quarantine(20). They identified two groups of factors that predisposed quarantined patients to experience high amounts of fear, anger, depression, anxiety, and stress. Two groups of patients with exceptionally high severe reactions to quarantine were persons with a history of psychiatric illness and healthcare workers. These data may require consideration in decisions related to the quarantine of these two groups of patients.

The other factor identified by Brooks et al. was the nature of stressors found to mediate psychological impact(20). These were duration, fears of transmitting or acquiring infection, frustration and boredom, inadequate supplies, and inadequate information from public health authorities. Awareness among the healthcare community of the contributory factor of positive and negative emotions when conducting a quarantine may auger for better operations (2,20).

Financial Stressors:
Several studies found that stress was positively related to low patient income (9, 17,20). Financial stressors of the type encountered in locales where participants did not express a depressed state of the economy or heavy dependence on unofficial employment in the present study are perhaps based on confidence in government programs to meet their needs. However, concern was expressed about the anticipated length of the lockdown among the patients.

Permitting employees to work online, providing meaningful tasks that can be addressed, keeping them informed about the expected length of time expected before they are discharged, and making the quarantine as short as practicable was found to reduce related financial concerns (17,20).

Social Stressors:
Confinement to quarantine is likely to disrupt patterns of social interaction within the family and community. The concern of this nature was expressed by many of the residents. Parents were especially concerned about their leadership role in the family structure, separate from providing their dependents' basic needs. More studies discussed the importance of differentiating between spatial and social distancing, emphasizing that participants, while isolated, desired to continue to meet their obligations to their group(17, 19). This is a particular concern when quarantined residents are responsible for caring for vulnerable persons in their group, such as elderly parents, infants, small children, and the disabled. These data agree with participants' concerns in the present study who felt that the care of these group members was put at risk through possible neglect during their confinement.

Limitations
This inquiry was conducted in Saudi Arabia. The qualitative approach of the investigation was employed to provide a broad representation of participants' thoughts and emotions and does not attempt to quantify the incidence with which they occur. Generalization of participants' data may require modification in other locales and cultures where quarantine conditions, financial conditions, and social structure may be different.

Conclusion and Recommendations

Exploration of quarantine in Saudi Arabia has illuminated important aspects of perceptions of this type of care. Awareness of the participants' concerns may provide a lens through which to provide this care based on empirical data.

For the community at large, emphasis is on quarantine as a powerful tool for preserving the common good. Moreover, full disclosure of the factors which drive the need to isolate contagious persons, initiation of some type of reward for satisfactory completion of quarantine, the formation of support groups for patients, avoidance of the growth of misinformation, and rumours, provision of accurate and easy to digest information. Additionally, emphasis on group goals and fostering the community's inter-connected nature may enhance acceptance of quarantine as a treatment measure.

Individuals quarantined have communicated the ability to establish timely, high quality, two-way communication with their loved ones. Also, preserving their financial status, and adequate, accurate information about the duration of their quarantine, and ways to protect their families from infection held the highest priority in their lives while they were confined.

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Psychosocial Impact of COVID-19 on Family Physicians in the Kingdom of Saudi Arabia

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Abstract

Background: The emergence of the new pandemic, COVID-19 has had a profound effect on public health and health care workers (HCWs) are at the frontline in combating this crisis. The pressure from work during this period may contribute to psychosocial problems in these HCWs.

Objectives: The study aimed to assess the effects of COVID-19 on the psychological health of family physicians in Saudi Arabia.

Materials and Methods: A cross-sectional study was conducted among doctors in the field of Family Medicine at various hospital settings in the Kingdom of Saudi Arabia. A pre-tested and validated questionnaire measured sociodemographic details; health concerns and emotional distress; perceptions related to precautionary measures and other effects of COVID-19.

Results: More than 81.9% of the physicians were concerned about their personal health during COVID-19 which showed a statistically significant relationship with self-reported health status. The degree of concern showed a statistically significant relationship between position, self-reported health and employment status ($p<0.05$). The prevalence of emotional distress due to COVID-19 was reported in 52.6% of the participants which showed a statistically significant association was seen highest with age group 30-39 years ($p=0.004$).

Conclusion: The study showed that this pandemic has created many high concerns among Family physicians about their health, family's health and also the public health. Stress reducing techniques such a physician–directed and organization–directed interventions should be initiated in helping the physicians in the management of stress while combating COVID-19.

Key words: COVID-19, Stress, Family, Physician, Burnout, Saudi Arabia

Introduction

SARS-CoV-2, commonly known as COVID-19 is a newly identified β-coronavirus that emerged as a pandemic after its emergence in Wuhan, China (1). Currently, it is labeled as an international public health emergency that has shown a rapid transmission rate the world has never witnessed (2). Health care workers (HCWs) are facing huge challenges in treating and managing the patients infected with COVID-19 and this demonstrates the uncertain preparedness of health care systems (2).

The HCWs, including family physicians, are at the frontline of this public health emergency and have a significant role to play in responding to this crisis. Also, the health care systems' capacity to prepare and respond properly relies on their ability to work well during these situations (3). Indeed, family physicians face tremendous pressure dealing with the COVID-19 pandemic as they have higher risk of being exposed to the virus through direct contact with the patients with a wide range of complaints. In addition, they need to deal with fast-paced changes in their organizations' policies as a response to this emergency, which adds more stress to their daily work. As a result, there is a higher risk of a negative impact on their mental health such as anxiety and depression in such situations (3).

Although the majority of current COVID-19 studies have been concentrated on disease epidemiology and its severity, there is limited evidence examining the psychological effect on family physicians as one of the frontline health care workers dealing with this crisis. A study in Hong Kong during the Severe Acute Respiratory Syndrome (SARS) pandemic reported that 89% of the HCWs reported psychological trauma (4). Additionally, a recent study on HCWs who are exposed to COVID-19 situations found that 70% of them reported psychological distress manifestations (5). It has been reported that COVID-19 is associated with symptoms of psychological distress and mental illness among the general population (6). Moreover, this has made them feel increased anxiety, stress, and concern towards hygiene when buying essential items (7,8). Literature review revealed insufficient evidence regarding the psychosocial effects of COVID-19 on family physicians in Saudi Arabia. Our objective is to explore and describe the impact of COVID-19 on family physicians to help enhance their resilience and preparedness for future public health emergencies.

Materials and Methods

Our study was a cross-sectional study done among doctors practicing in the field of Family Medicine (FM) that included consultants, specialists, residents, and interns practicing in different hospital settings in the Kingdom of Saudi Arabia. A pre-tested and validated questionnaire was used. A pilot study was done on 25 participants of the same categories to check the validity and reliability of the questionnaire and to calculate the minimum sample size. A minimum sample size of 315 was calculated considering values of the standard deviation of scores obtained from the pilot study done in 25 interns using the sample size formula,

$$n = \frac{S^2 [Z_{1-\frac{\alpha}{2}} + Z_{1-\frac{\alpha}{2}}]2}{(x-\mu)^2}$$

Where $\Delta=(x-\mu)/S$

S= standard deviation (10.19), χ= sample mean=12.23, μ = population mean = 9.87; Δ= effect size=0.2316;
α= significant level (95%) and 1-β= power of study (80%).

The Ethics and Research Committee of the institution approved this study. The questionnaire was sent randomly to selected participants (Family medicine) after contacting them either by phone and/or email. We used a mixed-method of convenience and snowball sampling, where doctors in FM from each province were identified and asked to answer the questionnaire. They were also requested to forward to their colleagues and other family medicine doctors from other provinces so that maximal participation could be ensured. The participants were briefed about the need and benefits of the study and anonymity of their responses was assured. Thus, the inclusion criteria were all the doctors who gave consent to participate and were practicing in the FM departments in the Kingdom of Saudi Arabia. Doctors who are currently on leave during the study period for any reason (e.g. maternity leave, sick leave, vacation, etc.) were excluded from our analysis.

Validation of Questionnaire

We checked the content validity and face validity of the questionnaire by expert evaluation and focused group discussion. Construct validity was established by exploratory factor analysis with varimax rotation to test the hypothesized domain structure and examine its substructure. Items with a correlation coefficient >0.7 were omitted. Internal consistency was examined, but test/retest reliability could not be performed because of the paucity of time. The homogeneity of the question items in each domain was evaluated using Cronbach's α coefficient. A coefficient of 0.7 or higher is preferred for a questionnaire to be internally consistent. The questionnaire contained items that recorded the psychosocial impact of COVID-19. Thus, the final version of the questionnaire had four sections with a total of 22 items. Section I had items that recorded sociodemographic details, section II- health concerns and emotional distress; section III- perceptions related to precautionary measures for COVID-19; Section IV-others effects of COVID-19.

Data Management and Statistical Analysis

Data collected were entered into MS Excel by a calibrated investigator and statistical analysis done using SPSS version 23 (IBM Corp. USA) by an independent biostatistician. Categorical variables were summarized as proportions and frequencies and any possible relationship of the variables analyzed using Pearson's Chi-square test.

Continuous variables obtained were expressed as mean and standard deviation. The significance value (p-value) ≤ 0.05 was considered as statistically significant.

Results

The data was collected using an online questionnaire that was sent to doctors residing in different provinces in the Kingdom of Saudi Arabia. We received a total of 516 responses and the final analysis included 475 completed responses that satisfied our eligibility criteria that were included. Our study had 48.2% of females and 51.8% males. The details of the personal and work-related information are given in Table 1. The self-reported health status by the participants showed that 81.9% had 'good to excellent' and 18.1% had 'very poor to fair' health status (Table 1).

When the participants were asked about concerns about their own and family's health and also about the COVID-19 death rates, it was found that 30.5% and 59.8% of the participants were 'very to extremely' concerned about their health and family's health respectively. The concern about COVID-19 death rates showed that 25.9% were 'not concerned', 48.4% were 'Slightly to somewhat' and 25.7% were 'very to extremely' concerned. It was also found that participants who had 'very poor to fair' self-reported health status were 'very to extremely' concerned about their health ($p<0.001$), with their family's health ($p<0.001$) and also with COVID-19 death rates ($p=0.014$). The prevalence of emotional distress due to COVID-19 was reported in 52.6% of the participants that showed a statistically significant association with age group 30-39 years ($p=0.004$) and also in participants who had 'very poor to fair' self-reported health status ($p<0.001$) [Table 2].

When we assessed the status of precautionary measures at the workplace, 55.2% of the participants reported that it was 'sufficient' and 31.6% reported it was 'not sufficient', which showed a statistically significant association with experience, position, self-reported health status, and employment status. The precautionary measures that made the participants bothered during work are depicted in Figure 1. Participants who reported 'sufficient' precautionary measures at workplace belonged more to the category of a) 'consultants (15.3%) and residents (48.5%), b) who had experienced more than 10 years in FM (17.1%) ($p=0.015$), c) 'good to excellent' self-reported health status (86.3%) and d) full-time employment status (78.2%) compared to their respective counterparts ($p<0.05$) [Table 3]. It was also reported that these precautionary measures affected their ability to do the job in 47.6% of the participants and were comparatively more reported in medical interns (27.2%) and who had 'very poor to fair' health status which showed a statistically significant association ($p<0.05$). Wearing masks was found particularly bothersome in 60.2%, which showed a significant association with age less than 30 years ($p=0.048$) and those who had 'very poor to fair' health status ($p<0.001$) [Table 3]. The bothering reasons for using masks as reported by participants (n=286) are depicted in Figure 2.

The effects of COVID-19 on work and personal life of the participants showed that 74.5% had reported changes in their regular job due to the pandemic situation and this was comparatively seen more in doctors who were on a full-time contract status ($p=0.008$). There was no statistically significant association seen between other sociodemographic variables and changes to regular jobs ($p>0.05$). In our study, 46.9% of the doctors reported that they started working over-time due to the COVID-19 situation and this showed statistically significant association with those with a 'very poor to fair' health status ($p=0.022$). The financial loss was reported by 45.9% of the participants, which also showed a statistically significant association with those 'very poor to fair' health status ($p=0.003$). It was surprising to find that 52.4% reported that society treated them differently because of their work nature in the hospital, but this didn't show any association with sociodemographic characteristics (Table 4). It was reported that the COVID-19 situation had positive outcomes in their personal and work life in 61.7% of the participants which showed a significant association with those who had 'Good to excellent' health status only ($p=0.001$) [Table 4]. The most reported positive outcome of this pandemic by the participants was 'increased awareness of the disease control' (41%) followed by new learning experience (23%), a greater appreciation of life and work (20%). [Figure 3]

Discussion

The risk of transmission of COVID-19 is higher for people who come in close proximity with the infected individual and this is huge for family medicine doctors. Thus there is a huge risk of becoming infected and transmitting to other health care workers and relatives. Doctors should take immediate and appropriate measures to control the spread of this pandemic (8). To the best of our knowledge, no study has been conducted in the kingdom to assess the concerns and perceptions of FM doctors about COVID-19 and its impact on personal and family health.

In our study, the majority of the FM doctors are concerned about their and also their family's health. The FM doctors are dealing with a new form of stress in their work and personal life dealing not only with patients but also with the emotional problems associated with their patients and also from the society (9). A study was done by Urooj et al. among doctors working in hospitals who reported that the majority of them feared to infect their family members, the rapid spread of disease, complications of the disease, becoming a carrier and also feared to miss the diagnosis(10). Our findings show that more than half of the participants experienced emotional distress due to this pandemic situation. It has been consistently reported that doctors are at higher emotional distress even under normal circumstances compared to the general population (11,12). So, no doubt the stress will increase during this pandemic, particularly when there are no effective control measures in place. A study done during the 2009 swine flu pandemic reported that 20% of the healthcare professionals (HCPs) reported the symptoms

Table 1: Sociodemographic details of the participants

		N	%
Gender	Female	229	48.2
	Male	246	51.8
Age	<30	274	57.7
	30-39	124	26.1
	40-49	56	11.8
	>50	21	4.4
Position/ designation	Family medicine intern	103	21.7
	Family medicine Resident	225	47.4
	Family medicine Specialist	87	18.3
	Family medicine Consultant	60	12.6
Experience in current position (years)	Less than 1 year	153	32.2
	1 to 3 years	158	33.3
	4 to 9 years	106	22.3
	More than 10 years	58	12.2
Employment status	Full-time	346	72.8
	Part-time	129	27.2
Self-rated health status	Good to excellent	389	81.9
	Very poor to fair	86	18.1

Table 2: Relationship concerns related to COVID-19 with sociodemographic characteristics

		N	%	P value* (Pearson's Chi- square test)					
				Age	Gender	Position/ Designation	Experience	Self- reported health	Employment status
Degree of concern about personal health	Not concerned	86	18.1	0.669	0.701	0.110	0.812	<0.001	0.005
	Slightly to somewhat	244	51.4						
	Very to extremely	145	30.5						
Degree of concern about family's health	Not concerned	53	11.2	0.106	0.101	0.003	0.230	<0.001	0.003
	Slightly to somewhat	138	29.1						
	Very to extremely	284	59.8						
Degree of concern about COVID-19 death rates	Not concerned	123	25.9	0.425	0.053	0.605	0.360	0.014	0.299
	Slightly to somewhat	230	48.4						
	Very to extremely	122	25.7						
Emotional distress	No	225	47.4	0.004	0.081	0.884	0.090	<0.001	0.223
	Yes	250	52.6						

* p value>0.05 is considered as statistically significant

Table 3: Relationship of perceptions of precautionary measures in COVID-19 with sociodemographic characteristics

		N	%	P value* (Pearson's Chi- square test)					
				Age	Gender	Position/ Designation	Experience	Self- reported health	Employment status
Precautionary measures at workplace were	Don't know	63	13.3	0.276	0.063	0.001	0.015	0.011	<0.001
	Not sufficient	150	31.6						
	Sufficient	262	55.2						
Precautionary measures affect ability to do job	No	249	52.4	0.270	0.576	0.013	0.174	0.030	0.588
	Yes	226	47.6						
Wearing mask is particularly bothersome	No	189	39.8	0.048	0.251	0.235	0.063	0.001	0.160
	Yes	286	60.2						

* p value>0.05 is considered as statistically significant

Table 4: Relationship of work and personal life related factors during COVID-19 sociodemographic characteristics

		N	%	P value* (Pearson's Chi- square test)					
				Age	Gender	Position/ Designation	Experience	Self -reported health	Employment status
Changes to regular job duties	No	121	25.5	0.122	0.079	0.274	0.265	0.567	0.008
	Yes	354	74.5						
Working overtime	No	252	53.1	0.064	0.311	0.929	0.819	0.022	0.596
	Yes	223	46.9						
Financial losses	No	257	54.1	0.429	0.868	0.394	0.253	0.003	0.563
	Yes	218	45.9						
Being treated differently because of working in hospital	No	226	47.6	0.097	0.139	0.095	0.891	0.059	0.115
	Yes	249	52.4						
Personal or family lifestyle affected	No	99	20.8	0.001	0.869	0.640	0.883	0.982	0.429
	Yes	376	79.2						
Live with children	No	211	44.4	0.003	0.894	0.116	0.143	0.314	0.026
	Yes	264	55.6						
COVID-19 situation had positive outcomes	No	182	38.3	0.328	0.370	0.527	0.446	0.001	0.448
	Yes	293	61.7						

of flu in their family members (13). Furthermore, family medicine physicians who are at the forefront of fighting this pandemic fear their families becoming infected, which makes them stay away from their beloved ones and this would add more stress to their mental health.

Studies conducted during epidemics and pandemics such as SARS in 2003, MERS in 2012, and Ebola in 2014-16 reported that healthcare professionals could experience immense psychological morbidities, including trauma, which might be experienced even after the outbreak is gone (14,15,16). To tackle this issue, the employer or organization should take measures to support the doctors mentally by motivation, assuring medical and financial support to both the doctor and family, supply of standard PPE kits. In our study, 31.6% of the participants reported that precautionary measures at their workplace were not sufficient. The shortage of PPE and the lack of other precautionary measures could make the situation worse.

The use of facemasks has become ubiquitous in every country after this pandemic even though their effectiveness in reducing the risk of transmission of SARS-CoV-2 is unclear and also scarce (17). Still, facemasks are widely being used by healthcare workers mainly to prevent the droplet spread, which is proved to be the main mode of direct transmission (18,19) But our study finding showed that 60.2% of the participants had bother in wearing masks. The majority of the doctors who had this problem with facemasks reported that it caused physical discomfort. The extended use of protective filtering face-piece respirators (FFR) such as N95 masks would cause physical discomfort in doctors (29,21).

There is an accelerating surge of patients with COVID-19 and this puts pressure on the global health care workforce, which will intensify the workload of HCPs. In our study, 74.5% of the doctors have reported that there were changes in the pattern of regular jobs due to this pandemic. It is been reported that the extended work hours in HCPs can contribute to adverse effects on mental and physical health (22). Employers or hospital administration should consider reducing the workload, as it would help to mitigate fatigue and related adverse effects on Family physicians (23).

Another important concern in this pandemic situation is the stigmatization and discrimination that HCPs experiences in society. In our study more than half of the participants reported that they are being unfairly treated by society because of their current work nature. Reports are showing that several frontline health care workers are facing discrimination and often face difficulty in finding food and shelter (24). It has also been reported that even relatives and neighbors have been showing a kind of displeasure to HCPs despite the fact they are working with all precautionary measures during this pandemic (25). To thwart this denounced discrimination towards doctors, it is important to disseminate accurate information to the public regarding the COVID-19 that will help the society to fight this public health crisis and also support the frontline health care workers.

Our study also tested whether this COVID-19 pandemic has produced some positive outcomes and it was found that 61.7% of the FM doctors had reported the same. According to 41% of doctors, this pandemic helped to increase the awareness of disease control measures not only in doctors but also among the general population. This increase in awareness and knowledge regarding the virus and its control measures would help the public and also the doctors to prepare for future epidemics or pandemic outbreaks. The study finding showed that 20% of doctors our study had reported that the pandemic increased the appreciation of life and work. This would help to increase the confidence and performance of the work skills of family medicine doctors (26).

Limitations

Being a cross-sectional study showed the relation between variables but hinders the cause-effect relationship.

Conclusion

It is clear from the above findings that, the COVID-19 pandemic has created demanding challenges for Family medicine doctors. These doctors deal both with the emotional and the scientific aspect, which plays a vital role in tackling this pandemic. It is thus important to provide comprehensive support to doctors from the administrators and the society, as they are the frontline healthcare providers in this public health crisis.

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A qualitative examination of quarantine work experience of nurses in Saudi Arabia

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Abstract

Background: COVID-19 infection was identified in 2019 and has reached pandemic stage. Historically, quarantine has been used to curb the spread of epidemics and is presently being used in Saudi Arabia for this purpose. Little is known about the impact on professional nurses practicing in this setting although preliminary discussion of this and the H1N1 pandemic of 2009 suggested that special training and consideration of special needs of nurses in this environment are needed. The aim of the present study is to explore the caring experience of Saudi Arabian nurses who are manning the quarantines.

Methods: Nurses employed in these centres were recruited via e-mail from lists provided by the Ministry of Health. Among those approached, 8 professional Saudi nurses were individually interviewed in March, 2019 via telephone. Informed consent was obtained. Transcripts of interviews were transcribed, inductive themes extracted, and analysed via NVivo software to form a conceptual framework of the quarantine experience.

Results: Perspectives communicated by the participants illuminated 6 main themes: Administrative Concerns, Nursing Roles, Patient Perspectives, Personal and Emotional Aspects, Training, and Special COVID-19 Quarantine Care Needs which together composed the central theme: Breaking the Wave.

Conclusions: Professional needs and personal challenges faced by nurses during the delivery of care for quarantine and disasters may supply a valuable perspective to this aspect of practice and may assist in providing useful considerations for preparation to meet challenges of this type including nursing education and training in administration, infection control, health education, and disaster management.

Key words: COVID-19, health education, infection control, nursing, quarantine, Saudi Arabia.

Background

The Coronavirus group was identified in 1960. Initially it was viewed as a simple and non-fatal infection causing the common cold. However, subsequently, various forms of this virus group which cause life-threatening symptoms have emerged and spread to various countries resulting in high mortality rates (1).

A new form of the Coronavirus known as COVID-19 emerged in China in late 2019 and has since spread to nearly every nation of the earth. It has affected millions of persons and has resulted in 414,581 deaths worldwide as of mid-June, 2020(2)

Quarantine as a method of limiting spread of disease is quite ancient, being found in the Book of Leviticus of the Christian Bible as a method for controlling leprosy(3). The renowned Islamic medical scholar Ibn Sina established the concept of al-Arb'iniya more than a thousand years ago(4). In public health practice, isolation and quarantine are procedures used to protect the community by isolating persons who have contracted or been in contact with persons suffering from a communicable illness (5).

Nurses over the years have been frontline fighters against pandemics and it has been seen clearly in the recent coronavirus COVID-19. They have a key role in any response to pandemics. Nurses define their professional role to include provision of care in disasters, wars or pandemics(6). Despite potential threats to themselves and their families they are committed to providing care in emergent health crises(7).

Epidemic outbreak and the need for quarantine and isolation care creates heavy demands on those who may be exposed to infection, required to work extended shifts, and be separated from their loved ones(8). Martin(9) found that 90% of nurses studied during the 2009 H1N1 pandemic were willing to work with shortages of PPE (personal protective equipment) and the remaining 10% were unwilling because of fear of personal infection. Another important source of unwillingness to care for those suffering from communicable conditions was found to be the potential threat to the health of nurses' families(7). Thus, nurses are placed at the epicenter of providing the care needed during pandemics and may have a variety of personal concerns which affects their successful participation.

Orlando posited in the theory of Deliberative Nursing Process that one role of nursing is assistance of others to obtain what is needed from the environment to meet their needs when they are unable to meet them themselves. It is then the nurses' professional responsibility to enable the patient to engage in developing these self-help abilities(10).

Those patients who are quarantined are in the position to receive this type of care in facing the pandemic. Educational activities for patients which implement the constructs of Pender's Health Promotion Model may be appropriate for developing self-help capabilities(11). In this context education may be aimed at learning sound preventive and protective habits giving patients experience and practice to build constructive defence strategies to employ when they re-join the community.

Our aim in this study is to explore nurses' experience at quarantine facilities during the 2019-2020 COVID-19 pandemic in Saudi Arabia. Their activities in caring for patients, patient's needs and responses to care, and personal and professional obligations placed on the nurses will be among the concerns of the inquiry.

Methods

Qualitative grounded theory design is employed. Grounded theory developed in sociology and was first described by Barney Glaser and Anselm Strauss as a qualitative methodological approach in which the aim was to generate a grounded theory to describe and explain the phenomenon under study. The paradigm which provides a base for this study is a constructivist shared understanding of the nursing role in caring for patients in quarantine related to COVID-19 infection and social interactions in that context. Interviews were used in a technique described as constant comparison in which all the data which emerged from previous interviews forms the basis for theoretical sampling which may produce more complex data(12).

Setting

During the COVID-19 pandemic of 2019-2020 the Saudi Arabian Ministry of Health selected a number of hotels and prepared them as quarantine facilities for persons suspected of being infected with COVID-19. These persons were isolated for testing and if the results showed positive infection they were transferred to a healthcare institution to receive medical treatment. On the other hand, if the result was negative they would be held at quarantine facilities and observed. Thereafter they would be discharged home after the passage of the incubation period mandated in the Ministry of Health Protocol. Three hotels in Riyadh city which had been selected for this purpose were chosen for this study.

Sample

Selection of the sample was purposive. Invitations were sent via e-mail to nurses who were currently working in the selected hotels. From this group, all 8 nurses who responded were included in the study.

Ethical considerations

The study plan was reviewed and approved by the central IRB-MOH (Institutional Review Board - Ministry of Health – Kingdom of Saudi Arabia) with log No.20-73M. An informed consent protocol was read to the participant including confidentiality of data and the ability to withdraw from the study at any time. Data was anonymized before transcription.

Data collection
The data was collected through individual interview with each participant. A suitable date and time for meeting was established for an online interview. Duration of each interview was 40 to 50 minutes. Digital recording was used to preserve data for transcription. The purpose of the study had been explained in the recruitment letter but was reiterated at the beginning of the meeting. Following the consent of the participant, the following questions were posed:

1- Please describe your work experience in the quarantine for suspected COVID-19? 2- Please describe your perceived feeling toward working in quarantine with suspected cases of COVID-19?
3- Please describe if there were any unique situations or experiences during your work in quarantine?
4- What are the challenges of working with suspected cases of COVID-19?

Saturation was achieved when no new themes emerged during interviews with the 8 participants.

Data was transcribed to hard copies and stored in a locked facility. Digitalized duplicates were stored on the laptop of the principal investigator and on a flash memory drive.

Tabulation and analysis of data:
Digitally recorded narratives were gathered from each subject. These narratives were transcribed and saved as Microsoft Word documents, which were stored on the laptop of the principal investigator and on a flash memory drive. Hard copies were stored in a locked facility.

Transcripts were reviewed independently by the principal investigator and co-investigators to extract inductive themes. All data was examined with no limitations. NVivo software was employed to extract axial themes. The output of this analysis was further reviewed and organized by the investigators for major themes and sub-themes which were used to illuminate concepts extracted from the narratives.

Personal opinion and normative standards were not implied to the participants in order to prevent bias. Questions were non-directive and open ended and neutrality of language was carefully maintained. Credibility and trustworthiness were enhanced by member checking during data collection and peer review.

Results

As themes representing the major factors were illuminated, sub-categories emerged. The practice used in inquiry with this method allowed for the emergence of concerns of the subject making this method highly suitable for analysing areas of this nursing experience(13).

The themes which emerged during analysis of results were administrative concerns; training; special care needs, patient perspectives; nursing roles; and personal and emotional roles. Figure 1 presents a graphic framework of the COVID-19 quarantine caring process and Table 1 presents the primary and secondary codes and themes and subthemes which emerged from the data.

The emergence of the core concept of BREAKING THE WAVE gathers all aspects of providing nursing care for those quarantined during the COVID-19 pandemic in Saudi Arabia. Strauss and Corbin noted that a substantive theory is used to gain insight and understanding of the group under study and may be useful(13). As such, this type of theory may be of assistance in guiding and stimulating development of knowledge, explaining interactive structures, and illuminating dynamics of organizational life(14).

Table 1: Inductive and Emergent Themes and subthemes

Inductive	Emergent themes	Subtheme
Administrative Concerns- Steady, Ready, Go	Leadership	*Need emotional support; need support from power structure; need support from leaders; need strong and supportive leader.*
	Lack of staff	*Every day a new policy; they prepared us completely within 2 days; new rules; pressure from other ministries; Plan for future; administrative policies and procedures not ready- we are the ones who created them; need to have a list of qualified infection control people available before disaster*
	Hygiene and Cleaning Staff	*Hygiene, cleaning staff: Positive and negative quarantine; staff in hotels not trained in infection control; cleaners need supervision; untrained workers sterilize room after discharge; no hygiene provided from hotel; sources of infection: staff to patient, patient to staff, deliveries, untrained security staff; afraid cleaners will not do an adequate job;*
	Security and Breakout	*Afraid of breakout by patients, security staff poorly trained*
Training	Training	Training: *Not experienced in quarantine care; will to learn, motivation, ready now, grasp, statistics, online training, must be someone responsible for training, some other staff not trained, don't do care properly, I have experience, courses, MERS-COV is more dangerous, I know how I experienced IC and PPE with MERS-COV; nurses should be chosen who know IC; already staff infected because of lack of training; untrained staff can contaminate themselves, patients, and others; not qualified;*
Special Care Needs	Special Characteristics of COVID-19 Care	Characteristics of COVID-19 which affect nursing staff in caring: *without symptoms; very weird; violation will ruin everything; scary; cannot trust; sources of infection; cannot see; safety; not scared; special clinic on site; strange how everything changed*
	Special Skills and Behaviour Required an Caring	Special Skills and behaviour required for COVID-19 Quarantine: *PPE care and use, removing and wearing; doing everything carefully, focus; continuous care; avoid touching; enter spaces one by one; PPE; precautions; don't shock them; protocol, they are our guests, take your time, hesitating, calm*
Patient Perspectives	Patient Role	*Must stay in room, stressed, ask when to be released, one by one, like jail, psychiatric care 75% of treatment*
	Stresses	*Praying; mother died- patient not allowed to go to burial; father crying, cry and scream, social distance; at least 2 meters; lot of questions; immunocompromised, liver transplant; infection separates family members*

Table 1: Inductive and Emergent Themes and subthemes (continued)

Nursing Roles	Roles	*Health educators; emotional support; answer questions; psychological support; administrator; nursing care; education; manager; get them out of quarantine safely*
	New Duties	*Some nurses are not serious infection control; outsiders; data insertion; hands working together (between staff); decision making; time management; effort; focus; attention; management; punctuality; readiness; communication; teamwork; 12 hours shifts*
	Patient Relations	*VIP; patient doesn't want to transfer to positive quarantine demand; complaints.*
	Ethical Aspects	*Professional ethics, under pressure, reward from God, humanitarian, psychological pressure, voluntary, national duty, trust in GOD, giving, listening, decrease stress, explaining, calm, communication, bad behaviour, rising voices, demanding attention*
Personal and Emotional Roles	Caring Roles	*New; heroes; challenge; struggle; cry; can do again; passion to learn; afraid; supported; friends; happy to work; fake disease vs. Real; invisible; nice interesting; wonderful; hesitating; stress; challenge.*
	Personal Roles	*Depend on self totally, no recognition for good work; first people with this knowledge; doing something great; acquire knowledge; public not appreciating; prepare to be away from family, cry; protect loved ones; my family; want to see family; away from my mother; apply social distance; isolate myself, out only once; mask; missing home*

Discussion

Theme 1: Administrative Concerns- Steady, Ready, Go

Subtheme 1.1: Leadership

When MERS-CoV (Middle East Respiratory Syndrome) was identified in South Korea, affecting 186 patients, a qualitative study was employed to better understand the work experiences of nurses caring for them(15). Although caring for persons with an infectious disease, most of the themes which emerged from focus groups and individual interviews were related to some facet of administration of care. Participants expressed that they needed support from leadership, specifically relief from work overload. Receiving excessive unclear instructions which contained frequently changing guidelines caused distress and confusion among those providing care(15).

In the current study participants emphasized that strong supportive leadership with consistent policies and procedures were important for a successful outcome. This was expressed in the following ways: *If the leader is strong and support[s] the juniors this makes a difference.* Nurse #3. *Every day they have a new rule and this will make you stressed and not focus.* Nurse #6: *We did not have administrative policies and procedures, we are the one[s] who created them.*

Evaluation and recognition for performance was mentioned as a source of dissatisfaction: Nurse #1: *At the administration level you feel some times that some people are working and others are not and at the end they are the same. There is no recognition from above.*

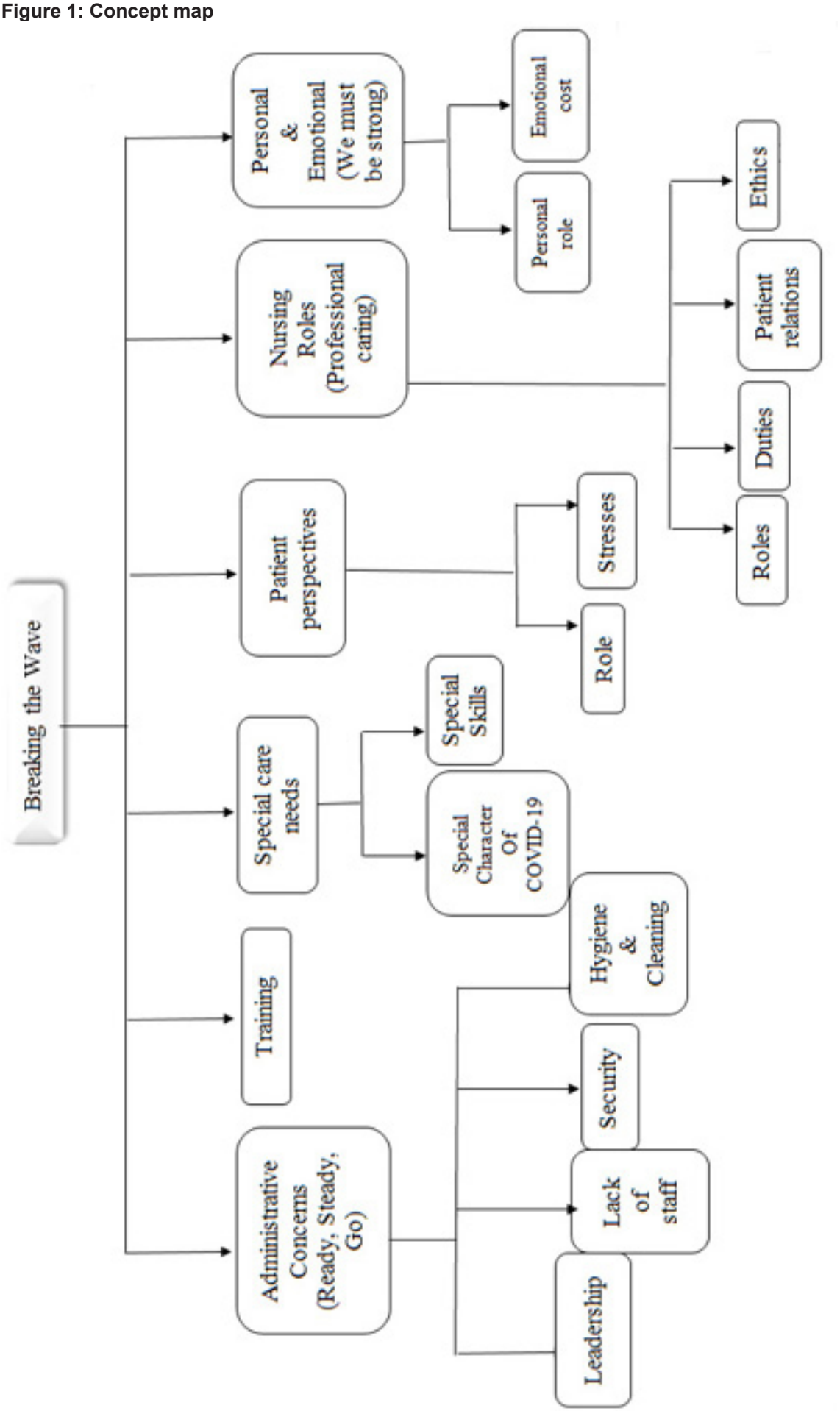
Subtheme 1.2: Lack of staff

Nurses working in quarantine settings found staff shortages stressful. They felt that they were performing tasks which would rightly be done by other healthcare professionals such as: Nurse #4: *All of the tasks fell to nurses. My role in this period was as a total medical staff.* Nurse #7: *You will represent all the medical staff and all the titles not only one person. Even you go and search for the lab results.*

Furthermore, when the quarantines were initiated, there was a lack of critical resources and staff: Nurse #3: *Actually the challenges we face mostly are lack of resources.* Nurse #5: *The number of guests one day reached to 280 or 270 but is now 64.* Nurse #8: *because of the shortage of staff the tasks are distributed between us.*

Corley et al. (16) explored the lived experience of Australian nurses during the H1N1 virus pandemic. They found that: the wearing of PPE, infection control procedures, the fear of contracting and transmitting the disease, adequate staffing levels within the intensive care unit, new roles for staff, morale levels, education regarding extracorporeal membrane oxygenation, and the challenges of patient

Figure 1: Concept map



care were the main themes which emerged during the use of open-ended questionnaires and focus groups. These themes express similar concerns voiced by the Saudi nurses who worked in quarantine settings and emphasized the need for specialized training of a variety of staff prepared for emergency use especially in delivery of care using increased oxygenation and patients of high acuity.

Subtheme 1.3: Hygiene and Cleaning Staff

An important concern of the nurses was the level of training among cleaning and security staff who manned the buildings hosting the quarantines.

Nurses felt they needed to perform sterilization after patients were discharged and before the hotel cleaners came: Nurse 5: After they [are] transferred we sterilize the rooms before the cleaners come to clean because I am afraid that they don't know how to deal with it as in hospitals… because just one single mistake they make may transfer the infection to themselves or to others. Nurse #1: *The hotel staff who are working in the quarantine are not aware or trained on the medical things so we had to monitor them every time.* Nurse #8: T*he thing I did not like is the hotel's way of dealing with us. They were not cooperative with us or with the guests. I even saw a mouse running from one of the guest rooms. When I informed the host they said "no, no, we don't have any".*

Subtheme 1.4: Security and Breakout:

Breakout, meaning unauthorized exit by a patient, is an ever-present threat in a quarantine environment. Nurses are placed in the position of negotiating with patients to accept the room assignments and confinement to specified facilities. Nurse #2: *A week ago one lady here received a positive test and they were afraid to tell her, so I went and informed her. She did not accept it and didn't want to be transferred to another hotel and they wanted to inform the security about her again. I went to her and I explained to her the situation and the protocols from the country and explained that we are here to serve you and if it was in our hands we would put you in the best hotel but for the confirmed cases there are specified hotels which we cannot change. The issue is not about prestige and we need you to help us, not to be a barrier for us.*

Nurse #4: *I am worried about staff and afraid from [of] breakout. After the swab is taken they go back to their rooms and we make sure they are inside their room with cooperation from the security agencies who work with us.*

Theme 2: Training

In general, nurses felt they were prepared for meeting the pandemic. Nurse #3: *I consider [viral] outbreaks to be a disaster. As long as we have a disaster plan, we are prepared for any disaster. So we need to plan for the man-power, for the places, resources all this needs to be done. So yes, we got prepared for this outbreak.*

However, participants felt that specified training to meet the immediate nursing practices required was not made available in a timely manner. Nurse #6: *It should be coordinated from the beginning and train the staff before bringing any guest, not to bring staff and then train them after two days*. Nurse #2: *Some of the staff had no experience with using ventilators. Nurse #8: Now as a primary line to detect Corona I am ready. But as a hospital nurse and receiving cases of respiratory disease in critical condition on a ventilator I am not ready because I am not trained, not qualified. I am ready to handle a positive and stable case.*

Undergraduate, advanced degree, and continuing education programs for practicing nurses may discuss infection control but mass casualty care and disaster management skills need to be incorporated or strengthened in curricula(17). A view which agrees with the statement of a participant in the current study: Nurse #1: *Disasters come at any time. It is good to prepare a team who are ready for any outbreak in the future.*

Some of the nurses in the study felt that they were not prepared in a timely way to assume quarantine duties: Nurse #5: *We stayed two days; nobody explained for[to] us and there was no team. We worked and read what the updates are[were] from the ministry.* This delay caused consternation among the participants. Nurse#4: *With COVID-19 every day brings a new study about the mode of transmission.*

However, some of the participants felt that they had been properly prepared to practice infection control by a two-day online introductory course. Nurse #3: *We received online training about the infection control and the contact with positive cases and how to transfer cases from a positive quarantine to a negative quarantine.* Nurse #8: *They prepared us about the precautions during outbreaks through lectures before we joined and covered hand hygiene and how to wear PPE so we were prepared before we joined here.*

Even so, some participants were concerned that training issues would result in increased infections. Nurse #7: *Medical staff became infected because they were not trained, they did not take courses or trained or follow the PPE and safety measurements. They will infect themselves, the family, and others or go out without knowing what the result is and that they are infected. So we need specialized programs, courses and specialized teams.*

For the nurses among the group who were trained in infection control, they expressed that their experience with MERS-CoV prepared them to take appropriate action during the COVID-19 pandemic. These participants were satisfied with their preparation levels and were more confident than less well prepared colleagues. Nurse #7: *Yes, I was ready and they selected me by name because I have [had] experience before with MERS-CoV and it was more dangerous than COVID-19 because of its mode of transmission. When we dealt with MERS- CoV we had to wear a N95 mask but for COVID-19 we are using*

a surgical mask and PPE. So I am ready. I saw a big difference between myself and those who did not have such experience.

These data in the present study tend to support the findings of Tam(18) which show that nurses who had experience in infection control tended to be more positive about their ability to face an avian influenza epidemic. In that study nurses who had not been employed during the SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) epidemic were less confident in accepting personal risk from infection.

The nurses in the present study felt quite strongly about the best way to improve infection control: Nurse #2: *I have a suggestion that those who are responsible for the quarantines must be involved with infection control. I mean that some of the people who were responsible for quarantines did not practice infection control. They must be qualified.* Nurse #1: *Follow up and training even if the staff are trained is very important. Nurse #6: There should be an infection control coordinator on every shift*. Nurse #7: *Just I want to add it is best if the chosen nurses[nurses chosen] to work in the quarantine are familiar with the infection control basics, not just because of shortage bring any nurse who is not prepared in the infection control. This is dangerous even to themselves.*

Theme 3: Special Care Needs:

Subtheme 3.1: Special Characteristics of COVID-19 Care

`Participants were unsure of this virus and felt that they were dealing with a highly unpredictable threat. Nurse #4: *I was scared to get the virus and take it to my family, to my kids, and to people I love.* Nurse # 3: D*ispersion, how everything is changing, it's really strange. This happened in one month and a half.*

Nurse # 5: *We deal with the negative cases as being [as if they are] positive because some cases appear negative at the first swab and in the second swab they are positive. This virus is very weird because still we cannot trust 100% that cases are negative and we have to be careful and deal with all cases as positive because they may be the sources, but maybe [it could be the] staff, housekeepers, and home services are also [possibly] spreaders.*

Subtheme 3.2: Special Skills and Behaviour Required and Caring

Participants exercised skills and behaviour based on the COVID-19 protocol: Nurse #2: *We did well with them as we were checking vital signs with complete PPE. The first time I worked in quarantine it was stressful because it needs time, needs effort, needs focus, needs attention, needs infection control, and continuous care.*

Nurse #8: We wear complete PPE; gown, mask, head cover, glov*es and even the face shield. We make sure that the guests rub hands when entering to the quarantine and wear a mask, we take his name and give him the key for the room and then take them straight away to the room. If they have any questions, inquiries, or anything it will be covered while he is in his room by [tele] phone.*

Some of the nurses found it difficult to decide to work in a quarantine section at first. Nurse #4: *I have never been in this experience before either with the previous MERS-COV or with SARS-CoV-2, but this time I am facing the situation so in the first moment it was really hard. Then I said, "Oh my God, no, I will be there". I decided to go.*

Some staff had not been trained in the COVID-19 care protocol:

Nurse #1: *We have medical staff who are infected –why [?] because they were not trained, they did not take courses or trained or follow the PPE and safety measures. They will infect themselves, the family, and others, or go out without knowing what the result is and that they are infected. So we need specialized programs, courses, and specialized teams.*

Theme 4: Patient Perspectives

Subtheme 4.1: Patient Role

Patients have a well prescribed role to play during their stay in quarantine. Nurse #7: *We don't allow them to come out of the room whatever happens. Everything is done in the room including history. All needs are addressed by phone as we try to minimize the exposure as [much as] we can.* Nurse #3: *Psychological support is very important as you know being in quarantine is like a jail but it is tidy.*

Subtheme 4.2: Stresses

Sometimes stresses beyond being confined to quarantine were experienced by patients. Nurse #1: *Patients are stressed, isolated, and asking when they will be discharged and what the swab results were.*

Significant life events occur among patients which increases the stress associated with confinement. Among these events was the need to care for critically ill family members or a death. Nurse #5: *Patients are not allowed to attend to their family obligations which is very painful for them.*

Nurse # 4: *A patient's mother died in Germany because of cancer and he was with her for 7 months. It's painful really that he came in the same airplane with his mother's body. It's [was] really very hard and then he came here and they took the mother and he was alone. He was 22 years old and he started to cry and scream "my mom, I want to go and see my mom, I want to say goodbye to my mom". So, these things are hard to be forgotten and when I talked [talk about it] it looks easy but when you are in the same situation and you are seeing everything it is not.*

Separation of family members can be very distressing. Nurse #6: *We did swabs for a family. All of them were negative except their 4 year old child was positive. When we informed them the father started to cry.*

Theme 5: Nursing Roles

Subtheme 5.1: Roles:

Participants defined their role in caring for patients in quarantine at a professional level: Nurse #4: *They need and deserve the patient care, the proper nursing care, and this is our role.* Nurse #2: T*his is our duty first among those who belong to the nursing profession – to provide nursing care under all different situations.* Nurse #6: *I learned many things in the nursing role, care, time management, punctuality, readiness, communication with the team, team work.*

The participants also felt that they were adding to the collective knowledge of the nursing field: Nurse #8: *We are dealing with new things here and take information about it. I am one of those first people who is taking this knowledge.* Nurse #3: I *had a passion to learn.*

Nurses assigned to quarantine found their roles were multipurpose: Nurse #7: I *was a nurse, I was infection control, I was administrative, I was a statistician, I was supportive, I was a health educator*. Nurse #6: *The first time I worked in quarantine it was stressful because it needs time, needs effort, needs focus, needs attention, needs infection control and continuous care.*

And responded with deeply committed action to the challenge: Nurse #7: *I am different now, 180 degree, totally different, I am not scared, I can face anything, I can deal with positive cases and I can do anything for my country, for people and everyone.*

In contrast, feelings expressed by these nurses toward professional nursing and national service values were somewhat different among emergency nurses in Hong Kong during the H1N1 outbreak(7). Hong Kong nurses were committed to caring in this setting but expressed the need for better utilization of PPE, availability of more accurate information for the public, and better allocation of manpower.

Subtheme 5.2: New Duties

During the assignments participants were pleased to learn and have new duties which increased their professional skill: Nurse #4: W*e work on data insertion which gave me a chance to learn on Excel which was complicated for me to use before.* Nurse #1: *if you suddenly are with a new work group and you became their leader.*

Subtheme 5.3: Patient Relations:

Effective communication with patients was seen as a valuable tool in the caring process. Nurse #8: *I saw that the feedback from communication helped people to become calm.*

Some participants found that patients expected to be cared for in different ways based on their social status. Nurse #5: *VIP patients had a lot of demands. … but at the end we count the reward from Allah*. Nurse #7: *We follow the professional ethics because whatever happened they were under pressure.*

Subtheme 5.4: Ethical Aspects:

Application of ethical precepts assisted the nurses to provide high quality care. Nurse #3: *This work is adding to my professional experience but it is dominated by a humanitarian and voluntary aspect. Also, it is a national duty. I am giving my duty that belongs to my profession under all conditions.* Nurse #6: *I feel that I am giving by listening to them to the extent that their stress [is] decreased by explaining everything to them.*

Theme 6: Personal and Emotional Roles:

Subtheme 6.1: Caring Roles

Participants discussed the personal costs of doing service in quarantine duty. Nurse #3: *Oh my God, I miss my family, I miss my kids, I miss everyone, I miss my office, I miss my people there, I miss my friends, I miss the places, I miss the country, I miss everything , so you feel that you are missing everything. This is really, really hard but on the other hand you want to do something.*

Those nurses practicing in disaster care in Iran expressed similar conflicts with emerging themes including concern for their families, conflicting emotions, and worry about the length of time their services would be required(19).

During the COVID-19 crisis, healthcare workers in Wuhan, China overall reported being affected by depression, anxiety, insomnia, and distress at 50.4 %, 44.6%, 34.0% and 71.5% respectively and frontline healthcare workers were reported to have higher rates of experiencing these conditions(20). These data suggest that mental health resources need to be available for frontline workers during times of major crisis or disaster(21). Nurse #8: *I went home wearing a mask because I was afraid for my family. I stayed two days and I came back and I felt better.* Nurse #1: *We were afraid on the first day - of course we are afraid but we trust in Allah and we took [looked after] our safety and [took] precautions.*

Subtheme 6.2: Personal Roles:

Impact on family life was also a theme with the nurses. Nurse #4: *My parents always keep reminding me to take precautions every time I call them.* Nurse #2: *I miss my family.*

While the pull between family and professional practice is ongoing one nurse expressed it this way: Nurse #5: *I think you can feel it through the tone of my voice, I think you can feel that. I am excited I am happy and I am sad that I can't see my family and loved people. If you asked me -are you going to do it again? I will say, yes, yes.*

Limitations:

Among the limitations which may affect transferability and generalizability is that all participants were female and the small number in the sample.

Conclusion

Participants in the COVID-19 quarantine efforts were affected in a variety of ways. They felt the importance of an opportunity to serve during a humanitarian and national crisis. During their experience they encountered challenges to providing high quality nursing care to patients who were confined to quarantine.

Several specific recommendations for modification of the quarantine process were offered by them. They specifically requested that staff who man quarantine facilities should be trained in disaster management and infection control. They further suggested that a register of potential staff who have been especially trained in quarantine care be established for use when needed and held in an available and organized way.

Placement of disaster management and infection control curriculum need to be present at all levels of nursing education from undergraduate study through to continuing education for employed nurses was supported by participants and in related literature. This part of the curricula may wisely need to be placed as a stand-alone, concentrated, hands-on required course including barrier nursing, infection control, universal precaution measures, health education, and public health as bases for preparing a specialized disaster-ready nursing force.

While the participants in the current study showed remarkable personal strength, professional, and national commitment, planning for their personal welfare needs to be part of a quarantine plan. Long assignments without opportunity for contact with families posed an especially stressful aspect of participation. Facilitating contact with absent family members perhaps through electronic channels and presence of counselling services on site for stressed care providers may be useful steps to prevent staff distress and burnout.

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Does it Rain after the Storm? Family medicine resident's reflection at Qatar: Results From a cross sectional study

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Abstract

The literature is enriched with evidence that the Covid-19 crisis led to negative impacts such as disruption of economy, health/social impacts, and financial difficulties. Our purpose is to investigate how the family medicine department move can beyond crisis recovery, develop resilience and what the family medicine residents learnt from the crisis and if they have had any negative or positive consequences that we can shed light on. Therefore, we developed a survey-based questionnaire to understand how our residents got actively or passively impacted, so thus the family medicine program can provide insightful bi-directional support for the trainees. Gain from a crisis was not expected. However, results from this survey showed that family medicine residents benefited from their experience as front-line staff managing patients during the covid-19 pandemic mostly in social, behavioral and skills aspects and to a minor degree in the professional aspect. On the other hand, the family medicine educational aspect was negatively impacted.

Key words: Covid-19, implications, family medicine Residents, QATAR

Introduction

Family medicine residency program in Qatar has been an accredited ACGME-I program since 2013. During the COVID crisis in Qatar, which started at the end February 2020 the ACGME/ACGME-I has granted significant flexibility to allow our residents to meet increased clinical demands created by the pandemic(1). Over several months of very heavy pressure on the health care systems with additional patients who must be cared for, family medicine residents took the initial steps in the front lines providing the best appropriate care for their patients. Their work was highly noticeable and their flexibility, and ability to face the uncertainty and ambiguity enabled most of them to lead their teams in the quarantines which were requiring significant trainee redeployment (2).

There is no universally valid reflection(3) giving our residents the space to express their own experience and how it affects them socially, mentally and professionally. We will be reflecting on what is their vision of personal development. This will consequently enhance knowledge and practical experience in residents' training. Their responses to the survey below varied in behavioural, psychosocial, professional, and physical benefits as well as self-awareness. It was noticed that one of them quit smoking while the other mentioned that he (has grown up) and become independent. Some of them mentioned the value of team work and others highlighted their leadership experience.

Covid-19 pandemic can provide opportunities for knowledge and sustainable development. From the family medicine residents' perspective while responding to the most urgent needs as a front-line staff facing the unpredictable pandemic, they took advantage of all opportunities for change to achieve the desired goals and sustainable recovery with the efficient use of the best available resources (4).

The Program has had the opportunity to describe how this crisis affected enrolled trainees and the resident's point of view has been highlighted via an anonymous survey(2).

Results

Table 1: demographic data distribution of studied group

		N	%
PGY	1	11	22.4
	2	12	24.5
	3	12	24.5
	4	14	28.6
Sex	Male	19	38.8
	Female	30	61.2
Marital	Single	17	34.7
	Married	31	63.3
	Divorced	1	2.0
Nationality	Non Qatari	45	91.8
	Qatari	4	8.2
Direct contact with Covid 19	No	8	16.3
	Yes	41	83.7
	Total	49	100.0

Females were the majority with 61.2% and also married were the majority (63.3%); regarding nationality non Qataris were the majority with 91.8% and 83.7% deal directly with Covid-19 patients.

Table 2: distribution of impact on quality of life parameters

		N	%
Social	Negative impact	12	24.5
	Positive impact	37	75.5
Behavior	Negative impact	10	20.4
	Positive impact	39	79.6
Professional	Negative impact	23	46.9
	Positive impact	26	53.1
Educational	Negative impact	26	53.1
	Positive impact	23	46.9
Skill	Negative impact	8	16.3
	Positive impact	41	83.7
	Total	49	100.0

Highest negative impact was in educational sector, then Professional

Graph 1

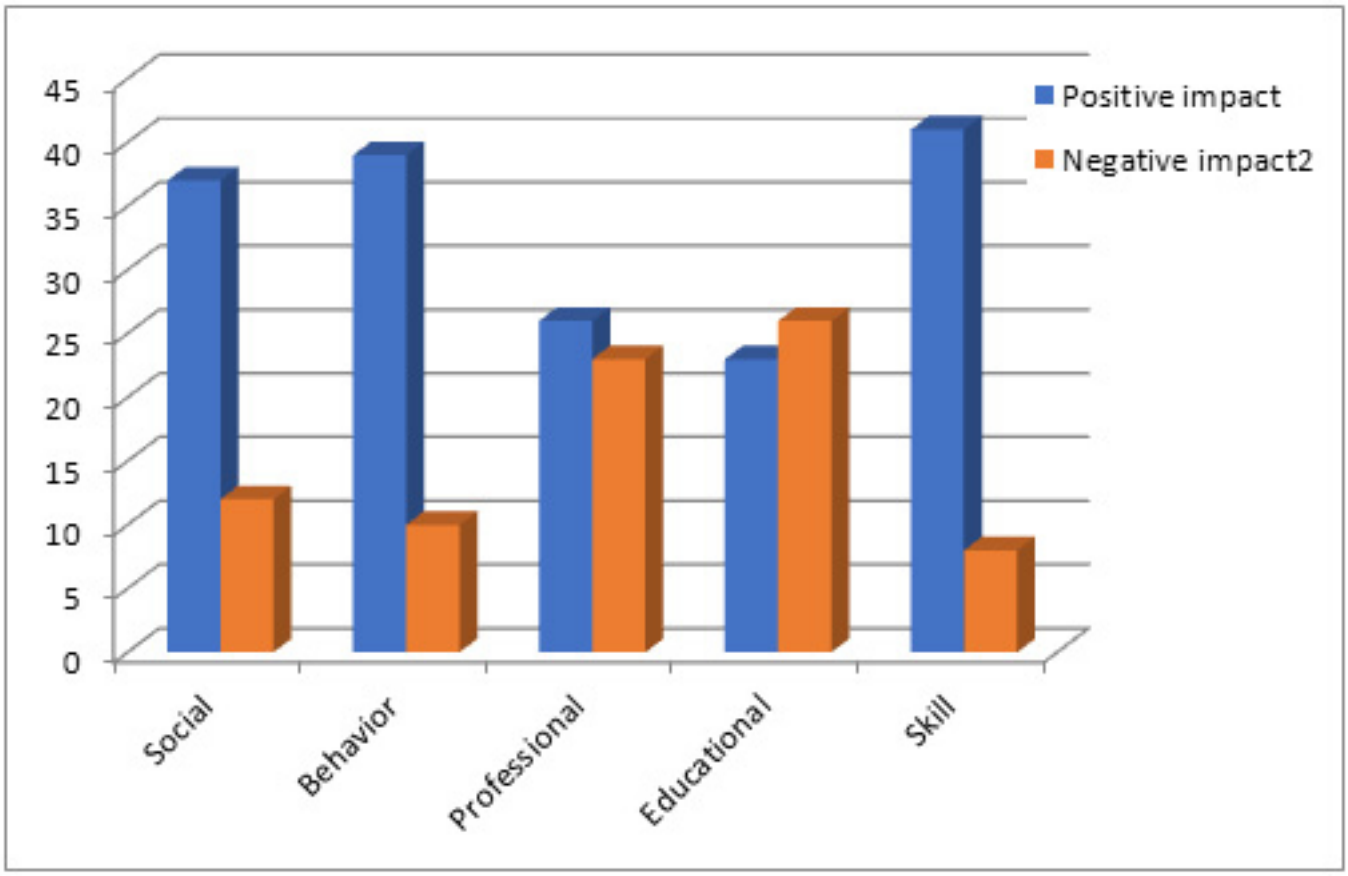
45
40
35
30
25
20
15
10
5
0
Positive impact
Negative impact2
Social
Behavior
Professional
Educational
Skill

Table 3: Relation with social impact

			Social		X^2	P
			Negative	Positive		
PGY	1	N	5	6		
		%	45.5%	54.5%		
	2	N	1	11		
		%	8.3%	91.7%		
	3	N	3	9	4.38	0.22
		%	25.0%	75.0%		
	4	N	3	11		
		%	21.4%	78.6%		
Sex	Male	N	4	15		
		%	21.1%	78.9%		
	Female	N	8	22	0.198	0.65
		%	26.7%	73.3%		
Marital	Single	N	4	13		
		%	23.5%	76.5%		
	Married	N	7	24		
		%	22.6%	77.4%	3.15	0.207
	Divorced	N	1	0		
		%	100.0%	0.0%		
Nationality	Non Qatari	N	10	35		
		%	22.2%	77.8%		
	Qatari	N	2	2	1.53	0.21
		%	50.0%	50.0%		
Direct contact	No	N	1	7		
		%	12.5%	87.5%		
	Yes	N	11	30	0.74	0.38
		%	26.8%	73.2%		
Total		N	12	37		
		%	24.5%	75.5%		

No significant difference or association

Table 4: Relation with Behaviour impact

			Behaviour		X^2	P
			Negative	Positive		
PGY	1	N	3	8		
		%	27.3%	72.7%		
	2	N	2	10		
		%	16.7%	83.3%		
	3	N	2	10	0.53	0.91
		%	16.7%	83.3%		
	4	N	3	11		
		%	21.4%	78.6%		
Sex	Male	N	3	16		
		%	15.8%	84.2%		
	Female	N	7	23	0.408	0.52
		%	23.3%	76.7%		
Marital	Single	N	2	15		
		%	11.8%	88.2%		
	Married	N	7	24		
		%	22.6%	77.4%	4.77	0.092
	Divorced	N	1	0		
		%	100.0%	0.0%		
Nationality	Non Qatari	N	9	36		
		%	20.0%	80.0%		
	Qatari	N	1	3	0.057	0.81
		%	25.0%	75.0%		
Direct contact	No	N	1	7		
		%	12.5%	87.5%		
	Yes	N	9	32	0.36	0.54
		%	22.0%	78.0%		
Total		N	10	39		
		%	20.4%	79.6%		

No significant difference or association

Table 5: Relation with Professional impact

			Professional		X^2	P
			Negative	Positive		
PGY	1	N	5	6		
		%	45.5%	54.5%		
	2	N	5	7		
		%	41.7%	58.3%		
	3	N	8	4	2.72	0.43
		%	66.7%	33.3%		
	4	N	5	9		
		%	35.7%	64.3%		
Sex	Male	N	8	11		
		%	42.1%	57.9%		
	Female	N	15	15	0.29	0.59
		%	50.0%	50.0%		
Marital	Single	N	8	9		
		%	47.1%	52.9%		
	Married	N	14	17		
		%	45.2%	54.8%	1.17	0.55
	Divorced	N	1	0		
		%	100.0%	0.0%		
Nationality	Non Qatari	N	22	23		
		%	48.9%	51.1%		
	Qatari	N	1	3	0.84	0.35
		%	25.0%	75.0%		
Direct contact	No	N	3	5		
		%	37.5%	62.5%		
	Yes	N	20	21	0.34	0.55
		%	48.8%	51.2%		
Total		N	23	26		
		%	46.9%	53.1%		

No significant difference or association

Table 6: Relation with educational impact

			Educational		X^2	P
			Negative	Positive		
PGY	1	N	4	7		
		%	36.4%	63.6%		
	2	N	9	3		
		%	75.0%	25.0%		
	3	N	8	4	6.13	0.105
		%	66.7%	33.3%		
	4	N	5	9		
		%	35.7%	64.3%		
Sex	Male	N	9	10		
		%	47.4%	52.6%		
	Female	N	17	13	0.404	0.52
		%	56.7%	43.3%		
Marital	Single	N	9	8		
		%	52.9%	47.1%		
	Married	N	16	15		
		%	51.6%	48.4%	0.91	0.63
	Divorced	N	1	0		
		%	100.0%	0.0%		
Nationality	Non Qatari	N	24	21		
		%	53.3%	46.7%		
	Qatari	N	2	2	0.016	0.89
		%	50.0%	50.0%		
Direct contact	No	N	4	4		
		%	50.0%	50.0%		
	Yes	N	22	19	0.036	0.85
		%	53.7%	46.3%		
Total		N	26	23		
		%	53.1%	46.9%		

No significant difference or association

Table 7: Relation with Skill impact

			Skill		X^2	P
			Negative	Positive		
PGY	1	N	2	9		
		%	18.2%	81.8%		
	2	N	3	9		
		%	25.0%	75.0%		
	3	N	1	11	1.29	0.73
		%	8.3%	91.7%		
	4	N	2	12		
		%	14.3%	85.7%		
Sex	Male	N	1	18		
		%	5.3%	94.7%		
	Female	N	7	23	2.78	0.095
		%	23.3%	76.7%		
Marital	Single	N	2	15		
		%	11.8%	88.2%		
	Married	N	6	25		
		%	19.4%	80.6%	0.66	0.71
	Divorced	N	0	1		
		%	0.0%	100.0%		
Nationality	Non Qatari	N	8	37		
		%	17.8%	82.2%		
	Qatari	N	0	4	0.85	0.35
		%	0.0%	100.0%		
Direct contact	No	N	6	2		
		%	75.0%	25.0%		
	Yes	N	2	39	24.09	0.00**
		%	4.9%	95.1%		
Total		N	8	41		
		%	16.3%	83.7%		

No significant difference or association except that direct contact with Covid-19 significantly associated with gaining of skills

A chi-squared test was conducted to determine whether there are statistically significant differences between the expected Frequencies and the observed frequencies in one or more categories such as distribution of impact of Covid -19 experience on quality of life parameters such as educational, professional, social, behavioural and needed skills in relation to different patches of family medicine residents in Qatar (PGY1, PGY2, PGY3 and PGY4). Of the 49 family medicine residents with 100% response rate (Table 1) females were the majority with 61.2% and the married residents were a majority as well of 63.3%, regarding nationality non Qataris were the majority with 91.8% and 83.7% of family medicine residents dealing directly with Covid -19 patients. As shown in Table 2 and Graph 1: distribution of impact on quality of life parameters, highest negative impact was in educational sector then Professional. Positive impact was remarkable in skills, behavioural and social categories respectively. In Table 3 Relation with social impact revealed that PGY2 obtained much social benefit with 91.7%, followed by PGY4 and PGY3 of 78.6% and 75% consequently, however PGY1 showed only 54.5% which could be due to less experience and flexibility. Males scored social benefits of 78.9% followed by females of 73.3%. In Table 4 in regard to relation with behavioural impact was equally in PGY2 and PGY3 of 83.3% followed by PGY4 of 78.6% and again PGY1 was the lowest ratio of 72.7%. In Table 5 which was discussing the relation with professional impact PGY4 led the ratio by 63.3% followed by PGY2 and PGY1 of 58.3% and 54.5% respectively and the least ratio was for PGY3 of 33.3%. in Table 6. Discussing the relation with educational impact it showed that PGY4 and PGY1 residents were almost similar with ratios of 64.3% of PGY4 and 63.6% for PGY1 , however PGY3 and PGY2 obtained only 33.3% and 25% respectively. In Table 7 regarding the relation with skills

impact, it was clear that PGY3 residents were in the front with a ratio of 91.7%, PGY4 and PGY1 were in the same band of 85.7% and 81.8% consequently, however the last rank was for PGY2 residents with 75% denoting No significant difference or association except that direct contact with Covid- 19 was significantly associated with gaining of skills.

Discussion

The Covid-19 pandemic has had impacts on the usual used method in teaching family medicine residents. Being flexible in facing the ambiguity of the pandemic as front-line staff was the main issue discussed and recommended by ACGME-I to overcome the situation (2).

In other studies done during the time of Covid-19 on reflections on different subspecialties such as emergency medicine, surgery residents in facing the COVID -19 along with another study on chief medical residents from an internal medicine program as a leader for the residents and many studies from different countries' perspectives discussed the uncertain world in Wuhan, Turkey and Singapore, additionally there was a study discussing how to restructure residents' education during the Covid pandemic. All those studies showed that even in the most developed countries, residents facing Covid-19 can be quickly exhausted in the event of a rapid increase in the number of infections. In many countries the faculty had transformed the academic day lectures into online format. Using the technology to maintain the education was a solution however the technical difficulties, hectic schedule and the new educational method during the pandemic had affected the knowledge domain. Additionally, residents' training rotations were also affected due to reduction of patient volume in hospitals with pandemic progression due to fear or being infected along with deploying the residents in quarantine and COVID -19 screening units due to increased demands of health care personnel(6,7,8,9,10,11). Our study is quite a similar situation to the previously mentioned studies as it was obviously seen in our survey results (Table 2). The highest negative impact was in the educational domain then the Professional sector by 53.1%, and 46.9% respectively. Since the start of th COVID situation the Continuity care clinics and academic day lectures have been suspended which has affected their training in terms of missing important lectures and the reduced chance to interact more with their assigned supervisors as they used to do during the educational activities. It has reduced their usual patient numbers and ACGME rotations requirements have fallen behind from the resident point of view. They have been out of their usual practice for long period; others mentioned that due to work overload there was not enough time to gain knowledge related to residency.

On the contrary, direct contact with Covid 19 was significantly associated with gaining of medical, Telemedicine and communication skills in 49 residents: 41 were positively impacted in a ratio of 83.7% and 8 residents noticed that their medical skills have been negatively affected due to the Covid pandemic at a ratio of 16.3% of our residents. Some of them labeled the situation as 'It is a once in a life time experience getting to participate in this national emergency' and being part of a bigger picture certainly added great value and experience for them. It was a reminder that a pandemic can erupt any minute and that in our profession we should always be ready and mentally prepared in terms of flexibility and resilience, having a wide range of patients in terms of demographics, comorbidities, and disease severity. Working side by side with colleagues and consultants from other specialties, changing protocols on a daily basis made them more flexible for change. This interaction broadened their medical knowledge and boosted their confidence level.

Additionally, they appreciate gaining more in communication skills, especially when reassuring anxious patients newly diagnosed, and how to explain the disease in a simple and scientific way; ECG and Chest X-ray interpretation; management of uncontrolled complicated cases in association with their Covid-19 infection; learning proper donning and doffing measures and infection control precautions. Other values included teamwork, getting in touch with doctors from other specialties, crisis management strategies along with participation in raising community awareness.

Socially, in our experience, it was noticed that one of them quit smoking while another mentioned that he (has grown up) and become independent. Some of them mentioned the value of team work and others highlighted the leadership experience and decision-making capacity. In their words, they learned to cooperate, collaborate, and listen to each other carefully. They learned to deal with high responsibility empathetic attitude facing the stressful situation and to be proactive in ambiguous circumstances along with staying compassionate to themselves, their colleagues and their families as 'at the end we are all having a tough time with all the unpredictable changes happening'. Some of them learned organization skills and time management. Others explored their ability in performing tasks like driving safely for 90km every day. One female doctor labeled herself as a stronger woman than what she thought. There are no similar studies done regarding the social aspect implications for comparison.

Behavioral aspect

The pandemic has brought major stress. Residents' psychological knowledge and the motivational theory of coping with stress and its implications on physical, mental health and support was an issue during the pandemic according to Singapore residency programs. All residents reported lower perceived stress and stigma compared to base line. "Our family medicine residents reflected upon that by saying that they learnt: management of conflicts and stress coping techniques and became "initiative" and proactive in seeking advice/help from consultants and other specialties when not sure or lacking the knowledge' and to adapt to different situations.

Conclusion

Family medicine residents' responses to this survey varied in behavioural, psychosocial, professional, physical benefits as well as self-awareness. They acknowledged taking part in facing the pandemic as a front-line health care provider. It was a beneficial life time experience for them. They have learned how to deal with pandemics and to adapt to different situations. Survey results concluded that family medicine residents benefited from their experience mostly in social, behavioral and skills domains and to a minor degree in professional aspect. On the other hand, the family medicine educational aspect was negatively impacted.

They proactively identified and abandoned residents who might be at a higher risk of pandemic physical and psychological sequalae due to their physical health status; suffering of burnout could be one of the contributing factors of gaining such a great positive implication.

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Clinical pattern of tuberculosis in malnourished children in Kassala hospitals, Sudan: A hospital based study

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Abstract

Objective: To study the clinical pattern of tuberculosis in malnourished children below five years of age admitted as diagnosed cases of tuberculosis.

Materials and Methods: This is a cross sectional hospital based study done in Kassala Teaching Hospital and Kwaiti Paediatric Hospital during the period from January 2010 to December 2011. Data was collected through a questionnaire detailing full socio-demographic, nutritional and medical history. Examination, anthropometric measurements and investigations of the children included in the study.

Results: The mean (SD) age was 28.8 months in 84 children of almost equal gender distribution. Almost all were of low socio-economic class. 51(60.7%) were BCG vaccinated; the mean duration of symptoms was 46 days. The commonest symptoms were loss of weight in all patients, fever in 95.5% and cough in 79.8% of the study group. The cough had a significant statistical relation to the pulmonary disease (P>0.042). 82.1% of the children had a weight /height percentage of less than or equal to 70%. Chest signs were seen in 66 (87.6%) patients. Pulmonary disease was diagnosed in 72.6%, miliary in 8(9.5%) and meningitic TB in 4 (4.8%) of the children in the study group. The WHO score system was positive of ≥7 in 65 (78.6%) of the study group.

Conclusion and recommendation: The clinical diagnostic scores are sensitive but they use non-specific parameters. Screening of children with adult TB contact and sufficient rehabilitation of malnourished children before labelling them as tuberculous is recommended.

Key words: Tuberculosis, Malnutrition, Marasmus, Kwashiorkor

Abbreviations: TB=tuberculosis; WHO=World health organization, TSC=tuberculosis score chart, IUTLD=international union against tuberculosis and lung disease, BCG=Bacille- Calmette- Guerin vaccination, MOH=ministry of Health

Introduction

One third of the world's population (about 1.7 billion people) are thought to be infected with TB with 30 million active cases and 8 to 10 million new cases annually. 3 million people die of TB annually and TB probably causes about 6% of all deaths world wide(1,2).

In 1993 the WHO declared TB as a global emergency. The case fatality rate exceeded 50% in some African Countries with high HIV rate and 8% of incident TB cases have HIV infection(3,4).

95% of the cases and 98% of tuberculosis deaths occur in developing countries where about 0.2% to 1% of the population are infectious for TB. The estimated incidence in Africa is 272 cases per 100,000 population(5). In children it is estimated that 1.3 million children are infected annually and the annual deaths due to TB in children reaches 450,000 world wide(6). TB may be responsible for about 10% of hospital admissions of children in the developing countries and about 10% of hospital deaths(7). Tuberculosis in Sudan is one of the most important public health problems as it is a leading cause of health service utilization of ambulatory services (the fourth), a most frequent cause for hospital admissions and is the fourth commonest cause of hospital deaths constituting about 16% of all hospital deaths(8). Figures may change yearly but still they are high. The best indicator of the problem of tuberculosis in Sudan is the average Annual Risk of Infection (ARI) which is the proportion of population that is likely to be infected over a period of one year. This is estimated in Sudan to be 1.8% putting Sudan among countries of high prevalence for TB in the East Mediterranean region. The incidence of all forms of TB is therefore about 180 per 100,000 with a detection rate of only 43.6% in the beginning of this century. Prevalence of infection is between 35% and 40% with death rate of about 60 per 100,000 cases(8,9,10.11).

There is a strong link between malnutrition and increased susceptibility and or severity of tuberculosis. The nutrients that have been implicated in the immune response to tubercle bacilli include protein, zinc and vitamin D. Others also are vitamin A, vitamin C and iron Malnutrition exerts many detrimental effects on many aspects of host immune response against mycobacterial infection(12,13,14).

Studies were carried out to show the very important relationship of different nutritional elements and the depletion, especially significant changes in the cell mediated type of immunity against tuberculosis and in cytokine production in human and animal models. These include the studies of Barnes et al., Mcmurray et al Chan et al and other researchers(12,15,16,17,18,19).

Studies in South Africa indicated that Tuberculosis can be found in 12 -30% of malnourished children and as a bidirectional relationship 66% of tuberculous children fail to gain weight or they show weight loss before tuberculosis become evident in them(20). There is good evidence that malnutrition increases the frequency of occurrence and exacerbates the clinical manifestations of TB. Our knowledge on the exact mechanism is limited. In the study of Mabebo et al. on clinical and radiological features of pulmonary TB in 329 adults of whom 78% were malnourished about 20% of severely malnourished patients presented more often with dyspnea, diarrhea, and night sweats and less often with hemoptysis and cavitation(21). In other studies malnutrition was significantly associated with smaller size of positive Mantoux test and with increased mortality(22,23).

Natural history of tuberculosis in children included three stages: exposure, infection and disease. Studies showed that without specific treatment, infection will proceed to disease in 43% of infants, in 24% of under five years and in 16% in children between 11 to 15 years. History of contact is usually found in up to 50% of cases and the disease is extrapulmonary in 25 to 35 % of cases in children including lymphadenitis, skeletal TB, abdominal TB and the less common serious forms of disseminated or miliary and meningitic TB and also other rarer types (24,25).

The objective of this study was to look at the clinical pattern of tuberculosis diagnosed in malnourished children attending Kassala hospitals in Eastern Sudan as an area of high prevalence of tuberculosis in Sudan.

Materials and Methods

Study design: This was a cross sectional hospital based study.

Study area: Kassala State in Kassala Teaching and Kuwaiti Pediatric hospitals and referred patients from peripheral refugee camps and rural hospitals.

Study Period: January 2010 to December 2011
Sample size: 84 patients

Inclusion criteria: All newly diagnosed children as cases of tuberculosis of age less than 60 months and were classified as malnutrition or underweight according to the clinical Welcome -Trust classification

Exclusion criteria: Neonates, age more than 60 months, parental or care giver refusal to enrol in the study, concomitant chronic medical disease.

Research tools and techniques
Ethical consideration: Ethical approval from the hospital authority was requested and obtained prior to the start of the study (dated on 15.11.2009).

A questionnaire was designed to contain full information about the nutritional social and medical history of the patient. Also examination finding,s anthropometric measurements and relevant investigation findings records for every patient were made. Anthropometric measurements done were the weight, height or length, and the head and mid-

upper arm circumference and these were plotted against the suitable centile charts and the results were recorded. Weight of every child unclothed was recorded in grams. Investigations included the Mantoux testing, radiology; chest x-ray, E.S.R .and hemoglobin, BCG test, ZN stain for gastric aspirate and some further investigations as relevant.

Informed consent was obtained for each patient from parents or guardian.

Direct interview for each patient was performed by the author to fill in the questionnaires. Data entry and statistics: data obtained was entered in a computer program (SPSS) and appropriate tests for significance levels were used.

Results

Socio-demographic characters: Eighty four tuberculous malnourished children were enrolled in the study. Ages of the study group ranged from 5 to 59 months the average with average age of 28.8 months of these children 13(15.5%) were less than one year. There were 53 children (63.1%) belonging to the original Eastern Sudan ethnic groups and 50 children (59.5%) living inside the city. Male to female ratio was almost equal (43:41). Almost all the group is of low socioeconomic background.

The most common presenting symptom were loss of weight (100%), anorexia (92.8%), mood changes and fever (90.5%) cough (79.8%) and sweating (61.9%) as shown in Figure 1. Fever most commonly was of continuous pattern.

History of close family member contact was detected in 25% of cases (Table 1). The mean duration of symptoms was 46 days with ranges from 10 days up to 6 months. Pulmonary TB was statistically significantly associated with presence of cough (p value of 0.042) but no significant association between pulmonary disease and fever was detected (p value > 0.6).

Difficult breathing at rest occurred in 23 (27.4%) of the children and the weight loss was severe in 50 (59.5%) of patients. Rarer symptoms were back deformity in 5 children and convulsions in six children. Convulsions have statistically significant correlation with severe types of TB (miliary or meningitic types) with p value of > 0.001 (Table 2).

Seventeen of the children were admitted twice or more to the hospital previously. There were 51 children who were BCG vaccinated but about half of the vaccinated children did not show a BCG scar. History of measles was not statistically associated with the presence of pulmonary disease nor with the presence of severe TB types nor with the type of malnutrition or Mantoux skin test size. In this study no significant correlation was found between previous BCG vaccination and presence of severe types of TB.

Clinical examination: Almost all of the children in the study group (98.8%) have weights that are below the third centiles for age and gender and 51(60.7%) have height or length below the third centile. There were 32 children (38.1%) of less than 60% and further 37 children (44%) of less than 70% regarding the Weight for height percent (severe wasting). The Welcome classification of malnutrition has no significant association statistically with the severe TB forms but the weight /height classification has a significant relation (p > 0.05).(Table 3).

Signs detected in the study group include severe pallor in 25 children (29.8%), edema in 22 (26.2%). Signs of vitamin A deficiency were in one third of the group, hepatomegaly alone in 38 patients (45.2%) and hepatosplenomegaly in 16 patients (19%). 39 children showed lymphadenopathy mostly of small size. Figure 2 shows the Welcome classification of malnutrition in the study group. Sixty-six children (77.4%) in the study group showed chest signs as demonstrated in Figure 3. The Mantoux test size was significantly related to the Welcome's classification of malnutrition (p> 0.001). The chest x-ray showed positive features in 72 patients (85.7%). The WHO clinical score chart was positive of ≥ in 66 patients (78.6%) and had statistical significance when compared with chest x-ray features and the duration of symptoms. The pattern of tuberculous disease seen in this series was pulmonary alone in 48 patients (57.1%), pulmonary with other extrapulmonary features in 13 patients (15.5%) miliary or disseminated in 8 patients (9.5%) nodal only in 6 patients (7.1%) meningitic in 4 patients (4.8%) 2 patients with Pott,s disease and 2 patients with other osteal disease. One patient had suspected abdominal TB. The pattern of tuberculous disease in this group is shown in Figure 4.

Figure 1: The main presenting symptoms in the study group (n = 84)

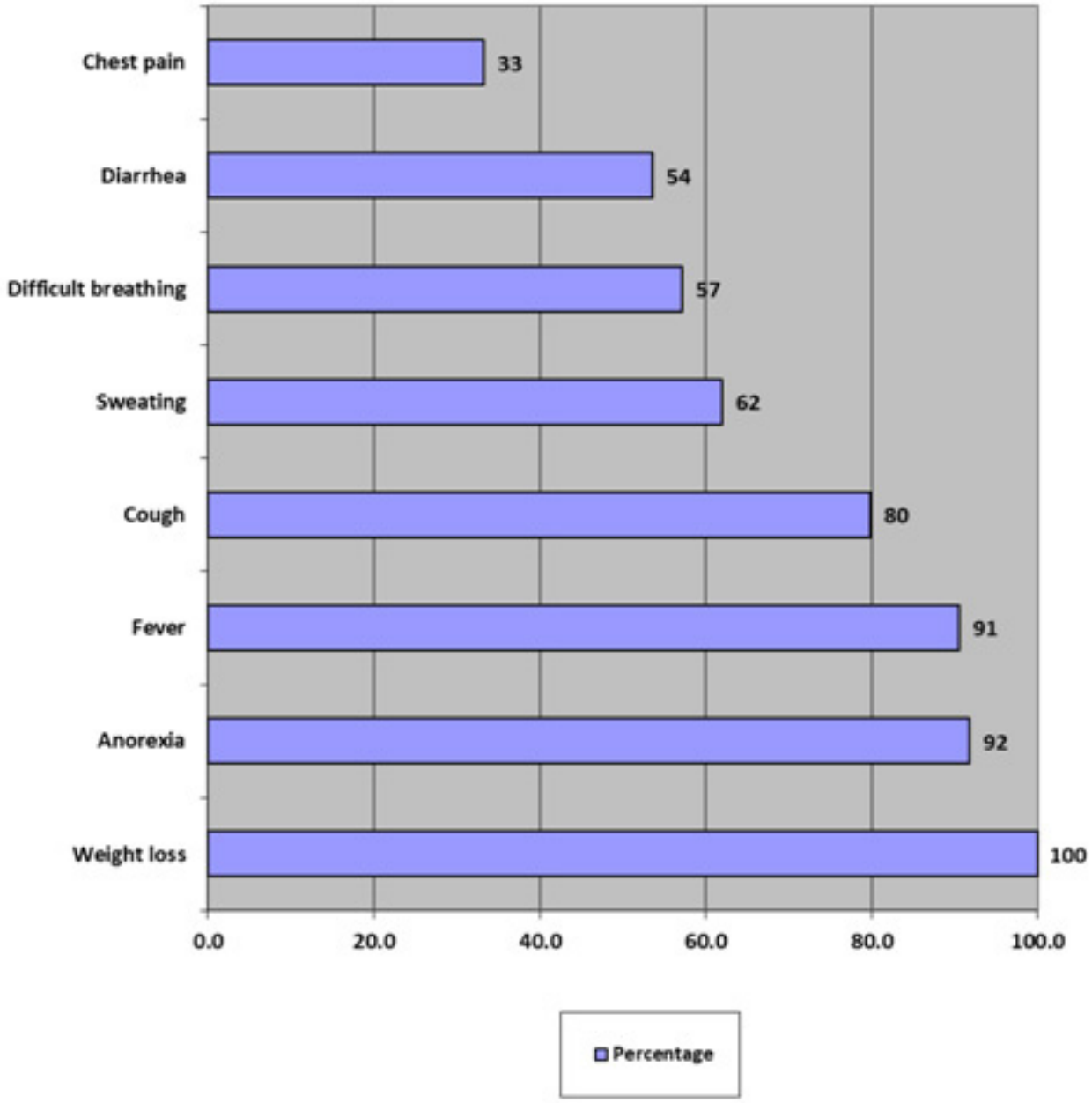


Table 1: History of contact with adult TB cases in the study group (n=84)

History of contact	Frequency	Percentage
No contact	47	56.0
House hold contact	21	25.0
Neighbour contact	14	16.6
School contact	01	1.2
Visitor contact	01	1.2
Total	***84***	***100.0***

Table 2: Comparison of pulmonary and non pulmonary TB with presence of cough in the study group (n=84)

Disease	Cough					
	No		Yes		Total	
	No.	%	No.	%	No.	%
Pulmonary	9	10.7	52	61.9	61	72.6
Non-Pulmonary	8	9.5	15	17.9	23	27.4
Total	17	20.2	67	79.8	84	100.0

$X^2 = 4.1$ P<0.0.042

Table 3: Comparison of severe TB and non -severe TB with presence of convulsions in the study group (n=84)

Disease	Convulsion					
	No		Yes		Total	
	No.	%	No.	%	No.	%
Severe TB	7	8.3	5	6.0	12	72.6
Non- severe TB	71	84.5	1	1.2	72	27.4
Total	17	20.2	6	7.2	84.0	100.0

$X^2 = 24.86$ P<0.0.01

Figure 2: The Welcome's classification of malnutrition in the study group (n = 84)

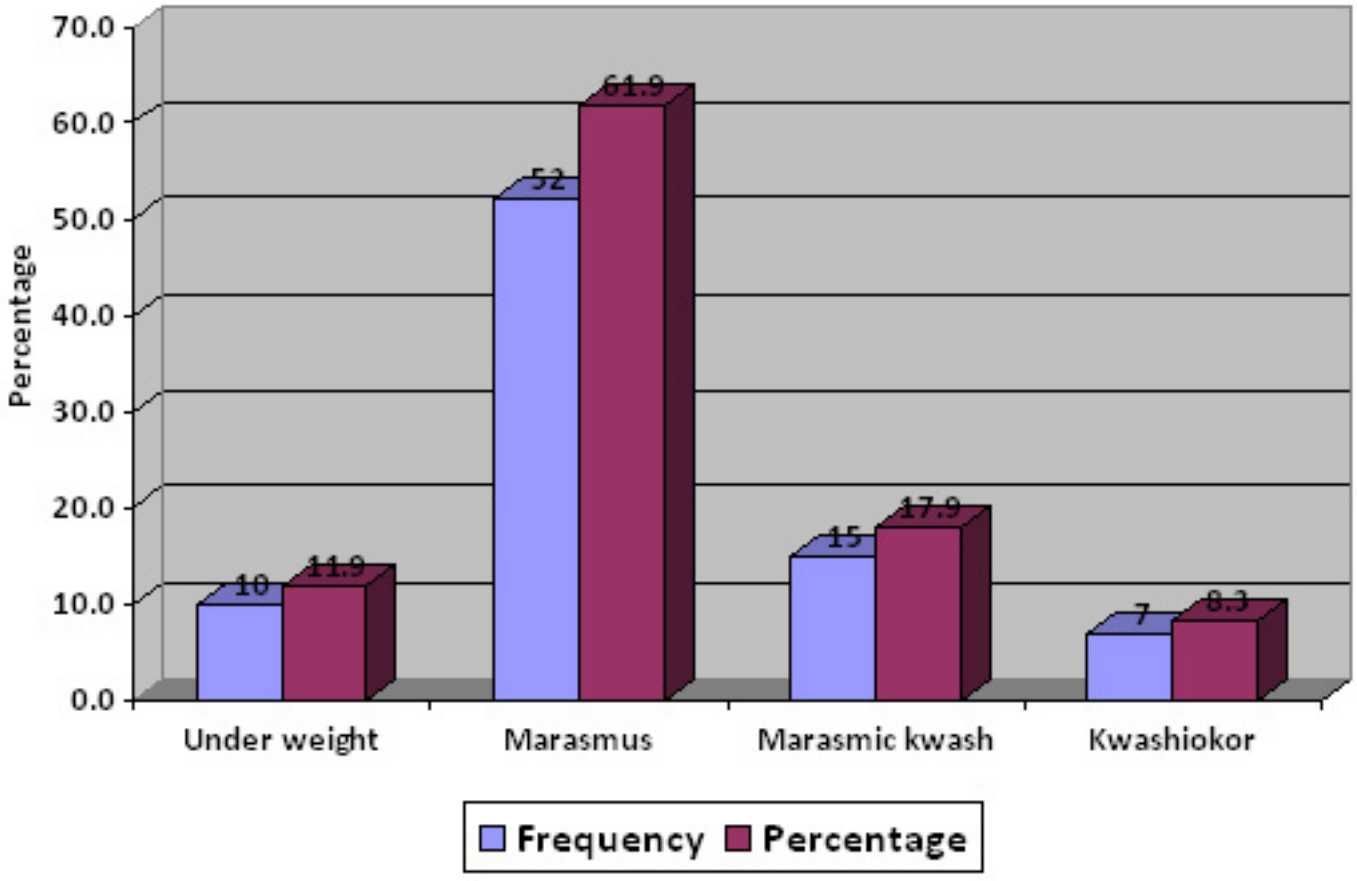


Figure 3: The chest signs seen in the children of the study group (n = 70)

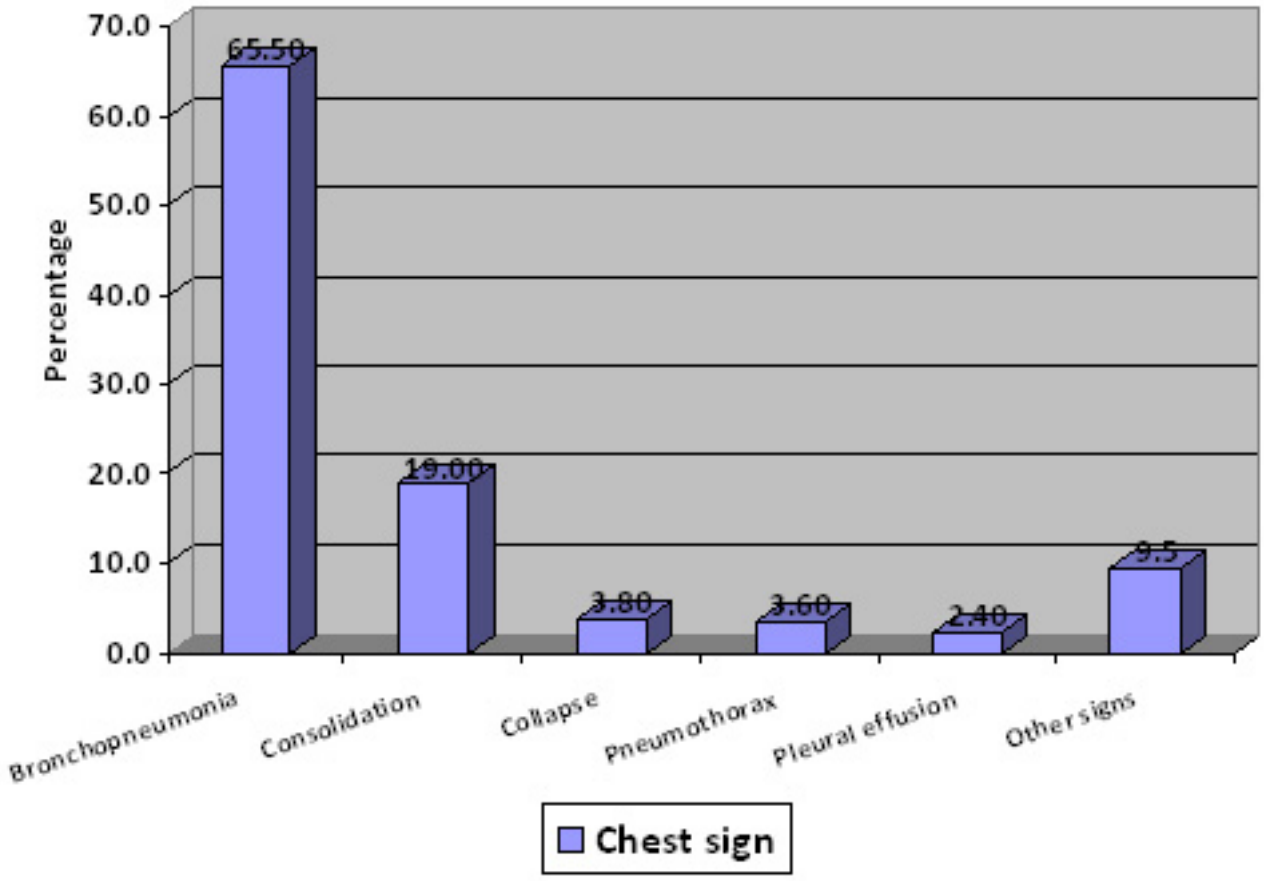
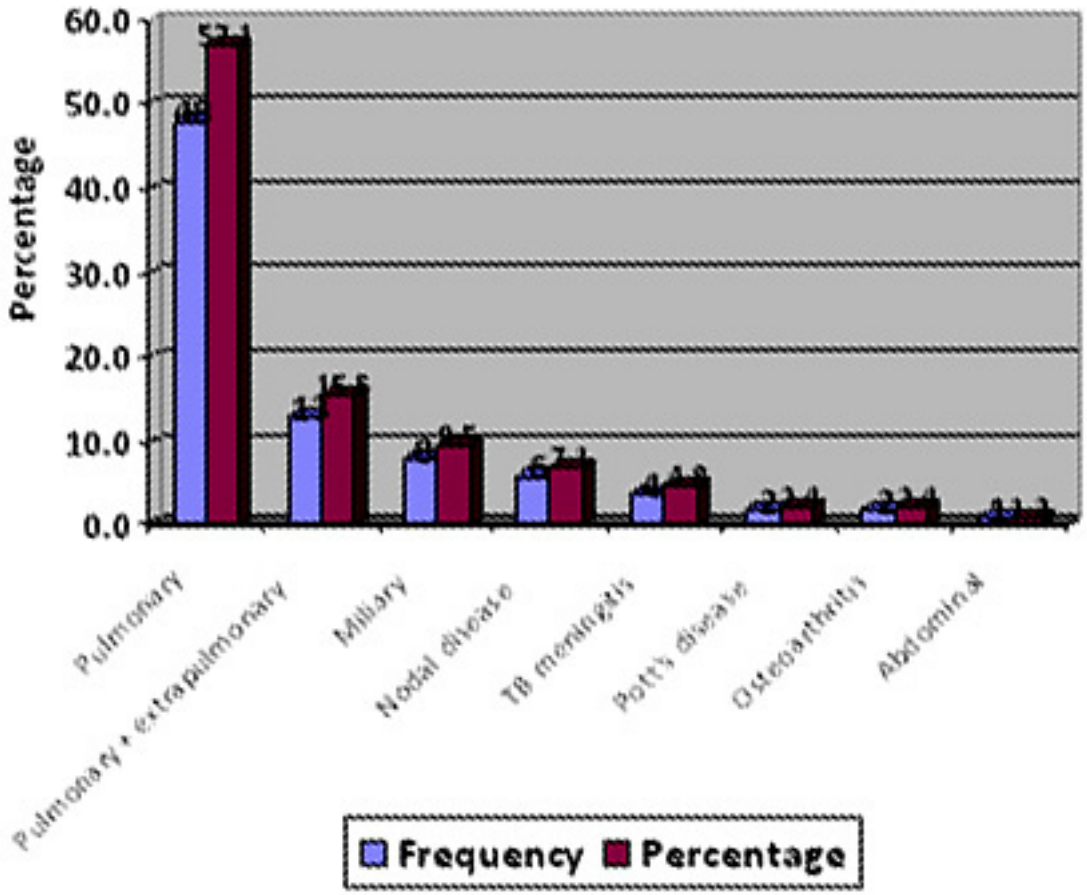


Figure 4: The pattern of tuberculous disease in the study group (n = 84)



Discussion

In Kassala in 2003 severely malnourished children of under 5 years age were estimated to be about 1,124. The majority of malnutrition cases in Sudan occur in the age groups of 6 to 24 months(26,27). Infants constitute 15.5% in this group of patients they are prone to severe forms of the disease as shown in previous studies(28). A large Turkish study on 2,205 children with tuberculous was comparable to my study in showing no gender difference(29). In a large community based Indian study on childhood tuberculosis the number of infected children was significantly higher in urban compared to rural areas. This may be attributed partially to the higher prevalence of malnutrition in city slums(30). The common low Socioeconomic origin and parental illiteracy were also seen in other comparable Sudanese studies on both Tuberculosis and malnutrition(26,27.31.32).

Most of the refugees in the Sudan are in Kassala State (82%). Studies on Sudanese children showed similar symptomatology as seen in this study(32). Most of the symptoms were not specific and may denote other associated infections in a malnourished child as shown by Adil study that 50% of malnourished children had pneumonia 25% pyuria and 8% had gastroenteritis(27). In this study more than 60% of the children were BCG vaccinated but meta-analysis studies have shown that BCG vaccination gives only about 50% protection against all forms of TB and more than 70% protection against severe forms of TB(33).

Duration of symptoms and the over-all percentage of history of contact were more or less similar to previous studies in Sudanese children(32.35.36).

In this study 82.1% of the children had weight for height or length ratio below 70% (severe wasting). The predominant type of malnutrition was marasmus and seen in more than half of the patients (52.9%). Features of scattered chest signs of tuberculous bronchopneumonia was the commonest chest sign followed by features of localized consolidation in 19% of the cases. In contrast to a study done on well nourished and older Sudanese tuberculous children in whom localized consolidation was predominant(32).

Extra pulmonary TB was seen in 27.3% of cases which is comparable to previous studies on TB in well nourished children previously.(32,34).

The WHO TSC score of ≥7 was found in 78.6% and the IUATLD score of ≥ 5 was about 90%. Assuming correct clinical labelling the sensitivity of both tests is high. Specificity evaluation needs further sophisticated diagnostic methods.

Conclusion and Recommendations

From the prevalent socio-demographic characteristics in the study group it could be concluded that TB and malnutrition were associated with low socio-economic conditions, parental illiteracy, poor housing and nutritional support. The duration of symptoms was usually prolonged, of more than one month before the child's diagnosis was considered by the medical personnel .

malnourished predominantly marasmic or marasmic–kwashiorkor. This may be due to the double effect of both conditions as debilitating childhood health problems.

Almost two thirds of the patients showed clinical chest signs and most of the patients showed suggestive chest x-ray features so that pulmonary disease was the prevalent form of TB in this group . Severe forms of TB were also seen in a considerable number of these patients most likely due to the immunosuppressing effect of malnutrition against TB infection. The clinical diagnostic scores were sensitive, but they use non-specific parameters and need further evaluation.

The following were recommended:
Community and governmental efforts urgently needed to address the risk factors and attitude towards vaccination; Screening for all children with adult contact for TB; Sufficient nutritional rehabilitation of malnourished children before labelling them as TB patients and provision of the ideal under -5 years health care programmes will prevent or decrease occurrence of TB in this group substantially.

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Awareness Level of General Population Regarding Club Foot in Aseer Region, Southern of Saudi Arabia

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Abstract

Background: Club foot, is a congenital structural deformity characterized by hindfoot equines, midfoot cavus, and forefoot adduction. It is the most common musculoskeletal birth defect worldwide with males being more affected than females. Without treatment, clubfoot may lead to lifelong disability. Population awareness regarding clubfoot has a significant role in early diagnosis and management of the disorder.

Aim: to assess the general population awareness regarding club foot in Aseer region, southern Saudi Arabia.

Methodology: A descriptive cross-sectional approach was used targeting all population in Aseer region. The study was conducted during the period from December 2019 to April 2020. Data were collected using structured questionnaire which included person's socio-demographic data, and participants' awareness regarding club foot. The questionnaire was uploaded online using social media platforms.
Results: A total of 744 participants were included in the survey from the general population in Aseer region. Participants' ages ranged from 18 to 55 years old and males were 375 (51.2%). As for club foot risk factors, 314 (42.2%) participants reported genetic factors followed by Fetal malpresentation (222; 29.8%), neurological disorders (124; 16.7%), and twin pregnancy (69;9.3%). Totally, good awareness level was recorded among a very low percentage of the surveyed population.

Conclusions & recommendations: In conclusion, the survey revealed that public awareness regarding club foot in Aseer region was very low especially among females with a high level of education. Health care providers had no role in improving this public awareness.

Key words: Club foot; population, awareness, knowledge, predictors, management, outcome

Background

Clubfoot is a foot disorder featured by one or both feet being rotated inward and downward (1, 2). There may be a shortage in the affected foot and leg compared to the other (3). Nearly half of the cases with clubfoot are affected in both feet (4). Mostly, club foot is not associated with other problems. Without treatment, the foot remains deformed, and people walk on the sides of their feet (5). This may lead to pain and difficulty walking (6).

The exact cause is usually unclear. Both genetic and environmental factors are reported to be the main risk factors (7-9). In cases of identical twins, affection of one of them is associated with a 33% chance the other one will be as well (10). The club foot pathology includes disruption of the muscles or connective tissue of the lower leg, leading to joint contracture (11).

Clubfoot is identified clinically, and radiography is not vital for diagnosis. Besides, ultrasound may have a role in antenatal diagnosis (12). Treatment methods for managing clubfoot are numerous, and include non-operative and operative techniques. Repeated manipulation and casting are non-operative treatments of clubfoot, with many described methods (13) . One of these is the Ponseti method, which is considered the gold standard used in most countries and is reported to have a high success rate (14).

Population awareness regarding clubfoot has a significant role in early diagnosis and management of the disorder (15). On the other hand, lack of awareness is considered a barrier for cases management (16). Worldwide, there is a rarity of studies detecting public awareness level about clubfoot and the few studies available show low awareness in the general population regarding the condition (16-18).

Methodology

A descriptive cross-sectional approach was used targeting all the population in Aseer region. The study was conducted during the period from December 2019 to April 2020. Data were collected using structured questionnaire which was developed by the researchers after intensive literature review and expert's consultation. The questionnaire data included person's socio-demographic data such as age, gender, and education. Participants' awareness regarding club foot was assessed covering risk factors, intervention modalities, recovery rate, and magnitude of the disorder among children. A panel of 3 experts reviewed the questionnaire independently for content validity and all suggested modifications were applied till the final tool was achieved. The questionnaire was uploaded online using social media platforms by the researchers and their relatives and friends to be filled in by all the population in Aseer region. A pilot study was conducted to assess tool applicability and reliability. The tool reliability coefficient (Alpha Cronbach's) was assessed and equalled 0.71.

Data analysis

After data was extracted, it was revised, coded and fed to statistical software IBM SPSS version 22(SPSS, Inc. Chicago, IL). All statistical analysis was done using two tailed test. P value less than 0.05 was considered to be statistically significant. For awareness items, each correct answer was scored one point and total summation of the discrete scores of the different items was calculated. A participant with a score less than 60% (5 points) of the maximum score was considered to have poor awareness while good awareness was considered if they had a score of 60% (6 points or more) of the maximum. Descriptive analysis based on frequency and percentage distribution was done for all variables including demographic data, awareness items and source of information. Cross tabulation was used to assess distribution of awareness according to participants' personal data and source of information. Relations were tested using Pearson exact probability tests

Results

A total of 744 participants were included in the survey from the general population in Aseer region. Participants' ages ranged from 18 to 55 years old and males were 375 (51.2%). Exactly 378 (50.8%) of the respondents were single. University level of education was recorded among 263 participants (35.3%) followed by university students (41.8%) (Table 1).

Table 2 demonstrates club foot awareness among general population. As for club foot risk factors, 314 (42.2%) participants reported genetic factors followed by fetal malpresentation (222; 29.8%), neurological disorders (124; 16.7%), and twin pregnancy (69;9.3%). Foot cast as the first recommended method in treating club foot was reported by 271 participants (36.4%). The first 6 months was the preferred age for treating club foot was reported by 253 (34%) of the participants and recovery rate in case of physiotherapy of 61%-80% was reported by 160 (21.5%) participants. Recovery percentage in case of repeated foot cast of 80%-100% was reported by 140 (18.8%) participants while Recovery percentage in case of surgical intervention of 61%-80% was reported by 137 participants (18.4%). The actual percentage of children having club foot and needing management was correctly reported by 319 participants (42.9%). Totally, good awareness level was recorded among 33 (4.4%) participants.

Regarding source of information for club foot (Figure 1), 56.7% of the participants had no identified source but 16.3% had their information from similar cases and 12.9% from families and friends while mass media as a source of information was reported by 2% of the participants.

Table 3 illustrates distribution of general population awareness regarding club foot by their personal data and source of information. Good awareness level was recorded among 6.1% of the male participants compared to 2.8% of the females with statistical significance (P=.029). Also, 14% of the participants with diploma and 7.4% of university students had good awareness level compared to 0.4% of university educated group (P=.001). The highest awareness level was recorded among participants who had their information from books and magazines (8.5%) in comparison to none of those who reported mass media as a source of information (P=.047).

Table 1: Socio-demographic data of survey participants' in Aseer region

Personal data	No	%
Gender		
Male	*375*	*51.2%*
Female	*358*	*48.8%*
Age in years		
< 20 years	*104*	*14.0%*
20-29	*311*	*41.8%*
30-39	*174*	*23.4%*
40-49	*114*	*15.3%*
50+	*41*	*5.5%*
Marital status		
Single	*378*	*50.8%*
Married	*336*	*45.2%*
Divorced/ widow	*30*	*4.0%*
Educational level		
Secondary/ less	*120*	*16.1%*
Diploma	*50*	*6.7%*
University student	*311*	*41.8%*
University/ more	*263*	*35.3%*

Figure 1: Source of information regarding club foot among general population in Aseer region

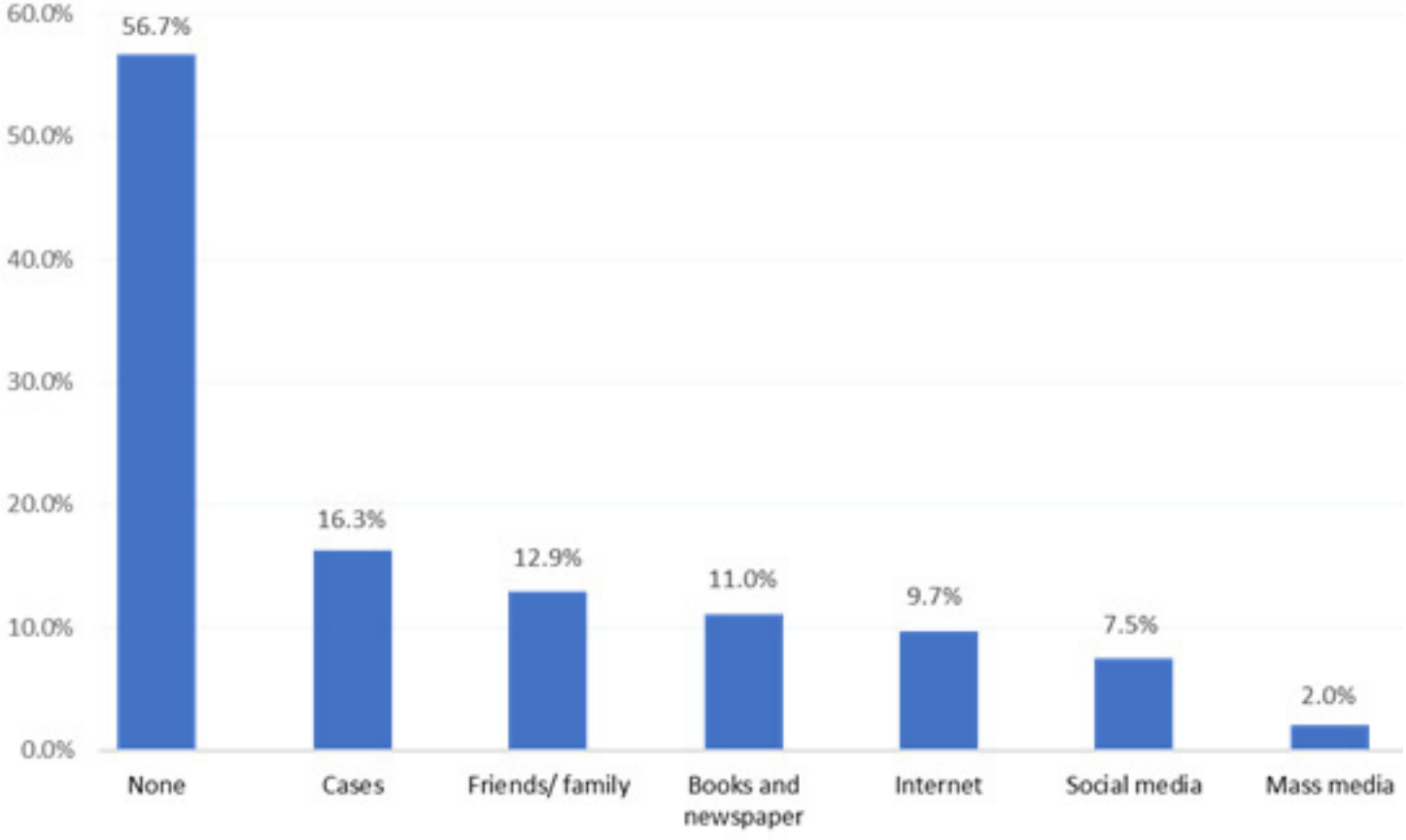

Table 2: club foot awareness among general population in Aseer region, Saudi Arabia

Club foot awareness		No	%
Risk factors of club foot	Don't know	265	35.6%
	Child gender	20	2.7%
	Twin pregnancy	69	9.3%
	Oligohydramnios	126	16.9%
	Genetic	314	42.2%
	Fetal malpresentation	222	29.8%
	Neurological disorders	124	16.7%
	Caesarean delivery	30	4.0%
	Others	7	.9%
First method in treating club foot	Don't know	235	31.6%
	Physiotherapy	136	18.3%
	Surgical intervention	102	13.7%
	Foot cast	271	36.4%
Optimum age to treat club foot	Don't know	248	33.3%
	First 6 months	253	34.0%
	6-12 months	187	25.1%
	1-4 years	56	7.5%
Recovery % in case of physiotherapy	Don't know	312	41.9%
	0%-20%	26	3.5%
	21%-40%	52	7.0%
	41%-60%	97	13.0%
	61%-80%	160	21.5%
	80%-100%	97	13.0%
Recovery % in case of repeated foot cast	Don't know	311	41.8%
	0%-20%	21	2.8%
	21%-40%	33	4.4%
	41%-60%	79	10.6%
	61%-80%	160	21.5%
	80%-100%	140	18.8%
Recovery % in case of surgical intervention	Don't know	350	47.0%
	0%-20%	12	1.6%
	21%-40%	14	1.9%
	41%-60%	65	8.7%
	61%-80%	137	18.4%
	80%-100%	166	22.3%
Actual % of children having club foot	Don't know	319	42.9%
	0%-20%	206	27.7%
	21%-40%	110	14.8%
	41%-60%	75	10.1%
	61%-80%	23	3.1%
	80%-100%	11	1.5%
Overall awareness	Poor	Good	
	711 (95.6%)	33 (4.4%)	

Table 3. Distribution of general population awareness regarding club foot by their personal data and source of information

Factors		Awareness level				P-value
		Poor		Good		
		No	%	No	%	
Gender	Male	352	93.9%	23	6.1%	.029*
	Female	348	97.2%	10	2.8%	
Age in years	< 20 years	102	98.1%	2	1.9%	.053
	20-29	290	93.2%	21	6.8%	
	30-39	166	95.4%	8	4.6%	
	40-49	112	98.2%	2	1.8%	
	50+	41	100.0%	0	0.0%	
Marital status	Single	355	93.9%	23	6.1%	.064
	Married	326	97.0%	10	3.0%	
	Divorced/ widow	30	100.0%	0	0.0%	
Educational level	Secondary/ less	118	98.3%	2	1.7%	.001*
	Diploma	43	86.0%	7	14.0%	
	University student	288	92.6%	23	7.4%	
	University/ more	262	99.6%	1	.4%	
Source of information	Not source	399	94.5%	23	5.5%	.047*
	Cases	119	98.3%	2	1.7%	
	Books and newspaper	75	91.5%	7	8.5%	
	Friends/ family	95	99.0%	1	1.0%	
	Social media	53	94.6%	3	5.4%	
	Internet	71	98.6%	1	1.4%	
	Mass media	15	100.0%	0	0.0%	

P: Exact probability test
* P < 0.05 (significant)

Discussion

The current survey aimed to assess Aseer region population's awareness regarding club foot which is a congenital structural deformity characterized by hindfoot equines, midfoot cavus, and forefoot adduction. It is the most common musculoskeletal birth defect worldwide with males being more affected than females. Without treatment, clubfoot may lead to lifelong disability. The affected person may not be able to wear shoes and may experience severe pain during walking (19, 20). The study revealed that public awareness regarding club foot in general was very low (did not exceed 5%) especially for recovery rate after different treatment modalities. Aseer population showed some knowledge regarding disease genetic nature, foot cast as a treatment modality, proper age for the intervention but other risk factors were poorly identified by the study participants. High awareness was more recorded among young aged participants whose source of information was books and magazines. This explains the surprising finding that participants with diploma and university students were more knowledgeable regarding club foot than university graduated participants. A second finding which should be considered was that medical staff and health care providers had no role in educating the population regarding this disorder which is a great concern and more detailed surveys should cover this area.

Conclusion and Recommendations

In conclusion, the survey revealed that public awareness regarding club foot in Aseer region was very low especially among females with high level of education. Also, healthcare providers had no role in improving this public awareness. Treatment modalities with its net recovery rate should be explained to the population to raise their awareness and improve their perception regarding their affected children. Health education sessions should be held for high risk groups to be fully aware regarding the nature of the disorder and to give hope for postnatal treatment outcome.

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Knowledge, Attitude and Practice regarding Diabetic Retinopathy Amongst Diabetic Patients in Aseer Region

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Abstract

Background: Diabetic retinopathy (DR) is the most common micro vascular complication of diabetes and the foremost cause of blindness in working-aged people and patients who are aged 55 years or older. It is estimated that up to 84.5% of patients with DM who have had the disease for more than 20 years will develop DR. DR is the leading cause of avoidable visual impairment and blindness worldwide it can affect 24% of diabetic patients who have had the disease for 10–15 years.

Aim: to assess the knowledge, attitude and practice of diabetic retinopathy among the Diabetic Patients in Aseer Region.

Methodology: A descriptive cross-sectional study was conducted between December, 2019 and March, 2020. Data were collected using a structured questionnaire developed in Arabic, which included questions about patients' bio-demographic data, type and duration of diabetes, awareness of DR.

Results: A total sample of 915 participants was included in the study with nearly half of them aged 40 years or more. Exactly 53.6% of the cases were males and 53.2% were married. University level of education was reported among 50.4% of the cases. Exactly 45.4% of the patients reported the normal level of blood glucose level and 76.6% reported that it's important to keep blood glucose level at its normal range. About 50% of the patients agreed that diabetic retinopathy is a curable disorder and 66.1% reported that uncontrolled diabetes is the main cause of progressing DR. Totally, more than half of the patients had good awareness level regarding diabetic retinopathy.

Conclusions & recommendations: In conclusion, the study revealed that the patients' awareness level and practice regarding diabetic retinopathy was intermediate. The patients who were recently diagnosed were more compliant for periodic checkups and had higher awareness level. More effort should be paid to improve patients' awareness regarding diabetes as a chronic health problem and of its related complications.

Key words: Diabetic retinopathy, diabetes, eye complications, awareness, practice, ophthalmic complications, assessment

Background

Diabetic retinopathy (DR) is one of the most recorded microvascular complications of DM affecting the eye (1). The main feature of diabetic retinopathy is disturbance of the retinal circulation which affects retinal blood supply and oxygen supplementation, which diminishes its ability to achieve the needs of its high metabolic demands (2). Therefore, disturbance in retinal circulation may affect normal vision, and subsequently cause vision impairment which may end with complete blindness (3-5). DR is associated with many risk factors among diabetics including uncontrolled DM, longer periods of DM and the presence of other systemic diseases such as hypertension (6, 7).

Diabetic Retinopathy (DR) is recorded as the main cause of blindness that affects 34 million worldwide constituting 4% of blindness cases (8). Diabetic retinopathy affects up to 80 percent of those who have had diabetes for 20 years or more (9). At least 90% of new cases could be reduced with proper treatment and monitoring of the eyes (10). Population awareness regarding diabetes mellitus and its complications is a significant factor for early detection and intervention for complications including diabetic retinopathy, ending with reduction or even improvement of these complications (5). The magnitude of diabetic retinopathy varies widely among diabetic patients which ranged from 27% in India to 67% in the USA (2, 11, 12). Also many patients don't visit the ophthalmologist for routine annual eye examination for controlling DR early which may affect its management (13, 14). All of this indeed will increase the demand for improving population awareness regarding diabetes and its complications to make T2D patients more aware about the nature of the disease and expected complications including ophthalmic complications.

Up to date there are a lack of studies that assess the awareness levels regarding DR among diabetic patients especially type 2 diabetics sufferers in Abha which is the main city in Aseer region. With expected increased incidence of DR, the current study was conducted to assess the awareness levels of diabetic patients regarding DR, compliance with DM control and routine eye check-up among the patients attending the diabetic center in Abha city.

Methodology

A descriptive cross-sectional study was conducted between December, 2019 and March, 2020. Data were collected using structured questionnaire developed in Arabic, which included questions about patients' bio-demographic data, type and duration of diabetes, awareness of DR, periodic checkup frequency, treatment of DR, and patients practice regarding DR. All interviewed patients were type I or type II diabetic and were directly interviewed in the diabetic centers in Aseer region and later on due to coronavirus, they were asked to fill out the questionnaire online as it was uploaded onto social media platforms by the researchers and their friends.

The content validity of the questionnaire was assessed by an expert panel of three anonymous specialists of advanced medical background regarding diabetes. Prior to the study, for the assessment of the reliability of the questionnaire, a random sample of 25 patients with diabetes was included to complete the questionnaire and the obtained Cronbach's alpha value was 0.73.

Data analysis

After data were extracted, it was revised, coded and fed into statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL). All statistical analysis was done using two tailed test. P value less than 0.05 was considered to be statistically significant. For awareness items, each correct answer was scored one point and total summation of the discrete scores of the different items was calculated. A patient with a score less than 60% (6 points) of the maximum score was considered to have poor awareness while good awareness was considered if they had score of 60% or more (7 points or more) of the maximum. Descriptive analysis based on frequency and percent distribution was done for all variables including demographic data, awareness items and patients practice. Univariant relations between patients' bio-clinical data and practice with awareness level were done based on Pearson chi-square test.

Results

A total sample of 915 participants was included in the study with nearly half of them aged 40 years or more. Exactly 53.6% of the cases were males and 53.2% were married. University level of education was reported among 50.4% of the cases and monthly income ranging between 5000 to 15000 SR was reported among 43.3% of the cases. Type I diabetes was diagnosed among 28.5% of the patients and type II among 33.8% while 37.7% of the patients did not know about the type of diabetes they have. Diabetes was diagnosed for less than 5 years among 41.9% of the cases and 36.6% were on insulin therapy (Table 1).

Table 2 illustrates the patients awareness regarding DR. Exactly 45.4% of the patients reported a normal level of blood glucose (90-120) and 76.6% reported that it's important to keep blood glucose level at its normal range. Also 75.4% of the patients said that diabetes can affect the eye retina and 65.9% agreed that DR can causes blindness. Diabetes control as a measure to prevent DR was reported by 73.1% of the patients and 63.5% of the patients agreed that diabetic patients may have eye problems at time of diagnosis. About 44% of the patients reported that there is no need for regular diabetic retinopathy assessment if both eyes are good while only 15.4% said that ophthalmic assessment for diabetes should be annual. Exactly 55.7% of the patients agreed that Diabetic retinopathy is a curable disorder and 66.1% reported that uncontrolled diabetes is the main cause of progressing DR. Totally, 57.8% of the patients had good awareness level regarding diabetic retinopathy.

Considering patients practice (Table 3), 55.5% of the patients keep their blood glucose level at its normal range while 69.7% of the patients have undergone ophthalmic assessment by a physician. About 60% of the patients have drugs for diabetes which was prescribed by a physician among 90% of them.

Finally, on relating patients' awareness regarding DR by their bio-clinical data, Table 4 demonstrates that 61.4% of the male patients had good awareness regarding DR compared to 53.6% of the females with a recorded statistical significance (P=.017). Also 60.6% of the single patients had good awareness level compared to 41.8% of separated patients (P=.001). Exactly 56.3% of the patients with low income had good awareness level compared to 49% of those who had high income (P=.003). Also, 68.7% of the patients who had diabetes for less than 5 years had good awareness levels compared to 45.5% of those who were diagnosed for more than 10 years (P=.001). About 72% of the patients who had previously undergone ophthalmic assessment had good awareness level compared to 24.2% of those who did not (P=.001).

Table 1: Bio-clinical data of diabetic patients in Aseer region, Southern Saudi Arabia

Bio-clinical data		No	%
Age in years	< 18 years	37	4.0%
	18-	199	21.7%
	30-	237	25.9%
	40-	308	33.7%
	50+	134	14.6%
Gender	Male	490	53.6%
	Female	425	46.4%
Marital status	Single	246	26.9%
	Married	487	53.2%
	Divorced/ widow	182	19.9%
Educational level	Primary	74	8.1%
	Intermediate	115	12.6%
	Secondary	265	29.0%
	University/ PG	461	50.4%
Monthly income	< 5000 SR	323	35.3%
	5000-15000 SR	396	43.3%
	> 15000 SR	196	21.4%
Type of DM	Don't know	345	37.7%
	Type I DM	261	28.5%
	Type II DM	309	33.8%
Duration of having DM	< 5 years	383	41.9%
	5-10	299	32.7%
	> 10 years	233	25.5%
Insulin therapy	Yes	335	36.6%
	No	215	23.5%
	No treatment at all	365	39.9%

Table 2. Awareness regarding diabetic retinopathy among diabetic patients in Aseer region, Southern Saudi Arabia

DR awareness items		No	%
Normal level of blood glucose	Don't know	139	15.2%
	90-120	415	45.4%
	120-160	175	19.1%
	160-240	117	12.8%
	240-300	69	7.5%
It's important to keep BGL normal	Don't know	109	11.9%
	Yes	701	76.6%
	No	105	11.5%
DM can affect retina	Don't know	118	12.9%
	Yes	690	75.4%
	No	107	11.7%
Diabetic retinopathy can cause blindness	Don't know	179	19.6%
	Yes	603	65.9%
	No	133	14.5%
Diabetic control prevents retinopathy	Don't know	128	14.0%
	Yes	669	73.1%
	No	118	12.9%
Diabetic patient may had eye problems at diagnosis time	Don't know	208	22.7%
	Yes	581	63.5%
	No	126	13.8%
No need for regular diabetic retinopathy assessment if both eyes are good	Don't know	163	17.8%
	Yes	401	43.8%
	No	351	38.4%
Frequency of ophthalmic investigation	Don't know	94	10.3%
	At diagnosis time	75	8.2%
	Every 6 months	362	39.6%
	Annually	141	15.4%
	Every 2 years	75	8.2%
	After 5 years	31	3.4%
	If had eye complaint	137	15.0%
Checking eyes at ophthalmology technician is enough	Don't know	129	14.1%
	Yes	317	34.6%
	No	469	51.3%
Diabetic retinopathy is curable disorder	Don't know	253	27.7%
	Yes	510	55.7%
	No	152	16.6%
Causes of progressed diabetic retinopathy	Don't know	160	17.5%
	Uncontrolled diabetes	605	66.1%
	HTN	311	34.0%
	Renal disorder	208	22.7%
	Anaemia	100	10.9%
Overall awareness	Poor	386	42.2%
	Good	529	57.8%

Table 3: Clinical Practice among patients with diabetes in Aseer region, Southern Saudi Arabia

Practice	No	%
Keep your BGL within normal		
Not sure	194	21.2%
Yes	508	55.5%
No	213	23.3%
Previously undergone ophthalmic assessment		
Yes	638	69.7%
No	277	30.3%
Use diabetic drugs		
Yes	550	60.1%
No	365	39.9%
If yes, is it prescribed by physician		
Yes	495	90.0%
No	55	10.0%

Table 4. Distribution of patients' awareness level regarding DR according to their bio-clinical data and practice

Factors		Knowledge level				P-value
		Poor		Good		
		No	%	No	%	
Age in years	< 18 years	15	40.5%	22	59.5%	.105
	18-	68	34.2%	131	65.8%	
	30-	109	46.0%	128	54.0%	
	40-	132	42.9%	176	57.1%	
	50+	62	46.3%	72	53.7%	
Gender	Male	189	38.6%	301	61.4%	.017*
	Female	197	46.4%	228	53.6%	
Marital status	Single	97	39.4%	149	60.6%	.001*
	Married	183	37.6%	304	62.4%	
	Divorced/ widow	106	58.2%	76	41.8%	
Educational level	Primary	32	43.2%	42	56.8%	.766
	Intermediate	53	46.1%	62	53.9%	
	Secondary	113	42.6%	152	57.4%	
	University/ PG	188	40.8%	273	59.2%	
Monthly income	< 5000 SR	141	43.7%	182	56.3%	.003*
	5000-15000 SR	145	36.6%	251	63.4%	
	> 15000 SR	100	51.0%	96	49.0%	
Type of DM	Don't know	130	37.7%	215	62.3%	.089
	Type I DM	120	46.0%	141	54.0%	
	Type II DM	136	44.0%	173	56.0%	
Duration of having DM	< 5 years	120	31.3%	263	68.7%	.001*
	5-10	139	46.5%	160	53.5%	
	> 10 years	127	54.5%	106	45.5%	
Previously undergone ophthalmic assessment	Yes	176	27.6%	462	72.4%	.001*
	No	210	75.8%	67	24.2%	
Use diabetic drugs	Yes	192	34.9%	358	65.1%	001*
	No	194	53.2%	171	46.8%	

P: Pearson X^2 test
* P < 0.05 (significant)

Discussion

Diabetes mellitus (DM) is a systemic disease characterized by a chronic high blood glucose level (15). Diabetes mellitus is a multifactorial disorder that affects 46% of men and 44% of females in the above "50 years old" age group in Saudi Arabia (16). World Health Organization (WHO) has ranked Saudi Arabia as having the second highest rate of diabetes in the Middle East (7th highest in the world) with an estimated population of 7 million living with diabetes (17). DM has many complications, including cardiovascular disease, neuropathy, nephropathy, and diabetic retinopathy (DR) (18).

Diabetic retinopathy (DR) is the most recorded microvascular complication of diabetes and the leading cause of blindness in old aged patients who are 55 years or older (19). Diabetic retinopathy may affect up to 85% of patients with DM who have had the disease for more than 20 years (19, 20). In Saudi Arabia, the prevalence for DR ranged from 28% to 36% of the diabetic patients according to different studies in different areas of the country (21-23). The majority of DR patients present in late stages due to the silent nature of the disease. If diabetic patients are aware of the disease nature and its related complications besides the importance of periodic comprehensive checkup including ophthalmic assessment, this will help in early detection of any complication and early intervention which will minimize the magnitude and burden of these complications.

The current study aimed to assess the diabetic patients' awareness and practice regarding DR in Aseer region. The study revealed that nearly two thirds of the patients had a good awareness level regarding diabetic retinopathy. The highest area of awareness included the triggering factors for having DR among diabetic patients especially the importance of controlling the blood glucose level. The frequency of undergoing ophthalmic assessment was poorly identified by the patients as nearly 1 out of each 8 patients gave the correct frequency. The most surprising finding regardless the good awareness was that nearly one third of the patients were not aware of the type of diabetes they have besides they don't have any treatment at all irrespective of that the majority of the sample being highly educated which needs further case studies and explanation. This may be explained by that they are high normal or pre-diabetic cases and need only dietary control and periodic follow-up. The second interesting finding was that the high awareness level regarding DR was associated with single patients with low income level but not related with the patients' level of education. Other significant determinants for the patients' awareness level were those who had the disease recently (less than 5 years) and this means that they are still caring about the disease and afraid of having the complications. Also, patients who had their therapy regularly plus those who had undergone ophthalmic checkup had higher awareness which may be achieved through their physician during the follow-up visits.

Regarding patients' practice, more than half of the cases are adherent to the management plan and keep their blood glucose level within its normal range. Also more than two thirds of the cases have undergone ophthalmic assessment by their physicians but only 60% receive medication. This also may strengthen the assumption of some that these included cases are not true diabetic but borderline and need continuous assessment with no need for medication.

A study was conducted in Jeddah to assess Awareness of diabetic retinopathy among people with diabetes, in 2018 by Alzahrani SH et al. (24). The study revealed that about 82.6% of the patients were aware that DM can affect their eyes. Also, nearly 36% of the patients reported that their doctors had not advised them about it. More than half responded that they did not feel their vision to be affected by DM. More than 58% had never been diagnosed with DR. About 35% did not go to their eye checkups, even though around 59% thought that DR could lead to blindness. A second study was conducted at a private hospital of Riyadh, Saudi Arabia to determine knowledge, attitude and practice regarding diabetic retinopathy screening and its management among diabetic patients (25). The researchers reported that two hundred participants were interviewed, half from the endocrinology unit and half from the eye clinic. High awareness of the ophthalmic effects of diabetes was noted in 45.5% of participants. Thirty-eight (19%) of the patients had a positive attitude. None had an acceptable level of practice and poor practice was noted in 74% of the participants. Longer duration of DM (P=0.07) and systemic complications (P=0.06) were associated with good knowledge.

Understanding the level of public awareness of a disease condition helps educators to plan a future program that increases the level of knowledge in the diagnosis, complications, and management of patients. There are few studies on DR that have been published from various cities across Saudi Arabia among diabetic patients.

Conclusion and Recommendations

In conclusion, the study revealed that the patients' awareness level and practice regarding diabetic retinopathy was intermediate, not poor and not high. The patients who were recently diagnosed were more compliant for periodic checkup and had higher awareness level. More effort should be paid to improve patients' awareness regarding diabetes as a chronic health problem and its related complications through health education sessions in primary health care centers and through social media which is present in all homes in the country. Periodic Screening for diabetic patients to assess silent complications including DR is mandatory to help in early detection and management.

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Awareness, attitude, and practice regarding E-cigarettes among students at King Khalid University, Saudi Arabia

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Abstract

Background: There is a noticed increase in the use of e-cigarettes among adolescents and adults. E-cigarettes, also called nicotine delivery systems, use battery power and heating elements to vaporise a nicotine-containing solution to be inhaled by the user. Hence, e-cigarettes are called vapours due to the inhalation and exhalation of vapours. The nicotine-containing solutions come in various flavours and nicotine content. E-cigarettes are marketed as a safer alternative for smokers to inhale nicotine and as an aid in smoking cessation.

Aim: to assess awareness, attitude, and practice regarding E-cigarettes among students at King Khalid University, Saudi Arabia.

Methodology: A descriptive cross-sectional study was used including 668 students with age range 18 years or more at University of King Khalid, Abha, Saudi Arabia. Data were collected using a pre-designed electronic questionnaire which was initiated by the researchers after intensive literature review and expert's consultation. Questionnaire included student's personal data, awareness regarding E-cigarettes, students' use of E-cigarettes, and source of students' information regarding E-cigarettes.

Results: The study included 668 students who completed the questionnaire at King Khalid University. Exactly 410 (61.4%) students were at non-medical colleges and 258 (38.6%) were from medical colleges. Male respondents were 500 (74.9%). Exactly 659 (98.7%) students had heard about E-cigarettes. Also, 410 (61.4%) students reported that E-cigarettes contain nicotine which is an addictive material. Being addictive, was reported by 417 (62.4%) students and 611 (91.5%) students know that E-cigarettes smoking is harmful. About 70 % of the students reported that they never used E-cigarettes ta all, 11.7% used in the past while 7.2% use it daily. The most reported source was family and friends (53%) followed by social media (51.9%).

Conclusions In conclusion, the current study revealed that half of the students were knowledgeable regarding E-cigarettes and their effect. Also, using E-cigarettes was not high (less than one fifth) especially among young female students.

Key words: E-cigarettes, vapour, smoking, students, awareness, practice, prevalence.

Background

Smoking is one of the most dangerous habits. Some young adults start smoking for a variety of reasons; some of them want to try smoking because their friends and family are smokers and some of them will start smoking because they just think it is cool behaviour. Smoking has been linked to many diseases such as lung, throat, and mouth cancer, and also could increase the risk of cardiovascular diseases, stroke, and diabetes [1-3].

The first successful e-cigarette was made in 2003 in Beijing, China by Chinese pharmacist Hon Lik [4]. E-cigarette is a battery-operated device that is designed to mimic the old cigarette and is used to inhale a usually nicotine-containing vapour. It contains a liquid solution typically consisting of nicotine, various chemical substances (such as propylene glycol or glycerol), and often flavouring [5-7]. After chemical analysis of E-cigarette there is chance of exposure to dangerous and potentially harmful component (HPHCs), including nicotine. Nicotine is considered a very addictive substance and can be hard to stay away from. It's important to mention that some e-cigarettes that claim to be nicotine-free have been found to contain nicotine [8-9].
E-cigarettes have gained a lot of popularity in the past few years among young Saudis; most of them think of it as good alternative and safer than the traditional cigarette. The hype in the media that E-cigarettes are less harmful than traditional cigarettes and help in smoking cessation is one of the important causes in increasing use of the e-cigarette among young people [10, 11].

In the current study, King Khalid University students were targeted to determine the general awareness regarding E-cigarettes and on how much less harmful e-cigarettes were believed to be. Adults were additionally targeted because the 2018 National Youth Tobacco Survey showed that vaping had increased by 78% among high-schoolers and 48% among middle-schoolers, showing that current programs are somewhat ineffective in preventing youth from using e-cigarettes [12].

Methodology

A descriptive cross-sectional study was used including 668 students with age range 18 years or more at university of King Khalid, Abha, Saudi Arabia. Data were collected using a pre-designed electronic questionnaire which was initiated by the researchers after intensive literature review and expert's consultation. A panel of 3 experts reviewed the initial questionnaire for content validity and applicability. Questionnaire included students' personal data including age, gender, and faculty type. Awareness regarding E-cigarettes was assessed by 7 questions covering overall awareness, harm effect, contents, and its use and associated symptoms. The third part covered students' use of E-cigarettes, duration of use, motives and reasons. The last section included source of students' information regarding E-cigarettes. After finalizing the questionnaire, it was uploaded online using social media platforms by the researcher and all colleges at different faculties during the period from February 2020 to May 2020 and the respondents who filled all items were included consecutively till end date of the study

Data analysis
After data was extracted, it was revised, coded and fed into statistical software IBM SPSS version 22(SPSS, Inc. Chicago, IL). All statistical analysis was done using two tailed tests. P value less than 0.05 was considered to be statistically significant. For awareness items, each correct answer was given one-point score and total sum of the discrete scores of the different items was calculated. A participant with a score less than 60% (4 points) of the maximum score was considered to have poor awareness while good awareness was considered if they had a score of 60% (5 points or more) of the maximum. Descriptive analysis based on frequency and percent distribution was done for all variables including demographic data, E-cigarettes uses in the social circle, besides awareness items practice, and participants' source of information. Cross tabulation was used to assess distribution of awareness according to participants' personal data and source of information. Relations were tested using Pearson chi-square test.

Results

The study included 668 students who completed the questionnaire at King Khalid University. Exactly 410 (61.4%) students were at non-medical colleges and 258 (38.6%) were from medical colleges. Male respondents were 500 (74.9%) and 405 (60.6%) were aged 21 years or more. As for e-cigarette use in participants' social circle, friends were the most reported users (59.4%; 397) followed by that none of the students' circle used E-cigarettes (37.3%; 249) (Table 1).

Table 2 shows awareness of university students regarding E-cigarettes among KKU students. Exactly 659 (98.7%) students had heard about E-cigarettes. Also, 410 (61.4%) students reported that E-cigarettes contain nicotine which is an addictive material. Being addictive, was reported by 417 (62.4%) students and 611 (91.5%) students know that E-cigarettes smoking is harmful. But 279 (41.8%) students reported that E-cigarettes are less dangerous than traditional smoking. Regarding E-cigarette role in smoking cessation, 207 (31%) students said yes and 329 (49.3%) disputed that only traditional smokers use e-cigarettes. Totally, exactly 339 (50.7%) students had good awareness regarding E-cigarettes.

Regarding students practice for E-cigarette use (Table 3), 470 (70.4%) students reported that they never used E-cigarettes at all, 11.7% used them in the past while 7.2% use it daily. As for duration of using E-cigarettes, 45 (37.5%) students used them for 1-5 months while 30 (25%) used them for less than 1 month. As for motivations for using E-cigarettes, being safer than traditional cigarettes was the most reported motivation (37.5%) followed by to help quit

smoking (27.5%), and Easier to use than cigarettes (20%). As for Symptoms you have due to using E-cigarettes, the most reported were shortness of breath (30%), cough (25%), and chest pain (20%).

Regarding source of students' information about E-cigarettes, Figure 1 shows that the most reported source was family and friends (53%) followed by social media (51.9%), mass media (34.6%), and study (10.8%) while 36.2% of the students had a specific source.

Table 4 illustrates distribution of students' awareness level regarding E-cigarettes by their personal data and practice. Exactly 58.5% of older aged students had good awareness level regarding E-cigarettes compared to 38.8% of younger groups with recorded statistical significance (P=.001). Also, 55.8% of male students had good awareness in comparison to 35.7% of females. Exactly 54.9% of students at non-medical colleges had good awareness compared to 44.2% of medical students (P=.007). Good awareness was detected among 66.7% of students who had siblings who used E-cigarettes compared to 42.6% of those who had no-one use E-cigarettes in their social circle (P=.002). Also, 68.6% of those who use E-cigarettes daily had good awareness level in comparison to 47.2% of those who never used them (P=.001). Besides, good awareness was detected among 66.7% of students who gained their information from the study compared to 40.9% who had no source of information (P=.001).

Table 1: Personal data of university students, Abha Saudi Arabia

Personal data	No	%
Age in years		
18-20	263	39.4%
21-26	405	60.6%
Gender		
Male	500	74.9%
Female	168	25.1%
Faculty		
Medical	258	38.6%
Non-medical	410	61.4%
E-cigarette use among your circle		
None	249	37.3%
Friends	397	59.4%
Parents	16	2.4%
Siblings	6	.9%

Table 2. Awareness of university students regarding E-cigarettes, KKU, Saudi Arabia

Awareness items		No	%
Do you hear about e cigarettes?	Yes	659	98.7%
	No	9	1.3%
Psychological effect materials included in E-cigarettes	Nicotine	410	61.4%
	Tar	12	1.8%
	Tobacco	30	4.5%
	Don't know	216	32.3%
E cigarettes can be addictive	Yes	417	62.4%
	No	107	16.0%
	Don't know	144	21.6%
Smoking of E cigarettes is	Harmful	611	91.5%
	Not harmful	36	5.4%
	Don't know	21	3.1%
E-cigarettes are less dangerous than traditional smoking	Yes	216	32.3%
	No	279	41.8%
	Don't know	173	25.9%
E-cigarettes help in smoking cessation?	Yes	207	31.0%
	No	327	49.0%
	Don't know	134	20.1%
Only traditional smokers use e-cigarettes?	Yes	48	7.2%
	No	329	49.3%
	Don't know	291	43.6%
Overall awareness	Poor (0-4)	329	49.3%
	Good (5-7)	339	50.7%

Table 3. KKU students practice regarding E-cigarette use, Saudi Arabia

Practice items		No	%
Do you smoke E-cigarettes?	No, I never used it	470	70.4%
	No, but I used it in the past	78	11.7%
	Yes, occasionally	72	10.8%
	Yes, daily	48	7.2%
How long have you been using E-cigarettes?	< 1 month	30	25.0%
	1-5 months	45	37.5%
	6 month/ more	24	20.0%
	Over a year	21	17.5%
What motivated you to use E-cigarettes?	Safer than traditional cigarettes	45	37.5%
	Cheaper than cigarettes	18	15.0%
	Easier to use than cigarettes	24	20.0%
	Quit smoking	33	27.5%
Symptoms you have due to using E-cigarettes	Cough	30	25.0%
	Chest pain	24	20.0%
	Insomnia	9	7.5%
	Shortness of breath	36	30.0%
	None	72	60.0%

Figure 1. Source of students' information regarding E-cigarettes, KKU, Saudi Arabia

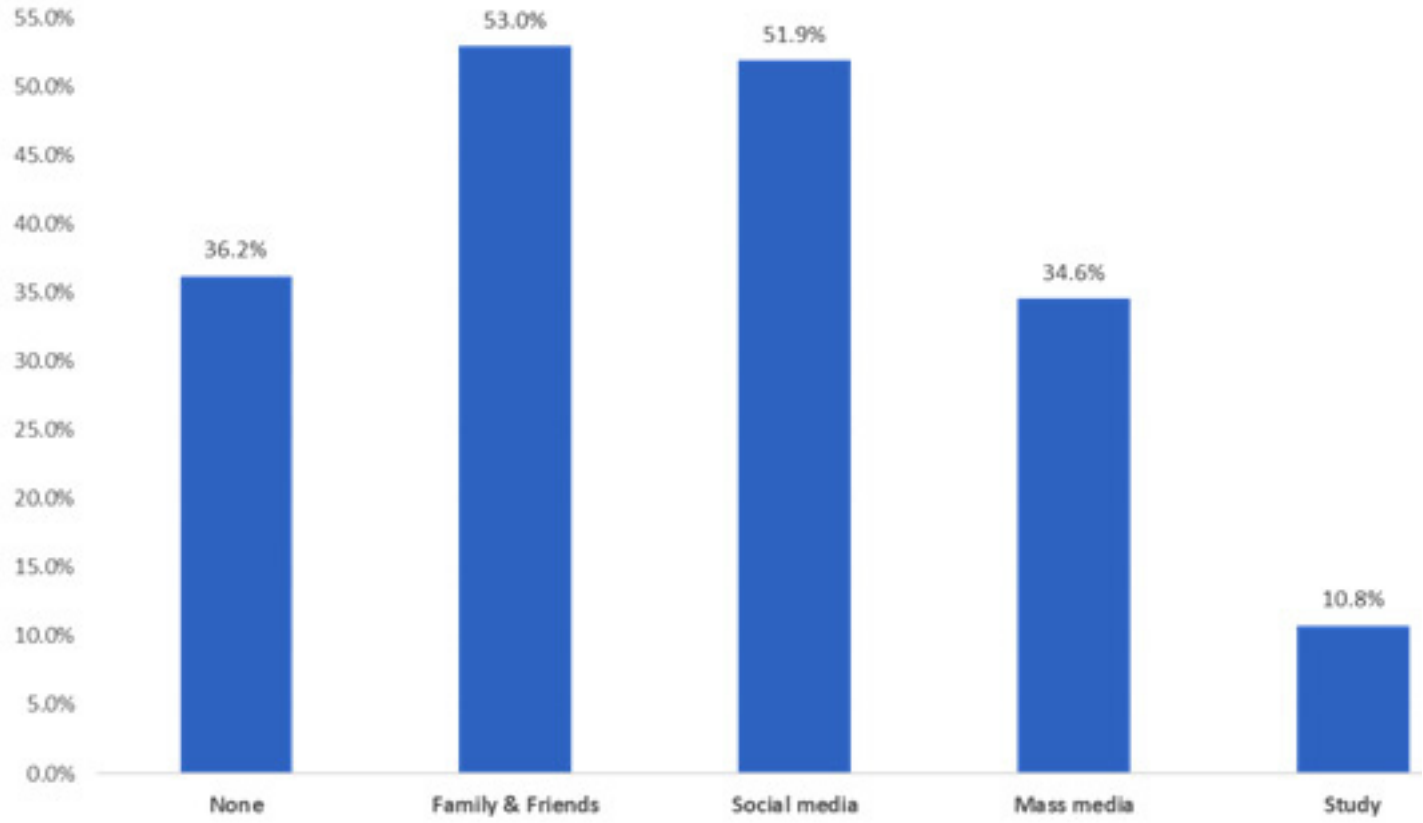

Table 4. Distribution of students' awareness level regarding E-cigarettes by their personal data and practice

Factors		Awareness level				P-value
		Poor		Good		
		No	%	No	%	
Age	18-20	161	61.2%	102	38.8%	.001*
	21-26	168	41.5%	237	58.5%	
Gender	Male	221	44.2%	279	55.8%	.001*
	Female	108	64.3%	60	35.7%	
Faculty	Medical	144	55.8%	114	44.2%	.007*
	Non-medical	185	45.1%	225	54.9%	
E-cigarette use among your circle	Friends	173	43.6%	224	56.4%	.002*
	Parents	11	68.8%	5	31.3%	
	Siblings	2	33.3%	4	66.7%	
	None	143	57.4%	106	42.6%	
Do you smoke E-cigarettes?	No, I never used it	248	52.8%	222	47.2%	.001*
	No, but I used it in the past	42	53.8%	36	46.2%	
	Yes, occasionally	24	33.3%	48	66.7%	
	Yes, daily	15	31.3%	33	68.8%	
Source of information regarding E-cigarettes	Family & Friends	153	43.2%	201	56.8%	.001*
	Mass media	90	39.0%	141	61.0%	
	Social media	173	49.9%	174	50.1%	
	Study	24	33.3%	48	66.7%	
	None	143	59.1%	99	40.9%	

P: Pearson X^2 test;* P < 0.05 (significant)

Discussion

The current study aimed to assess the awareness, attitude, and practice regarding E-cigarettes among King Khalid University students. In spite of an effort to improve adults' awareness regarding the hazards of smoking with a freely accessible Smoking fact sheet from the Centres for Disease Control (CDC), nearly 70% of adults from the survey across the United States were aware of at least one harmful effect of nicotine, with the average number of effects per person being close to three out of the six major effects [13]. Even though CDC has conducted the program Lists from Ex-Smokers since 2012, only 75% of surveyed young adults were aware of programs and resources that were available to them to quit smoking and vaping.

The estimated incidence of yearly global deaths due to smoking is about seven million making smoking and vaping considered as a major public health challenge [14]. Also, there is upward trend regarding the incidence of vaping [15]. Data from the National Youth Tobacco Survey showed that overall use of tobacco products (including non-combustible products) increased by about 40% among United States high school students in 2018 [16]. Also, it was reported that nearly 5 million middle and high school students had used some type of tobacco product in the past month, up from 3.6 million in 2017. This increase was driven entirely by e-cigarette use, as use of other tobacco products fell slightly.

The current study revealed that nearly half of the students were knowledgeable regarding E-cigarettes and their effect. More than two thirds know the nicotine content and its psychological effect while nearly all of them (91.5%) know that it is harmful. But less than half of the students reported that E-cigarettes are less dangerous than traditional smoking. On the other hand, nearly two thirds of them know that it may be addictive. The awareness level regarding E-cigarettes was higher among old, aged students who may have experienced smoking and also among males which is logical due to the male tendency being higher for smoking making them more knowledgeable regarding smoking generally and E-cigarettes in private. Also, higher awareness was recorded among students with friends who used E-cigarettes, and among students who actually used this type of smoking. Students who had their information from their own study and those who had information from mass media also had a good awareness level. The surprising finding was that awareness was higher among non-medical students than medical students. This was not expected as medical students may study about E-cigarettes but this may be explained by that, non-medical students may experience more social relations due to lower study load with many friends and contacts making them at higher probability for exposure to E-cigarettes with friends. Regarding students' practice, the current study revealed that nearly three quarters of the students never used E-cigarettes but also some of them use it daily. The main factors behind using E-cigarettes as reported by the students were their perception regarding being safer and to help them to quit smoking. This was also noticed on awareness regarding safety and its role in quitting smoking. All these findings were consistent with what was reported by Kanyadan V et al who assessed E-cigarette awareness among young adults [17]. The study revealed that about 88.6% of all respondents had heard about E-cigarettes. Nearly 55% of the adults attended schools with tobacco prevention programs. Sixty-four percent of the cohort thought that vaping is safer than traditional cigarettes. Daniluk A et al [18] assessed that the main reason for a recourse to E-cigarettes among adults is a desire to use fashionable technological innovations, and the conviction that such cigarettes are less harmful than the traditional tobacco products. Some respondents used E-cigarettes to quit smoking; others to minimize the harmful effects of smoking. Most respondents acquired information about e-cigarettes from friends or from the internet. There was a high awareness of the chemical composition of substances contained in E-cigarettes. In Malaysia, Adib A et al [19] found that 97% of students know about E-cigarettes and 76% know about nicotine content. Also, two thirds of the students agreed that smoking electronic cigarettes is just like traditional cigarette smoking. In Saudi Arabia, a study was conducted to assess Awareness, knowledge, and perception of electronic cigarettes among undergraduate students in Jazan Region [20]. The study found that 21% of the participants used E-cigarettes which was for quitting smoking among 35.1% of them. The overall knowledge score was 3.9 out of 7. About half of the participants correctly identified e-cigarettes as not less addictive than cigarettes. Though, 70.2% of students failed to classify E-cigarettes as a source of second-hand exposure to nicotine. About two-thirds of the sample believed that e-cigarettes could adversely affect health. A second study was conducted by Qanash S et al to assess Electronic cigarette use among health science students in Saudi Arabia [21]. The study found that E-cigarette (27.7%). Moreover, one-fifth of the E-cigarette users were using them on a regular daily basis. The study found that 42.7% of E-cigarette users have used thm as a tool to quit smoking. Interestingly, more than half (56.7%) of the students who used them to stop smoking had succeeded. However, only 46% of E-cigarettes users who tried to quit vaping have succeeded. Young aged students believed that smoking is more addictive than vaping or recommended E-cigarette for smoking cessation were found to have a higher chance of quitting smoking in the univariate regression analysis.

Conclusions and Recommendation

In conclusion, the current study revealed that half of the students were knowledgeable regarding E-cigarettes and their effect. Also, using E-cigarettes was not high (less than one fifth) especially among young female students. Also, there are irregular users ofE-cigarettes who should be advised and followed to avoid becoming permanent users. Health education programs involving more materials regarding E-cigarettes and their drawbacks should be included in the study curriculum to improve student's awareness and evaluate their attitude regarding

their harmful effect. Also, more taxes should be added roE-cigarettes to be unaffordable for that young age group as some of the students said that their motive for using E-cigarettes was them being cheaper than traditional cigarettes.

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The role of a clinical pharmacist in lifestyle modification in type 2 diabetic patients with peripheral neuropathy in Erbil, Iraq

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Abstract

Background: This study was designed to evaluate the effectiveness of clinical pharmacist intervention in lifestyle modification to improve glycemic control and diabetic peripheral neuropathic symptoms.

Methods: One-hundred diabetic peripheral neuropathic patients were randomly assigned into two groups, intervention, and usual care group. The intervention group has received the three months' lifestyle modification program by a clinical pharmacist. The usual care group has been provided with standard medical services. Lifestyle modification was assessed using a summary of diabetes self-care activity (SDSCA) scale while the Douleur Neuropathique 4 (DN4), Neuropathic Pain Scale (NPS), and Brief Pain Inventory (BPI) were used to assess diabetic peripheral neuropathy.

Results: Intervention patients had significant positive effects of self-management education on self-reported dietary habits, physical activity, and foot care. After lifestyle modification, a significant reduction in the percentage of the response of patients feeling electric shock, tingling, and 'pins and needles' were observed in the intervention patients. Lifestyle modification significantly improved all assessed pain qualities except of feeling cold to a greater extent than the usual care group. Significant reductions in pain interference were observed in the intervention group after the three months of follow-up.

Conclusion: The provision of lifestyle modification has positive effects on glycemic control and is a clinically effective approach for patients with DPN that improves peripheral neuropathic symptoms, their severity, and pain interference.

Key words: Clinical pharmacist,
Diabetic neuropathy, Life style modification

Introduction

Type 2 diabetes mellitus is a chronic disease that, if left uncontrolled, may cause microvascular and macrovascular complications in the long term, which are the main causes of increased morbidity and mortality and decreased health-related quality of life among patients (1). Although the existence of effective therapies and the established benefits derived from tight control of blood glucose and other cardiovascular risk factors, such as blood pressure and serum lipids, evidence shows that the achievement of recommended objectives for these factors remains suboptimal among patients with type 2 diabetes (2). This is because diabetes globally has been highly linked to the increasing rates of obesity, metabolic syndrome, westernized dietary patterns, and physical inactivity (3), also, lack of adherence to therapy and other recommendations might explain these findings, given that more than 50% of chronically treated patients do not take the prescribed pharmacotherapy (4).

Diabetic peripheral neuropathy (DPN) is a complex and frequent complication of diabetes that affects nearly 50% of diabetic patients (5). It affects the quality of life and often inhibits daily activities and work and is associated with the duration of diabetes, poor glycemic control, and metabolic syndrome (6). On the other hand, there is no pharmacological disease-modifying therapy available for diabetic peripheral neuropathy to reverse pathogenesis and progression and therapy is thus aimed largely at pain control (7). It is well established that diabetes and related complications such as peripheral neuropathy can be prevented by tightly regulating blood glucose and lifestyle intervention which involves diet and exercise (8). Diet improves neuropathic pain by improving glycemic control, blood lipid concentrations, and blood pressure (9).

Patients with DPN are more likely to be sedentary and to have decreased daily walking distances (10). Despite these difficulties, exercise contributes to improving glucose control, which slows or stops the progression of diabetic neuropathy (11). In addition, effective exercise interventions have been correlated with improvement in neuropathic symptoms, gait, stability, quality of life, and sensory function (12).

Because of their knowledge in pharmacotherapy and their availability in the community, pharmacists can create strong relationships with patients and become a dependable source of information (13). Consequently, pharmacists are in a perfect position to provide patient education, monitor and boost adherence to self-care and therapeutic plans, which have a positive influence on achieving therapeutic outcomes in diabetes (14).

Patients and Methods

This study was conducted at the Leila Qasm Diabetic Centre, Erbil, Iraq which is generalized and provides health care for diabetic patients, from October 2015 to August 2016. Patients were included in the study if they were aged 18 years or older, diagnosed with type 2 diabetes at least one year earlier, have at least one specified medication for diabetes, diagnosed as having diabetic peripheral neuropathy based on clinical examination by physician, and level of urea and creatinine within normal to exclude nephropathy. Patients were excluded from the study if they had a history of alcohol consumption, thyroid gland disorder, any kidney disorder, any conditions that could confound the assessment of pain due to diabetic peripheral neuropathy, and pregnant females or those who planned to become pregnant during the study period.

One hundred diabetic peripheral neuropathic patients were randomly assigned into two groups, intervention and usual care group (50 patients in each group). The intervention group has received the three months' lifestyle modification program run by a clinical pharmacist. The usual care group has been provided with standard medical services.

The patients who met the inclusion criteria and who agreed to participate in the study were asked to sign a consent form. A specific questionnaire form was designed to obtain the demographic characteristics and clinical data from each patient.

Glycemic levels (glycated hemoglobin (HbA1c) values and fasting blood glucose), blood urea, serum creatinine, blood pressure, and BMI were measured.

Peripheral neuropathic pain was measured using three pain measurement scales: Douleur Neuropathique 4 questionnaire (DN4), Neuropathic Pain Scale (NPS) and part of The Brief Pain Inventory (BPI) (15), (16), (17).

Lifestyle modification was assessed using a summary of diabetes self-care activity (SDSCA) (18).

All biochemical parameters and scales were determined at baseline and after three months follow up.

The patients in the intervention group were provided with lifestyle education sessions about diet and exercise following ADA (19) guidelines. The objective of this session was to recommend dietary changes based on the personalized diet analysis, and the determination of dietary behavior that was threatening blood glucose control. Also, present physical activity levels were assessed and data about the ADA exercise goal shared (150 minutes of light aerobic exercise each week) and initiation of an exercise plan that could be incorporated into the patient's daily schedule. Self-monitoring of glycemic control was initiated by counseling the patients to check their blood glucose levels daily. General foot self-care education was provided to patients and they were informed about the importance of foot examination. They were asked

to adhere to antidiabetic therapy as prescribed by the physician and were asked about any problems that they had faced in taking their medication. Finally, 3 weekly direct and indirect contacts were made by the clinical pharmacist to each intervention patient to emphasize the importance of adherence to the diet, exercise, treatment plan, and to answer patient questions. Patients in the usual care group received the usual care provided by the medical staff, which included standard medical services.

Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 19). Chi-square test of association was used to compare proportions. When the expected count of more than 20% of the cells of the table was less than 5, Fisher's exact test was used. McNemar test was used to compare proportions of the same sample (before and after the intervention). For 3X3 tables, the McNemar-Bowker test was used (also for the same sample, before and after the intervention). Student's t-test was used to compare the means of the two study groups. A p-value of ≤ 0.05 was considered statistically significant.

Results

Around half (43%) of the studied sample was in the age group 50-59 years, and 75% of the whole sample were females. Twenty-six percent were illiterate, and another 26% were graduates of primary schools. No significant differences were detected in the proportions of the age categories, sex, educational level, and smoking of the two study groups.

Table 1 showed that lifestyle modification made a significant reduction (P<0.001) on biochemical (FBG, HbA1c) parameters and BMI in the intervention group while the usual care group did not significantly change the tested parameters after the three months follow up except FBG and HbA1c, which were significantly increased.

Table 2 represents the means of diabetic self-care activity scale at baseline visit and after three months. In the intervention group, significant increases in the means of all items of the mentioned scale were detected except for blood sugar testing, which remained the same. In the usual care group, the only mean of exercise was increased significantly (p = 0.006).

able 3 represents DN4 scale. In the intervention group, there was a significant reduction in the percentage of the response of patients feeling; electric shock (76% to 60%), tingling (80% to 66%), and pins and needles (78% to 60%) after the lifestyle modification (p = 008, 0.016, 0.004 respectively), whereas the other symptoms (cold, numbness, itching, hypoesthesia to touch, hypoesthesia to prick and brushing), remained the same or decreased non significantly.

Table 4 represents NPS. In the intervention group, there was a significant improvement in the mean scores of the items of neuropathy pain scale after the lifestyle modification, except for feeling cold sensation which was non significantly reduced, while in the usual care group, the changes in the mean scores of all items of the scale were not significant, except for intense and sensitive sensation, which had an increase in the mean scores of them after three months.

Table 5 represents BPI. There was a significant decrease in the means of the parameters of the brief pain inventory scale after the three months (in the intervention group), while in the usual care group, no significant changes were detected except for the sleep parameter, which was aggravated significantly (p=0.011).

Discussion

Patient education has recently become an important domain of medicine to enforce therapeutic outcomes (20). Many studies have shown the role of pharmacists in educating patients and improving their understanding of the disease, importance of medication adherence and lifestyle modifications, which decreases the morbidity and mortality rate (21,22,23).

This randomized controlled study provided evidence of the efficacy of lifestyle modification for patients with diabetic peripheral neuropathy. The intervention that consisted of individualized self-management education, adherence support, and regular contact follow-up lead to significant betterment in HbA1c, the primary outcome measurement in this study.

Although blood glucose levels change with a series of internal and external factors, reaching an ideal result regarding blood glucose is confirmed by the patient's active disease management (24).

The findings of this study indicated that the baseline mean of HbA1c values was higher in the intervention group than the mean of HbA1c for the usual care group. Moreover, the results of this study showed that the mean of HbA1c was significantly reduced for the intervention group while it was increased in the usual care group with significant differences between the two groups at the 3 months follow up period. This reduction of HbA1c was consistent with previous research findings of Farsaei et al (25) and Jarab et al (26). The improvements in HbA1c in the present study might be due to the clinical pharmacist's interventions about improving adherence to the diet, physical activity, and regular telephone follow-up.

The present study indicated a significant reduction in FBG levels in the intervention group patients when compared with the usual care group patients over the 3-month study period. This result is consistent with previous findings of Farsaei et al (25), and in agreement with the study of Jarab et al (26). This largest impact on glycemia is consistent with significant improvement in self-management which

Table 1. Mean scores of some of the studied variables at baseline and after three months visit in the study groups

Variables	Intervention group		P	Usual care		P
	Pre	Post		Pre	Post	
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
FBG	196.18 ± 87.41	148.82 ± 45.67	< 0.001	207.44 ± 72.25	227.54 ± 78.92	.043
HbA1c	9.04 ± 2.08	7.70 ± 1.54	< 0.001	9.04 ± 1.73	9.66 ± 1.34	< 0.001
BMI	31.06 ± 4.96	30.54 ± 4.72	< 0.001	31.87 ± 6.91	31.76 ± 6.99	.288
SBP	133.60 ± 15.88	131.60 ± 17.07	.236	132.70 ± 15.75	130.20 ± 17.78	.208
DBP	83.80 ± 6.74	81.80 ± 7.74	.042	81.60 ± 9.28	79.50 ± 8.88	.077
Mean BP	100.40 ± 8.77	98.40 ± 8.60	.032	98.63 ± 10.44	96.40 ± 10.60	.059
Pulse pressure	49.80 ± 12.97	49.80 ± 16.84	1.000	51.10 ± 11.84	50.70 ± 14.32	.838

Table 2. Mean scores of diabetic self-care activity scale in each of the studied groups

DM self-care Activity	Intervention group		P	Usual care group		P
	Before	After		Before	After	
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
General diet	3.26 ± 2.46	4.81 ± 2.23	< 0.001	2.8 ± 2.4	2.8 ± 1.7	.788
Specific diet	3.56 ± 1.72	5.02 ± 1.42	< 0.001	3.6 ± 1.7	3.5 ± 1.4	.520
Exercise	2.99 ± 1.81	4.93 ± 1.86	< 0.001	2.3 ± 2.1	2.6 ± 2.0	.006
Blood sugar testing	2.68 ± 2.71	2.86 ± 2.73	.376	1.9 ± 2.4	1.6 ± 2.1	.209
Foot care	4.61 ± 2.88	5.65 ± 2.15	< 0.001	4.0 ± 2.9	4.2 ± 2.8	.149

Table 3. Comparison of the percentages of responses (to DN4 scale items) at baseline and after three months follow up, in each of the intervention group and the usual care group

DN4 scale items	Intervention group			Usual care group		
	Response %		P*	Response %		P*
	Pre	Post		Pre	Post	
Burning	78	74	0.5	72	72	1
Cold	34	30	0.5	42	42	1
Electric shock	76	60	0.008	64	62	1
Tingling	80	66	0.016	76	72	0.5
Pins and needles	78	60	0.004	70	68	1
Numbness	48	48	1	50	48	1
Itching	48	42	0.25	52	52	1
Hyposthesia to touch	4	4	1	8	8	1
Hyposthesia to prick	6	6	1	28	30	1
Brushing	10	10	1	22	22	1

*By McNemar test

Table 4. Mean scores of neuropathy pain scale at baseline and after three months follow up, in each of the intervention group and the usual care group

NPS	Intervention			Usual care		
	Before	After	P	Before	After	P
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
Intense	5.78 ± 2.22	4.60 ± 2.37	< 0.001	6.16 ± 2.49	6.52 ± 2.30	.035
Sharp	4.30 ± 3.40	3.26 ± 3.05	< 0.001	4.44 ± 3.51	4.72 ± 3.39	.061
Hot	5.08 ± 3.11	3.36 ± 2.75	< 0.001	4.54 ± 3.55	4.56 ± 3.39	.931
Dull	3.38 ± 3.12	2.56 ± 2.70	< 0.001	3.08 ± 3.47	3.10 ± 3.47	.811
Cold	2.46 ± 3.51	2.12 ± 2.99	.094	2.94 ± 3.79	2.86 ± 3.69	.681
Sensitive	4.36 ± 3.04	3.82 ± 2.81	.001	4.10 ± 3.30	4.30 ± 3.45	.032
Itchy	2.44 ± 2.96	1.74 ± 2.42	.002	3.28 ± 2.85	3.58 ± 2.93	.149
Unpleasant	5.64 ± 2.31	4.34 ± 2.55	< 0.001	6.20 ± 2.19	6.38 ± 1.96	.276
Deep pain	5.38 ± 2.60	4.42 ± 2.60	< 0.001	5.36 ± 2.72	5.48 ± 2.70	.204

*P<0.05 when compared to its baseline.

Table 5. Mean scores of brief pain inventory scale at baseline and after three months follow up, in each of the intervention group and the usual care group.

Brief pain inventory scale	Intervention group			Usual care group		
	Pre	Post	P	Pre	Post	P
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
General activity	4.56 ± 2.89	3.04 ± 2.70	< 0.001	3.88 ± 2.48	4.20 ± 2.49	.051
Mood	5.50 ± 3.22	3.70 ± 2.84	< 0.001	4.22 ± 3.07	4.36 ± 2.79	.431
Walking ability	3.94 ± 2.85	2.38 ± 2.72	< 0.001	3.62 ± 2.57	3.90 ± 2.51	.070
Normal work	3.72 ± 2.59	2.38 ± 2.69	< 0.001	3.60 ± 2.37	3.68 ± 2.33	.542
Relations	.76 ± 1.73	.42 ± 1.25	0.02	.68 ± 1.45	.74 ± 1.56	.322
Sleep	5.16 ± 2.85	3.28 ± 2.65	< 0.001	4.90 ± 2.75	5.52 ± 2.56	.011
Enjoyment	1.30 ± 1.96	.94 ± 1.49	0.015	2.12 ± 2.33	2.30 ± 2.30	.095

*P<0.05 when it's compared to its baseline.

includes significant improvements in physical exercise and a healthy diet, which is expressed by the diabetic self-management education scale.

Weight loss has long been a recommended plan for obese adults with diabetes (27). Modest weight decline may provide clinical benefits (improved blood pressure, lipids, and glycemia) in some individuals with diabetes, especially those early in the disease process (28). The challenge for every obese person is to keep up in lifestyle changes that will permit him or her to preserve weight loss (29). Results revealed that the intervention group achieved a significant reduction in BMI while the usual care group showed an increase in BMI values over the 3-month study period. This weight loss achieved in this study was a successful outcome for patients with diabetic peripheral neuropathy and suggests that subjects, who lose weight, and who met physical activities and dietary fat goals, could reduce their risk of diabetes and its complications as peripheral neuropathy. Jarab et al (26) did not find any significant improvement in BMI.

The common coexistence of high blood pressure and high lipid profile in diabetic neuropathic patients needs monitoring of metabolic parameters to guarantee successful health outcomes (28). When a patient has both high blood pressure and hyperglycemia, the risk of vascular complications is increased by 66 to 100% as compared with those with only one of these conditions (30). In the current study, lifestyle modification had minor effects in lowering SBP, DBP and mean blood pressure among patients with diabetic peripheral neuropathy.

Good knowledge about diet, exercise, and self-monitoring of blood glucose is essential in the effective self-management of diabetes, however, knowledge alone does not guarantee required behavior modifications or effective self-management. The inclusion of the assessment tool is an important consequence measure in diabetes education programs (31).

Many randomized controlled trials have been conducted to evaluate the impact of Diabetic self-management education (DSME) on clinical outcomes in individuals with T2DM (32, 33).

The significant improvement in dietary habits in intervention patients at the end of the present study is likely due to the powerful content of the educational material that determined types and proportions of healthy diet utilized. This result is consistent with findings of Jarab et al (26) who reported that pharmacists were successful at increasing the number of days per week that patients spent engaging in a healthy diet by helping basic meal scheduling, explaining the misunderstandings, and/or providing reinforcement of the nutrition program developed collaboratively by the registered dietitian nutritionist and the patient.

It is well known that patients with high physical activity levels have improved glycemia because exercise therapy induces glucose and free fatty acid utilization by skeletal muscles and ameliorates insulin resistance (30). It is worth mentioning that this study included not only walking but also other forms of aerobic exercise, such as bicycling

or running. Also in this study, the patients were advised to walk at a moderate intensity, 120–150 minutes/week.

In the present study, patients who received the clinical pharmacist services had significantly better self-reported physical activity than did patients in usual care, as well patients in the usual care group showed an increase in the mean number of days in performing exercise but this increase was found not to be significant. For patients with diabetic peripheral neuropathy, this improvement in physical activity was to gain benefits on glycemic control and neuropathic symptoms.

Self-monitoring blood glucose (SMBG) plays a significant role in glycemic control and is part of the therapeutic strategy in both type 1 and type 2 diabetes mellitus (34). Many studies have confirmed the role of SMBG in providing better glycemic control in patients with diabetes. Farham, (35) in his study suggested that clinical management of diabetic patients who committed self-monitoring of blood glucose levels have a significant reduction in HbA1c compared with those patients who do not have self-monitoring of blood glucose.

Many patients might not understand the value of checking their feet daily. The poor foot wear gives rise eventually to neuropathic foot ulceration and higher HbA1c levels itself results inneuropathy again, causing a vicious circle for pathology to develop again and again (36).

The significant improvement in foot care in the intervention patients of this study was most probably attributed to the provision by a clinical pharmacist of high-quality information about foot care.

In this study, the presence of painful diabetic peripheral neuropathy was determined using the Douleur Neuropathique 4 questionnaire (DN4). After lifestyle modification, the result of this study showed improvements in neuropathic pain symptoms in the intervention group. Improvement in burning, cold, electric shock, tingling, itching, and pin and needles sensation, without any improvement in numbness, hypoesthesia to touch, hypoesthesia to prick, and brushing symptoms.

At baseline, the patients in this study had DPN of varying severity and showed that intense pain was the most common while the least common was itching. Nearly all patients had more than one type of pain, which boosts the complication of any clinical evaluation. This may propose that the mechanism of pain is most possible from small nerve fibers, rather than from large fiber dysfunction. Previous clinical and electrophysiological studies also presented that neuropathic pain in diabetic polyneuropathy is not related to the degree of involvement of large diameter sensory fiber or diabetes severity (37).

Persons with neuropathic pain generally represent differential treatment effects on the various pain qualities they suffer. For this cause, neuropathic pain scale (NPS) items can be a more sensitive and clinically effective measure of neuropathic pain treatment effects than a single measure of total pain intensity.

This study demonstrates that self-management education palliates all of the most usual pain qualities related to neuropathic pain, as measured in the certified neuropathic pain scale (NPS). Three months of the intervention of patients with peripheral neuropathy resulted in statistically significantly greater reductions in the mean of neuropathic pain qualities.

In an analysis covering a numeric item of NPS, which involves the different pain qualities (“sharp,” “cold,” “itchy,” “hot,” “skin sensitivity,” “dull,” and “deep pain,”), a global “pain intensity” measure, and a measure of “pain unpleasantness,” the intervention group demonstrated statistical reduction in the mean scores of items of neuropathy pain scale except for feeling cold.

This improvement in the scales of peripheral neuropathy suggested that the lowering of HbA1c and meaningful changes in this study in a healthy lifestyle (diet and exercise) have had real effects in the intervention group. The mechanism by which the diet enhances neuropathy pain may include improved insulin sensitivity, resulting in good glucose control (9).

In this study, exercise was another important part of the self-management of diabetic peripheral neuropathic patients. It is clear that routine exercise may be a highly effective means of promoting recovery from, and improving some of the suffering symptoms associated with, peripheral neuropathy (38). Routine exercise has been shown to both preserve and promote the function of the peripheral nerves (39).

Chronic neuropathic pain generally restricts a patient’s ability to accomplish important daily activities, thereby boosting the negative impact of pain. At the baseline visit, patients experienced substantial diabetic peripheral neuropathy pain-related interference in normal work, walking ability, enjoyment of life, sleep, general activity, and mood. The walking distance was of special care, being one of the main indicators of the physical health of diabetic patients (40). The other important factor is mental health because lower mood status decreases the capability of diabetic patients to take care of themself and this might aggravate the glycemic control and complications. Also, they complained of nocturnal exacerbations due to neuropathic pain therefore evaluation of sleep impairment is a key element of the patient-level load among painful DPN sufferers. Thus, a painful DPN may be one of several factors responsible for impairing quality of life among diabetic patients. It has been proposed that the level of neuropathic pain severity is associated with the experience of sleep problems, mood, and walking (41).

The result in this study showed significant reductions in how the intervention patients described that their diabetic neuropathic pain conflicted with their daily activities including normal work, walking, relationships with others, and sleep. This significant reduction in the mean of pain interference scale exhibits that lifestyle modification may have played a role in declining the impact of pain on the quality of daily life.

Conclusions

The engagement in diabetes self-management education results in a statistically significant improvement in glycemic control, significant improvement in Douleur Neuropathique 4 (DN4) questionnaire-based DPN, reduction in the intensity of general neuropathic pain qualities associated with peripheral neuropathic pain conditions, improvement in perceived neuropathic pain interference that is positively correlated with the extent of neuropathic pain relief. The present study has established the importance of the clinical pharmacist in lifestyle modification for patients with diabetic peripheral neuropathy in Erbil. Further research is also needed to evaluate which intervention elements contribute the most observed effects. Also clinical pharmacists should be integrated into the healthcare team to deliver an educational programme to improve patient safety, create awareness of a healthier lifestyle, and high-quality responsive clinical care.

Limitation

First, this study was based on self-report and this may be subject to recall bias and human error. Second, this study evaluates outcomes only after 3 months, and longer follow-up is important to ascertain if the short-term outcomes are continued from the clinical pharmacist intervention.

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Female medical students are stronger advocates for colorectal cancer screening than their male colleagues

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Abstract

Colorectal cancer (CRC) remains one of the most commonly diagnosed malignancies worldwide. A significant body of evidence supports the role of CRC screening in reducing disease mortality. Previous studies addressed barriers to screening among physicians and the general populace. As the role of medical students as CRC screening promoters could be significant, we sought to assess medical students' attitude and knowledge toward CRC screening and to determine the obstacles that they face. We conducted a cross-sectional study at our academic hospital by distributing a paper-based survey to medical students in their clinical years. The predictors of students' attitude and knowledge were determined by conducting regression analyses. The response rate was 74%. Among study participants, 24.9% suggested CRC screening to their relatives. Knowledge-related barriers were the most commonly disclosed barriers (85.4%). Sixth-year students ($P < 0.001$) and participants who had direct relatives diagnosed with CRC ($P < 0.001$) were more likely to recommend CRC screening, where as male students ($P = 0.026$) and students with a lower cumulative grade point average (pass/good) ($P = 0.026$) were less likely to recommend it. Medical students have not reached their full potential as CRC screening proponents for a variety of reasons, including inadequate knowledge and suboptimal attitudes, as well as the presence of various barriers that hinder them. In this study, female students were stronger advocates than males. Strategies to enrich students' knowledge and help them overcome the barriers they face should be offered through educational sessions and training to enhance their role as screening champions.

Key words:
Colorectal Cancer Screening, Medical Students, Medical Education, Health Knowledge, Colorectal Cancer, Colorectal Neoplasms, Cancer Screening, Student Attitudes

Introduction

Colorectal cancer (CRC) remains the third most common malignancy in men and the second most common malignancy in women worldwide, with incidence rates of 13.1% among men and 10.1% among women(1,2). There is some global variation in CRC incidence (3). In Saudi Arabia, the CRC incidence rate ranks first in men (8.9%) and third in women (4.2%) (4). The median age of diagnosis in Saudis is 59 years in males and 57 years in females, which represents a younger median age of presentation than in other countries (5,6). Early diagnosis has been significantly linked to improved CRC prognosis and reduction in mortality rates (7, 8). Results from the Surveillance, Epidemiology, and End Results Program showed a peak incidence of CRC in the 1980s, with a reduction in the incidence and mortality rate after screening implementation in subsequent years (9).

Several screening modalities with various sensitivities are available,(10) including colonoscopy, computed tomography colonography, and stool tests such as guaiac-based, immunochemical fecal tests, and stool DNA sampling. The US Preventive Services Task Force guidelines recommend starting screening at the age of 50 until 75 years with either an annual fecal occult blood test and sigmoidoscopy every 5 years, or a full colonoscopy every 10 years (11). In Saudi Arabia, earlier screening starting from the age of 45 years has been recommended because evidence suggests that CRC presents at an earlier age (12). Screening people over the age of 70 years is not recommended in Saudi Arabia in most cases (13,14). Despite the reported success of CRC screening in reducing mortality,(9) published articles on CRC practices have demonstrated inadequate screening (14-17). Interventions to promote the screening process have been investigated, such as improving health promotion, enriching the population's awareness, and implementing CRC screening education in medical schools (15,18,19).

Enhancement of medical education and an emphasis on cancer prevention in medical school can result in positive attitudes and an intent to apply prevention in future practice (19,20). Studies on medical students' knowledge and their attitude as CRC screening advocates are, however, limited. In order to develop better learning outcomes, we aimed in this study to evaluate medical students' attitudes and knowledge toward CRC screening and to identify the hurdles they face as screening advocates.

Methodology

Study participants and design

We obtained approval for this study from the Biomedical Ethics Research Committee at the King Abdulaziz University Faculty of Medicine. We conducted a cross-sectional study at King Abdulaziz University Hospital in Jeddah, Saudi Arabia. All 1,270 medical students studying in their clinical years (fourth to sixth year) were included. The study was conducted over 8 months starting from September 2018 until April 2019. A literature review on knowledge assessment and barriers toward CRC screening was performed, and a study questionnaire was created from questionnaires identified in the literature. The final version of the questionnaire was reviewed independently by four experts in the field: three colorectal surgeons and one statistician. Two medical students also offered their input. The questionnaire was in English, as it is the teaching language at the faculty. It comprised four sections. The first section included demographic data. The second section assessed respondents' knowledge about CRC screening methods and guidelines. This section included five questions with a calculated score out of a total of 5. The correct answers to the questions and the scoring used are represented in Appendix 1. The third section assessed students' attitude as CRC screening advocates. The fourth section aimed to identify the perceived barriers that medical students encounter as CRC screening advocates. This section included yes/no questions for 18 identified barriers. The barriers were further divided into four categories: knowledge-related barriers, health system barriers, social barriers, and personal beliefs. A voluntary paper-based questionnaire was distributed among all of the included study participants (Appendix 2).

Statistical analysis

Frequencies and percentages were used to summarize categorical data and means and standard deviations were used to summarize continuous variables such as age. Five questions assessed knowledge regarding CRC screening. A cumulative score was calculated for each respondent (out of 5). We used linear regression to explore factors associated with the knowledge score and performed hypothesis testing at a 5% level of significance. Statistical analysis was performed with R software (v 3.6.2).

Results

A total of 938 students completed the survey, with a response rate of 73.85%. Female students represented 49% of the study sample. The three academic years (fourth, fifth, and sixth years) were well presented. The demographics of the respondents are represented in Table 1. Most of the respondents (83.4%) were aware of the presence of CRC screening tests. However, only one quarter of them had recommended CRC screening to a relative (n = 233, 24.9%). Only 29.2% of the relatives who received such a recommendation had undergone screening. The family members that medical students were most likely to discuss CRC screening with were their parents (73.82%) (Table 2).

The overall mean knowledge score was 1.86 ± 1.04 (a full mark was 5). The correct target population for CRC screening was identified by approximately 21% of the respondents, and 35% of respondents did not know that CRC is completely curable. Colonoscopy was the most commonly identified test (85%) of the acceptable screening modalities and was identified as the gold standard test by 64% of the students (Figure 1). The distribution of students' responses to knowledge questions and the percentages of correct answers for each question, as well as their overall knowledge score, are represented in Table 3.

Table 1. Demographic characteristics of the study cohort.

Characteristic	All respondents, *n* (%)	*N*
	(*N*=938)	
Gender		938
Female	460 (49.0%)	
Male	478 (51.0%)	
Age, M (SD)	22.4 (1.17)	926
Nationality		937
Saudi	910 (97.1%)	
Non-Saudi	27 (2.88%)	
Academic year		938
Fourth year	400 (42.6%)	
Fifth year	312 (33.3%)	
Sixth year	226 (24.1%)	
Cumulative GPA		897
Pass	5 (0.56%)	
Good	72 (8.03%)	
Very good	479 (53.4%)	
Excellent	341 (38.0%)	
Direct relatives with CRC		936
No	755 (80.7%)	
I do not know	83 (8.87%)	
Yes	98 (10.5%)	

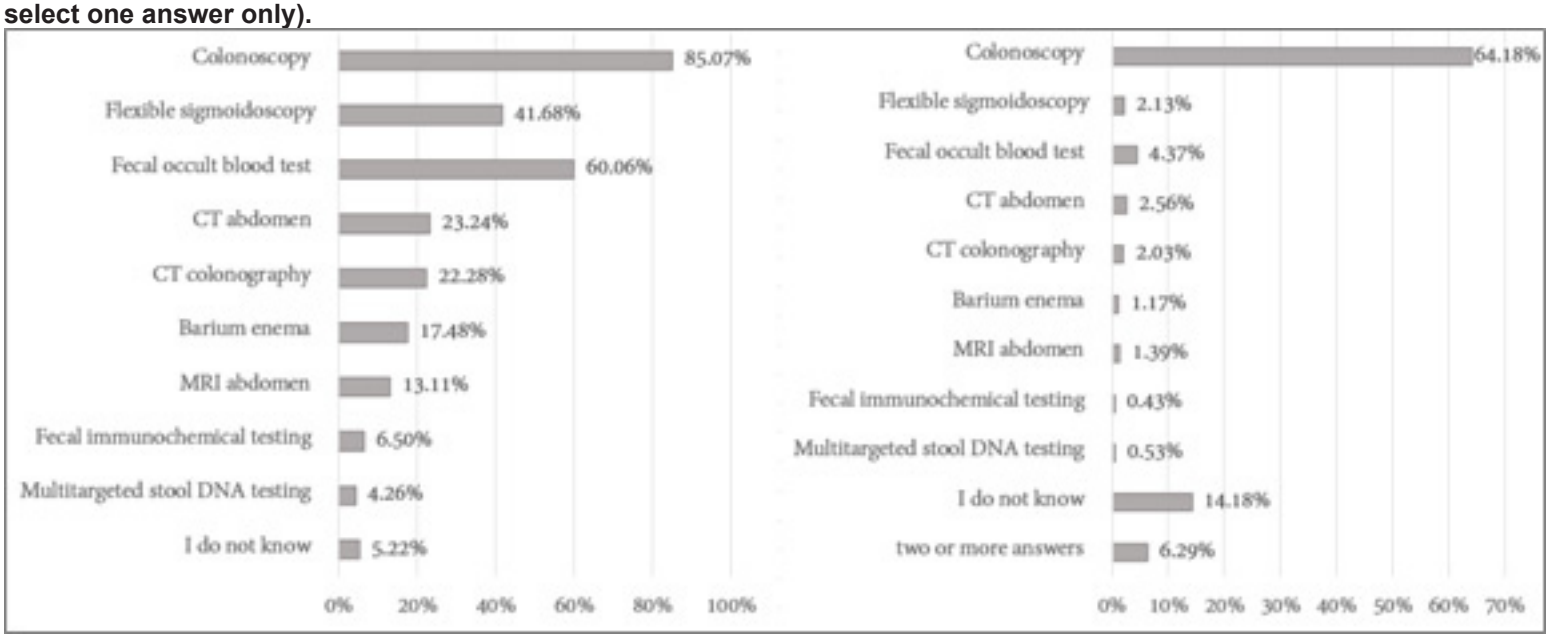
Note. All values are n (%) except where otherwise indicated.
CRC: colorectal cancer; GPA: grade point average.

Table 2. Students' responses to the questions assessing their attitude toward CRC screening.

Question	All respondents, n (%)	N
	(*N*=937)	
Ever recommended CRC screening to a relative in the complete absence of symptoms?		937
No	706 (75.1%)	
Yes	233 (24.9%)	
Did the family member you recommended CRC screening to do it?		233
No	102 (43.8%)	
I don't know	63 (27.0%)	
Yes	68 (29.2%)	

.Note. CRC: colorectal cancer.

Figure 1. Summary of participants' answers about (A) acceptable tests for CRC screening (participants could select as many answers as appropriate) and (B) the gold standard modality for CRC screening (participants could select one answer only).



A **B**

Note: CRC: colorectal cancer; CT: computed tomography; MRI: magnetic resonance imaging.

Table 3. Distribution of students' correct answers to CRC screening knowledge questions and their mean knowledge score.

Knowledge Assessment Question	All respondents, n (%)
CRC screening program available in the training hospital	75 (8.03%)
Target population for CRC screening	205 (21.9%)
Acceptable test for CRC screening	256 (27.3%)
Gold standard for CRC screening	602 (64.2%)
CRC is completely curable	609 (65%)
Knowledge score (out of 5), M ±SD	1.86 ±1.04

Note. All values are n (%) except where otherwise indicated.
CRC: colorectal cancer.

Table 4. Perceived barriers to recommending CRC screening.

	All respondents, n (%)	*N*
Barriers	*N=914*	
Knowledge	784 (85.4%)	918
Health System	625 (68.1%)	918
Social	664 (72.3%)	918
Personal Thoughts	696 (75.8%)	918

Note. Participants could select as many barriers as appropriate. CRC: colorectal cancer.

Common responses regarding barriers to recommending CRC screening to direct relatives included "I did not think of it" (65.6%) and "the lack of a national screening program" (53.6%). Other common barriers as perceived by students included "fear of discovering a cancer" (53.1%), "financial cost of a colonoscopy is too high" (39.3%), and "difficulty in gaining access to a hospital/difficulty in opening a medical file" (35.1%) (Figure 2). Barriers were further classified as lack of knowledge, social factors, personal beliefs, and those related to the health system. Knowledge barriers were the most commonly reported barrier to CRC screening (85.4%) (Table 4).

The results of bivariate logistic regression analyses, which demonstrate the predictors of students' attitudes as CRC screening advocates, are represented in Table 5. Sixth-year students (odds ratio [OR]: 2.84, 95% confidence interval [CI]: 1.65 to 4.94, P < 0.001) and participants who had direct relatives with CRC (OR = 2.94, 95% CI: 1.79 to 4.79, P < 0.001) were more likely to recommend CRC screening to their relatives. However, male students (OR: 0.67, 95% CI: 0.47 to 0.95, P = 0.026) and students with a lower cumulative GPA (pass/good) (OR: 0.43, 95% CI: 0.20 to 0.87, P = 0.026) were less likely to recommend screening.

Multivariate linear regression was conducted to ascertain the factors affecting medical students' level of knowledge about CRC screening. We found that being a male (B=-0.25, 95% CI: -0.40 to -0.11, P < 0.001), having a good cumulative GPA (B = -0.76, 95% CI: -1.02 to -0.49, P < 0.001), or having a very good cumulative GPA (B = -0.23, 95% CI: -0.37 to -0.09, P = 0.001) was significantly associated with a lower knowledge score. On the other hand, being a sixth-year student was the only significant factor associated with a higher knowledge score (B = 0.63, 95% CI: 0.40 to 0.86, P < 0.001). None of the remaining factors showed a statistically significant association with the overall knowledge score (Table 6).

The average perceived number of barriers was higher in males (B = 0.96, CI: 0.50 to 1.42, P < 0.001), fifth-year students (B = 1.22, CI: 0.65 to 1.78, P < 0.001), and students with a lower cumulative GPA (good/pass) (B = 0.94, CI: 0.10 to 1.78, P < 0.028) (Table 7).

Figure 2. Perceived barriers to recommending CRC screening and getting screened.
Note. Participants could select as many barriers as appropriate. CRC: colorectal cancer.

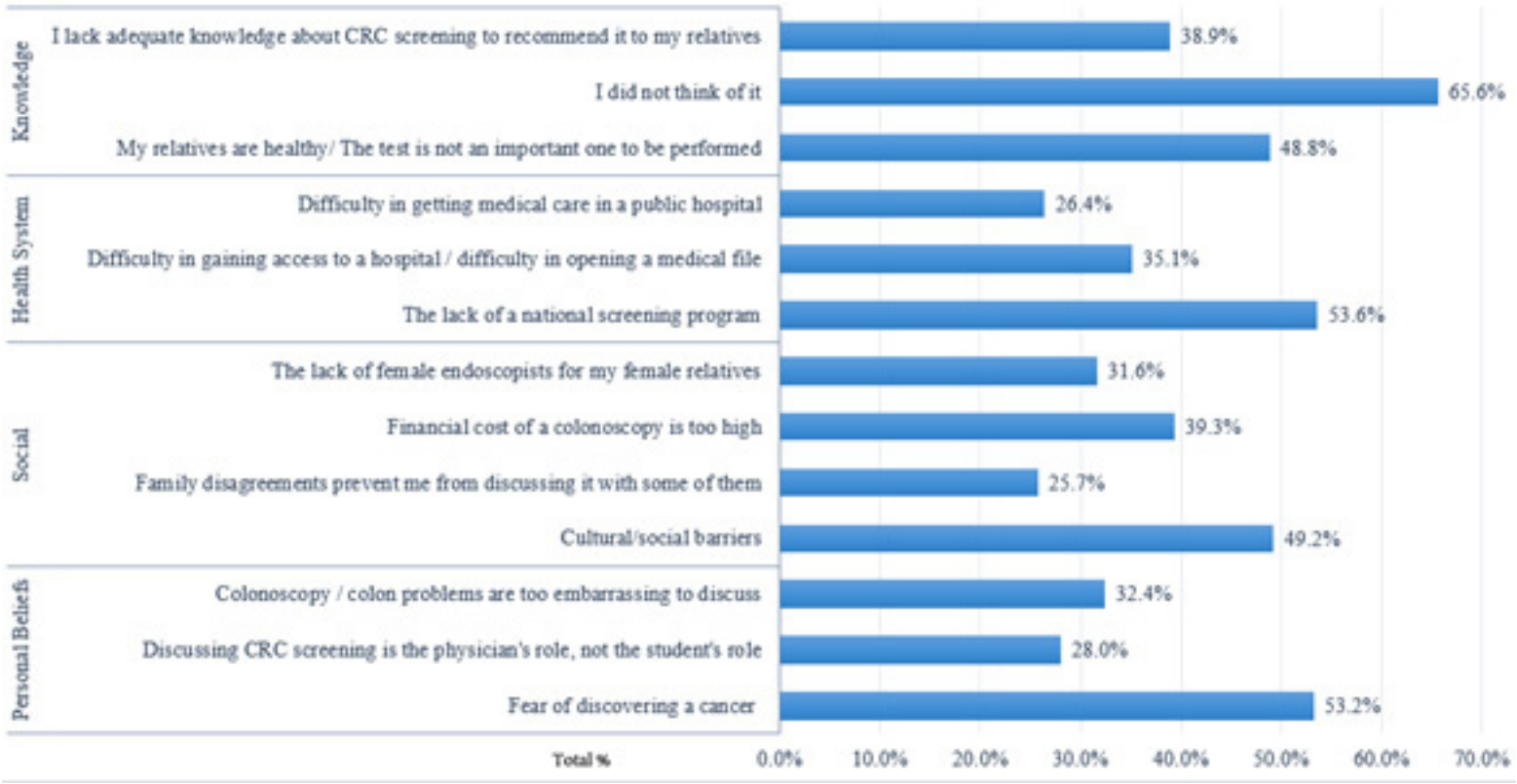


Table 5. Predictors of medical students' attitudes as CRC screening advocates

Predictor	Odds ratio	CI	P
(Intercept)	0.02	0.00 – 1.51	0.071
Gender: Female	Ref		
Gender: Male *	0.67	0.47 – 0.95	**0.026**
Age	1.14	0.94 – 1.38	0.168
Academic year: Fourth year	Ref		
Academic year: Fifth year	1.27	0.81 – 2.01	0.302
Academic year: Sixth year *	2.84	1.65 – 4.94	<**0.001**
Cumulative GPA: Excellent	Ref		
Cumulative GPA: Very good	0.79	0.56 – 1.12	0.191
Cumulative GPA: Good/pass *	0.43	0.20 – 0.87	**0.026**
Marital status: Single	Ref		
Marital status: Married	0.60	0.23 – 1.40	0.260
Direct relatives with CRC: No			
Direct relatives with CRC: I don't know	0.95	0.50 – 1.71	0.874
Direct relatives with CRC: Yes *	2.94	1.79 – 4.79	<**0.001**

Note: CRC: colorectal cancer; CI: confidence interval; GPA: grade point average.
*P-value < 0.05.

Table 6. Multivariate linear regression analysis for factors associated with knowledge score.

Predictor	Estimate	CI	P
(Intercept) *	3.27	1.48 to 5.06	<**0.001**
Gender: Female	Ref		
Gender: Male *	-0.25	-0.40 to -0.11	<**0.001**
Age	-0.03	-0.11 to 0.04	0.387
Academic year: Fourth year	Ref		
Academic year: Fifth year	0.02	-0.15 to 0.20	0.803
Academic year: Sixth year *	0.63	0.40 to 0.86	<**0.001**
Cumulative GPA: Excellent	Ref		
Cumulative GPA: Very good *	-0.23	-0.37 to -0.09	**0.001**
Cumulative GPA: Good *	-0.76	-1.02 to -0.49	<**0.001**
Cumulative GPA: Pass	-0.66	-1.64 to 0.31	0.182
Marital status: Single			
Marital status: Married	-0.07	-0.41 to 0.28	0.713
Direct relatives with CRC: No	Ref		
Direct relatives with CRC: I don't know	-0.11	-0.34 to 0.12	0.352
Direct relatives with CRC: Yes	0.19	-0.04 to 0.41	0.102

Note: CI: confidence interval; GPA: grade point average; CRC: colorectal cancer.
*P-value < 0.05.

Table 7. Factors associated with higher number of perceived barriers toward CRC screening recommendation.

Predictor	B	CI	P
(Intercept)	0.02	0.00 – 1.51	0.071
Gender: Female	Ref		
Gender: Male *	0.96	0.50 – 1.42	<**0.001**
Age	0.08	-0.17 – 0.34	0.527
Academic year: Fourth year	Ref		
Academic year: Fifth year *	1.22	0.65 – 1.78	<**0.001**
Academic year: Sixth year	-0.17	-0.92 – 0.58	0.654
Cumulative GPA: Excellent	Ref		
Cumulative GPA: Very good	0.34	-0.12 – 0.80	0.152
Cumulative GPA: Good/pass *	0.94	0.10 – 1.78	**0.028**
Marital status: Single	Ref		
Marital status: Married	-0.15	-1.28 – 0.99	0.801
Direct relatives with CRC: No			
Direct relatives with CRC: I don't know	-0.12	-0.88 – 0.64	0.757
Direct relatives with CRC: Yes	0.43	-0.30 – 1.16	0.246

Note: CRC: colorectal cancer; CI: confidence interval; GPA: grade point average.
*P-value < 0.05.

Discussion

Screening plays an essential role in detecting CRC at an early stage and reducing its mortality (9). Physicians recommend CRC screening to their patients to help improve the uptake rate (21,22). Medical students, as future physicians, are progressively involved in the provision of various health promotion interventions and patient education. Their role as health advocates has the potential to improve patients' knowledge and to enhance their health attitude (23). As cancer prevention is a core part of the curriculum of medical students, they are expected to act as CRC screening advocates, especially within their immediate social circle such as their family, as they are often the source of medical information in their household. In order to develop better teaching strategies for medical students, there should be a clear understanding of their knowledge and attitude toward CRC screening. We performed this study in order to evaluate medical students' attitudes and knowledge toward CRC screening and to identify the barriers they face as screening advocates.
Previous studies have evaluated physicians' attitudes and knowledge about CRC screening,(15,24) but studies of medical students' attitudes and knowledge on the same topic are limited (25,26). Our results showed that only a minority of medical students (24.6%) recommended CRC screening to their relatives, suggesting that these students are not receiving early and adequate education regarding the importance of CRC screening. As a result, they are not reaching their full potential as CRC screening advocates. Medical students are usually asked to gather information from patients rather than to counsel them. Previous studies have demonstrated a relationship between students' experience and their competency in counseling patients and recommending CRC screening. Students with more clinical experience perform better in history taking, physical examination, and counseling. Continuous clinical practice has been reported as the preferred educational method for acquiring clinical skills (25,27,28).

In our study, female medical students were more likely to recommend CRC screening to their relatives, which might indicate that female students have better communication with their family members and greater attention to their health care needs than do their male counterparts. A previous meta-analysis found that 57% to 81% of caregivers of the elderly were female relatives.(29) Our finding is in agreement with that of Mosli et al.,(15) who reported that male primary health care physicians (PHCPs) were less likely to recommend CRC screening. Moreover, we demonstrated that a lower GPA is a significant predictor of suboptimal attitude and knowledge toward screening. Students with a lower GPA had a lower knowledge score regarding screening guidelines and were thus were less motivated and confident in recommending CRC screening (30). Health care providers with higher levels of training are stronger CRC screening advocates (15,31). Similarly, we found that senior medical students were more likely to recommend CRC screening. Furthermore, students who had a relative with CRC possessed a better attitude as screening advocates, as they were more likely to recommend CRC screening. Individuals with a family history of CRC are at higher risk than the general population; this might encourage these students to recommend CRC screening to their relatives to detect CRC at an earlier stage.

Numerous studies have reported physicians' knowledge about CRC screening guidelines as a significant predictor of their attitude toward screening(31,32). Students in our study demonstrated a gap in their knowledge about

CRC screening, as evaluated by our study survey. These findings are consistent with the results of previous studies in which investigators reported inadequate knowledge about CRC screening guidelines among medical students, internal medicine residents, and PHCPs (15,25-27,33). The mean knowledge scores for CRC screening guidelines were directly proportional to the level of training (26,33-35). Senior medical students in our study had a higher knowledge score, most likely due to their considerable academic and clinical exposure, which enriches their perception about the value of screening and its importance. Interestingly however, in our study, male students had lower knowledge scores. Previous studies have shown that female PHCPs had better knowledge about CRC screening guidelines and were following the guidelines more strictly than were their male counterparts (15,36).

To better understand why CRC screening is not being more frequently recommended by medical students, we sought to identify the barriers that they might encounter (37). Most medical students in this study thought that their knowledge defect was a barrier to recommending screening. Furthermore, they failed to perceive their role as screening advocates, as the most commonly selected barrier was "I did not think of it." They should be encouraged to recognize their role in tackling this critical health problem. A previous study reported that "fear of discovering a cancer" was a major barrier among patient-related barriers (26).

Our study's strengths are its high response rate. This study is the first to evaluate medical students' attitudes in their role as CRC screening advocates among their family members and to attempt to identify the obstacles that they encounter. Our study also has several limitations. First, it is restricted to one city in Saudi Arabia, which might affect the generalizability of our results. We believe, however, that our results are thought provoking and would be enriched by similar surveys that targeted medical schools internationally. Second, the study was limited by its design, as self-reported data were obtained from the participants and this approach involves an associated recall bias. Third, the fact that different modalities are used in CRC screening and that the guidelines are continually changing may contribute to the various low knowledge assessment scores.

Collectively, our results demonstrated suboptimal knowledge and attitude toward CRC screening among medical students. Their knowledge defect was reported as a major barrier to recommending CRC screening. The study results suggest that medical students are not receiving adequate and early training in CRC screening. In the absence of national screening programs, and with the need to enhance population awareness, medical educators should encourage students to be actively involved in counseling patients and advocating for CRC screening in their communities. Providing this additional training could enhance students' knowledge and clinical skills in CRC screening,(28,38,39) and it may result in a more proactive attitude that continues throughout their future career(40).

Medical students have not reached their full potential as CRC screening proponents for a variety of reasons, including inadequate knowledge and suboptimal attitudes, as well as various barriers that hinder them in this role. Female students in this study were stronger advocates than male students were. Strategies to enrich students' knowledge and help them overcome the barriers that they face should be offered through educational sessions and training to enhance their role as CRC screening champions.

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Knowledge and Practice Regarding Infant Feeding of Mothers Attending PHCCs in Abha City, Saudi Arabia

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Abstract

Objectives: To study infant-feeding knowledge and practice and factors that affect infant-feeding among mothers of infants attending PHCCs in Abha, KSA.

Material and Methods: An interviewer- administered questionnaire was used to interview 280 mothers who attended well baby clinic in PHCCs, who had a child aged less than one year during 2015.

Results: Among 280 mothers; (75.7%) of them were aged 25-35 years, (49.3%) of them had a university level of education and (66.4%) of them were not working. In prenatal planning of infant feeding, (44.3%) of them planned to breastfeed their infants while (41.1%) of them planned to give both artificial milk and breastfeeding. Only (53.6%) of mothers received prenatal health education on infant feeding. The first type of feeding given to the index infants was breastfeeding alone (46.4%) or both breastfeeding and artificial milk feeding (45%). Start of weaning was at 4-6 months in (46.4%) of them. Most of the additional feeding was artificial milk feeding among children who are on breastfeeding (43.6%).

Conclusions: This study explores some of the factors related to knowledge and practice of infant feeding which are: mother's age and her level of education, father's age and his educational level and occupational status, family size and monthly income, prenatal plan and prenatal health education of infant feeding and practice of breastfeeding with the previous child.

Key Words: infant-feeding, knowledge, practice, mothers of infants

Introduction

Background

The World Health Organization (WHO) recommends that infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health. Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to two years of age or beyond (WHO/UNICEF, 2003) [1].

Infants who are not breastfed require a suitable breast-milk substitute or Replacement Feeding, for example, an infant formula prepared in accordance with the present guidelines. The amount of guidelines and publications provided by leading health care authorities either internationally by WHO, UNICEF, or Nationally by the Ministry of Health in Saudi Arabia regarding artificial milk feeding in comparison or combined with Breast feeding is enormous and will give the health care promoter an indication about the importance of such a topic. In 2009 the WHO published the acceptable medical reasons for use of replacement feeding [2], and it included many reasons to start such a practice.

Powdered infant formula (PIF) has been associated with serious illness and death in infants due to infections. During the preparation of PIF, inappropriate handling practices can exacerbate the problem. In 2005 the World Health Assembly (WHA) of WHO requested the Organization to develop a guideline in order to minimize this risk to infants, and indeed the guidelines were published in 2007 [3].

Literature Review

Infant nutrition (i.e. nutrition in the first year of life) is one of the important infant well being issues for mothers and health care providers. Its impact on child growth and development is crucial. Mother's source of knowledge, choices and practice of infant feeding are influenced by many factors which have been the area of several studies and this present paper.

A study was done in KSA in 2006, on 4,872 mothers about infant feeding practice [4]. The study found that age, nationality and educational level were the major factors related to infant feeding. The study also found that about four-fifths of the mothers had received health education about breastfeeding, most often from medical staff; younger mothers tended to be better informed. Approximately 92% fed colostrum to the newborn, but 76.1% had introduced bottle-feeding by 3 months (48.3% cited insufficient milk as the reason for introducing the bottle).

In 2009, another study in KSA was aimed to measure the compliance to WHO recommendation of exclusive breastfeeding in the first 6 months of life [5]. The study included 5,339 children and found 4,889 of them (91.6%) received breast milk at birth indicating a prevalence of initiation. The high prevalence of breastfeeding initiation at birth indicated the willingness of Saudi mothers to breastfeed. Bottle feeding was introduced by 1 month of age in (51.4%) and to (90%) of them by 6 months of age. The majority of infants (80.8%) were introduced to "solid foods" between 4 to 6 months of age.

In order to assess mother's knowledge about breastfeeding, another study was done in 2009 on three hospitals in Riyadh [6]. Among 848 women, (61.5%) of them fell within the age groups between 21-30 years. Most women (49.8%) have a college or higher level of education. Only (55.8%) of women had previously received prenatal breastfeeding education, and approximately (54.2%) of women received breastfeeding education when they were in the hospital for delivery.

Another similar study was done in shopping centers in Riyadh in 2013 [7]. Eighty six percent of interviewed mothers believed that the best way to start feeding the newborn is solely breastfeeding. Forty one percent attended breast feeding health education. Availability of formula milks, limited availability, duration of maternity leave and lack of awareness were factors believed to limit breast-feeding.

A systematic review done in KSA in 2014, including seventeen cross-sectional studies about breastfeeding [8]. It reported that breastfeeding initiation rates were high (mostly above 90%), but a few studies reported low rates of timely initiation (within the first hour). The partial (mixed) feeding method was common and the category of 'any breastfeeding' has generally high rates. The mean duration of breastfeeding has shown a progressive decline over time from 13.4 months in 1987 to 8.5 months in 2010. Factors associated with a high prevalence of breastfeeding and longer duration include increased maternal age, low educational levels, rural residence, low income, multiparity and avoiding contraceptives. The most common reason for breastfeeding cessation was insufficient breast milk. Other reasons include sickness, new pregnancy and breastfeeding problems.

Studies were done by Dr. ALBinAli [9],[10] in Abha city in 2010 and 2011 on breastfeeding among female health care workers in tertiary care hospitals and female school teachers.

The study on female health workers, reported that Saudi nationals were 83 (55%). Forty seven (31%) started breast-feeding within half an hour of delivery, twenty four (15.9%) breast fed up to 6 months. Work-related problems were the main reason for stopping breast-feeding in 69 of them (45.7%). The intention to breast-feed and to attend workshops addressing breast-feeding issues were (86.1%) and (97.7%) respectively.

The other study on female school teachers showed different results. A total of 384 women made up of 246 (61.1%) primary, 89 (23.2%) intermediate and 49 (12.8%) high school teachers participated in the study. One hundred and nineteen participants (31%) started breastfeeding their children within one hour of delivery, while exclusive breastfeeding for 6 months was reported only by 32 (8.3%) participants. Insufficient breast milk and work related problems were the main reasons given by 169 (44%) and 148 (38.5%) of participants, respectively, for stopping breastfeeding before two years. Only 33 participants (8.6%) had attended classes related to breastfeeding. However, 261 participants (68%) indicated the willingness to attend such classes, if available, in future pregnancies.

A recent study was done in Abha city in 2014[11] to assess the knowledge, practice and attitude of exclusive breastfeeding among mothers attending PHCCs. Of a total of 600 mothers, their ages ranged between 18 and 47 years with a mean of 31.4±5 years. Most of them were Saudi (88.2%) and university graduated (78.7%). Overall mothers' breastfeeding knowledge was good among more than half of them (55.3%) and excellent among 30.7% of them while it was unsatisfactory among 14% of the mothers. Positive attitude towards breastfeeding was reported among 62.2% of the participants while negative attitude was reported among more than one–third of them (37.8%). Breastfeeding in the first 6 months was practiced by 24.7% of the participating mothers. Of them, only 7.3% practiced exclusive breast feeding.

Methodology

Study design

Cross sectional design.

Study setting and population:

This study was conducted in Abha City, which is the capital of Aseer Region in Saudi Arabia.

The study population was mothers of infants (i.e. age of less than 1 year old) who were attending four primary health care centers in Abha (AlQabel PHCC, Shamasan PHCC , Almowadhafeen PHCC and AlManhal PHCC) during the year of 2015.

Sampling and sample size determination:
The sample size was calculated by using the
N = Z2 *(p*1-p)/d2 equation [12] :
Where: n = sample size
Z = Z statistic for a level of confidence (95% level of confidence used, therefore Z value is 1.96)
P = expected prevalence of proportion (taken from a study done before) [4]
d = precision
N = (1.96)2 * (0.76* 1-0.76) / (0.05)2
= 3.8416 * 0.1824 / 0.0025= 280

The required sample size is 280 mothers. A simple Random sampling method was used for selecting PHCCs located in center of Abha. The sample size was esti¬mated to be 280 mothers.

Data collection tool:
Infant feeding questionnaire was used. It was based on selected questions of " The National Infant Feeding Survey 2008, University of Dublin, Ireland" [13] which is available online and doesn't have required permission. The researcher translated the questionnaire to Arabic language and it was approved by the discovery for certified translation and educational services centers in Abha. A pilot study (n = 28) was conducted to test the data collection procedures and the questionnaire reading clarity level and comprehensiveness.

Statistical analysis:
Collected data were verified and coded prior to computerized data entry. The researcher utilized the IBM Statistical Package for Social Sciences (IBM® SPSS® Statistics V22.0) for data entry and analysis. Percentages, means and standard deviations were used as descriptive statistics. Chi square test was used to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories. A p-value of less than 0.05 was considered as statistically significant.

Results

Part I : Background Characteristics and Knowledge About Advantages of Breastfeeding

Table 1 (opposite page) shows that most participant mothers (75.7%) were aged 25-35 years, while most of their husbands' ages (65.4%) were 30-40 years old. About half of the mothers' families (52.5%) had 2-5 children, and the family size of most of them (61.1%) was 4-8 members. Almost half of mothers (49.3%) had a university level of education, while almost half of their husbands (48.9%) had a secondary level of education. Most participant mothers 186 (66.4%) were not working, while 94 (36.6%) were working, and almost all participant fathers 260 (92.9%) were working, with just 6 (2.1%) not working, and 14 (5.0%) retired. The majority of participant's monthly income (69.3%) ranged between 3000 and 15,000 SR, with the monthly income of 13.9% being below 3000 SR while that of 16.8% was above 15,000 SR.

Table 2: Characteristics of index infants:

Infant characteristics	No.	%
Birth Order		
First	81	28.9
Second	56	20.0
Third	38	13.6
Fourth	41	14.6
More than Fourth	64	22.9
Child Gender		
Male	150	53.6
Female	130	46.4
Child Age		
< 4 months	49	17.5
4-6 months	85	30.4
7-9 months	88	31.4
> 9 months	58	20.7

Table 2 shows that 28.6% of participants' children were first born, 20.4% were second, 13.6% were third, 14.6% were fourth while 22.9% were after the fourth. About half of children (53.6%) were males. Age of most children ranged from 1 to 18 months.

Table 1: Personal characteristics of respondents

Personal characteristics	No.	%
Mother's age		
<25 years	45	16.1
25-35 years	212	75.7
>35 years	23	8.2
Father's age		
<30 years	45	16.1
30-40 years	183	65.4
> 40 years	52	18.6
No. of children		
One child	81	28.9
2-5 children	147	52.5
> 5 children	52	18.6
Family Size		
<4	81	28.9
4-8	171	61.1
>8	28	10.0
Mother's education		
Illiterate	17	6.1
Primary	23	8.2
Intermediate	16	5.7
Secondary	86	30.7
University	138	49.3
Father's education		
Illiterate	7	2.5
Primary	17	6.1
Intermediate	14	5.0
Secondary	137	48.9
University	105	37.5
Mother's Occupation		
Working	94	36.6
Not working	186	66.4
Father's Occupation		
Working	260	92.9
Not working	6	2.1
Retired	14	5.0
Monthly income (in SR)		
<3000	39	13.9
3000-8999	110	39.3
9000-14999	84	30.0
15000+	47	16.8

Table 3: Knowledge about the benefits of breastfeeding for the mother

Stated Benefits	No.	%
It bonds the child with the mother	171	61.1
It helps in losing weight and returning my body shape to its original form	147	52.5
It decreases the chances of ovarian cancer and cervical cancer	137	48.9
It prevents pregnancy	115	41.1
It doesn't cost me anything	82	29.3
It doesn't need preparation like artificial milk	68	24.3
It prevents osteoporosis	57	20.4
It makes me feel comfortable and helps me to sleep	46	16.4
Nothing	17	6.1

*Multiple Answers

Table 3 shows that "bonding the child with the mother" was the most frequently stated benefit of breastfeeding to mothers (61.1%), followed by "it helps in postpartum return of weight and body to their original forms" (52.5%), cancer prevention (48.9%) and natural contraception (41.1%) .

Table 4: Knowledge about the benefits of breastfeeding for the baby

Stated benefits	No.	%
It strengthens the immune system and reduces infections	175	62.5
It emotionally bonds the child with the mother	149	53.2
It provides better development for the child	134	47.9
It increases the child's IQ	120	42.9
It prevents colic and is easy to be absorbed	110	39.3
It prevents obesity and diabetes	79	28.2
It prevents allergy and bronchial asthma	74	26.4
Nothing	18	6.4

*Multiple Answers

Table 4 shows that "strengthens the immune system and reduces infections" was the most frequently stated benefit of breastfeeding to babies (62.5%), followed by "it emotionally bonds the child with the mother" (53.2%) and for child development (47.9%)

Part II: Prenatal Planning for Infant Feeding

Table 5: Participants' prenatal plans for feeding their children

Prenatal plans for feeding the baby	No.	%
Breastfeeding	124	44.3
Artificial feeding	14	5.0
Mixed breast and artificial feeding	115	41.1
Did not have any plan	27	9.6

Table 5 shows that prenatally, 44.3% of participants planned to breastfeed their babies, while 5% planned for artificial feeding. Moreover, 41.1% of participants planned to give mixed feeding while 9.6 did not have any plans.

Table 6: Participants' reasons for planning to breastfeed their babies

Reasons for planning to breastfeed	No.	%
Breastfeeding is the best for the baby	183	65.4
Breastfeeding is beneficial for both the baby and the mother	98	35.0
Breastfeeding is easier and more convenient than artificial feeding	83	29.6
Because I did so with my previous child	56	20.0
Because it's a natural method and God gifted	43	15.4
Because my mother and sisters breastfeed	30	10.7
Because I want to give it a try	12	4.3

*Multiple Answers

Table 6 shows that the main reason for planning to breastfeed was breastfeeding is considered the best for the child (65.4%), followed by that breastfeeding is beneficial to both the baby and the mother (35%), and breastfeeding is easier and more convenient to the mother than artificial feeding (29.6%).

Table 7: Participants' reasons for planning to feed their babies artificially

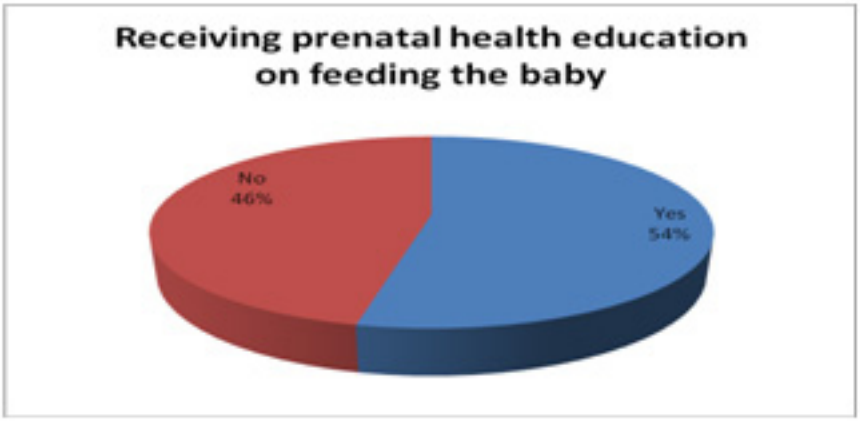
Reasons to artificially fed the baby	No.	%
Because I did so with my previous baby	59	21.1
Because I am busy with a job / no time	52	18.6
Because there are other children I am caring for	32	11.4
Due to the ease of preparation of the artificial milk	20	7.1
Due to health reasons (medications or breast disease)	17	6.1
Because I could not breastfeed before	10	3.6
Because I feel shy about breastfeeding	9	3.2
Because my mother or sisters do so	8	2.9
So I would know how much milk my child consumes	6	2.1
To let my husband participate with me in feeding our child	5	1.8
Because one of the physicians or health care providers did not advise to breastfeed	5	1.8

*Multiple Answers

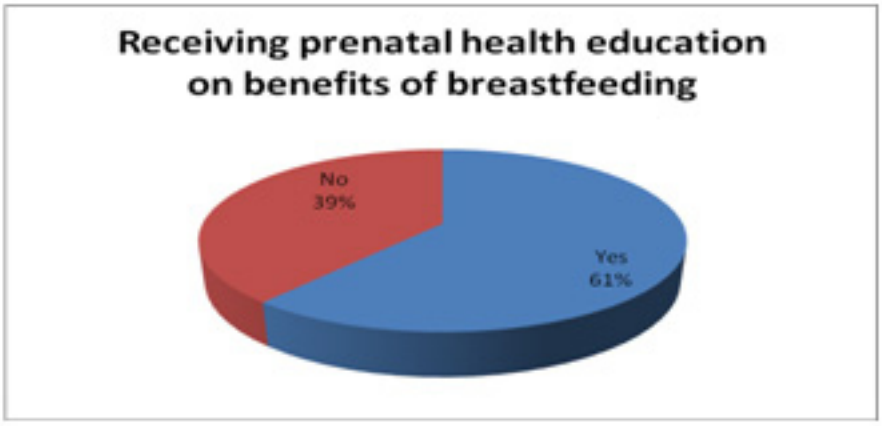
Table 7 shows that the main reasons for planning to artificially feed was she did so with her previous baby (21.1%), followed by being busy with her work (18.6%) and the presence of other children to care for (11.4%).

Tables and Pie charts (8 - next page) shows that only 53.6% of mothers received prenatal health education on feeding the baby. The main person who provided health education was gynecologists (33.9%) followed by others outside medical field (13.6%). Moreover, only 61.1% of mothers received prenatal health education on benefits of breastfeeding. The main source for health education was the gynecologist (31.8%) followed by others outside medical field (17.9) and by the nurse (14.3%).

Table 8: Prenatal health education regarding the method of feeding the baby.



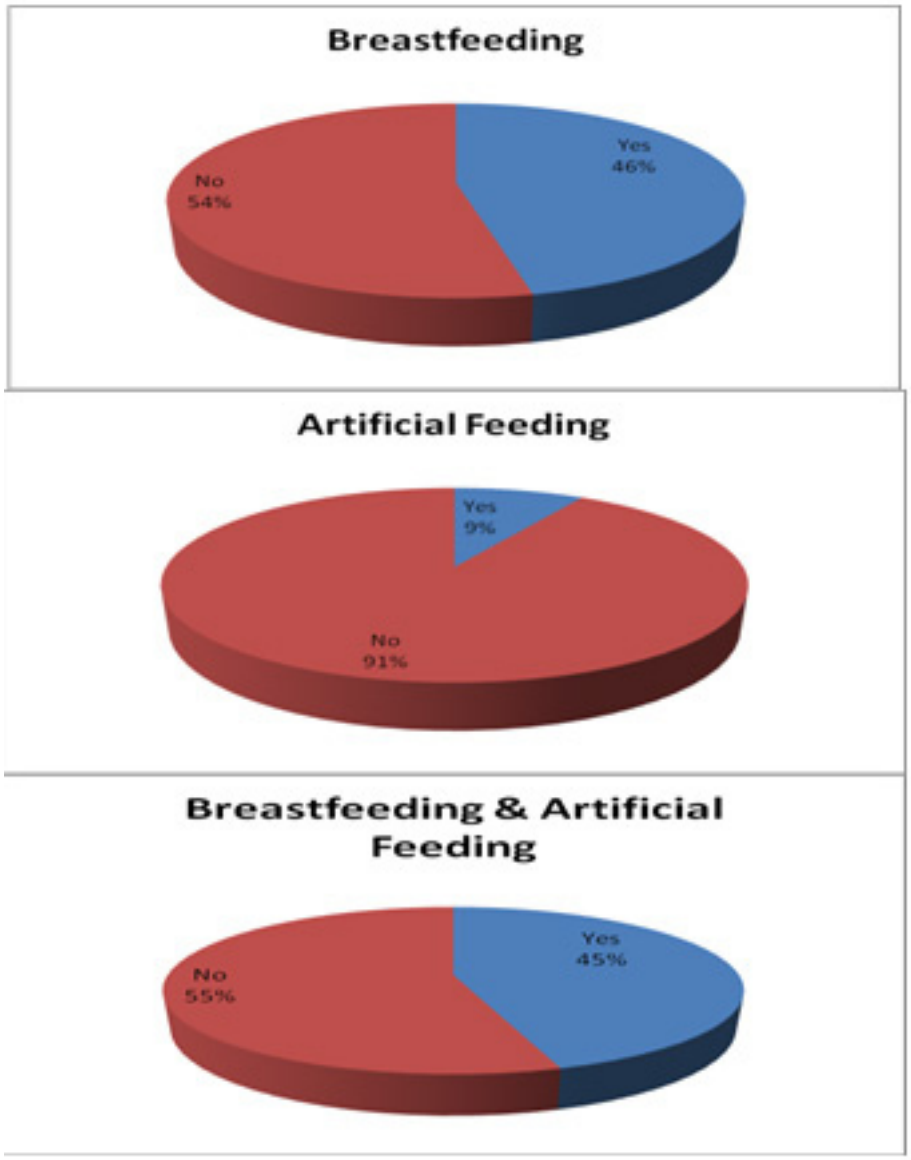
Prenatal health education on feeding the baby	No.	%
- Person who provided health education on feeding the baby:		
Gynecologist	95	33.9
Nurse	23	8.2
Midwife	10	3.6
General practitioner	7	2.5
Other person	38	13.6



Source of health education on benefits of breastfeeding:	No.	%
Gynecologist	89	31.8
Nurse	40	14.3
Magazines and booklets	26	9.3
Midwife	19	6.8
Television and radio	14	5.0
General practitioner	3	1.1
Other sources	50	17.9

Part III: Practice of infant feeding for studied infant

Figure 9 Pie charts : The first type of feeding given to the baby after birth



Pie charts (9) show that the first type of feeding given to participants' babies at birth was mainly breastfeeding alone (46.4%) or both breastfeeding and artificial feeding (45%).

Table 10: Reasons for breastfeeding discontinuation for infant

Reasons	No.	%
Because breast milk was inadequate and the child was often hungry	61	21.8
Being busy with household work or other children	58	20.7
Having to return to work	51	18.2
Breast-related problems	31	11.1
Being uncomfortable with breastfeeding in public	19	6.8
Desire to let others to participate in feeding the child	16	5.7

*Multiple Answers

Table 10 shows most frequent reasons for breastfeeding discontinuation were "Because breast milk was inadequate amount for the child" (21.8%), followed by "Being busy with household work or other children" (20.7%) and "having to return to work" (18.2%).

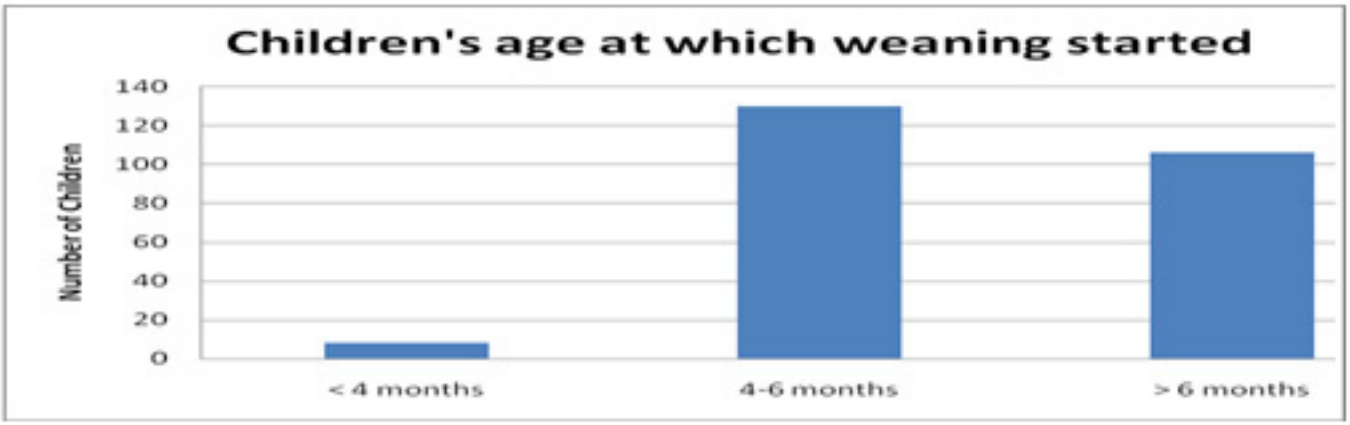
Table 11: Participants' reasons for adding artificial feeding to the infants

Reasons	No.	%
To provide the child with more nutrition	78	27.9
For extra sources of milk / child is often hungry	61	21.8
Due to the complexity of commitments to breastfeeding	50	17.9
Because I had house work or another child to look after	42	15.0
Because the child's feeding is complete when breastfed	27	9.6
To allow the child to be accepting to the change of type of feeding	24	8.6
Because of the night feeding	19	6.8
To take some rest from breastfeeding	15	5.4

*Multiple Answers

Table 11 shows most frequent reasons for participants' for adding artificial feeding to their babies were "to provide the child with more nutrition " (27.9%), followed by "for extra sources of milk / child is often hungry" (21.8%) and (17.9%) found difficulties in commitment to breastfeeding.

Figure 12 Bar Chart : Children's age at which participants started weaning practices



Bar chart (12) shows that about half of mothers (46.4%) started weaning their children early at 4-6 months, while (4-6%) of mothers started weaning in early infant's age and (37.9%) of mothers delayed weaning after the age of 6 months.

Table 13: Weaning practice at 6 months

Weaning practice	No.	%
Mixed breast and artificial milk with other liquids and mashed food	155	55.4
Artificial milk with other liquids and mashed food	53	18.9
Breast milk only without any food or liquids like water or juice	25	8.9
Artificial milk only without any food or liquids like water or juice	11	3.9

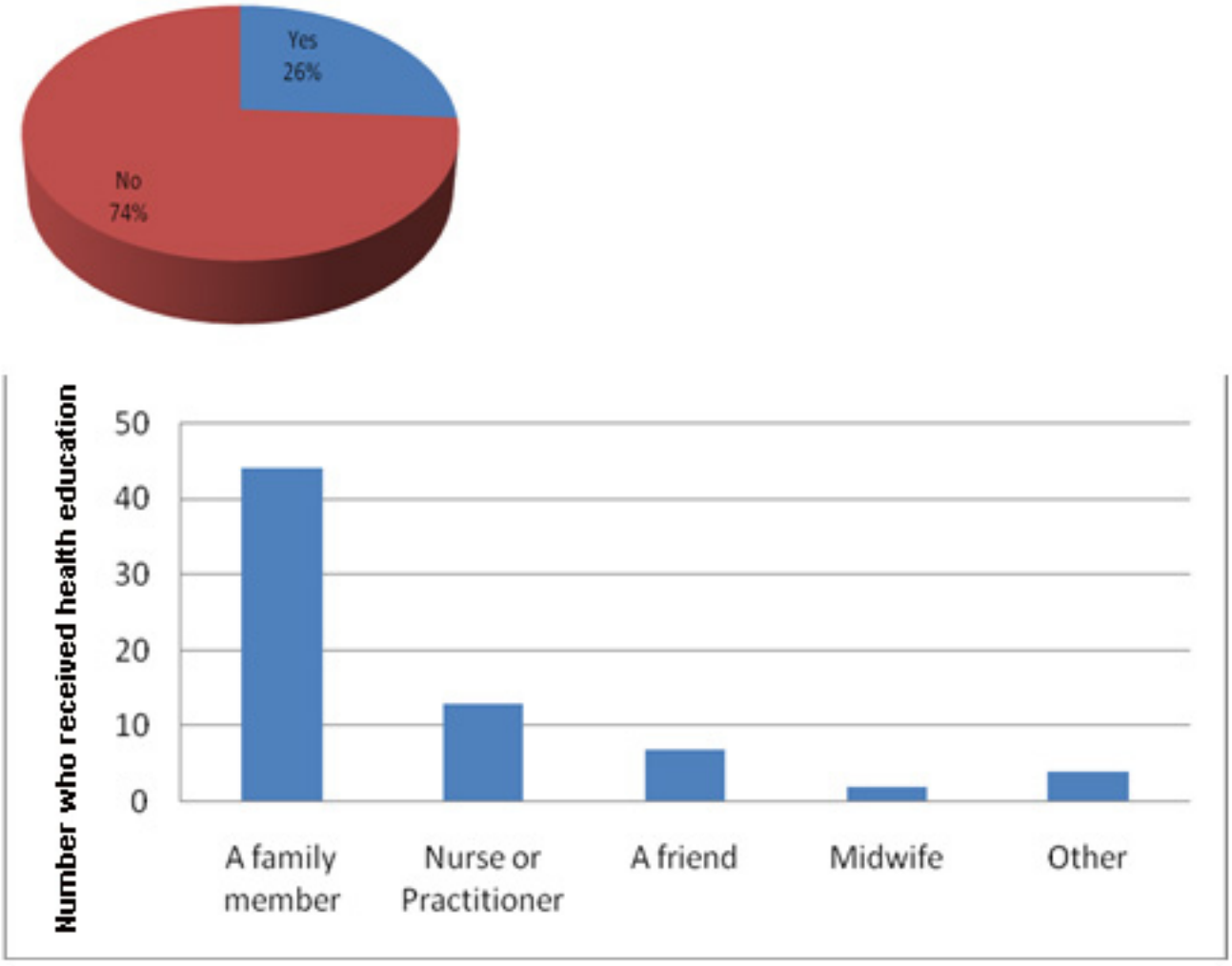
Table 13 shows that at the age of 6 months, most mothers (55.4%) gave their children mixed breast and artificial milk with other liquids and mashed food while (18.9%) gave their children artificial milk with other liquids and mashed food.

Table 14: Participants' practices regarding artificial feeding of their children

Practices	No.	%
Prepare one feeding in each session	187	66.8
Prepare several feedings to be stored in the refrigerator	40	14.3
Use ready made milk for feeding	13	4.6
Used water for the artificial milk:		
Boiled water directly	65	23.2
Boiled water after being left for about 30 minutes to cool	112	40.0
Boiled water after being left for more than 30 minutes to cool	41	14.6
Bottled water	12	4.3
Direct tap water	1	0.4
Other method	7	2.5
Frequency of using artificial milk feeding for children who are on breastfeeding:		
Most of the feedings	122	43.6
Half of the feeding	53	18.9
Once or twice	51	18.2
A few times during one week or several weeks	10	3.6

Table 14 shows that most participant mothers (66.8%) prepare one artificial feeding in each session, (14.3%) of mothers prepare several feedings to be stored in the refrigerator. (40%) mothers used boiled water after being left for about 30 minutes to cool down and (23.2%) used boiled water directly (23.2%). Most of the feedings were artificial milk feeding among children who are on breastfeeding (43.6%).

Figure 15: Pie and Bar Charts : Receiving health education on artificial milk preparation



Pie and Bar charts (15) show that only 26.1% of participant mothers received health education on artificial milk feeding. Family members were the main sources for health education on weaning (15.7%), followed by nurses or practitioners (4.6%).

Table 16: Previous Practice of Infant Feeding

Feeding practices	No.	%
Feeding of previous children		
Breast and artificial feeding	135	48.2
Breastfeeding only	51	18.2
Artificial feeding only	17	6.1
No previous children	77	27.5

Table 16 shows that feeding of previous children of almost half of mothers (48.2%) was mixed breast and artificial milk feeding. Only 18.2% of mothers provided breastfeeding only to their children.

Part IV: Factors affecting practice of infant feeding for infant

Table 17 (opposite page) shows statistically significant differences regarding infants' feeding patterns at birth according to mothers' age ($p=0.002$) with younger mothers (<25 years) offering breastfeeding to their infants significantly more than others (71.1%).

In addition, the proportion of mothers with only one child who breastfed their infants (51.9%) was significantly higher than those who had more than one child ($p<0.001$). Similarly, the proportion of mothers within a smaller family size (<4) who breastfed their infants (50.6%) was significantly higher than those of mothers with bigger family size ($p<0.001$).

Type of infant' feeding was significantly different according to mothers' educational level ($p=0.012$), with those who had university level of education having the highest proportion of breastfeeding their infants (61.9%).

Moreover, type of infant' feeding was significantly different according to fathers' educational level ($p=0.014$), with those who had primary level of education having the highest proportion of breastfeeding their infants (60.9%).
In addition, type of infant' feeding was significantly different according to fathers' occupational status ($p=0.008$), with those who had retired and working occupational status having the highest proportion of breastfeeding their infants (50.0% & 46.5%).

Type of infant' feeding was significantly different according to family's monthly income ($p<0.001$), with those who had <3000 SR monthly income having the highest proportion of breastfeeding their infants (61.5%).

Type of infant' feeding did not differ significantly according to fathers' age nor with mothers' occupational status.

Table 17 : Background Characteristics Factors

Personal Characteristics	Breastfeeding		Artificial Feeding		Both		P value
	No.	%	No.	%	No.	%	
Mother's age							
<25 years	32	71.1	3	6.7	10	22.2	0.002
25-35 years	84	39.6	20	9.4	108	50.9	
>35 years	14	60.9	1	4.3	8	34.8	
Father's age							
<30 years	26	57.8	4	8.9	15	33.3	0.258
30-40 years	78	42.6	18	9.8	87	47.5	
> 40 years	26	50.0	2	3.8	24	46.2	
No. of children							
One child	42	51.9	15	18.5	24	29.6	< 0.001
2-5 children	72	49.0	8	5.4	67	45.6	
> 5 children	16	30.8	1	1.9	35	67.3	
Family Size							
<4	41	50.6	16	19.8	24	29.6	< 0.001
4-8	78	45.6	8	4.7	85	49.7	
>8	11	39.3	0	0.0	17	60.7	
Mother's education							
Illiterate	7	41.2	0	0.0	10	58.8	0.012
Primary	14	60.9	4	17.4	5	21.7	
Intermediate	8	50.0	1	6.3	7	43.8	
Secondary	29	33.7	5	5.8	52	60.5	
University	72	52.2	14	10.1	52	37.7	
Father's education							
Illiterate	3	42.9	0	0.0	4	57.1	0.014
Primary	8	47.1	2	11.8	7	41.2	
Intermediate	6	42.9	2	14.3	6	42.9	
Secondary	48	35.0	13	9.5	76	55.5	
Mother's Occupation							
Working	47	50.0	8	8.5	39	41.5	0.6
Not working	83	44.6	16	8.6	87	46.8	
Father's Occupation							
Working	121	46.5	20	7.7	119	45.8	0.008
Not working	2	33.3	3	50.0	1	16.7	
Retired	7	50.0	1	7.1	6	42.9	
University	65	61.9	7	6.7	33	31.4	
Monthly income (in SR)							
<3000	24	61.5	6	15.4	9	23.1	< 0.001
3000-8999	44	40.0	2	1.8	64	58.2	
9000-14999	38	45.2	13	15.5	33	39.3	
15000+	24	51.1	3	6.4	20	42.6	

Table 18: Infant' feeding practice factors

Infant Feeding Practice Factors	Breastfeeding		Artificial Feeding		Both		P value
	No.	%	No.	%	No.	%	
Prenatal Plan							
Breastfeeding	95	76.6	7	5.6	22	17.7	< 0.001
Artificial Feeding	4	28.6	4	28.6	6	42.9	
Both	27	23.5	10	8.7	78	67.8	
No Plan	4	14.8	3	11.1	20	74.1	
Prenatal Health Education							
Yes	93	54.4	16	9.4	62	36.6	< 0.001
No	35	33.3	6	5.7	64	61.0	
Practice of Previous Child							
This is the first child	42	54.5	12	15.6	23	29.9	< 0.001
Breastfeeding	36	70.6	3	5.9	12	23.5	
Artificial Feeding	6	35.3	5	29.4	6	35.3	
Both	46	34.1	4	3.0	85	63.0	
Health Education on Preparation of Artificial Milk							
Yes	33	45.2	6	8.2	34	46.6	0.85
No	75	41.4	17	9.4	89	49.2	

Table (18) shows statistically significant differences regarding infant' feeding patterns at birth according to the prenatal plan ($p<0.001$) with mothers who prenatally planned to breastfeed their child offering breastfeeding to their infants significantly more than others (76.6%).

In addition, prenatal health education was significantly different ($p<0.001$) with mothers who underwent prenatal health education having the highest proportion of breastfeeding their infants than those who had not (54.4%).

Moreover, practice with previous child was significantly different ($p<0.001$) with mothers who practiced breastfeeding with their previous child having the highest proportion of breastfeeding their infants than those who practiced artificial or both (70.6%).

Type of infant' feeding did not differ significantly according to health education on preparation of artificial milk.

Discussion

The global report of the World Health Organization on infant feeding shows only about 36% of infants aged 0 to 6 months worldwide were exclusively breastfed over the period of 2007-2014 [14].

The present research was looking for the background characteristics of the families of infants, prenatal plan, prenatal education, previous and current feeding practice of mothers of infants to find out its relation to infant feeding knowledge and practice.

Among 280 mothers; (75.7%) of them were aged 25-35 years, (49.3%) of them had a university level of education and (66.4%)of them were not working. The results showed the reversed relationship of low level of education of mothers, large family size and low income to infant breastfeeding. It was surprising in this study to find that the mother's age had a reverse relation to breastfeeding as younger mothers (<25 years) were offering breastfeeding to their infants significantly more than others (71.1%). Moreover, type of infants' feeding whether it was breastfeeding or artificial milk feeding did not differ significantly according to mothers' occupational status.

Similar results are found in a published review of seventeen cross-sectional studies about breastfeeding in KSA in 2014 [8] that showed the factors associated with a high prevalence of breastfeeding and longer duration include increased maternal age, low educational levels, rural residence, low income, and multiparity [10].

Background knowledge of the participants' mothers about benefits of breastfeeding to mothers showed that (61.1%) of mothers knew it bonds the child to the mother, (52.5%) knew it helps in losing weight, (48.9%) knew it prevents cancer and (41.1%) knew it is a natural contraceptive. About breastfeeding benefits for the babies, (62.5%) believe it strengthens the immune system, (53.2%) knew it bonds the child to mother and (47.9%) knew itis the best for the child.

Similar findings were observed in a study done by Ayed A in Abha PHCCs [11] that stated the overall mothers' breastfeeding knowledge was good among more than half of them (55.3%) and excellent among (30.7%) of them while it was unsatisfactory among (14%) of the mothers. Positive attitude towards breastfeeding was reported among (62.2%) of the participants while negative attitude was reported among more than one–third of them (37.8%).

Results of the present study showed that only (46.4%) of infants received breastfeeding alone at birth while (45%) of them received artificial milk feeding alone at birth.

Both the mothers who discontinued the breastfeeding of their infants and those who added the artificial milk to the breastfeeding mostly reasoned that by the breast milk was inadequate for child's need.

Similar results are found in the study done by Dr. Ali Mohamed Al-Binali in Abha [9] which revealed that (31%) of mothers started breastfeeding their children within one hour of delivery, while exclusive breastfeeding for 6 months was reported only by 32 (8.3%) participants. Insufficient breast milk and work related problems were the main reasons given by 169 (44%) and 148 (38.5%) of participants, respectively, for stopping breastfeeding before two years.

Another systematic review in KSA [8] showed a low percentage of exclusive breastfeeding practice of the mothers. This study also reported that the partial (mixed) feeding method was common. The mean duration of breastfeeding has showed a progressive decline over time from 13.4 months in 1987 to 8.5 months in 2010.

In the present study, prenatal planning of infant feeding showed that the percentage of mothers who planned to breastfed was (44.3%) , while (41.1%) of them planned to give both artificial milk and breastfeeding. The results showed that mothers who prenatally planned to breastfeed their child offered breastfeeding to their infants significantly more than others (76.6%). The main reason to plan to breastfeed was the mother's believe that breastfeeding is the best for the child, while the most reasons to feed them artificial milk were that they did the same with previous child, being busy at work and presence of other children to care for.

The data about receiving prenatal health education of infant feeding was disappointing. Only (53.6%) of the mothers received health education on infant feeding. Education about breastfeeding benefits in particular was given to only (61.1%) of mothers.

Similar results were reported by the Alwelaie YA study [6]. Only (55.8%) of women had received prenatal breastfeeding education, and approximately (54.2%) of women received breastfeeding education when they were in the hospital for delivery.

Another study done by Al-Faleh [7] reported that (41%) of the mothers attended breast feeding health education.

The present study showed that practice of infant feeding in previous child had a significant influence on breastfeeding practice to the index infant. Mothers who practiced breastfeeding with their previous child had the highest proportion of breastfeeding their infants than those who practiced artificial or both (70.6%).

In this study, the percentage of mothers who are adherent to the optimal practice of weaning time at 4-6 months was (46.4%) which is less in comparison with the study done by El Mouzan MI [5]. He reported that (80.8%) were introduced to "solid foods" between 4 to 6 months of age. This difference in practice of weaning among the participants of this study may be due to lack of knowledge regarding correct time of starting weaning.

Only a quarter of the mothers received health education on artificial milk preparation and mainly through the family members. This data can't be compared with any study as none of the studies reported on this issue. This area needs to be addressed more among the pregnant women.

Conclusion

Based on the findings of this study, it is concluded that breastfeeding was more prevalent among the mothers who had a prenatal plan to breastfeed their infants and those who received health education on breastfeeding. Moreover, breastfeeding was significantly higher among the younger mothers and also it was related to higher parent's educational levels, low economic status and lower family size.

Link to Appendix: Infant Feeding Questionnaire

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Prevalence, risk factors and clinical aspects of Diabetes Mellitus among Saudis in the Western Region. Saudi Arabia: A community based study

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Abstract

Background: The prevalence of diabetes mellitus (DM). in Saudi Arabia. is growing at a fast rate. About 25% of the 30 – 70 years old subjects suffer from DM; this figure is further predicted to double by the year 2030.

Aim of this study: To investigate the occurrence of DM among different age groups. and explore the determinants. risk factors and clinical aspects of DM among Saudis in Jeddah city.

Method: A cross-sectional study. which included 1.106 subjects. randomly. visiting the walk area in North of Jeddah. or one Mall in East of Jeddah city. during the study period. An interview questionnaire was used to collect data on socio-demographic and clinical characteristics of the participants. Anthropometric measurements as well as blood pressure and capillary Random Blood Glucose (RBG) test. were assessed on each subject. Chi square test and Multinomial Logistic Regression were used to analyze the data. Odds Ratio (OR). and 95% confidence interval (95% CI) were employed. The level of significance was 0.05.

Results: DM was prevalent among 35% of Saudi subjects. aged 60 years or older. DM was discovered accidently in 46.1% of the diabetic subjects. Hyperglycemia was found in 11.8% of subjects with no doctor having diagnosed DM. Subjects who were 40 years or more. were 7 times more at risk to develop DM (OR: 6.98; 95% CI: 4.18. 11.66). those who lived in separate houses. were 2 times more likely to develop DM (OR: 2.207; 95% CI: 1.195. 4.082). and subjects who have family history of DM. were 2.4 times more likely to develop DM (OR: 2.430; 95% CI: 1.447. 4.082). Subjects who have DM. were 2.4 times more likely to develop vision problems (OR: 2.430; 95% CI: 1.447. 4.082). were 3 times more at risk to suffer from hypertension (OR: 3.085; 95% CI: 1.524. 6.243). and 10 times more at risk to develop foot ulcer (OR: 10.080; 95% CI: 1.490. 68.206). These complications were significantly associated with increased duration of DM.

Conclusion: DM is a major health problem among Saudis in Jeddah city. Our results demonstrate the need for major intervention to reduce this burden and to engage other sectors of the government and the community in these efforts.

Key words: DM. Saudi Arabia. complications. Risk factors.

Introduction

Diabetes mellitus (DM) is a noninfectious chronic disease caused by the inability of the pancreas to effectively produce enough insulin or when the body in unable to properly use the insulin produced by it [1-2]. Globally. an estimated 463 million adults are living with diabetes. according to the 2019 data from the International Diabetes Federation [3]. Diabetes prevalence is increasing rapidly; previous 2017 estimates put the number at 425 million people living with diabetes [4]. The number is projected to almost double by 2030 [3]. The increase in incidence in developing countries follows the trend of urbanization and lifestyle changes. including increasingly sedentary lifestyles. less physically demanding work and the global nutrition transition. marked by increased intake of foods that are high energy-dense but nutrient-poor (often high in sugar and saturated fats) [5. 6]. Due to its chronic nature. the severity of the complications and the control methodologies required. diabetes is an expensive disease. affecting both the sufferer as well as his/her family and the health authorities as well [7-9]. The Kingdom of Saudi Arabia began to notice an insidious increase in the prevalence and incidence of DM soon after the rapid industrialization which resulted in a remarkable rise in the standard of living and adopting a more 'Westernized' lifestyle. The unhealthy dietary patterns and drop in the level of physical activity across the country saw the alarming rise in the level of diabetes to over 25% of the adult population. The rate is anticipated to more than double by 2030 [10. 11-13]. According to the World Health Organization (WHO). Saudi Arabia ranks second in the prevalence of diabetes in the Middle East region and seventh in the world [14]. More disturbing perhaps. is the rising tendency for diabetes in the recent years with a nearly ten-fold increase over the past thirty years in Saudi Arabia [15]. Moreover. studies conducted since the late 1980s have revealed a growing trend among adult Saudis. in which one of five adults had DM [16-22]. The aim of this study was to investigate the occurrence of DM among different age groups. and explore the determinants. risk factors and clinical aspects of DM among Saudis in Jeddah city.

Subjects and Methods

This was a cross-sectional study. using the non-probability convenient sampling technique. where subjects. randomly. visiting the walk area in North of Jeddah city or one Mall in the East of Jeddah city. during the study period. were enrolled in the present study. The targeted participants were Saudis. aged 7 through to 85 years old. The total number was 1.106 subjects. This number was greater than the minimal required sample size for such a study. which was calculated to be 1.091 (based on effect size of 0.1. $\alpha = 0.05$. power = 80%. df = 3) [23].

Data were collected on each subject. after we obtained written consent to participate in the study. Each subject was asked the interview questionnaire which provided information on personal and socio-demographic characteristics. as well as clinical aspects. Anthropometric measurements. mainly weight and height of the subject. were measured using standard techniques and equipment. The body mass index (BMI) was calculated for each subject (the body mass in kg. divided by the square of the height in meters. with the value universally being given in units of kg/m2) [24]. Blood pressure measurement was conducted on the right arm. using mercury sphygmomanometer in sitting position. after 5 minutes rest. and mean of two measurements were recorded. Both systolic and diastolic blood pressures were measured. For each person a random capillary blood sample was taken for blood sugar measurement (mg/dL). It was done without regards to time since the last meal for the entire sample. Glucose level below 140 mg/dL (7.8mmol/L) was considered normal. whereas higher glucose level indicates hyperglycemia.

Statistical analysis: The SPSS software (version 23. PC/ IBM). was employed and Chi square test and Multinomial Logistic regression were used to analyze the data. Odds Ratio (OR). and 95% confidence interval (95% CI) were employed. The level of significance was 0.05

Results

Table 1 shows the distribution of studied subjects according to presence of DM and sociodemographic variables. The present study comprised 1.106 subjects. where the majority were in the age range 21 to 60 years old (82%). Doctor diagnosed diabetes mellitus (DM). was encountered among 9.5% of the studied subjects with highest prevalence among age group 40 to less than 60 years old . and those 60 years old and over (20.6% and 35.3% respectively). On the other hand. prevalence of DM was lowest among those aged less than 21 years old (0.9%) and those aged 21 to less than 40 years old (4.1%). These differences were statistically significant. where $p < 0.000$. No significant difference was found between diabetic and non-diabetic subjects regarding educational and occupational levels ($p > 0.05$). Compared to subjects with no DM. diabetic subjects were more encountered among those who had extended families ($p < 0.03$). and among those who lived in separate houses ($p < 0.006$).

Table 2 displays distribution of studied subjects according to presence or absence of DM and clinical aspects. Greater proportions of subjects with DM had grade 1. 2 and 3 obesity (21%. 13.2% and 8.6% respectively). compared to subjects without DM (19.4%. 6.5%.and 4.7% respectively). These differences were statistically significant where $p < 0.016$. A greater proportion of subjects with DM had elevated systolic blood pressure or stage 1 hypertension (36.4%. and 25.7% respectively). compared to subjects without DM (26% and 11.6% respectively). These differences were statistically significant where $p < 0.000$. A greater proportion of subjects with DM had family history of DM (59.8%) compared to those without DM (42/7%). This difference was statistically significant where $p < 0.001$. Random blood sugar level was significantly higher among subjects with DM. compared with those without DM (64.7% and 11.8% respectively) where $p < 0.000$. About 9.0% of the subjects without DM were pre-diabetics. while 3.0% were diabetics and they did not know.

Table 3 shows duration of having DM and mode of control of diabetes among patients with DM. In a great proportion of the subjects. DM was discovered accidently (46%). particularly among those who had the disease for a duration longer than 10 years. The majority of the patients with DM received oral hypoglycemic drugs to control their DM (68%). Insulin was used by 17.6% of the patients; while following healthy diet was only adopted by 17.6% of the patients. No significant difference was found between those who had DM for a short. or long duration ($p > 0.05$).

Table 4 displays prevalence of complications among subjects with DM. Neuropathy is the most prevalent complication among subjects with DM. followed by retinopathy and nephropathy (33.3%. 21.6%. and 16.7% respectively). Although. these complications were more prevalent among those who had the disease for 10 years or more. these differences were not statistically significant ($p > 0.05$).

Table 5 displays the treatment history of the patients with DM. and duration of having DM. History of treatment for hypertension was the most common (23.5%). followed by treatment for vision problems and atherosclerosis (15.7% and 8.8% respectively). History for treatment of these diseases were significantly higher among those who had the disease for more than 10 years compared to those who had it for a shorter periods ($p <0.05$). History of treatment for angina and foot ulcer was only encountered among subjects who had DM for long duration ($p <0.05$).

Table 6 shows the relationships between DM and some demographic and clinical aspects. Subjects aged 40 years or older are 7 times more likely to develop DM (OR: 6.98; 95%CI: 4.18. 11.66. $p < 0.000$) compared to those under the age of 40 years. Subjects who live in separate houses. are 2 times more likely to develop DM (OR: 2.207; 95%CI: 1.195. 4.082. $p < 0.011$) compared to those who live in shared houses. Subjects who have family history of DM. are 2.4 times more likely to develop DM (OR: 2.430; 95%CI: 1.447. 4.082. $p < 0.001$) compared to those who have not. Subjects who have DM. are 2.4 times more likely to develop vision problems (OR: 2.430; 95%CI: 1.447. 4.082. $p < 0.001$) compared to those who have not. Subjects who have DM. are 3 times more likely to suffer from hypertension (OR: 3.085; 95%CI: 1.524. 6.243. $p < 0.002$) compared to those who have not. Subjects who have DM. are 10 times more likely to develop foot ulcer (OR: 10.080; 95% CI: 1.490. 68.206. $p < 0.018$) compared to those who have not.

Discussion

According to the World Health Organization (WHO). Saudi Arabia ranks second in the prevalence of diabetes in the Middle East region and seventh in the world [14]. In the present study we aimed at exploring the burden of DM among Saudis from Jeddah city. and investigated the hyperglycemic state among subjects who were not diagnosed as diabetic before and investigate the risk factors associated with DM. A previous study in Saudi Arabia reported that the prevalence of diabetes had risen to 34.1% in males and 27.6% in females. It was reported that the mean age for diabetes onset in males and females was 57.5 and 53.4 years. respectively [20]. Another study reported that the overall prevalence of DM in Saudi Arabia. and especially in the central region (Riyadh). was 23.7% (age group 30-70 years). while another 14.1% had impaired fasting glucose [21]. A more recent study in Saudi Arabia reported that more than 50% of the population. 30 years or older. were either diabetic (25.4%) or pre-diabetic (25.5%) [22]. In Jeddah city we found. also. that occurrence of DM was 0.7% among subjects younger than 21 years old. 4.1% among those aged 21 to 40 years old. and then the figure increased markedly to 20.6% among those aged 40 years to 60 years. with the highest burden among those aged over 60 years old (35.3%). The median age of onset was 38 years old. Evidence-based interventions are available to prevent or delay the onset of diabetes in people with pre-diabetes [25. 26]. and to reduce rates of complications among those with type 2 diabetes [27]. As with many diseases. screening and early detection of diabetes and prediabetes is the first step to initiating prevention and treatment interventions. and has received considerable interest [28].

The present study revealed that. in the subjects with no doctor diagnosed DM (age range: 7 – 85 years old). 12 % had abnormally high Random Blood glucose level (the occurrence of pre-diabetes was 8.9%. and of diabetes was 3.0%). This finding is similar to a previous study [29].

In the present study we found a significant relation between age and occurrence of DM. where subjects older than 40 years old were 7 times at risk of developing DM compared to the younger ones (95% CI 4.180-11.657; $p <0.000$). We found also that subjects who lived in separate houses were 2.2 times more likely to develop DM compared with those who lived in shared houses (95% CI 1.195-4.075;$p <0.01$). However. other socio-demographic characteristics were not significantly associated with DM such as education. occupation. marital status. and family characteristics. These findings are consistent with findings from a previous study [29].

Several large prospective studies have raised the possibility that cigarette smoking increases the risk of type 2 diabetes [30]. In a meta-analysis of 25 prospective cohort studies. current smokers had an increased risk of developing type 2 diabetes compared with non-smokers [31]. In the present study we found that subjects with DM were significantly more encountered among the ex-smokers compared to the non-smokers ($p < 0.046$). Risk factors for type 2 diabetes are well established and include underlying genetic susceptibility. Because family history reflects genetic susceptibility in addition to other factors. it may be a useful public health tool for disease prevention [32]. The present study showed that subjects with family history of DM. were 2.4 times more at risk to develop DM compared to those without family history (95% CI: 1.447-4.082; $p< 0.001$). Overall. a family history approach appears

Table 1. Distribution of studied subjects according to presence of DM and sociodemographic variables

Variables		Diabetes Mellitus						Chi square	p-Value
		No		Yes		Total			
		#	%	#	%	#	%		
Age in years	< 21	151	14..8%	1	0.9%	152	13.5%	118.32	0.000
	21 -	592	58.1%	25	32.4%	617	54.8%		
	40 -	243	23.8%	63	58.9%	306	27.2%		
	60+	33	3.2%	18	16.8%	51	27.2%		
Level of education	Illiterate	32	3.1%	4	3.7%	36	3.2%	9.647	0.086
	Read and write	42	4.1%	11	10.3%	53	4.7%		
	Essential	78	7.7%	10	9.3%	88	7.8%		
	Average	376	36.9%	32	29.9%	408	36.2%		
	University	448	44.0%	46	43.0%	494	43.9%		
	Higher	43	4.2%	4	3.7%	47	4.2%		
Level of occupation	High clerical	157	15.4%	23	21.5%	180	16.0%	3.876	0.423
	Average clerical	242	23.7%	23	21.5%	265	23.5%		
	Skilled	189	18.5%	19	17.8%	208	18.5%		
	Manual	91	8.9%	12	11.2%	103	9.1%		
	Unemployed	340	33.4%	30	28.0%	370	32.9%		
Type of family	nucleus	847	83.1%	80	74.8%	927	82.3%	4.645	0.031
	extended	172	16.9%	27	25.2%	199	17.7%		
Nature of house	rented	514	50.4%	54	50.5%	568	50.4%	.000	0.996
	owned	505	49.6%	53	49.5%	558	49.6%		
Type of house	Separate	719	70.6%	89	83.2%	808	71.8%	7.608	0.006
	Shared	300	29.4%	18	16.8%	318	28.2%		
	Smoker	408	92.3%	34	7.7%	442	100%	6.177	0.046
	Ex-smoker	73	83.9%	14	16.1%	87	100%		
	Non-smoker	508	91.1%	59	9.9%	597%	100%		

to be a promising new screening tool to fight the growing epidemic of diabetes. As part of the metabolic syndrome. hypertension and diabetes are closely associated with obesity and frequently occur together in an individual [33]. Despite this close relationship between hypertension and type 2 diabetes. little information exists on the relationship of BP levels with the subsequent development of type 2 diabetes. Finding an independent association between BP or BP progression and new-onset diabetes may be important. as it could imply close surveillance of blood glucose levels in individuals with increasing BP levels. Few studies analyzed the precise relationship between BP and incidence of type 2 diabetes. Gress et al [34] found that individuals with hypertension had a relative risk of 2.34 (95% confidence interval 2.16–2.73) of developing type 2 diabetes compared with individuals without hypertension. In the present study. we found that subjects with hypertension were 3.085 times more likely to have DM (95% CI:1.524-6.243; p< 0.002) compared to those with normal blood pressure.

Results from metabolic and epidemiologic studies provide strong evidence that obesity is causally related to type 2 diabetes. Many studies have reported associations between body mass index (BMI) and type 2 diabetes in men and women [35]. The present study confirmed. also. the relationship between obesity and DM. where subjects with gross obesity were 3.3 times more likely to suffer from DM compared to subjects with normal BMI (95% CI 1.337-7.991; p < 0.009). Type 2 DM is one of the most common metabolic disorders majorly affecting the adult population. It accounts for 90–95% of all diabetes cases [36-38]. Long-term elevations in blood glucose levels contribute to many complications in various organs. including the kidneys. skin. nerves. heart. and blood vessels [39]. This rise in blood glucose. particularly after diagnosis. is mainly due to a lack of compliance with the management plan that involves lifestyle modification and pharmaceutical interventions [40]. In the present study we found that only 35.2% of the subjects have RBS less than 140mg/dl. while 63% had increased RBS (25.7% had RBS 140 – 199 mg/dL. and 39% had RBS ≥ 200 mg/dL). One of the main impairments occurring from hyperglycemia is damage to the vasculature. It occurs either at small (microvascular complications) or large blood vessels (macro-vascular complications). Diabetic retinopathy is the most common microvascular complication. followed by diabetic nephropathy and neuropathy. All macro-vascular complications arise from

Table 2. Distribution of studied subjects according to presence of DM and clinical aspects

Variables		Diabetes Mellitus						Chi square	p-Value
		No		Yes		Total			
		#	%	#	%	#	%		
Grades of obesity	Body weight deficient	30	3.0%	2	1.9%	32	2.9%	14.017	0.016
	Normal	239	23.7%	14	13.3%	253	22.7%		
	Overweight	432	42.8%	44	41.9%	476	42.7%		
	Obesity grade 1	196	19.4%	22	21.0%	218	19.6%		
	Obesity grade 2	66	6.5%	14	13.3%	80	7.2%		
	Obesity grade 3	47	4.7%	9	8.6%	56	5.0%		
Grades of systolic hypertension	Normal	602	59.1%	37	34.6%	639	56.8%	28.275	0.000
	Pre-Hypertensive	265	26.0%	39	36.4%	304	27.0%		
	Hypertension stage 1	118	11.6%	27	25.2%	145	12.9%		
	Hypertension stage 2	23	2.3%	3	2.8%	26	2.3%		
	Hypertensive crisis	10	1.0%	1	0.9%	11	1.0%		
Grades of diastolic hypertension	Normal	385	37.8%	28	26.2%	413	36.7%	7.221	0.125
	Pre-Hypertensive	394	38.7%	46	43.0%	440	39.1%		
	Hypertension stage 1	193	19.0%	28	26.2%	221	19.6%		
	Hypertension stage 2	41	4.0%	5	4.7%	46	4.1%		
	Hypertensive crisis	5	0.5%	0	0.0%	5	0.4%		
Family history of DM	Yes	435	42.7%	64	59.8%	499	44.3%	11.507	0.001
	No	584	57.3%	43	40.2%	627	55.7%		
Family history of hypertension	Yes	398	39.1%	51	47.7%	449	39.9%	2.991	0.084
	No	621	60.9%	56	52.3%	677	60.1%		
Family history of heart disease	Yes	161	15.8%	20	18.7%	181	16.1%	.600	0.438
	No	858	84.2%	87	81.3%	945	83.9%		
Family history of obesity	Yes	154	15.1%	14	13.1%	168	14.9%	.314	0.575
	No	865	84.9%	93	86.9%	958	85.1%		
Random blood glucose levels	< 139 mg/dL	870	88.1%	37	35.2%	907	83.1%	247.203	0.000
	140 < 200 mg/dL	87	8.9%	27	25.7%	114	10.4%		
	≥ 200 mg/dL	30	3.0%	41	39.0%	71	6.5%		

the development of atherosclerosis. which gradually causes the narrowing of arterial walls [41. 42]. The present study revealed that patients with DM were 10 times more likely to suffer from foot ulcer (p<0.001). 3 times at risk to suffer from hypertension (p<0.0.002). and 2.4 times at risk to suffer from vision problems compared to subjects with no doctor diagnosed DM. This is consistent with findings of a previous study [43].

Conclusion

The prevalence of DM among the Saudis in Jeddah City is high. Although DM is a common chronic health problem. yet a great proportion of the subjects with DM were discovered accidently. and the majority are not properly controlled. Appropriate actions should be taken to build up medical therapy and lifestyle management to overcome amendable risk factors for complications in order to reduce morbidity and mortality. Considering that the elderly. the obese. those with high blood pressure and those with positive family history of DM are at the highest risk of having prediabetes and DM. systematic healthcare interventions targeting these groups are recommended to reduce the burden of the disease. Additional studies employing social and behavioral paradigms are needed so that interventions with direct effects on relevant social and behavioral issues can be designed and implemented before the diabetes problem further increases in its scope and severity.

Limitation

Though the study showed important findings of burden of DM. its risk factor. and management practice among Saudis. in Jeddah city. it has its own limitations. Firstly. the cross-sectional study design could not reveal the condition of the actual population. Secondly. the study participants were subjects visiting general places. and self-selection bias could not be ruled out and over-consideration of the actual prevalence of the DM. Therefore. it may be somewhat improper to generalize the findings of this study to the entire population of Jeddah city. Another limitation is the use of RBS testing to assess the hyperglycemia. because the participants were seen on one occasion only in the community. and other tests like fasting blood sugar test and post prandial glucose test were not feasible.

Acknowledgment

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Table 3. Distribution of subjects with DM according to duration of having the disease and method of control of DM

Variables		Duration of Diabetes Mellitus						Chi square	p-Value
		< 10 years		≥ 10 years		Total			
		#	%	#	%	#	%		
Diagnosis of DM	Due to symptoms	38	63.3%	15	35.7%	53	52.0%	9.637	0.022
	accidently	21	35.0%	26	61.9%	47	46.1%		
Control of DM by diet	yes	16	26.7%	12	28.6%	28	27.5%	.045	0.832
	no	44	73.3%	30	71.4%	74	72.5%		
Control of DM by insulin	yes	10	16.7%	8	19.0%	18	17.6%	.096	0.756
	no	50	83.3%	34	81.0%	84	82.4%		
Control of DM by oral hypoglycemic agent	yes	39	65.0%	31	73.8%	70	68.6%	1.394	0.498
	no	21	35.0%	11	26.2%	32	31.4%		

Table 4. Distribution of subjects with DM according to duration of having the disease and suffering from complications of DM

Complications of DM		Duration of Diabetes Mellitus						Chi square	p-Value
		< 10 years		≥ 10 years		Total			
		#	%	#	%	#	%		
Neuropathy	yes	19	31.7%	15	35.7%	34	33.3%	.182	0.670
	no	41	68.3%	27	64.3%	68	66.7%		
Nephropathy	yes	9	15.0%	8	19.0%	17	16.7%	.960	0.619
	no	50	83.3%	34	81.0%	84	82.4%		
Retinopathy	yes	12	20.0%	10	23.8%	22	21.6%	.881	0.644
	no	47	78.3%	32	76.2%	79	77.5%		
Vascular disease	yes	4	6.7%	0	0.0%	4	3.9%	2.914	0.088
	no	56	93.3%	42	100.0%	98	96.1%		

Table 5. Distribution of subjects with DM according to duration of having the disease and treatment for diseases

Variable	Categories	B	Sig	Exp (B)	95% CI for Exp (B)	
					Lower bound	Upper Bound
Intercept		-4.474	.000			
Age groups	≥ 40 years	1.943	.000	6.981	4.180	11.657
Smoking	Smoker	-.047	.852	.954	.580	1.568
	Ex-smoker	.506	.170	1.658	.806	3.412
Obesity	Body deficient	1.055	.196	2.872	.580	14.215
	Normal	1.184	.009	3.269	1.337	7.991
	Grade I	.631	.112	1.880	.864	4.092
	Grade II	.534	.212	1.706	.738	3.945
	Grade III	-.102	.827	.903	.361	2.259
Family history	Heart disease	-.211	.537	.810	.415	1.582
Family history	Obesity	-.446	.230	.640	.309	1.325
Treatment for	Vision	.888	.001	2.430	1.447	4.082
Treatment for	Renal disease	-.153	.577	.858	.502	1.469
Treatment for	Neuritis	-.211	.537	.810	.415	1.582
Treatment for	Hypertension	1.126	.002	3.085	1.524	6.243
Treatment for	Atherosclerosis	.273	.504	1.314	.589	2.933
Treatment for	Angina	-1.150	.173	.317	.061	1.655
Treatment for	Foot ulcer	2.311	.018	10.080	1.490	68.206

Table 6: Multinomial Logistic Regression for Having DM with some clinical variables

Variable	Categories	B	Sig	Exp (B)	95% CI for Exp (B)	
					Lower bound	Upper Bound
Intercept		-4.474	.000			
Age groups	≥ 40 years	1.943	.000	6.981	4.180	11.657
Smoking	Smoker	-.047	.852	.954	.580	1.568
	Ex-smoker	.506	.170	1.658	.806	3.412
Obesity	Body deficient	1.055	.196	2.872	.580	14.215
	Normal	1.184	.009	3.269	1.337	7.991
	Grade I	.631	.112	1.880	.864	4.092
	Grade II	.534	.212	1.706	.738	3.945
	Grade III	-.102	.827	.903	.361	2.259
Family history	Heart disease	-.211	.537	.810	.415	1.582
Family history	Obesity	-.446	.230	.640	.309	1.325
Treatment for	Vision	.888	.001	2.430	1.447	4.082
Treatment for	Renal disease	-.153	.577	.858	.502	1.469
Treatment for	Neuritis	-.211	.537	.810	.415	1.582
Treatment for	Hypertension	1.126	.002	3.085	1.524	6.243
Treatment for	Atherosclerosis	.273	.504	1.314	.589	2.933
Treatment for	Angina	-1.150	.173	.317	.061	1.655
Treatment for	Foot ulcer	2.311	.018	10.080	1.490	68.206

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Colorectal cancer related Knowledge, Attitude, and Practice among adult Saudis in Jeddah city

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Abstract

Background: Colorectal cancer (CRC) is the third most common malignancy and the fourth leading cause of mortality worldwide. CRC has been the most common cancer among men and the third commonest among women since 2002 in Saudi Arabia (SA).

Objectives: To study the pattern of Knowledge, Attitude, and Practice (KAP), regarding CRC in Jeddah city, SA.

Methods: A cross-sectional survey was conducted on online using Google forms sent to residents in Jeddah, SA. The total number enrolled was 364 subjects. Data was collected using a questionnaire which provided information on the socio-demographic characteristics, and KAP of the subjects about CRC. SPSS version 23 was used; Multi-nominal logistic regression was used and the OR and 95% CI were calculated. The level of significance was 0.05.

Results: The mean scores of knowledge was 13.21 (out of 36), of attitude was 32.8 (out of 40), and that of practice was 3.59 (out of 9). The knowledge score was positively associated with the attitude score (r = .174, p<0.001), and the practice (r= 0.221, p <0.000). Those with clerical jobs, were two times more likely to have higher KAP score compared to manual workers (OR: 2.04; 95% CI: 1.03, 4.05; p<0.04). Subjects who had ever heard about CRC, were three times more likely to have higher KAP score than those who hadn't (OR: 0.282; 95% CI: 0.141, 0.563; p < 0.000).

Subjects who had ever heard about CRC screening were three times more likely to have higher KAP score than those who hadn't (OR: 0.328; 95%CI: 0.199, 0.539; p < 0.000). '

Conclusions: Although CRC is a major cause of morbidity and mortality in KSA, yet the KAP of the studied subjects were defective. There is an urgent need to implement health education programs to raise the KAP standards of the community about CRC. More research, about this issue, in different regions of the Kingdom needs to be conducted.

Key words: Colorectal cancer, KAP, Saudi Arabia.

Introduction

Colorectal Cancer is an adenocarcinoma, which may start as a benign polyp, but then becomes malignant, and invades and destroys healthy tissue, which extends into the surrounding structures [1]. Colorectal cancer is the third most common malignancy and the fourth leading cause of mortality worldwide, accounting for 8% of all cancer deaths [2]. Based on a cancer registry report, CRC was the most common cancer among male nationals of the Gulf Cooperation Countries (GCC) aged between 45-59 years (12.8%), in the period between 1998 and 2007 [3]. The incidence rate of CRC in the Kingdom of Saudi Arabia (KSA) has increased over the past decade reaching 14.5/100,000 in 2010 [4]. The most common CRC risk factors include increased age, smoking, diabetes, and obesity; high red meat diet (e.g. beef, pork, lamb or liver), and low fiber intake diet was found to stimulate the growth of CRC. Overall, CRC incidence and mortality rates are higher in males than in females [5, 6]. People with first degree relatives who were diagnosed with CRC, have a greater risk of developing the disease by 2 to 3 times, compared to individuals with no family history [6]. Identifiable symptoms include alterations in bowel habits, hematochezia, melena, abdominal discomfort, fatigue, and an unexplained reduction in weight [7]. The guidelines for CRC screening, including those from Saudi Arabia [8], vary in the screening method recommended, how frequent to repeat the tests, as well as the ages at which to start and stop screening [9]. The Saudi guidelines recommended CRC screening for average risk individuals to start from the age of 45 years, and colonoscopy was the recommended modality for screening; when not available, flexible sigmoidoscopy every 5 years with an annual guaiac fecal occult blood test (FOBT), or fecal immunochemical testing was recommended. This variability in recommendation between guidelines reflects the variability in baseline risks and resources available for such programs. Although the Saudi guidelines for CRC screening have been disseminated, screening has been performed on an opportunistic basis rather than a national level [10, 11]. Awareness and preventive screening programs play a vital role in early diagnosis and improving the survival rate of such patients. It has been reported that the awareness of a disease among the public is directly related to the screening program participation. Zubaidi et al. reported a lack of correct knowledge and presence of misconceptions regarding the understanding of CRC in the general public of Riyadh region [12]. The information about knowledge, attitude and practice about CRC in the Western region of KSA is deficient, therefore, the aim of this study was to explore the pattern of the knowledge, attitude, and practice about CRC, among the adult Saudi population in Jeddah, SA.

Subjects and Methods

It was a cross-sectional study; where an online survey using Google form questionnaire was sent via email to the residents of Jeddah, Saudi Arabia. Sampling method was a non-probability convenient one. Sample size for the present study was determined using G*power software [13] where, α = 0.05, Power = 0.95, effect size = 0.3 and degree of freedom = 5. The sample size required was 277. The total number of subjects who responded was 367, however, only 364 were enrolled in the study (age: 18 years through to 69 years). Three subjects refused to answer the questions and were removed (as answers of all questions was a pre-request for the form to be submitted). Data was collected using the questionnaire which included the following sections: Personal questionnaire which provided information about socio demographic characteristics, hobbies, habits and clinical aspects of participants; and a knowledge attitude and practice questionnaire toward colorectal cancer contained three sections of 34 closed-ended questions on knowledge, and 8 questions on attitude, and 9 questions on practice. The questions on the knowledge about CRC was given responses of yes, no and don't know. Correct answer was given 1 and total score was 34. Questions on attitude were in the form of Likert scale, and were given a score out of 40. Questions on practice were each, scored 1 for the best practice and total score was 9. Validity of the questionnaire: reliability study was conducted on the questionnaire responses and Cronbach`s alpha was calculated. The reliability index for the Knowledge questions was 0.947, for the attitude questions was 0.724 and for the practice questions was 0.279.

Data analysis and statistical tests: Statistical Package for Social Sciences (IBM SPSS, version 23, Armonk, NY: IBM Corp.) was used. Multi-nominal Logistic regression method, reliability studies and Chi square tests were used. Odds ratios (OR), 95% confidence interval (95% CI), and p values were calculated. The level of significance was 0.05.

Ethical considerations

Ethical clearance was obtained from the institutional review board (IRB). In order to keep confidentiality of any information provided by study participants, the data collection procedure was anonymous. Availability of the data: the raw data is available at the research center of ISNC and all results of the data are included in the paper.

Results

The total subjects for the present study was 364 (66.5% males and 33.5% females). Mean age was 40.9 years (SD is 11.7). 72.5% were younger than 50 years and 27.5% were older than 50 years. The majority of the subjects were married 80.1%, and a greater proportion had university or above education (72%). About 60% of the subjects had clerical jobs and 55% earned SR 10,000 or more per month.

The mean score on the knowledge questions was 13.21 (SD: 9.71) out of 36; the mean score on the attitude questions was 32.8 (SD: 4.02) out of 40, and the mean score on the practice questions was 3.59 (SD: 1.41) out of 9 (Table 1). The score on knowledge questions was positively associated with the score on attitude questions (r = .174, p<0.001), and the score on practice questions (r= 0.221, p <0.000). These associations were statistically significant (Table 1).

Table 2 shows the correct answers on the knowledge questions about CRC by age groups. Although the answers on the question about hearing of cancer colon was correct among about 80% of the subjects particularly those younger than 50 years old compared to the older ones (56.3% and 25%, p< 0.004), the correct answers on the majority of the other knowledge questions, were below 40%. Those who are younger than 50 years old gave the correct answers on some of the questions compared to the older ones, e.g. relationship between consumption of red meat and CRC (20.6% and 14.6% respectively, p < 0.000), relationship between colon polyps and CRC (20.3% and 12.1% respectively, p< 0.003) and relationship between diabetes mellitus and CRC (19.2% and 11.5% respectively, p< 0.002).

Table 3 shows the questions on the attitude towards CRC by age groups. The majority of the responses which showed a positive attitude towards CRC accounted for about 50% of the responses. Those who were younger than 50 years old had more positive attitude towards CRC compared to those older than 50 years old, particularly on questions addressing importance to know about CRC (p< 0.003), and that addressing the importance of regular physical examination in detecting CRC at early stages (p < 0.031).

Table 4 displays the practice of the subjects regarding CRC by age groups. Only 16.5% of the subjects thought about undergoing screening for early detection of CRC, and only 2.2% of those who took part in CRC screening were older than 50 years. 67% of the subjects were smokers, particularly those younger than 50 years old (p <0.011). A minority of the subjects (17%) searched for information about CRC prevention, and were more encountered among those younger than 50 years old (p < 0.002). About 40% of the subjects eat fatty food on a daily basis, particularly among those younger than 50 years old (p <0.001).

The mean knowledge score was significantly higher among those whose education is university or higher compared to those how had lower educational level (b= -2.635). The mean knowledge score was also significantly higher among those who had a relative with CRC, or inflammatory bowel disease compared to those who had not (b= -4.22, and b= -1.44 respectively). The mean score of knowledge was significantly higher among those who ever heard about CRC screening (b= -4.933) compared to those who had not. Attitude score was significantly increased among males compared to females (b=1.397).

On the other hand the attitude score increased in those with lower education level compared to those with university education (b = 1.501). The mean attitude score was higher among those who ever heard about CRC screening (b= 0.928) compared with those who had not. The mean practice score was significantly higher among males compared to the females; it also increased among those who had relatives with CRC or IBD (b= -0.576 and – 0.496 respectively) compared with those who had not. Those who had heard about CRC screening had higher mean practice score (b= -0.692), compared with those who had not (Table 5).

Table 6 shows the results of multi-nominal logistic regression of factors which predict KAP score. Those with clerical jobs, were two times more likely to have higher KAP score compared to manual workers (OR: 2.04; 95% CI: 1.03, 4.05; p<0.04). Subjects who had ever heard about CRC, were three times more likely to have higher KAP score than those who hadn't (OR: 0.282; 95%CI: 0.141, 0.563; p < 0.000). Subjects who had ever heard about CRC screening were three times more likely to have higher KAP score than those who hadn't (OR: 0.328; 95%CI: 0.199, 0.539; p < 0.000).

Table 1: Mean values and Correlation matrix of the scores of Knowledge, Attitude, and Practice about CRC among studied subjects

Variables	Statistics	Knowledge score	Attitude score
Knowledge score	Pearson Correlation	1	-
	Significance (2-tailed)	-	-
	Total score	36	-
	Mean	13.21	-
	Standard deviation	9.71	-
Attitude score	Pearson Correlation	.174**	1
	Significance (2-tailed)	.001	-
	Total score	40	-
	Mean	32.85	
	Standard deviation	4.02	-
Practice score	Pearson Correlation	.221**	.223**
	Significance (2-tailed)	.000	.000
	Total score	9	-
	Mean	3.59	-
	Standard deviation	1.41	-

Table 2: Distribution of studied subjects according to correct answers about knowledge on CRC by age group

Variable	Frequency of correct answers			X^2 (p-value)
	<50 years	≥ 50 years	Total	
Have you ever heard of colorectal cancer, sometimes called colon cancer?	56.3%	25.0%	81.3%	8.507 (p <0.004)
Have you ever heard of colorectal cancer screening?	25.3%	12.4%	37.6%	3.184 (p <0.074)
At what age do you think colorectal cancer screening should start?	21.4%	11.0%	32.4%	10.119 (p <0.038)
Where does colorectal cancer rank amongst the most commonly occurring cancers in men in Saudi Arabia?	9.1%	2.7%	11.8%	6.107 (p <0.191)
Where does colorectal cancer rank amongst the most commonly occurring cancers in women in Saudi Arabia?	13.5%	4.9%	18.4%	2.508 (p <0.643)
Is colonoscopy used as a screening test for colorectal cancer?	26.9%	12.6%	39.6%	2.879 (p <0.24)
Is fecal testing used as a screening test for colorectal cancer?	20.6%	10.4%	31.0%	3.572 (p <0.168)
Is X-ray with barium used as a screening test for colorectal cancer?	17.0%	8.5%	25.5%	5.303 (p <0.071)
Is CT used as a screening test for colorectal cancer?	24.5%	9.6%	34.1%	0.414 (p <0.813)
Is blood testing used as a screening test for colorectal cancer?	17.6%	7.1%	24.7%	0.121 (p <0.941)
Is abdominal pain one of the symptoms of colorectal cancer	29.4%	12.1%	41.5%	0.396 (p <0.821)
Is weight loss one of the symptoms of colorectal cancer	32.7%	15.4%	48.1%	5.009 (p <0.082)
Is blood in stool one of the symptoms of colorectal cancer	27.5%	12.6%	40.1%	2.294 (p <0.318)
Is vomiting one of the symptoms of colorectal cancer?	14.0%	4.7%	18.7%	0.433 (p <0.805)
Is a change in bowel habits one of the symptoms of colorectal cancer?	25.0%	8.5%	33.5%	0.936 (p <0.626)
Do people with colorectal cancer have symptoms before being diagnosed?	2.5%	0.8%	3.3%	0.360 (p <0.835)
Does colorectal cancer usually develop over several years?	36.8%	16.5%	53.3%	3.051 (p <0.217)
Are there ways to stop the development of colorectal cancer?	25.3%	10.4%	35.7%	0.400 (p <0.82)
Is colon cancer most often caused by a person's behavior or lifestyle?	6.6%	2.7%	9.3%	1.456 (p <0.483)
Generally, colorectal cancer screening should start at age 50?	23.6%	12.4%	36.0%	4.866 (p <0.088)
Does colorectal cancer start as a polyp, which is a small growth found in the colon?	14.6%	8.5%	23.1%	5.478 (p <0.065)
Is colonoscopy the most accurate test to check for polyps in the colon and rectum?	26.9%	12.9%	39.8%	2.957 (p <0.23)
Do people eating a low-fat and high-fiber diet seem to have a lower risk of colon cancer?	32.1%	15.4%	47.5%	5.187 (p <0.075)
Do people with high alcohol consumption seem to have a lower risk of colorectal cancer?	23.1%	11.8%	34.9%	4.611 (p <0.100)
Do people who do not exercise seem to have a lower risk of colorectal cancer?	23.4%	10.7%	34.1%	2.076 (p <0.354)

Table 2: Distribution of studied subjects according to correct answers about knowledge on CRC by age group (continued)

Do people who have high levels of stress tend to have a lower risk of colorectal cancer?	28.6%	11.5%	40.1%	1.755 (p <0.416)
Do people who are overweight tend to have a lower risk of colorectal cancer?	28.3%	12.6%	40.9%	3.906 (p <0.142)
Do people who have a family history of colorectal cancer tend to have a lower risk of colon cancer?	25.5%	12.4%	37.9%	3.841 (p <0.146)
Do smokers have a lower risk of colorectal cancer?	32.1%	15.7%	47.8%	4.850 (p <0.088)
Do people who eat a lot of red meat tend to have a lower risk of colorectal cancer?	20.6%	14.6%	35.2%	19.273 (p <0.000)
Do people who have colon polyps tend to have a lower risk of colorectal cancer?	20.3%	12.1%	32.4%	11.608 (p <0.003)
Do people of old age tend to have a lower risk of colorectal cancer?	29.7%	13.7%	43.4%	2.449 (p <0.294)
Do people who have diabetes tend to have a lower risk of colorectal cancer?	19.2%	11.5%	30.8%	12.591 (p <0.002)
Do people who have inflammatory bowel disease tend to have a lower risk of colorectal cancer?	25.5%	12.4%	37.9%	4.928 (p <0.085)
Do people who have irritable bowel syndrome tend to have a lower risk of colorectal cancer?	25.5%	13.2%	38.7%	5.598 (p <0.061)
Do people who have hemorrhoids tend to have a lower risk of colorectal cancer?	23.4%	11.0%	34.3%	4.050 (p <0.132)

Table 3: Distribution of studied subjects according to Correct answers about Attitude on CRC by age groups

Attitude		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	X2 (p-value)
It's important for me to know about cancer	<50 years	43.1%	24.2%	3..8%	1.4%	0.0%	14.107 (p <0.003)
	≥ 50 years	12.4%	11.0%	4.1%	0.0%	0.0%	
	Total	55.5%	35.2%	8.0%	1.4%	0.0%	
It's just misfortune that someone has cancer	<50 years	6.0%	8.8%	18.4%	27.5%	11.8%	9.324 (p <0.053)
	≥ 50 years	0.8%	1.6%	9.9%	11.5%	3.6%	
	Total	6.9%	10.4%	28.3%	39.0%	15.4%	
Colorectal cancer diagnosed in an early stage can be treated better	<50 years	41.5%	24.7%	5.5%	0.8%	0.0%	0.427 (p <0.935)
	≥ 50 years	15.7%	9.3%	1.9%	0.5%	0.0%	
	Total	57.1%	34.1%	7.4%	1.4%	0.0%	
The regular physical examination can find cancer at an early stage	<50 years	40.9%	20.9%	9.6%	1.1%	0.0%	10.614 (p <0.031)
	≥ 50 years	12.4%	9.6%	4.9%	0.0%	0.5%	
	Total	53.3%	30.5%	14.6%	1.1%	0.5%	
I will take physical examination regularly	<50 years	22.3%	26.1%	20.9%	3.0%	0.3%	3.392 (p <0.495)
	≥ 50 years	9.9%	8.0%	8.8%	0.5%	0.3%	
	Total	32.1%	34.1%	29.7%	3.6%	0.5%	
I will try to stop smoking and alcohol abuse	<50 years	42.3%	14.8%	9.3%	1.9%	4.1%	1.854 (p <0.763)
	≥ 50 years	15.4%	5.2%	4.7%	1.1%	1.1%	
	Total	57.7%	20.1%	14.0%	3.0%	5.2%	
Colorectal cancer screening tests are effective	<50 years	42.6%	24.2%	4.9%	0.8%	0.0%	7.296 (p <0.121)
	≥ 50 years	14.0%	9.1%	3.3%	0.8%	0.3%	
	Total	56.6%	33.2%	8.2%	1.6%	0.3%	
Cancer screening should be widely implemented	<50 years	39.8%	26.4%	6.0%	0.3%	0.0%	3.961 (p <0.411)
	≥ 50 years	14.8%	9.1%	3.0%	0.3%	0.3%	
	Total	54.7%	35.4%	9.1%	0,5%	0,3%	

Table 4: Distribution of studied subjects according to Correct answers about practice on CRC by age groups

Practice		<50 years	≥ 50 years	Total	X2 (p-value)
Have you ever thought about undergoing screening for early detection of colorectal cancer?	Yes	11.3%	5.2%	16.5%	0.634 (p <0.426)
	No	61.3%	22.3%	83.5%	
Have you ever taken part in a colorectal cancer screening?	Yes	3.0%	2.2%	5.2%	5.712 (p <0.058)
	No	62.9%	24.5%	87.4%	
	Not sure	6.6%	0.8%	7.4%	
Are you a smoker?	Smoker	51.4%	15.7%	67.0%	9.005 (p <0. 011)
	Ex-smoker	8.2%	6.3%	14.6%	
	Non-smoker	12.9%	5.5%	18.4%	
Have you ever searched for information about cancer prevention intentionally?	Yes	9.6%	7.4%	17.0%	9.692 (p <0.002)
	No	62.9%	20.1%	83.0%	
I go to see the doctor if I am not feeling well.	Yes definitely	40.4%	19.8%	60.2%	10.637 (p <0.005)
	Definitely not	7.1%	0.5%	7.7%	
	Probably	25.0%	7.1%	32.1%	
Do you intend to take up a Fecal occult blood test?	Yes definitely	17.6%	9.1%	26.6%	4.425 (p <0.109)
	Definitely not	15.9%	3.8%	19.8%	
	Probably	39.0%	14.6%	53.6%	
Do you drink alcohol?	Yes	0.3%	0.8%	1.1%	4.585 (p <0.032)
	No	72.3%	26.6%	98.9%	
On average, how many times do you eat spicy food?	Daily	13.7%	3.3%	17.0%	6.025 (p <0.110)
	Twice a week	25.0%	9.1%	34.1%	
	Twice a month	14.6%	8.5%	23.1%	
	I don't eat it	19.2%	6.6%	25.8%	
On average, how many times do you eat fruits and vegetables?	Daily	25.0%	9.9%	34.9%	8.020 (p <0.046)
	Twice a week	29.9%	13.5%	43.4%	
	Twice a month	11.0%	3.8%	14.8%	
	I don't eat it	6.6%	0.3%	6.9%	
On average, how many times do you eat fatty food?	Daily	32.4%	6.9%	39.3%	17.366 (p <0.001)
	Twice a week	29.1%	17.3%	46.4%	
	Twice a month	4.9%	2.2%	7.1%	
	I don't eat it	6.0%	1.1%	7.1%	

Table 5: Linear multiple regression relationship between knowledge, attitude and practice scores with sociodemographic factors

Independent variables	Knowledge score	Attitude score	Practice score
(Constant)	40.163***	35.291***	5.641***
Gender	1.175	1.397**	.391*
Age	.042	-.014	.009
Marital status	-.385	-.565	-.140
Education	-2.635*	1.501**	.129
Occupation	-.284	.393	.044
Income	1.552	-.290	-.087
Have any of your relatives been diagnosed with colorectal cancer?	-4.870**	-.802	-.576*
Have any of your relatives been diagnosed with inflammatory bowel disease?	-1.422	-.950	-.496*
Have you ever heard of colorectal cancer, sometimes called colon cancer?	-7.092***	-.174	.254
Have you ever heard of colorectal cancer screening?	-4.933***	-.928*	-.692***

Table 6: Multi-nominal logistic regression of factors which predict KAP score.

Dependent variable (KAP Score < 60%) [reference value set 1]	B	Sig.	Exp (B)	95% Confidence Interval for Exp (B)	
				Lower Bound	Upper Bound
Intercept	.137	.672			
Age group (less than 50 years)	.273	.342	1.314	.748	2.311
Gender (Female)	.302	.287	1.353	.776	2.359
Education University or above)	-.161	.554	.851	.499	1.453
Occupation Unemployed	.320	.308	1.377	.744	2.551
Manual worker	.713	.042	2.040	1.028	4.048
Income 10,000 SR or more	.116	.665	1.122	.666	1.893
Have any of your relatives been diagnosed with colorectal cancer?	-.868	.081	.420	.159	1.112
Have any of your relatives been diagnosed with inflammatory bowel disease?	-.398	.269	.672	.332	1.361
Have you ever heard of colorectal cancer, sometimes called colon cancer?	-1.265	.000	.282	.141	.563
Have you ever heard of colorectal cancer screening?	-1.116	.000	.328	.199	.539

Discussion

Colorectal cancer is the most common cancer in the world; and locally it is the second most prevalent type of cancer in the Kingdom of Saudi Arabia [14]. There is a scarcity of research of KAP of the population, about CRC and CRC screening, in the Western region of Saudi Arabia; thus in the present study, we explored the KAP about CRC among Saudi subjects residing in Jeddah city.

This study indicates that among the subjects we studied, general awareness of CRC and CRC screening was low. Most had heard about CRC, but were not able to describe any particular detail of what it was or what polyps were, and the vast majority had not heard of bowel cancer screening or the FOBT test. This is consistent with findings of other research [15, 16]. CRC ranks first in males and third in females among all cancers in Saudi Arabia. Genetic and environmental factors may have played important roles in the increase in CRC incidence in Saudi Arabia [17]. In the present study a minority of the studied subjects had known about the morbidity information about CRC, particularly among females, older individuals and those with lower educational level. Regular screening for CRC, beginning at age 50, is the key to preventing colorectal cancer. The U.S. Preventive Services Task Force (USPSTF) recommends that adults age 50 to 75 be screened for colorectal cancer [18]. However, in the present study, about 90% of the subjects aged 50 years or more had not known the recommended beginning of colorectal cancer screening. This is consistent with other studies [15,16]. While colorectal adenoma is the most frequent precancerous lesion, other potentially premalignant conditions, including chronic inflammatory bowel diseases and hereditary syndromes, such as familial adenomatous polyposis, are also reported as risk factors for CRC [20]. In the present study the majority of the subjects, particularly, those aged 50 years or more, had not heard about these risk factors. This is similar to findings from other studies [15, 16]. CRC is preventable and curable by an early diagnosis, and with the removal of premalignant polyps. There are a variety of methods and tests for the detection of CRC such as colonoscopy, sigmoidoscopy, fecal occult blood test (FOBT), fecal immunochemical test (FIT), double contrast barium enema (DCBE) and computerized tomography, as well as blood tests [20]. The majority of the subjects in the present study had not heard about these screening methods. Similar findings were reported by other studies [21-26]. About 57% of the respondents in the present study knew the importance of early detection. Previous reports, however, showed better rates [21, 24]. The most frequently mentioned screening methods, in the present study, were colonoscopy, CT scan of the abdomen, and FOBT (39.6%, 34.1% and 31 % respectively). This is consistent with other studies [21, 25, 26]. About 40% the participants had not heard about CRC screening methods before. Berkowitz et al. also surveyed respondents who had not heard of CRC screening methods, and, compared to our study, their rate was higher (42.0%) [25]; while Ged et al. revealed rates lower than the present study (27%) [21]. Previous qualitative research [27], reported that people who had been diagnosed with adenomas gave little thought as to what might have caused the adenoma, and in those who gave possible explanations, these tended to relate to age, genetics or chance. Similar findings have been reported from studies of cancer survivors where genetic factors, smoking and environmental factors (e.g., pollutants or occupation), and psychosocial factors are the most frequently quoted causes of cancer [28]. Lifestyle factors that may contribute to an increased risk of colorectal cancer include: lack of regular physical activity; a diet low in fruit and vegetables; a low-fiber and high-fat diet, or a diet high in processed meats; overweight and obesity; alcohol consumption and tobacco use [29]. In the present study 91% of the respondents were not well-informed about the risk factors. In a previous study, this rate was more than

90.0% [26] . In the present study the majority of the respondents were not well informed about the symptoms. Other studies revealed similar high rates among the subjects they investigated [21,26]. In the present study, the knowledge, attitude and practice scores were significantly associated with each other. The males had significantly better knowledge score compared to the females. Those who had had relatives with CRC or inflammatory bowel disease, or had heard about CRC screening significantly increased their knowledge, attitude and practice scores.

Conclusions

The decisive majority of respondents did not know the CRC screening guideline and did not have accurate information about CRC risk factors and symptoms. Furthermore, a significant number of respondents had not heard about CRC screening methods. This lack of information can result in a low rate of participation in CRC screenings, since adequate knowledge is essential for participation. Most of the respondents were open to new information. To broaden people's awareness of this topic, health promotion programs should focus on females, relatively old people, and those who have a relatively low level of educational attainment. Health workers and the internet have a significant role in mediating information. Consequently, these sources of information should be strengthened.

Limitations

Several limitations to this study must be noted. As our sampling strategy was non-random, the results of this study cannot be considered representative of all Saudi population. Participants were recruited through online Google forms and are therefore likely to be more health connected, proactive in their health behavior, better informed about health issues and have greater exposure to prevention messages. Furthermore, participants use the internet, so results may not reflect the views of those unfamiliar with the internet, and living in very remote regions and living traditional/nomadic lifestyles. Our main outcome measure was largely hypothetical, asking participants on their future 'intention' to take up CRC screening. Such questions may not translate or predict real life behaviors, so results need

to be interpreted with caution. Nevertheless, considering undertaking a preventive behavior is a first step towards behavior modification and therefore remains important. Despite these limitations, our results have generated important information on Saudi views of bowel cancer and bowel cancer screening in an otherwise unexplored area of health care.

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Depression, the silent killer, a South Asian perspective

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Abstract

Depression is a chronic illness having major impact on a significant population of the World. The problem continues to grow rapidly in the wider World. Due to the silent nature of the illness in the vast majority of the people, it continues to be underdiagnosed and untreated.

According to the World Health Organisation (WHO), more than 264 million people are affected by depression Worldwide.

There is no single cause for depression and in a large number of patients, could be multifactorial. The causes can range from bereavement, illness, job loss, divorce or any other stressful factor[1]. In some patients, there may be no trigger associated with depression. Genetics may play a role as depression is known to run in families. There are studies currently underway to link chromosomal abnormalities with depression.

Depression is a leading cause of disability worldwide and is a major contributor to the overall global burden of disease. Depression leads to reduced life expectancy, decreased compliance with treatment for other chronic diseases, poor academic achievement and work performance[2].

More women are affected than men. Close to 800, 000 people die due to suicide every year and suicide is the second leading cause of death in 15-29 year olds. The WHO estimates that between 76% and 85% of people in low- and middle-income countries receive no treatment for their mental health disorder.

Key words: depression, South Asia

Introduction

Grace et al [3] studied the prevalence of depression in 30 countries between 1994 and 2014. They report that South America has the highest aggregate prevalence at 20.6% (95% CI: 13.8–29.7%), followed by Asia at 16.7% (95% CI: 13.5–20.4%), North America at 13.4% (95% CI: 10.6–16.9%), Europe at 11.9% (95% CI: 7.5–18.4%), and Africa at 11.5%. This shows that depression is a major health problem in all parts of the World.

The current Covid 19 pandemic has disproportionately affected the weaker sections of society the hardest. The virus is ruthlessly exposing the gaps between the haves and the have nots both within and between countries. Millions of people risk sliding into poverty and widening the social and economic divisions in the society.

The social isolation due to the pandemic, coupled with the financial costs is likely to cause a severe mental health crisis with patients suffering from anxiety and depression[4].

Depression in South Asians

From our experience of working in Primary Health Care Corporation (PHCC), Qatar with the predominantly South Asian community, we would like to discuss depression in the South Asian population and what steps could be taken to raise awareness of depression in the society and improve access to healthcare for the affected patients.

Depression is a very common problem in South Asians but unfortunately a lot of patients do not recognise its symptoms as related to an underlying mental health disease[5]. Despite the tremendous advances in the management of depression by both medication and counselling, patients remain reluctant to seek help from healthcare professionals. This is true of the South Asian population who live in their home countries as well as those who have migrated to Europe and America[6].

Barriers to seeking healthcare advice for depression

1. Depression and other mental illnesses may be perceived as punishment from God[7]. There may be feelings of deep guilt and shame about the condition. The patient is blamed for the illness and asked to turn to religion to get better.

Religious beliefs can provide support through enhancing acceptance, endurance and resilience. They generate peace, self-confidence, purpose, forgiveness to the individuals own failures, self-giving and positive self-image. A substantial amount of research points to the benefits of faith to mitigate symptoms of depression[8].

Patients may seek counselling from faith healers[9], some of whom may not have good understanding of mental health disorders. While effective coordination between progressive faith-based services and formal healthcare may improve patient outcomes, this coordination is often found to be lacking.

2. Some families associate depression and associated mental health conditions with possession by an evil spirit[10]. The families may seek the help of practitioners of witchcraft who misguide them and stop them from seeking professional advice. This is frequently observed in families from deprived backgrounds with limited education.

3. Patients with depression may see it as a personal weakness or moral failing. They are seen as having brought shame and dishonour to the family generating the kinds of stereotypes, fear and rejection. There is fear of instability and disorder. Families try to hide the condition from others for the fear of being stigmatised. This is particularly the case for unmarried women as families fear that the stigma of depression may prevent them from getting married in the future.

4. Childhood abuse in different forms is widespread in all parts of the world and the South Asian countries are no exception to this. There is a higher incidence of depression in adults who were abused as children[11].

Victims of childhood abuse find it very hard to speak out for different reasons. The perpetrator of the abuse might be a family member and they worry about families breaking apart by speaking out. They may also convince themselves that they will not be believed and be somehow held responsible for the abuse. They may suffer with intense shame and feel that they will lose respect in the society if people find out about the abuse.

5. Women in abusive relationships in marriage may experience increased incidence of depression. They may face social pressure from families to project a picture of harmony and happiness. They may be totally dependent on their husbands for finances and coming out of such marriages can be difficult, leaving them to experience a lifetime of abuse and depressive illness.

6. Evidence demonstrating an association between heavy usage of social media and depression[12] is mounting. While being socially connected to others can ease stress, anxiety, and depression, lacking strong social connections can pose a serious risk to mental and emotional health. Social media use is also linked to feelings of inadequacy and insecurity.

7. Drugs and alcohol excess may also play an important role in people suffering with anxiety, depression and other mental health disorders. This problem appears to be increasing, particularly among the college students in cities.

8. South Asian women may present with somatic symptoms rather than the typical symptoms of depression seen in the Western world[6]. The diagnostic criterion for depression may not be accurate for these population groups and physicians may not link the somatic symptoms with depression.

9. There is an enormous gap in the health and socio-economic conditions between developed and developing countries. This particularly applies to the provision of psychiatric services in a lot of South Asian countries.

According to the World Bank collection of development indicators, 65.57% of the South Asian population lived in rural areas in 2019. The majority of the healthcare providers prefer to live and serve in the urban areas. Patients with physical and mental health problems rely on 'quacks' for their health needs in these places. This coupled with lack of education and false beliefs about mental health disorders renders a significant proportion of the population with no access to adequate psychiatric services.

9. Unlike in the Western countries, most of the South Asian countries do not have a family medicine model of Primary care[13]. The majority of healthcare is delivered by doctors who have completed basic medical graduation and not spent time in structured general practice training.

In the Western countries, most general practice training programmes involve structured curriculum, training doctors in general medicine, general surgery, obstetrics, psychiatry and emergency medicine. Hence General Practitioners as the first point of contact for the patients are well trained to diagnose and treat not only depression but also a lot of other health disorders.

Lack of structured general practice training programmes in South Asian countries is a major impediment to patients getting effective overall health care and in particular mental health services.

Strategies to deal with depression and mental health disorders

A sustained and coordinated effort is needed to counter mental health disorders both at national and international level. This has become a matter of greater urgency in the context of the current Covid-19 pandemic which is leading to a tsunami of mental health disorders in the wider World and particularly in the South Asian countries.

1. Media can play a big role in educating masses about depression and other mental health disorders. Unfortunately, the negative portrayal of people with mental health disorders as violent contributes to stigmatization, stereotyping, discrimination, and social rejection.

Media houses should be encouraged to avail services of psychiatric / medical / scientific advisors instead of mental/ medical/scientific advisors. Journalists and producers could undergo short training courses on the mental health disorders so that they can remove prejudice in their reporting and presentations. They should be encouraged to produce movies on mental health disorders to increase awareness of mental health disorders among the masses.

2. There has to be increased funding for health services in general and psychiatric services in particular. The Covid pandemic has laid bare the health gaps in our societies. There has been a severe shortage of healthcare professionals in a lot of South Asian countries to deal with the Covid pandemic. Psychiatric healthcare staff among other specialists, had to be drawn in to deal with the Covid crisis. This led to psychiatric services being severely understaffed, depriving the patients with psychiatric needs of their services.

3. Religious leaders of all faiths and backgrounds need to have basic education about depression and mental health disorders. They should be made aware of local referral pathways for psychiatric services. Faith leaders can play a major role in educating our communities and bring about behavioural changes through their teachings and actions.

4. The General Practice training system similar to the one in the Western countries should be introduced in the South Asian countries. Family physicians should have the basic knowledge and skills to diagnose and treat anxiety and depression and be able to refer to specialists in the more severe cases.

5. There should be greater incentives for healthcare professionals to work in rural areas so that the rural population can access quality healthcare as well.

6. Health centres and clinics should arrange community training programmes and lectures on mental health. More community psychiatric nurses should be trained and recruited.

7. Healthcare professionals should be made aware of atypical presentation of depression in South Asian women as relying on the current diagnostic tools for depression they may under-diagnose the condition.

Conclusion

Depression is a leading cause of disability Worldwide and is underdiagnosed and untreated. The problem is likely to get worse over the next few years as the World faces the after effects of the coronavirus. A sustained effort by Governmental and non-Governmental agencies throughout the World is needed to address this problem with greater urgency. Investment in healthcare and psychiatric services is likely to make the population healthy and better prepared to deal with pandemics and other major upheavals.

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Myths with diuretics

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Problem

Observational data suggest an association between hydrochlorothiazide and the risk of Squamous Cell Carcinoma (1). Risk is consistently higher with large doses and long duration (example: 5 years of use increases risk 3-4 times) (2, 3). This data leads me to review my registered patient list who are currently taking hydrochlorothiazide (HTCZ), in order to minimize the risk of SCC by changing to newer diuretic agents. Of the estimated 76,100 Of Canadians affected by non-melanoma skin cancer annually, approximately 23% are diagnosed with SCC (4). It is the second most common form of skin cancer after Basal cell carcinoma.

Methods

I planned to review all my registered patients who were taking HTCZ. I communicated with them this recent study and its outcome and gave them a chance to minimize the risk of SCC by changing HTCZ to either indapamide or chlorthalidone.

I reviewed 55 patients who were on HTCZ already. Most of them have been taking HTCZ for more than 3 years. Only two of them started during the last one year. Out of these two patients, one was taking a small dose of HTCZ for ureteric stone suggested by Urologist. I discussed the new study with all of the patients on HTCZ and all of them agreed to change the medication (except one patient taking HTCZ recommended by Urologist).

Results

All of my patients accepted this change of medication except the one patient who will consider this change if he noticed any change in skin or after prolonged use of this medication. We can minimize the risk of SCC by the simple effort of reviewing patient notes or at the time of annual renewal of medications.

Discussion

This unproven link directs us to start a discussion of skin cancer patients' (as one of my patients was taking HTCZ and getting recurrent SCC) link to HTCZ and lawsuit against manufacturers. It also leads us to think whether any other kind of medication may cause skin lesions or cancers, which requires more observation and research in future.

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Endoscopic Septoplasty: Surgical Outcome in Aden, Yemen

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Abstract

Objective: To describe the characteristics of the patients and to evaluate the endoscopic septoplasty outcome and complications.

Methods: A retrospective review of medical charts of patients presenting to the ENT Units of two private hospitals (Alshifa and Alsaidi hospital) in Aden, Yemen during the period January 2016 to December 2019 and who underwent endoscopic septoplasty.

Results: The total study patients were 117 and the sex distribution of patients were (59.0%) males and (41.0%) females. The mean age of the patients was 25.4 ± 7.9 years.

Nasal obstruction was the most common presenting symptom, being found in (56.4%) patients followed by headache in (13.7%) patients, obstruction and discharge in (12.8%) and the last one snoring in (3.4%) patients.

The type of deviated nasal septum (DNS) was cartilage with bone in patients (49.6%), followed by bony in (22.2%), spur in (17.1%) patients and cartilage in (11.1%) patients.

The associated conditions were hypertrophy inferior turbinate in (46.1%) patients followed by obstruction of osteomeatal complex (OMC) in (17.1%) patients, concha bullosa in (12.8%) patients and antrochoanal polyp in (2.6%) patients.

The type of operations were septoplasty alone in (44.4%) patients followed by septoplasty with inferior turbinectomy in (19.7%) patients, septoplasty with functional endoscopic sinus surgery in (17.1%) patients, septoplasty with conchoplasty in (16.2%) patients and septoplasty with removal of polyp in (2.6%) patients.

Eight patients (6.8%) developed postoperative complications: perforation in 4 (3.4%) patients, bleeding in 2 (1.7%) patients, and synchia in 2 (1.7%) patients.

Conclusion: Endoscopic septoplasty is an effective technique that can be performed safely.

Key words: septal deviation, nasal obstruction, endoscopic septoplasty

Introduction

Septal deviations are the most common cause of nasal obstruction, representing a common complaint in rhinologic practice. Since its introduction, procedures for correction of nasal septal deformities have undergone several modifications, from radical septal resection, to possible preservation of septal framework and nasal mucosa. Frequently, septal deformities can be associated with lateral wall diseases or may be the cause of them. A significantly deviated nasal septum has been implicated in epistaxis, sinusitis, obstructive sleep apnoea and headaches attributable to contact point with structures of lateral nasal wall [1].

For this reason, correction of septal deformities cannot be separated from treatment of disorders of the lateral wall when present.

Thus, endoscopic septoplasty is a useful technique for treating symptomatic deformities, but also for improving intraoperative surgical access to lateral nasal wall surgeries (e.g. dacryocystorhinostomy, functional endoscopic sinus surgery) [2,3].

Since the first description by Lanza et al. in 1991, the use of the endoscope for the correction of septal deformities is increasingly more frequent [4].

Also, since 1991, surgeons have performed endoscopic septoplasties not only to treat symptomatic nasal obstruction, but also to improve surgical access to the middle meatus as an adjunct to endoscopic sinus surgery (ESS) [5,6].

Endoscopic septoplasty is now an attractive alternative to traditional headlight approach for septoplasty.

Bothra et al [7] showed better results and fewer complications with endoscopic septoplasty compared to conventional approaches, as endoscopy gave better illumination and improved access to high deviations and spurs.

The same opinion in favour of endoscopic septoplasty was expressed later by several authors who compared the two techniques [8]. Gulati et al [9] found that an endoscopic approach to septoplasty simplifies identification of the pathology due to better illumination, improved accessibility to remote areas and magnification, while allowing for limited incision and elevation of flaps without compromising adequate exposure of the pathological site.

Objectives

To describe the characteristics of the patients and to evaluate the endoscopic septoplasty: outcome and complications.

Materials and Methods

A retrospective chart review was performed in patients presenting to the ENT Units of two private hospitals (Alshifa and Alsaidi hospital) in Aden during the period January 2016 to December 2019.

The material consisted of 117 medical records from patients aged 16–55 years and they were 69 males and 48 females. The patients were complaining of nasal obstruction as the chief complaint. On examination, they had a septal deviation with inferior turbinate hypertrophy, obstruction of osteomeatal complex (OMC), concha bullosa and antrochoanal polyp which was documented by preoperative CT scan of the nose and paranasal sinuses. Endoscopic septoplasty under general anesthesia was carried out for all the patients using zero degree 4mm lens.

The obtained information included sex, age, symptoms, type of DNS, the associated conditions, the type of operations, the postoperative complications and the result of follow-up examinations of the patients at one month and three months postoperatively.

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) software package version 17.

Descriptive statistical parameters were calculated. Descriptive statistics as number, percentage, mean, and standard deviation were used for data analysis. A $p < 0.05$ was defined as statistically significant.

Results

The total study patients were 117 and the sex distributions of patients were 69 (59.0%) males and 48 (41.0%) females, as shown in Figure 1.

The male to female ratio was 1.4:1. The mean age of the patients was 25.4 ± 7.9 years (range between 16 to 55 years). Also the age group 16 – 25 years represented 72 (61.6%) cases, followed by 26 – 35 years with 33 (28.2 %) cases in all patients and also in female and male patients, and the difference between values of gender related to age groups is statistically not significant ($p > 0.005$), (Table 1, Figure 2).

Nasal obstruction was the most common presenting symptom, being found in 66 (56.4%) patients followed by headache in 16 (13.7%) patients, obstruction and discharge in 15 (12.8%) patients, recurrent sore throat in 11(9.4%) patients, epistaxis in 5(4.3%) patients and finally snoring in 4 (3.4%) patients.

The difference between values of gender related to symptoms is statistically not significant ($p > 0.005$), as shown in Table 1 and Figure 2.

Figure 1: Distribution of patients related to sex

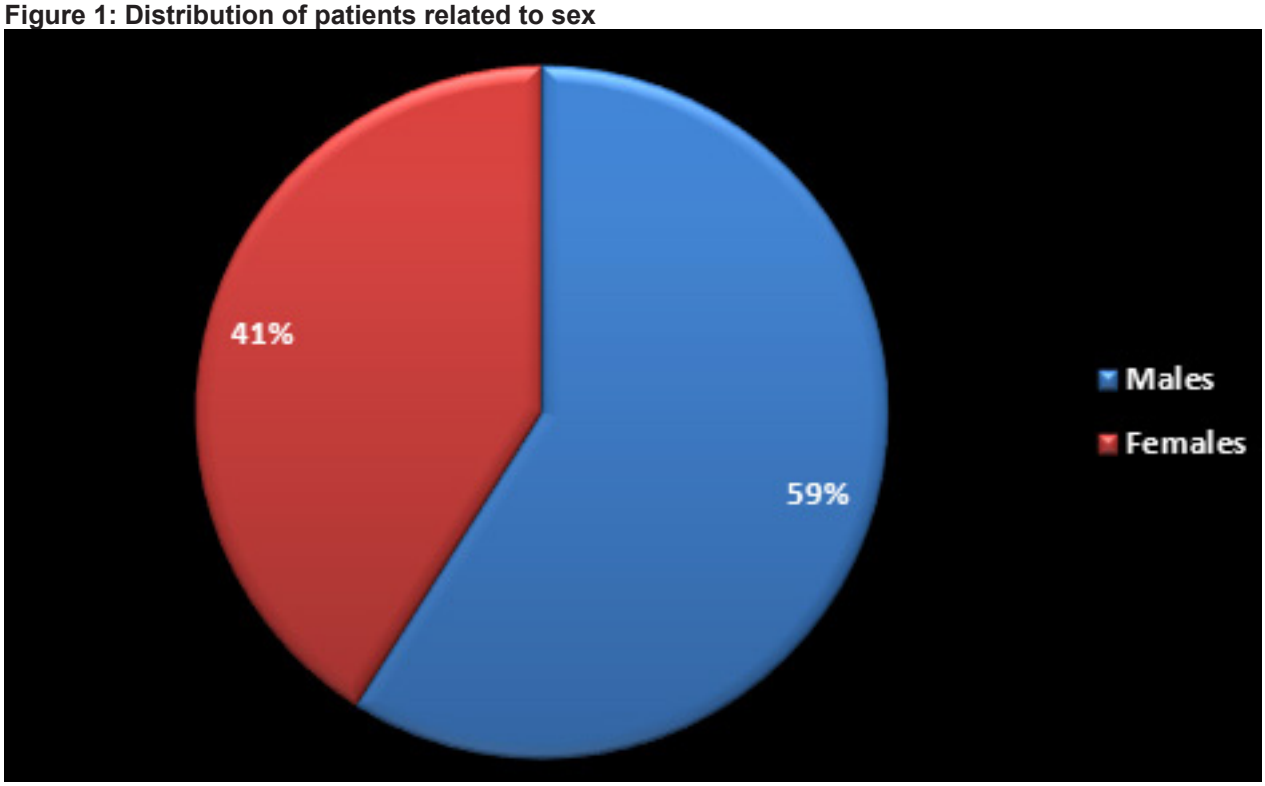


Table 1: Characteristics of the study patients (n=117)

Variables	Sex				Total n=117		P
	Females n=48		Males n=69				
	No	(%)	No	(%)	No	(%)	
Age groups (years):							
16 – 25	26	(22.2)	46	(39.3)	72	(61.5)	
26 – 35	19	(16.2)	14	(12.0)	33	(28.2)	P > 0.05
36 – 45	03	(2.6)	07	(6.0)	10	(8.6)	
46 – 55	00	(0.0)	02	(1.7)	02	(1.7)	
Symptoms:							
Nasal obstruction	29	(24.8)	37	(31.6)	66	(56.4)	
Headache	06	(5.1)	10	(8.6)	16	(13.7)	P > 0.05
Obstruction & discharge	06	(5.1)	09	(7.7)	15	(12.8)	
Recurrent sore throat	03	(2.6)	08	(6.8)	11	(9.4)	
Epistaxis	03	(2.6)	02	(1.7)	5	(4.3)	
Snoring	01	(0.8)	03	(2.6)	4	(3.4)	
Mean age (years):	25.4 ± 7.9						
Range (years):	16 – 55						
Male to female ratio:	1.4 : 1						

Figure 2: The age distribution of cases studied (n=117)

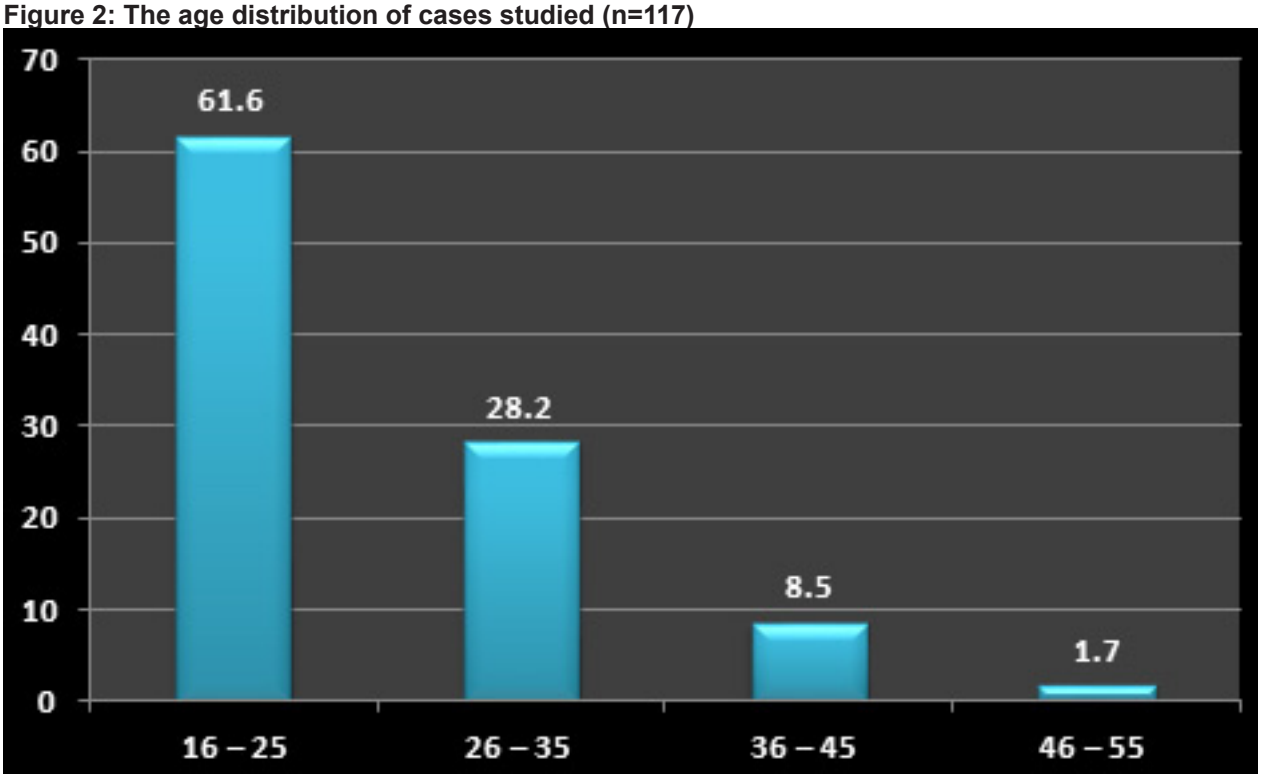


Table 2 shows that the type of DNS were cartilage with bone in 58 patients (49.6%), followed by bony in 26 (22.2%), spur in 20 patients (17.1%) and cartilage in 13 patients (11.1%).

The associated conditions were hypertrophy inferior turbinate in 54 patients (46.1%) followed by obstruction of osteomeatal complex (OMC) in 20 patients (17.1%), concha bullosa in 15 patients (12.8%) and antrochoanal polyp in 3 patients (2.6%).

The type of operations were septoplasty alone in 52 (44.4%) patients followed by septoplasty with inferior turbinectomy in 23 (19.7%) patients, septoplasty with functional endoscopic sinus surgery in 20 (17.1%) patients, septoplasty with conchoplasty in 19 (16.2%) and septoplasty with removal of polyp in 3 (2.6%), as shown in Table 2 and Figure 3.

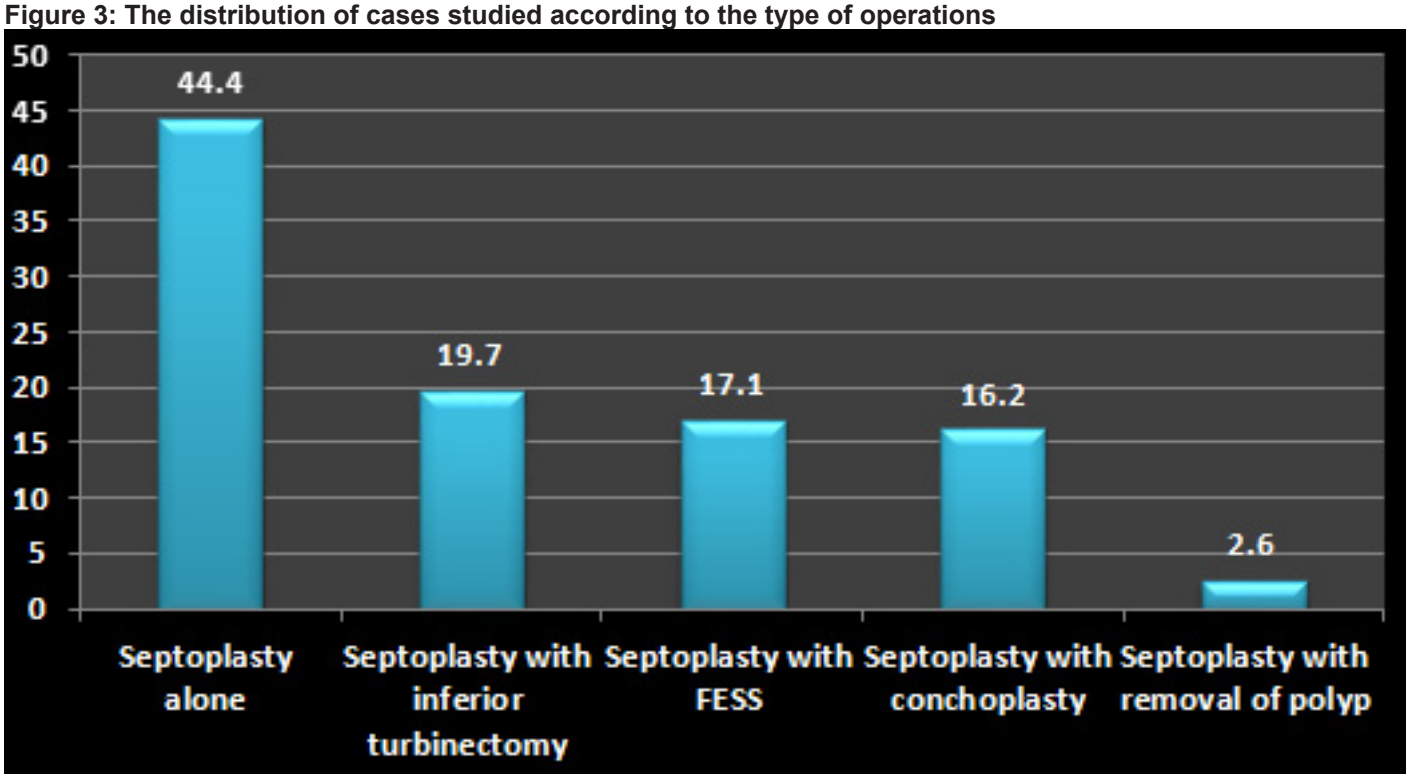
Eight patients (6.8%) developed postoperative complications: perforation in 4 (3.4%) patients, bleeding in 2 (1.7%) patients, and synchia in 2 (1.7%) patients.

Table 2: Clinical characteristics, management and outcome (n=117)

Variables	No	%
Type of DNS:		
Cartilage with bone	58	49.6
Bony	26	22.2
Spur	20	17.1
Cartilage	13	11.1
Associated condition:		
Hypertrophy inferior turbinate	54	46.1
Obstruction of OMC	20	17.1
Concha bullosa	15	12.8
Antrochoanal polyp	03	2.6
No	25	21.4
Type of operation:		
Septoplasty alone	52	44.4
Septoplasty with inferior turbinectomy	23	19.7
Septoplasty with FESS	20	17.1
Septoplasty with conchoplasty	19	16.2
Septoplasty with removal of polyp	03	2.6
Post-operative complications:		
Perforation	4	3.4
Bleeding	2	1.7
Nasal synchia	2	1.7
Nil	109	93.2

Type of DNS = Type of deviated nasal septum;
Obstruction of OMC = obstruction of osteomeatal complex;
Septoplasty and FESS = Septoplasty and functional endoscopic sinus surgery

Figure 3: The distribution of cases studied according to the type of operations



Discussion

Septoplasty is a commonly performed surgical procedure aimed at relieving nasal airway obstruction, often in conjunction with other nasal and sinus procedures, such as cosmetic rhinoplasty and functional endoscopic sinus surgery (FESS) [10]. Other indications include rhinologic headache, which is due to irritation caused by the contact of the septum with the lateral nasal wall, and chronic sinusitis secondary to septal deviation. The rationale for developing an endoscopic technique from a traditional "headlight" approach comes from the fact that during common nasal procedures, the surgeon\'s view is obstructed due to the narrowing caused by septal spurs or septal deviations [11].

In our study patients the sex distribution was males 69 (59.0%) while females were 48 (41.0%) with males to females ratio 1.4 : 1.

Mohammad et al [12] conducted a descriptive study on 200 patients to assess the complications of septoplasty and submucosal resection of septum, in which 162 patients (81%) were males and 38 patients (19%) were females with a ratio of 4.26:1.

In many other studies, male patients were more common than female patients [13,14,15]. This can be attributed to more exposure to trauma in males or random assignment of patients. Similar to the existing literature, our study also had more male patients compared to female patients.

In the current study the mean age of the patients was 25.4 ± 7.9 years (range between 16 to 55 years). It shows also, the age group 16 – 25 years represented 72 (61.6%) cases, followed by 26 – 35 years with 33 (28.2 %) cases. Similar findings to ours were reported by others [15,16,17].

We found in our study that the nasal obstruction was the most common presenting symptom, being found in (56.4%) patients followed by headache in (13.7%) patients, obstruction and discharge in (12.8%) and the last one snoring in (3.4%) patients.

Nasal obstruction is the most common symptom in ENT practice and septum deviation is the most common cause of nasal obstruction. The evaluation of septal deviation causing nasal obstruction depends heavily on physical examination and imaging. The most common presenting symptoms were nasal obstruction (55 patients, 78.6%), headache (42, 60%) and posterior nasal discharge (34, 48.6%), which improved significantly postoperatively [17]. Baig et al [15] reported in their study that the most common symptoms were nasal obstruction (82%) and headache (45%).

In the present study the type of DNS were cartilage with bone in 58 patients (49.6%), followed by bony in 26 (22.2%), spur in 20 patients (17.1%) and cartilage in 13 patients (11.1%).

Nasal septum, divides the nasal cavity into two halves, consists anteriorly of quadrilateral cartilage and posteriorly bony part; consisting of perpendicular plate of ethmoid and vomer. Along the floor there is crest of maxilla and crest of palatine bones [18]. Nasal septum also supports the external osseo-cartilagenous structures, thus the shape of the nose, "where goes the septum, there goes the external nose"[19]. The aetiology of the nasal septal deformity is varied. It may be congenital, developmental, and traumatic etc [18,20,21]. The nasal septal deformity or DNS has many classifications. It may be anterior or posterior; superior or inferior and may take the form of C or S shaped deformity, with either unilateral or bilateral nasal obstruction [22].

The assessment of septal deformity depends upon the site and severity of the deformity. It may be mild producing no symptoms or it may be severe, causing severe unilateral or bilateral nasal obstruction, thus disturbing the routine life of the patient.

The associated conditions were hypertrophy inferior turbinate in 54 patients (46.1%) followed by obstruction of osteomeatal complex (OMC) in 20 patients (17.1%), concha bullosa in 15 patients (12.8%) and antrochoanal polyp in 3 patients (2.6%).

In the present study the type of operations were septoplasty alone in (44.4%) patients followed by septoplasty with inferior turbinectomy in (19.7%) patients, septoplasty with functional endoscopic sinus surgery (FESS) (middle meatal antrostomy and anterior ethmoidectomy) in (17.1%) patients, septoplasty with conchoplasty in (16.2%) and septoplasty with removal of polyp in (2.6%) patients.

Shreeya et al [23] reported in their study from India that the most common operative procedure done was septoplasty in (62.6 %), FESS with septoplasty in (18.3 %) cases, septorhinoplasty in (9.9 %) cases and DCR with septoplasty in (9.2 %) cases.

We found in our study that out of 117 study patients 8 patients (6.8%) developed postoperative complications: perforation in 4 (3.4%) patients, bleeding in 2 (1.7%) patients, and synchia in 2 (1.7%) patients.

Dąbrowska-Bień et al [24] reported in their study that among the 5,639 study patients, different types of complications were noted in 193 patients (3.42%). The most frequent complication was excessive bleeding (3.3%), which required additional packing with absorbable hemostatic mesh (e.g. Surgicel). Septal perforation was observed in (2.3%) of the patients undergoing surgery.

Kulkarni et al [25] mentioned that in endoscopic septoplasty, there is a negligible to nil complication rate and it is excellent and precise in correcting septal deviations posterior to the mobile septum. However; Hwang et al [6] in their retrospective study of 111 patients undergoing endoscopic septoplasty, reported haematoma in 0.9 %, asymptomatic perforation in 0.9 %, and synechiae

formation in 4.5 % patients. In a retrospective study of 116 patients, Chung et al [26] described transient dental pain/ hyperaesthesia in 4.3 %, asymptomatic septal perforation in 3.4 %, synechiae formation in 2.6 %, epistaxis 0.9 %, septal haematoma in 0.9 %, and persistent septal deviation requiring revision septoplasty in 0.9 % patients. Complication rate in the study by Gupta [27] was found to be 2.08 % for endoscopic septoplasty.

However, in our study we reported only four patients with asymptomatic small posterior perforation that did not affect the condition of patient and did not need revision surgery and two patients with bleeding after removal of pack that required repacking of the nose for 24 hours, and another two patients presented with nasal synechiae after one month that required adhenolysis.

Our present study revealed that, after the end of the 3-month follow up period, there were no recorded postoperative complications apart from small posterior asymptomatic perforations in four patients. This finding is in full agreement with other published study reports [13,14,23].

Conclusion

1-Use of endoscopy in septoplasty gives better visualization and improves access to posterior and high deviated nasal septum.
2-Endoscopy enables the surgeon to localize and remove the septal spurs under direct visualization by performing incision over them, thus minimizing trauma to mucosal flaps.
3-Allows detecting the other pathology associated with deviated nasal septum and deals with it in the same setting.
4- Causes less trauma to the mucosal flaps and lateral nasal wall thus reducing the postoperative complications and improves the symptoms of the patients.

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Communication Skills of Resident Physicians in Aseer region, Saudi Arabia

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Abstract

Effective communication improves patient-physician relationship and the overall quality of care. The aim of this study was to evaluate communication skills of resident physicians at different health care facilities in Abha, Saudi Arabia through a cross-sectional, questionnaire-based study. A total of 210 resident doctors participated, of whom 31.4% were internal medicine trainees, and 27.1% were family medicine trainees. Previous training on communication skills was reported by 74 participants (35%). The communication skills scores were nearly normally distributed with a mean score of 113.30 ± 32.25. In comparing the skills by various socio-demographic factors, it was noted that gender and age played a significant role in specific communication skills. There was a significant difference in mean scores of younger and older physicians in domains of interpretation and clarification ($p < 0.001$), asking ($p < 0.001$), feedback ($p < 0.01$), punishment and reward skills ($p < 0.001$). In asking skills, there was a significant difference in mean scores of male and females ($p < 0.001$). Residents in the specialty of Internal Medicine had significantly higher scores than other specialties (CI 95% = 88.6488–102.3688; $p < 0.001$). Fifth-year residents had significantly higher scores than those of other levels (CI 95% = 81.3998–99.9335; $p < 0.001$). Residents with more than one year of experience after the basic degree had significantly higher scores than residents with lesser experience (CI 95% = 123.7650–137.6870; $p < 0.001$). Residents who had taken training in CME in communication skills had significantly higher scores than those who had no prior training or who had attended other methods of training (CI 95% = 121.4108–135.3320; $p < 0.05$). Results of this study point towards a lingering need to focus on training of physicians in effective communication and efforts should be made to include it as a core competency in medical curriculum.

Key words: communication skills, doctor-patient relationship, resident physicians, Saudi Arabia

Introduction

Communication is an essential skill for dealing with and relating to other people (1,2). Health care is delivered effectively when doctors communicate competently with patients, families, and carers. Strong communication skills lay the foundation for a successful doctor–patient relationship, which is considered to be the core element in the ethical principles of medicine. Effective communication enhances the patient's understanding of treatment, and improves compliance and health outcomes. It can also make the professional–patient relationship a more equitable one, ensuring a better quality of care and improved patient satisfaction(3). The importance of health communication as an essential component of the patient experience was outlined in the WHO world health report 2000 (4). Strong doctor–patient communication increases the patient's confidence, thus enabling them to disclose relevant information and adhere to prescribed treatment (5). Better doctor–patient communication is associated with better patient health outcomes (6,7).

Doctor–patient communication is affected by a range of factors, namely, socio cultural norms, physician training, and organizational factors (8). Resident physicians form an important part of the health workforce and are often the first and most commonly encountered health professional for patients receiving care in teaching hospitals. Therefore, residents must have good communication skills to improve the overall success of management (9). Although research on the communication process of medical consultations has identified the quality of health care provider communication to be a vital aspect of care, and provided growing evidence of the influence of patient–provider communication on caregiver behaviors, (10) the quality and impact of provider communication is not well documented in Saudi Arabia. The few studies conducted in Saudi Arabia have largely been confined to the capital Riyadh, (8,9,11,12) with the exception of one regional study. Two of the studies in Saudi Arabia focused on residents of a particular specialty, and the others dealt with primary health care physicians and pediatric specialists. Some of the studies provided a dual perspective, i.e., that of the patients and the treating physician.

A brief overview of the previous studies helped us to formulate our research question and it is provided here. Al-Zahrani et al. conducted a cross-sectional study to assess barriers, practice attitude, and knowledge of primary health care physicians about communication skills during medical consultations in primary health care centers at the National Guard Hospital in Riyadh, Saudi Arabia. A positive correlation between age, years of experience, and practicing communication skills was found. The study concluded that the knowledge of communication skills can improve with training, age, and experience. However, the improved knowledge does not affect the practice of communication skills (8). In a study by Alnasser et al., physicians and parents from general pediatrics wards at King Saud University Medical City completed a validated Criteria Cognitive Aptitude Test (CAT-T) questionnaire and a translated version of the CAT-T questionnaire, respectively (12). The results revealed a higher level of confidence in communication skills among experienced physicians compared to young physicians, who expressed concerns regarding their communication with parents, particularly concerning decision making. The parents rated the physicians' skill of introduction to be higher than the physicians' self-rating and that of active listening as poor. An important finding of this study was that the parents' satisfaction with the physicians' communication skills was inversely related to their level of education. Alsaad et al. studied patients' perceptions of the communication skills of family medicine residents. The study focused on perspectives of patients who were under the care of resident physicians from four family medicine residency programs in Riyadh. The results demonstrated that patients rated male residents higher than female residents with a significant difference (11). Pediatrics trainee residents working at 13 different hospitals in Saudi Arabia were interviewed to determine their attitude and confidence in the use of communication skills in the performance of their primary duties. The majority of the residents were shown to consider learning communication skills a priority in establishing a good patient–doctor relationship, and nearly one-third were very confident with regard to their communication skills (9).

Studies of the impact of postgraduate training in communication skills have identified a need to provide more effective communication skills teaching in clinical practice (13). In 2015, the Saudi Commission for Health Specialties (SCFHS) revised all Training Program Curriculums to include communication skills. Specialties such as Family Medicine consider communication and consultation skills part of the training program, but the training approaches in most of these programs are primarily theoretical (14). To the best of our knowledge, no study has been conducted that focuses on the communication skills of resident physicians across specialties of the Saudi Board of Health Specialties in the Aseer region. This study was conducted to assess communication skills among resident physicians at health care facilities in the Aseer region, and to identify the socio-demographic and job factors that could affect those skills.

Materials and Methods

This cross-sectional study took place between January and July 2018 in Abha City, which is the capital of the Aseer Region in Kingdom of Saudi Arabia (KSA). All residents in the specialty programs were invited to participate. A total of 207 resident physicians from the specialties of Family Medicine, Internal Medicine, Pediatrics, Obstetrics/Gynecology, and General Surgery took part in the study. The questionnaire was distributed to respondents at their place of training, namely, the outpatient clinics of Aseer Central Hospital, Abha Maternity and Children's Hospital, and primary health care centers accredited for Family Medicine training. All participants were briefed by the researcher about the objectives of the study and assured about the anonymity and full confidentiality of their

responses. The study instrument was a self-administered pre-validated questionnaire from a previous study (15). It included questions on personal characteristics, namely, age, gender, program of residency (specialty), level of residency (i.e., year of residency), years of experience (prior to joining the residency program), and formal training in communication skills. The second part comprised questions related to interpersonal communication skills and barriers of communication (not included in this paper). The alpha Cronbach coefficient (α = 0.89) of the questionnaire was reported in the source study which was confirmed in this study. The interpersonal communication skills section included 36 items grouped into seven domains of communication skills, i.e., general communication (6 items), speaking (5 items), listening (5 items), interpretation and clarification (5 items), asking (5 items), feedback (5 items), and reward and punishment (5 items). For each statement, there were 5 Likert-scale responses (never, rarely, sometimes, mostly, and always). The score for each item ranged from 1 to 5. The total score ranged from 36 to 180. The Statistical Package for Social Sciences version 23.0 (16) was used for data entry and analysis. In the presentation of results, categorical variables are presented as frequency and percentage distribution, and continuous variables as means and standard deviations. To examine the differences in the communication skills scores of physicians according to their socio-demographic and job characteristics, an independent t-test and ANOVA were applied. All tests were two-tailed, and results considered significant at 95% CI and a p-value less than 0.05.

Results

Table 1 shows the background characteristics of participants. The total number of physicians included in the study was n = 210 doctors. There were 122 (58.1%) males and 88 (41.9%) females among the participating residents. In terms of age, the mean age was 28.5 years (SD ± 1.78 years), with a range of 25–33 years. The median age was 29 years. The majority (n = 66, 31.4%) were Internal Medicine trainees, followed by 57 (27.1%) who were Family Medicine trainees, 35 (16.7%) who were Pediatrics trainees, 31 (14.8%) who were Obstetrics and Gynecology trainees, and 21 (10%) who were Surgery trainees. The majority (n = 63, 30%) were second year resident (R2) trainees, followed by 60 (28.6%) R3 trainees, 45 (21.4%) R1 trainees, 36 (17.1%) R4 trainees, and only 6 (2.9%) R5 trainees. Only 73 (34.8%) had pre-residency clinical experience, compared to 137 (65.2%) who did not. This pre-residency clinical experience was less than one year for 55 (26.2%) trainees, and more than a year for 26 (12.4%) trainees. Previous training on communication skills was reported by 74 participants (35%), of whom, 16.7 % had received continuing medical education (CME) and 18.7% had received other training methods.

Table 2 depicts the details of the communication skills scores of the study participants. The communication skills scores were nearly normally distributed with a mean score of 113.30 ± 32.25 and median of 108. The skewness was 0.261 and kurtosis was −0.407. The mean and standard deviation of the total score of general communication skills was 20.46 ± 4.94. For speaking and listening skills, the mean and SD were similar: 16.59 ± 4.54 and 16.34 ± 4.15, respectively. For interpretation and clarification, and feedback, the scores were lower at 14.79 ± 5.24 and 14.80 ± 5.33, respectively.

In comparing the skills by various socio-demographic factors, it was noted that gender and age played a significant role in specific communication skills. There was significant difference in mean scores of younger and older physicians in interpretation and clarification skills ($p < 0.001$), asking skills ($p < 0.001$), feedback skills ($p < 0.01$), and punishment and reward skills ($p < 0.001$). In asking skills, there was significant difference in mean scores of male and females ($p < 0.001$). Other socio-demographic factors did not show an effect on the communication skills of the participants. This information is presented in Table 3.

The differences between groups based on specialty, residency level, years of experience, training in communication skills, and type of training were studied for the total communication skills scores. Post hoc analysis was used to confirm the differences. Residents in the specialty of Internal Medicine had significantly higher scores than other specialties (CI 95% = 88.6488–102.3688; $p < 0.001$). Fifth-year residents had significantly higher scores than those of other levels (CI 95% = 81.3998–99.9335; $p < 0.001$). Residents with more than one year of experience after the basic degree had significantly higher scores than residents with lesser experience (CI 95% = 123.7650–137.6870; $p < 0.001$). Residents who had taken training in CME in communication skills had significantly higher scores than those who had no prior training or who had attended other methods of training (CI 95% = 121.4108–135.3320; $p < 0.05$). The correlation between the total years of experience and communication skills mean score was significant at the 0.01 level, $r = 0.443$. Table 4 presents the above findings.

Table 1: Socio-demographic and Training Information of the study Participants.

Characteristic	Frequency (210)	Percentage (%)
Gender		
Males	122	58.1%
Females	88	41.9%
Age in years mean ±SD (median)	28.5 ±1.78 (29)	
Program		
Internal Medicine	66	31.4%
Family Medicine	57	27.1%
Pediatrics	35	16.7%
Obstetrics and Gynecology	31	14.8%
Surgery	21	10%
Residency Level		
R1	45	21.4%
R2	63	30%
R3	60	28.6%
R4	36	17.1%
R5	6	2.9%
Pre-residency Clinical Experience		
Yes	73	34.8%
No	137	65.2%
Experience years		
Less than a year	55	26.2%
More than a year	26	12.4%
Training Received		
Yes	74	35.2%
No	136	64.8%
Method of Training		
CME	35	16.7%
Other methods (self-learning, online training etc.)	39	18.6%

Table 2: Communication skill scores of participants for each skill component.

Skill component	Item	Item Mean ± SD	Component Mean ± SD
General Communication Total score-30	1. I greet my patients	3.35 ± 0.82	20.46 ± 4.94
	2. I talk with a smile	3.55 ± 0.87	
	3. I appear sophisticated looking, clean and tidy	3.53 ± 0.91	
	4. I have integrity and privacy in communication	3.40 ± 0.98	
	5. During communication, I am interested in comfortable physical space conditions	3.24 ± 0.91	
	6. I make sure to end the communication in a polite manner	3.36 ± 0.88	
Speaking Total score - 25	1. Talking tough, dignified, quiet, and fluency	3.46 ± 0.91	16.59 ± 4.54
	2. I try to use appropriate, simple and understandable words	3.33 ± 0.99	
	3. I try to use the head, face, hands and body as appropriate	3.34 ± 1.01	
	4. I may use walking and sitting when needed	3.26 ± 0.97	
	5. I speak with passion	3.18 ± 1.01	
Listening Total score 25	1. I listen carefully to what the patient expresses	3.31 ± 0.90	16.34 ± 4.15
	2. I pay careful attention to the tone and pace of speech and non-verbal gestures	3.30 ± 0.91	
	3. I frequently put myself in his/her position in order to better understand him/her	3.21 ± 0.91	
	4. I do not interrupt his/her talk	3.24 ± 0.95	
	5. I Don't look away from patient at the time of listening	3.25 ± 0.90	
Interpretation Clarification Total score-25	1. I repeat important points in brief to the patient	2.86 ± 1.09	14.79 ± 5.24
	2. I repeat his/her talk after getting approval from him/her	2.85 ± 1.16	
	3. I do not confirm his negative descriptions of himself	2.94 ± 1.11	
	4. I clarify the question, if it seems to be vague	3.06 ± 1.08	
	5. I pay attention to others' non-verbal gestures	3.05 ± 1.11	
Asking Total score -25	1. I plann a proper question to understand the audience's feelings and concerns	3.08 ± 1.11	15.09 ± 5.14
	2. I make sure to use friendly and respectful tone and pace of the question	3.10 ± 1.19	
	3. I outline a subject and wait to hear the same answer for the same questions	3.00 ± 1.03	
	4. I avoid questions with the word "Why?"	2.93 ± 1.06	
	5. I avoid questions that they answer "Yes" or "No"	2.97 ± 1.10	
Feedback Total score - 25	1. I evaluate the views not what the patient implies	3.02 ± 1.04	14.80 ± 5.33
	2. I give feedback about his/ her new behaviors	2.95 ± 1.13	
	3. I give feedback about his/her inconsistent behavior	2.96 ± 1.12	
	4. I refuse to giving feedback on several subjects simultaneously	2.89 ± 1.12	
	5. I give feedback at the proper time	2.96 ± 1.13	
Punishment-Reward Total score -25	1. I encourage to continue talking with the proper words	3.10 ± 1.16	15.21 ± 5.45
	2. I encourage to continue speaking with the proper head and body movements	3.09 ± 1.18	
	3. I demonstrate understanding of the emotions and the decisions of the audiences	3.00 ± 1.12	
	4. I show important feelings and decisions to the patient	3.03 ± 1.12	
	5. I refrain from blaming and judging the patient	2.98 ± 1.10	

Table 3: Comparison of communication skills scores of the participants by their age and gender

Skill	Variable (Age, Gender)	Mean ± S.D.	t	P value	Mean diff	SE diff	CI 95% Lower	CI 95% Upper
General Communication	≤29 years	20.16 ± 4.61	−1.394	0.165	−1.050	0.753	−2.534	0.434
	>29 years	21.21 ± 5.64						
	Male	20.87 ± 4.57	1.420	0.157	.979	0.689	−.379	2.338
	Female	19.89 ± 5.38						
Speaking	≤29 years	16.24 ± 4.43	−1.765	0.079	−1.220	0.691	−2.582	0.142
	>29 years	17.46 ± 4.73						
	Male	16.43 ± 4.49	−0.603	0.547	−0.383	0.636	−1.639	0.871
	Female	16.81 ± 4.62						
Listening	≤29 years	16.00 ± 3.86	−1.867	0.063	−1.176	0.630	−2.419	0.066
	>29 years	17.18 ± 4.72						
	Male	16.18 ± 3.93	−0.667	0.505	−0.387	0.581	−1.533	0.758
	Female	16.56 ± 4.45						
Interpretation and clarificatio	≤29 years	13.94 ± 5.15	−3.857	0.000	−2.993	0.776	−4.523	−1.463
	>29 years	16.93 ± 4.88						
	Male	14.27 ± 5.51	−1.687	0.093	−1.232	0.730	−2.672	0.207
	Female	15.51 ± 4.78						
Asking	≤29 years	14.27 ± 5.10	−3.752	0.000	−2.860	0.762	−4.362	−1.357
	>29 years	17.13 ± 4.69						
	Male	14.26 ± 5.42	−2.791	0.006	−1.976	0.708	−3.372	−0.580
	Female	16.23 ± 4.50						
Feedback	≤29 years	14.07 ± 5.30	−3.187	0.002	−2.543	0.797	−4.116	−0.970
	>29 years	16.61 ± 5.00						
	Male	14.26 ± 5.57	−1.727	0.086	−1.283	0.742	−2.747	0.181
	Female	15.54 ± 4.91						
Punishment-Reward	≤29 years	14.28 ± 5.33	−4.063	0.000	−3.263	0.803	−4.846	−1.679
	>29 years	17.55 ± 5.06						
	Male	15.01 ± 5.90	−0.634	0.527	−0.483	0.763	−1.988	1.02125
	Female	15.50 ± 4.76						

Table 4: Comparison of communication skills scores of the participants by their training characteristics.

Variable	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		F	P
					Lower Bound	Upper Bound		
Specialty								
Family medicine	57	95.50	25.85	3.42	88.64	102.36	7.55	<0.001
Pediatrics	35	116.02	29.88	5.05	105.76	126.29		
Surgery	21	122.42	13.68	2.98	116.19	128.65		
Internal medicine	66	117.40	39.32	4.84	107.74	127.07		
Obstetrics and Gynecology	31	128.06	24.09	4.32	119.22	136.90		
Year of residency								
R1	45	90.66	30.84	4.59	81.39	99.93	8.82	<0.001
R2	63	115.69	26.17	3.24	109.04	122.22		
R3	60	122.48	31.107	4.01	114.44	130.51		
R4	36	118.97	35.317	5.88	107.02	130.92		
R5	6	133.00	8.625	3.52	123.94	142.05		
Years of Experience								
≤1 year	137	104.02	29.62	2.53	99.02	109.03	38.48	<0.001
>1 year	73	130.72	29.83	3.49	123.76	137.68		
Training on Communication skills								
No	136	110.41	35.23	3.02	104.43	116.38	3.14	0.078
Yes	74	118.63	25.25	2.93	112.78	124.48		
Training method in communication (n = 74)								
CME	35	128.37	20.26	3.42	121.41	135.33	4.74	0.010
Other methods	39	109.89	26.31	4.21	101.36	118.42		

Discussion

It is well-known that communication skills are a pillar of clinical practice(1). To be an effective doctor, in addition to knowledge and technical skills, communication skills are also essential. These skills are not limited to talking, but include listening and nonverbal communication (17). The findings of the current study illustrate the communication skills of resident physicians and show the important factors that effect the communication skills.

Our study uncovered several important factors that could help understand communication among resident physicians. One of the findings of our investigation was that female gender is associated with better listening skills, whereas, in other components, there were no differences between female and male residents. This is contrary to past studies where Saudi patients rated male trainees higher than females(11). We also confirmed that older residents have higher scores in communication skills.

Pre-residence clinical experience also stood out as a factor for better communication skills. Work experience is an established factor in improving and refining communication skills for doctors and medical students (18,19). Interaction with patients leads to better understanding of their needs, better recognition of verbal and non-verbal cues, and better communication with both patients and their significant others (17,19). In this study, we found that the number of years of clinical experience had a strong correlation with better communication skills. This could be expected and is consistent with past research (20). In addition, local research has confirmed that experienced senior physicians are more competent in terms of communication skills than their younger colleagues (12).

In our study, the specific specialty did not affect communication skills, with the exception of Internal Medicine. Although Family Medicine necessitates particular communication skills, as it deals at the primary care level with patients of all ages and social backgrounds, and their families, their mean scores were lower than their counterparts in Internal Medicine, Surgery, and Obstetrics and Gynecology. Other studies have reported Family Medicine trainees are more skilled than Surgical trainees in providing information (18). It should also be noted that patients' perceptions of the communication skills of Family Medicine trainees in Saudi Arabia were shown to be relatively favorable in previous studies, however, this finding could not be replicated in the current study(11). This is an important finding that points towards gaps in specialty training in Family Medicine in the region and warrants further exploration. For pediatric trainees, there is inherent complexity around effective communication with patients and families (21). Communication skills' training for medical students has gained more focus recently (22), particularly in surgical specialties such as Obstetrics and Gynecology (23) and General Surgery (24) which may have some role in our study findings.

An important finding of our investigation is that communication skills were affected by the level of residency and attendance at training through CME events. In terms of the structure of the current training system for communication skills development, this is a positive finding. This clearly complements international literature that emphasizes improvement in communication skills with progression in training for residents across specialties (25). Training in communication skills has become a core competency in modern medical education (26) given its established positive effect on various clinical outcomes (27). Effective training and teaching has been shown globally to enhance communication skills among post-graduate medical residents (28). It can be hypothesized that training in the Middle Eastern region is lacking in terms of communication skills. As communication skills equip doctors with confidence in dealing with difficult situations and improve patient satisfaction, (29,30); they deserves greater focus during doctors' specialty training.

Conclusion

The residents communication skills were explored and it was found that interpretation, clarification skills and feedback skills were lower than speaking-asking and punishment-reward skills. General skills were better than any other skill component. Factors that affect the communication skills included gender, residency year, experience and prior training in communication.

Limitations: Any interpretation of the results of this study should be mindful of one important limitation. The cross-sectional design does not imply causation, just establishes a relationship between the communication skills and the factors. It is reported that there are differences between self and patient perceptions of physicians' communication skills as reported in previous research (31). This comparison is lacking in the current work and is one of its limitations. Considering the results of this study, and in light of the observations made in previous similar studies, the structure of the current Saudi Board post-graduate training in communication skills requires revision and reconsideration to bring it in line with international evidence-based standards. To achieve this goal, further longitudinal research is required to evaluate different educational interventions and their effects in enhancing communication skills amongst resident physicians.

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The Challenges of Virtual Consultations in Diagnosing Acute Medical Conditions in Primary Care

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Abstract

Since the start of the global Covid-19 Pandemic many health providers have resorted to virtual telephone consultations replacing the traditional face-to-face encounters [1]. The aim of virtual consultations is to protect both the patient and the clinician from the potential spread of the coronavirus.

It also became mandatory in many areas where there are strict lockdowns in place, preventing people from leaving their homes, unless they have a pressing reason to do so [2]. It seemed reasonable that a lot of the routine health needs of patients such as medication refills, referrals and ordering blood tests could be conducted over the phone without the need to see the patient in person. There are still instances though when a patient needs to be seen in person depending on the severity or type of their complaint.

This case study looks at a specific case where the telephone consultation model had limitations in reaching a diagnosis and commencing appropriate timely treatment. It also highlights the pitfalls we as clinicians can face when solely relying on virtual consults to manage some of our high-risk patients [3]. It looks at how important it is to take a detailed history over the phone and what safety net measures need to be put in place to prevent missing a life-threatening medical emergency.

Key words COVID 19, Virtual consultation, Risk stratification, Cardiovascular disease

Case Report

The case is that of a 49-year-old male Bangladeshi patient who contacted the call centre to book a telephone appointment at the Primary Health care centre (PHCC) with a clinician. The reason for this was to get a refill of his proton pump inhibitor tablets of which he had run out of a few days prior. He reported no other complaints at the time.

The patient was a known Type 2 Diabetic, hypertensive, and had dyslipidaemia. His last Blood Pressure reading was 134/82. His BMI was 28 and he had a 10-pack year smoking history. He had no family or personal previous history of coronary artery disease. He had a QRISK2 score of 41.1% based on the above information.

His current medication regimen included sitagliptin/metformin 50/1000mg, atorvastatin 10mg, amlodipine 5mg, and esomeprazole 40mg. He was compliant with taking his medication and this was confirmed by the frequency of his request for refills, which was timely and appropriate.

The GP enlisted the help of a doctor colleague, with the patients' consent, who helped with translation as the patient did not speak any English. The patient reported that he had a heavy meal in the afternoon. Immediately following the meal, he experienced epigastric discomfort, belching, and bloating. He had experienced these symptoms in the past and put it down to his dyspepsia. These symptoms usually resolved after taking esomeprazole 40mg, and since he had run out of this medication, he contacted the health centre.

The entire consultation was performed over the phone. His symptoms were explored in more detail due to his underlying risk factors. On further questioning, the patient reported that he had also felt generally unwell, weak, clammy and was slightly breathless. 999 was not immediately called at the time of the consultation as the patient was in the premises of the health centre as he desperately wanted to go to the health centre pharmacy and get the esomeprazole as soon as the prescription was issued by the doctor. All PHCC have a pharmacy from where patients would receive their medication

It was decided that he should be seen face-to-face due to his history and the risk factors. Under our health centre protocol, all necessary PPE precautions were taken and the patient was immediately reviewed.

Examination
The patient looked pale, his chest was clear, and the heart sounds were normal. Blood pressure was recorded as 144/90, his pulse was 88bpm regular, he was apyrexial, and his oxygen saturation was 97% in air. The GP organized a 12 lead ECG which showed an ST Elevation in Leads V1 and aVR with ST depression in leads V4, V5, V6.

A provisional diagnosis of Acute Coronary Syndrome (ACS) was made and the patient was informed that he would need to be referred to secondary care. He was given Aspirin 300mg, GTN spray sublingual and transferred to the Heart hospital via the ambulance service for further management.

Recent Investigations
His last blood tests 6 weeks prior to his attendance revealed the following: HBa1c 8%
Lipids: Total Cholesterol 5.4, HDL 0.8, LDL 4.8, TG 1.2
FBC: Normal
Renal Function and Liver Function Test Normal

Investigations following admission to hospital
Chest X Ray: Normal
Troponin: 62.93 ng/L and this rose to 1234 ng/L after 5 hours
Coronary Angiography:
Left Main (LMS) Normal
Left Anterior Descending
(LAD) Mid LAD 100% Stenosis,
D1 80% Stenosis
Left Circumflex (LCA)
CM1 95% Stenosis
Right Coronary Artery (RCA)
Proximal RCA 80% Stenosis
Mid RCA 90% Stenosis
Right PDA 100% Stenosis

This gentleman was confirmed to have suffered with an acute coronary syndrome due to severe atherosclerosis of his coronary arteries. He was appropriately managed as an NSTEMI in hospital and was discharged home with appropriate medication. He was put on the waiting list for a coronary artery bypass graft (CABG).

Discussion

The research literature on virtual consultations is sparse. During the covid-19 pandemic such consultations offer potential advantages to patients and the healthcare system in reducing the transmission of the virus and therefore limiting its spread [4]. However, fears have been expressed that they may be clinically risky and less acceptable to patients or staff, and they bring significant technical, logistical, and regulatory challenges [5]. The telephone consultations can at times be more challenging than the traditional face-to-face consults in terms of missing important cues and being unable to examine a patient to help identify the unwell patient. We anticipate that this case study will contribute to a balanced assessment of when, how and in what circumstances it is appropriate to manage a patient over the phone.

Learning Points
An unusually heavy meal may increase the risk of heart attack by about four times within two hours after eating, according to a study presented at the American Heart Association's Scientific Sessions 2000[1]. Researchers say this finding indicates that eating a heavy meal may act as a trigger for heart attack in much the same way as extreme physical exertion and outbursts of anger might – especially in someone who has heart disease [6].

Hence any patient, especially those with concurrent risk factors, who report any gastritis like symptoms after a heavy meal, such as dyspepsia, belching, retrosternal pain, should have a detailed evaluation to rule out any cardiac cause of their symptoms. Whilst virtual consultations can add to the difficulty of getting an accurate history from the patient, every effort should be made to add certainty to rule out any serious health issue.

In Primary Health Care Corporation Centres in Qatar, every health centre has a pool of trained nurses, doctors and allied health care professionals who speak different languages. If a clinician has trouble in consulting a patient due to a language barrier, he or she can enlist the help of a translator from amongst the healthcare staff [7].

Conclusion

Gastritis is a very common condition in patients from Bangladesh due to the high incidence of H Pylori among the population [8]. It is not uncommon for these patients to present with symptoms of bloating, belching and dyspepsia, hence there may be a tendency for doctors not to explore the other causes of these symptoms, such as cardiovascular or respiratory causes. This is particularly so in cases where patients book an appointment over the phone with the operator to have a virtual consultation to obtain a refill of their regularly prescribed medication, in this case a Proton Pump Inhibitor.

Risk stratification of patients with a personal or family history of diabetes, hypertension and dyslipidaemia is important with patients of Bangladeshi origin as the incidence of these conditions is high among this population [9]. Physicians need to be aware that patients with serious life-threatening symptoms may not always understand the severity of their condition and may make routine appointments with the physician [10]

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Thyroid Nodules: What Family Medicine Doctors Should Know

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Abstract

Thyroid nodules are a common condition and family medicine clinicians are likely to encounter them not least as incidental findings from a variety of imaging modalities. Most of these nodules are benign but often investigations will need to be undertaken to exclude malignancy. Therefore, family medicine clinicians will need to know how to manage thyroid nodules, including how to assess for malignancy, including an understanding of the investigations required and what follow up is necessary.

Key words: thyroid nodules, family medicine

Introduction

Thyroid nodules are a common condition and family medicine clinicians need to understand how they are detected and managed. Increasingly, thyroid nodules are being detected incidentally through imaging modalities such as ultrasound (US), magnetic resonance imaging (MRI), computed tomography (CT) scan and positron emission tomography (PET). The importance is to ensure that those which are malignant are treated appropriately.

It is estimated that clinically apparent thyroid nodules occur in 6.4 percent of women and 1.5 percent of men (1). Nearly two-thirds of the population have thyroid nodules when evaluated by ultrasound (2). It is estimated that there is a 10% lifetime probability for developing a thyroid nodule and females are four times more susceptible. The prevalence increases with age, occurring in 1.0%–1.5% of children (3), rising to 76% for those older than 61 years (2). The prevalence at autopsy has been reported between 50% and 65% (4). There are familial risk thyroid syndromes including familial medullary thyroid cancer and familial non-medullary thyroid cancer (5). Papillary thyroid cancer affecting a parent or sibling increases the patient's risk of developing that type of cancer by threefold and sixfold, respectively (6). A history of irradiation to the head or neck, especially if received under the age of 20 years, or older than 70 years, has been reported to cause a rate of development of thyroid nodules of 2% per year, with a peak incidence in 15 to 25 years (5).

Pathogenesis

The American Thyroid Association (ATA) defines thyroid nodules as "discrete lesions within the thyroid gland, radiologically distinct from surrounding thyroid parenchyma" (7). The underlying cause for thyroid nodule development has yet to be defined.

Many disorders can cause thyroid nodules including benign processes such as Hashimoto's thyroiditis, or malignancies such as papillary cancer and thyroid lymphoma, as well as metastases most commonly arising from lung, renal and head and neck neoplasms (8).

Genetic mutations, such as the BRAF mutation and RAS driver mutation and iodine deficiency can promote thyroid nodule formation (9). A BRAF mutation can be found in papillary cell cancers, and RAS driver mutation is detected in follicular adenomas, follicular thyroid cancer, and follicular variants of papillary cell cancers (9).

Types of nodules

There are several types of thyroid nodules (10). Most thyroid nodules are benign. Colloid and hyperplastic nodules are benign and can occur as solitary nodules or as part of a multinodular goitre. Thyroid cysts and thyroid adenomas are also benign, but surgery is usually required to determine that there is no malignancy present when an adenoma is suspected.

Malignancy is considered to occur in 4.0 to 6.5% of all thyroid nodules (8). The most common thyroid cancer is papillary thyroid carcinoma (PTC), accounting for 80–85% of thyroid malignancies. There is frequently lymph node involvement. Women are more frequently affected, and the peak incidence occurs in the third and fourth decades. Follicular thyroid cancer comprises 10% of thyroid malignancies, spread through the blood stream and develop in a pre-existing follicular adenoma.

Medullary carcinoma produces calcitonin and comprises 5% of thyroid malignancies. It can be familial, as part of multiple endocrine neoplasia (MEN) type II syndrome, or occur sporadically. Anaplastic carcinoma yields the worst prognosis with peak incidence in the sixth to seventh decades. It typically presents late with symptoms such as dyspnea, dysphagia, and laryngeal nerve palsy (11).

Management

There are several guidelines available for evaluation of thyroid nodules from organizations such as the American Thyroid Association (ATA) and the British Thyroid Association (9). The guidelines recognize the need to use the findings from a variety of sources, including clinical examination, measurement of serum thyroid stimulating hormone (TSH), ultrasound assessment, fine needle biopsy (FNA) cytological results, and patient preferences as part of the decision making. Newer methods, like molecular marker detection are being developed to reduce the amount of unnecessary surgical interventions.

Clinical examination.

A detailed focused history is required including looking for risk factors such as a family history of thyroid malignancy or personal history of irradiation. A physical examination, not just of the thyroid but important related anatomy such as regional lymph nodes (usually deep cervical or supraclavicular region) is important.

Thyroid nodules when symptomatic can present in a variety of ways, such as a palpable neck mass, anterior neck pain, dysphagia, globus sensation, and voice changes (9). The onset and rate of progression of symptoms are important in terms of risk of thyroid cancer, with persistent hoarseness and rapidly growing thyroid nodules more likely to indicate a malignant cause.

Red flag symptoms have been identified (12):

- Family history of thyroid malignancy
- History of irradiation
- A thyroid nodule in childhood
- A thyroid swelling with unexplained hoarseness or stridor
- Rapidly enlarging thyroid mass over a period of a few weeks
- Palpable cervical lymphadenopathy
- Several weeks of persistently painful thyroid.

Many of the methods of evaluating a thyroid nodule are undertaken in secondary care. According to UK's National Institute for Health and Care Excellence (NICE) (13), immediate hospital admission is required if there are signs of tracheal compression such as severe stridor at rest. An urgent referral, expecting an appointment within 2 weeks is indicated if:

- There is an unexplained thyroid lump
- A thyroid swelling in the presence of unexplained voice changes
- A thyroid swelling associated with cervical lymphadenopathy
- A painless thyroid swelling that is increasing in size
- A thyroid nodule in a child

A non-urgent referral should be considered if:

- There is a thyroid nodule and abnormal thyroid function tests
- A sudden onset of pain in a thyroid lump

Management in primary care can be considered if:

- There are several years of an unchanged nodule or goiter and no red flag features.

Blood tests

TSH measurement is recommended by the ATA guidelines for the evaluation of a thyroid nodule (14). A suppressed TSH level (< 0.3 mU/L) suggests an autonomously functioning nodule, and a thyroid scan with iodine-123 should be performed. A hyperfunctional or "hot" nodule is rarely malignant, and biopsy is typically not required (14).

Calcitonin is a tumor marker for medullary thyroid carcinoma (MTC) which develops from calcitonin secreting C tumor cells. Routine serum calcitonin measurement is not recommended in the ATA's guidelines (14). Calcitonin measurement may be of benefit if there is a family history of medullary thyroid carcinoma or MEN type 2.

Radionuclide thyroid scan/scintigraphy

Thyroid gland scintigraphy uses radioisotopes of iodine or technetium-99 pertechnetate to detect timed radioisotope uptake by the thyroid gland. There will be greater uptake in a hyperfunctioning nodule than in surrounding normal tissue, and these nodules will appear "hot". In virtually all malignant and benign nodules, the uptake will be lower, and they will appear cold on scintigraphy.

Although ultrasound has largely replaced scintigraphy, the latter can still be utilized to identify hyperfunctioning "hot" nodules when a low TSH is found on initial testing, and which nodule(s) to sample in in presence of multiple nodules (15). However, Radionuclide scintigraphy or radioiodine uptake determination is contraindicated during pregnancy and cannot be used if the patient is breast feeding (16).

Ultrasound.

A normal thyroid normally demonstrates an isoechoic homogeneous structure with a fine granularity not exceeding 1 mm (8). Thyroid Ultrasound (US) should be performed on all patients with nodules suspected clinically or incidentally noted on other imaging studies such as CT or MRI scanning (8).

Thyroid ultrasound can be used to confirm the presence of a nodule and sonographic features as well as detecting regional lymphadenopathy. Malignant thyroid nodules appear solid with irregular margins, possess microcalcifications, taller-than-wide shape with hypoechoic echotexture. A nodule being taller than wider has the highest diagnostic odds ratio for malignancy. Purely cystic nodules with a spongiform appearance are more likely to be benign.

Fine Needle Aspiration

Fine needle aspiration biopsy (FNA) is held to be the gold standard method for evaluating thyroid nodules (8). There are a variety of cytological results that can be obtained through FNA:

- Nondiagnostic or unsatisfactory
- Benign
- Atypia of undetermined significance or follicular lesion of undetermined significance
- Follicular neoplasm or suspicious for a follicular neoplasm
- Suspicious for malignancy
- Malignant

Treatment of thyroid nodules.

80% of biopsied nodules are benign (noncancerous). Typically, they do not require removal unless they are causing symptoms such as dysphagia. Percutaneous ethanol ablation can be considered as a treatment modality for thyroid cysts and certain complex thyroid nodules, and there is no role for TSH suppressive therapy in the management of a benign nodule (17).

Indeterminate results (10–15 % of all FNAs), lacking a distinct cytological diagnosis pose a challenge in terms of next steps for management. Traditionally, an ipsilateral thyroid lobectomy can be performed, preceding to a thyroidectomy if cancer is found. The ATA recommends molecular testing to be considered to establish the risk of malignancy by looking for gene mutations. However, patients who do not undergo surgery must be followed with serial imaging to ensure stability of their nodules (18).

5% of biopsies yield a malignant result and surgery is recommended, typically removal of the lobe containing the biopsied nodule. A suspicious biopsy has a 50-75% risk of malignancy and surgical intervention is normally undertaken (8). Active surveillance can be indicated for low risk papillary microcarcinoma or if the patient has significant co-morbidity or limited life expectation. The management of metastatic thyroid nodules will be influenced by the primary malignancy (8).

The biopsy is typically nondiagnostic or inadequate in less than 5% of cases when an ultrasound is used to guide the FNA (8). A repeat FNA or surgery may be required depending on the risk factors and the growth of the nodule.

Radioactive iodine can be used to treat a hyperfunctioning nodule which has an annual risk of 4% of causing hyperthyroidism (15). Antithyroid drugs, such as propylthiouracil, can be used to treat a patient with hyperthyroidism (hot nodule) but recurrence can occur when the medication is stopped. Surgery may be used for patients with a large thyroid nodule especially if they cause compression of local structures.

Thyroid nodules in pregnancy

Thyroid nodules have been reported to be detected in 3% and 21% of pregnancies (16). It is estimated that 10% of thyroid cancers occurring in the child-bearing age are detected during pregnancy or in the first-year post-partum, the most common type being papillary carcinoma (19). The American Thyroid Association (ATA) recommends utilizing a thorough history, physical examination, TSH and thyroid ultrasound in the work up of a thyroid nodule in a pregnant person. Radionuclide scintigraphy is contraindicated during pregnancy (16). A multidisciplinary approach involving obstetricians, pathologists, radiologists, endocrinologists and surgeons is recommended (11).

The timing of surgical intervention is affected by the type of thyroid cancer. Patients with papillary and follicular thyroid cancer can have surgery during the second trimester or post-partum. There is a risk of teratogenicity and of miscarriage if thyroidectomy is undertaken in the first trimester and premature labor if the surgery is undertaken in the third trimester (11). Medullary carcinoma

or anaplastic cancer require surgery during pregnancy. Pregnancy is not thought to be compromised by thyroid cancer (16). There is no significant difference between the overall prognosis and survival rates for thyroid cancer during pregnancy from that in nonpregnant women with similar disease (11).

Thyroid nodules in children

Thyroid nodules occur in 1.0%–1.5% of children compared to a prevalence of up to 68% of adults at high resolution ultrasonography (20). A thorough history should be undertaken to include whether there has been exposure to radiation and whether there are first degree relatives with MEN (multiple endocrine neoplasm) type 1 and 2. The same steps are undertaken to diagnose the thyroid nodule in adults and in children, and typically an ultrasound guided FNA is undertaken.

The likelihood of a nodule being malignant is approximately 4-5 times higher than in adult patients (21) with more chance of lymphatic and pulmonary involvement at diagnosis (22). Thyroid nodules are more common in girls, malignant thyroid disease is more common in boys, and typically before the age of 10. Like in adults, the most common thyroid malignancy in children is papillary carcinoma. Approximately 5 percent are medullary thyroid carcinomas, most commonly in association with MEN type 2. Of the benign nodules, the nodular type found in Hashimoto disease is the most common (21).

Children with thyroid nodules can be managed in a similar way to adults (22). Benign thyroid nodules that do not enlarge, a conservative approach, with a "watch and wait" approach can be undertaken. Papillary thyroid cancer is usually multifocal, and so require total or near-total thyroidectomy (23). Children at a high risk for developing medullary thyroid carcinomas can have a total thyroidectomy prophylactically during infancy or early childhood (24).

Follow up:

Follow up is determined by a variety of factors, including whether a diagnosis has been reached, the extent of the intervention undertaken and its effect on the thyroid gland, and patient preference. Careful monitoring and repeat biopsies within 1 to 2 months are required with an FNA is inadequate, inconclusive, or indeterminate (25). After subtotal surgery, an ultrasound can be used to monitor the remaining thyroid gland. After surgery, TSH is usually measured annually to detect hypothyroidism. Monitoring of thyroglobulin levels can be used to screen for cancer recurrence after total thyroidectomy for papillary and follicular carcinoma.

Learning points

Thyroid nodules are extremely common and can be detected incidentally through a variety of imaging modalities. Although most thyroid nodules are benign, malignancy needs to be identified, initially with a careful history and clinical examination. The presence of risk factors for malignancy as well as ultrasonic features helps to decide which nodules require more investigation or intervention. Fine needle aspiration cytology is the gold standard to evaluate thyroid cancer risk although molecular marker assessment is evolving, especially for indeterminate cytological diagnosis. Benign nodules typically require no further intervention. Malignant nodules often require surgery in the form of a lobectomy or thyroidectomy depending on tumor type and follow up is required to ensure that there is no recurrence. Thyroid nodules detected in pregnancy are assessed in essentially the same manner as for non-pregnant patients, but thyroid malignancy needs to be timed according to the tumor type. Pediatric nodules have a greater chance of malignancy, particularly for boys. Risk factors such as irradiation and the possibility of familial thyroid malignancy needs to be considered.

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Intrinsic predictive factors for acute and recurrent lateral ankle sprain in active and athlete population: A systematic review

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Abstract

Background: Acute and recurrent lateral ankle sprain are two of the most frequently reported lower limb injuries in the athlete population. Identifying the causative and etiological factors contributing to lateral ankle injury is challenging and it is mostly lagging behind. Understanding the intrinsic factors for lateral ankle injury is crucial for developing preventive measures.

Objective: To identify intrinsic predictors that are associated with increased risk of initial and lateral ankle sprain.

Data source and synthesis: MEDLINE, Web of Science and Google scholar entries electronic from 1970 through to 2015 were searched using the terms ankle sprain, predictors, intrinsic and risk factors. Five relevant studies were identified to fit the inclusion criteria and 19 studies were excluded after reviewing the full text for the following main reasons: subjects recruited from military, age under 15 years, study follow up periods below 3 months and retrospective study design.

Study selection/eligibility: Only prospective (with follow up period of 3 months) studies in English language that were assessing intrinsic factors for lateral ankle sprain in athletes and physically active individuals were included.

Data extraction: Data on research design, study duration, participants, lateral ankle diagnosis, investigated risk factors, odds ratio, confidence interval and other relevant data were assessed.

Result: Five studies were identified with three potential intrinsic factors of ankle sprain; previous ankle sprain and ankle plantar flexion range of motion and with conflicting findings on dorsiflexion range of motion. All of the aforementioned variables were found to increase the risk of lateral ankle sprain with one study reporting increased ankle dorsiflexion range of motion positively influencing the incidence of future ankle injury, while another study contradicted this result and revealed that decreased ankle dorsiflexion range of motion raises the possibility of future ankle sprain.

Limitation: Most studies were not sufficiently powered, with fair to poor quality and with not adequately mentioning concealment and blindness from the outcome measure. Different equipment was used to investigate the variables.

Conclusion: A previous history of ankle sprain as well as ankle plantar flexion strength puts athletes and physically active individuals at risk for initial and recurrent ankle sprain.

Key words: Lateral ankle sprain, Predictors and intrinsic.

Introduction

Initial and recurrent lateral ankle sprain are two of the most frequently reported injuries in both the physically active and athletes. One of the recent descriptive epidemiological studies reported that ankle ligament sprain was the second most common body location of injury in amateur soccer players (1). Bruno et al stated that the incidence of ankle ligament injury in handball, volleyball and basketball players was 52 %. He also found that ankle ligament injury is more prevalent in women volleyball players 13.6% (22). Another study stated that the rate of anterior talofibular ligament injuries was 85.3% of the total ankle sprain that resulted in approximately 50% loss of participation in high school sport matches (2). More than half of injuries were recurrent (3). Carlos and Joao defined lateral ankle sprain as an inversion injury of the ankle (21). Many intrinsic and extrinsic factors have been addressed as a link with lateral ankle injuries such as age, previous injuries, range of motion, dynamic balance and player's position (3,4,5,6). For example V. Hadzic et al's study hypothesised a link between higher plantar-flexion strength and the decrease of active range of dorsiflexion with lateral ankle sprain in male volleyball players. The backdrop of this study was the sample size of participants was too small to generalise the finding (7). Another study conducted by Willems et al concluded that increased dorsiflexion muscle strength, higher extension range of motion at the first metatarsophalangeal joint and less coordination were risk factors for an ankle sprain in female physical education students (8).

Evaluating these variables is critical to develop and implement an effective strategy to prevent and reduce the prevalence of acute and recurrent lateral ankle sprain (3). In addition, it will emphasize on introducing a rehabilitation programme and preventive exercises that will target these variables (4-8). The Evert Verhang paper indicated the importance of pursuing through a transitional research cycle describing seven distinct steps. The first is identifying the burden of disease, the second is describing the theory for causation and aetiology of ankle sprain which is mostly lagging behind. This part is important to be addressed in ankle sprain and would assist in pursuing step six which is implementing an effective preventive program of acute ankle sprain and re-sprain (9). Reviewing systematically the intrinsic factors of lateral ankle sprain is useful to update the sport therapist with recent study results; this would help in appropriately approaching the athlete by using certain indicators (history and examination) to predict the occurrences of lateral ankle sprain.

The aim of this review was to study potential intrinsic risk factors in a systematic fashion and determine what factors contribute to the occurrence of acute and recurrent lateral ankle sprain.

Therefore; prospective studies are needed with a proper study design and sufficientsample size to approach the conclusion.

Method

Protocol:
PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) statement was utilized as a protocol to develop the outline of the study (11).

Eligibility (Inclusion and Exclusion) criteria:
PICOS was the tool strategy to formulate the research question with a huge consideration of FINER criteria (10). Tables 1A and 1B:

Table1 A:

P	Patient	Athletes/Physically active population
I	Intervention	Intrinsic risk factors
C	Comparison	Non
O	Outcome	Ankle sprain or recurrent sprain
S	Studies design	Prospective studies (Cohort and case-control)

Strategy tool used to develop a research question.

Table 1 B:

F	Feasibility	Using adequate study design with adequate sample size
I	Interesting	Interesting as a researcher (Interesting in predictors for ankle sprain)
N	Novel	Updating previous systematic review finding (Not new)
E	Ethical	Approved from Institutional review board (All studies were approved)
R	Relevant	Could influence the clinical practice (Implementation of preventive program)

Considering criteria to develop the research question.

Literature search strategy and data source:
Publications were retrieved by a search of the following electronic database using phrases and search terms that are explained in Table 2:
• MEDLINE
• Web of Science and
• Google scholar

Table 2:

Data base name	Search words used	Date of search	Years covered
Web of Science	Boolean method: 1-Ankle sprain AND Predictors 2-Ankle Sprain AND Risk Factors	9/April/2015	1970-2015
MEDLINE	Boolean method: 1-Ankle sprain AND intrinsic OR predictor	20/April/2015	Past 10 years
Google scholar	1-Lateral ankle sprain + intrinsic risk factors + prospective studies + 2009 - 2015	20/April/2015	Unable to tightly restrict the years

Summary of the electronic database names, terms used, date of search and years covered.

Study selection:
1-Type of studies:
Our search started from March to April 2015 and the studies were included if they met the following inclusion criteria:
• Status and date of publication: we chose published studies from 2009 to 2015.
• Language of the studies: the studies included were only in English language.
• Prospective observational studies (Cohort and case-control)
• Follow up period of at least 3 months (12 weeks)
• Measuring at least one potential intrinsic risk factor for lateral ankle sprain and re-sprain

2-Participants characteristics:
• Gender: participants of any gender (Male, Female)
• Age: adult (above 18 years)
• Physically active or athletes
• Medical problem: subjects without history of lateral ankle sprain or with a previous history of ankle sprain.

3-Type of outcome measure:
• Measuring the occurrences of acute and recurrent ankle sprain.

A definition of initial ankle sprain and re-sprain was made based on mechanism of injury, symptoms with or without physical examination Table 3.

Table 3 explains the definition of initial, recurrent ankle sprain and chronic ankle instability

Term	Definition
Initial ankle sprain (4,5,14,17)	Non-contact inversion injury of ankle that produced more than one day hematoma, pain and swelling and forced the player to be absent from at least one scheduled game or practice
Recurrent ankle sprain (4,5,7,14,17)	History of previous one ankle sprain

Any studies that described ankle sprain in general terms, use of cadaveric and animal models and analytic design were rejected. Unpublished papers and papers from other languages were excluded from the study. Also, ongoing studies, review articles and abstracts from conference meetings were rejected. Studies with participant numbers below 25 and with no clear primary outcome were excluded.

The following predictors, identified from previous studies as potential risk factors for lateral ankle sprain and re-sprain were history of previous ankle sprain, questionnaires (CAIT and FAOS), anthropometric (Height, Weight, BMI), clinical exam (Anterior drawer test, foot type, rearfoot deformities and hallux position), postural balance test, ankle range of motion (dorsiflexion and plantar flexion), ankle strength (dorsiflexion and plantar flexion), foot lift test, leg heel angle, foot internal rotation angle in plantar flexion, mortis test, Navicular Medial Maleollous distance and mortis test.

Data Extraction:
Data on research design, study duration, participation, lateral ankle sprain diagnosis, investigated risk factors, odds ratio (ORs), confidence interval (CI 95%) and any other data that the reviewer deemed relevant were extracted and summarised in Tables 5, 6, 7. The data from the included studies were extracted by one reviewer and verified by the second reviewer. Any disagreements were resolved by meeting and if necessary; a third party was involved.

Quality assessment:
Modified Downs and Black checklist was used to assess the methodological quality of all non-randomised (observational) studies (12). This checklist was created by Downs S and Black N 1998 who showed how to produce a non-randomised studies checklist for their quality assessment. It consists of 32 items (13). Janice J ENG et al made some modification in the checklist because they found the last question in the checklist was ambiguous and difficult to score (Power of the sample size) and decided to score it as 0 if the sample size was not present and 1 if the power calculated. Therefore; after this modification the score range became between 0 to 28 with four quality levels (12,18), Table 4. This methodological quality assessment was used to reduce the number of researchers bias during the data collection stage. Level of evidence was evaluated using Oxford CEBM (Centre of Evidence Based Medicine) recommendation (20). Tables 4a and 4b:

Table 4a:

Modified Downs and Black	
Quality levels-Qualitative	Quantitative
Excellent	26-28
Good	20-25
Fair	15-19
Poor	Less than 14

Table 4b:

CEBM of Oxford – Level of evidence (March 2009)	
Level of evidence	Characteristic of study
1a	SR (heterogeneity) of RCT
1b	Individual RCT (with narrow CI)
1c	All or none RCT
2a	SR (heterogeneity) of cohort studies
2b	Individual cohort study or low quality RCT <80% follow up
2c	Outcome research; ecological study
3a	SR (homogeneity) of case-control studies
3b	Individual case-control study
4	Case series and (poor quality cohort and case control)
5	Expert opinion

Result

Study selection:
The search strategy identified 1,663 titles. Following title and abstract screening, 24 relevant articles were found. Only 5 met the inclusion criteria (Figure 1). All of the included studies were prospective (Cohort and case-control) (4,5,7,14,17). The five included studies had follow up periods that varied between 6-13 months (4,5,7,17). Participants were adolescents in one study (7), and adults in the remaining four studies (4,5,7,14,17). In all studies the inclusion criteria were index with no history as well as with previous history of one or multiple lateral ankle sprains (4,5,7,14,17). Participants were recruited from various settings; university (5), college (4), Norwegian 1st,2nd and 3rd divisions soccer teams (14), Slovenian 1st and 2nd division volleyball teams (7) and fourth division professional soccer teams (17). The predictors of initial and recurrent ankle sprains measured were ankle dorsiflexion (DF) range of motion (4,5,7,17), ankle plantar-flexion (PF) range of motion (7,17), ankle DF and PF strength (7,17), postural dynamic balance (5,7), static balance (5,14), questionnaires; CAIT (5) and FAOS (14), history of ankle sprain (5,14,17), anthropometricdata (Height, weight and BMI) (14,17), Mechanical stability of ankle with anterior drawer test (14,17), foot and first toe biomechanics (14) and angles of; leg-heel, plantar-flexion, mortis test and NMMD (4).

Study characteristics:
Study characteristics (Author's name, years of publication, type of the study, location of the study, follow up period, total participants number, inclusion and exclusion criteria, predictors, outcome measure and the conclusion) are summarized in tables 5, 6 and 7 from all included studies.

Table 5: Study characteristics

Author /year	Type of study/Location	Follow up period	Participants	In /Exclusion criteria
Verdan et al (2009) (7)	-Prospective; Observational study -Slovenia	6 months	-Total 38 -Only male -Age:15-34 years -Two groups: injured and controlled	-Inclusion: male playing volleyball -Exclusion: not clear
De Noronhan (2013) (5)	-Prospective study -Brazil	13 months	-Total 125 -Male +Female -Age:18.2-23.6 -Two groups: injured and controlled	Inclusion: physically active university students Exclusion: no neurological, *MSK, vestibular and ankle sprain less than a month.
Takumi Kobayashi et al (2013) (4)	-Case-Control -Japan	12 months	-Total 191 -Male +Female -Age:18-21 -Two groups: injured and uninjured	Inclusion: Intercollegiate athletes who participate in jumping and cutting motions (badminton, baseball, basketball, volleyball and soccer) Exclusion criteria: Not daily training or who were training for personal reasons, injuries, illness, medical risk, communication disability, mental disturbance
A. H. Engebretsen et al (2009) (14)	-Prospective cohort study -Norway	3 to 6 months	-Not clearly mentioned	-Inclusion: amateur soccer player -Exclusion: those who did not speak Norwegian and injuries were not recorded by physiotherapists
Konstantinos Fousekis (2012) (17)	-Prospective Cohort study -Greece	-10 months	-Total of 115 -Gender not clearly mentioned -Two groups: with and without sprain	-Inclusion: professional soccer players were training regimen (6-7 days of training per week) with one game per week with no ankle injury before 6 months and contact ankle sprain

*MSK: musculoskeletal,

Table 6: Study characteristics

Author	Predictors	Main outcome measure	Conclusion / Quality Assessment score (QAS)/Level of evidence (CEBM –Oxford)
Verdan et al (2009) (7)	-Postural dynamic balance *(BBS in the following axis *MLSI, *APSI and *OSI) with bilateral stance and opened eyes (20 *sec) -*DF and *PF concentric strength using (BBS, dynamometer) -DF and PF *ROM using sitting position and (goniometer)	-Acute lateral ankle sprain -Lateral ankle re-sprain -Knee injury -Navicular bone fracture	-High PF strength and decrease in DFROM were important predictors of lower limb injury including ankle sprain. -(QAS 12). -(CEBM:4)
De Noronhan et al (2013) (5)	-*CAIT - Ankle DF ROM with weight bearing lunge test (trigonometry) -Postural dynamic balance *SEBT (*A, *PL and *PM direction) -Motor imagery using (computer program) -*HX/O ankle sprain -Foot lift test with eyes closed (30 sec)	-Acute lateral ankle sprain -Lateral ankle Re-sprain	-DFROM were not confirmed as predictors for ankle sprain -H/XO of previous ankle sprain is a predictor of future ankle sprain -Better performance on the SEBT in the PL direction was considered as a protective against ankle sprain. -(QAS 18). -(CEBM:2b)
Takumi Kobayashi et al (2013) (4)	-DF ROM with weight bearing lunge test (inclinometer) -Leg heel angle (goniometer) -Foot internal rotation angle in plantar flexion (goniometer) -Mortis test -Navicular Medial Malleolus Distance (NMMD) (digital caliper)	-Lateral ankle sprain -Lateral ankle re-sprain	-Ankle ROM with maximal dorsiflexion (>49.5 degrees) could participate in future re-sprain -Abnormal talocrural kinematic (NMMD) was a predictor factor for an initial lateral ankle sprain. -(QAS 14). -(CEBM:4)
A. H. Engebretsen et al (2009) (14)	-Previous ankle sprain -*FAOS questionnaire -Single leg balance test (on floor and mat) with opened eyes 60 sec and closed eyes 15 secs -Clinical examination: Foot type Rearfoot deformity Halluxs position Anterior drawer test ROM (in supine and prone) -Also height, weight, *BMI	-Lateral ankle re-sprain	-Previous ankle sprain and FAOS sub score were found to be significant risk factors for new acute ankle sprain. -(QAS 14). -(CEBM:4).
Konstantinos Fousekis et al (2012) (17)	-Anthropometric data (Weight, height, BMI) -Isokinetic (eccentric and concentric) muscle strength of ankle DF and PF (Biodex system dynamometer) -Ankle flexibility: DF and PF ROM (goniometer) -Proprioception using (kinesthetic stabilometer) -Lower limb length (from greater trochanter to the ground) -*ADT	- Acute lateral ankle sprain	-3 significant predictors of lateral ankle sprain were revealed from the study: asymmetry in the eccentric strength of both ankle DF and PF, increase in the BMI and increased in the body weight -(QAI 17). -(CEBM:2b).

(Table 6) *BBS: Biodex Balance System, MLSI: medial-lateral stability index, APSI: anterior –posterior stability index, OSI: overall stability index, sec: second, DF: dorsiflexion, PF: plantar-flexion, ROM: Range Of Motion, CAIT: Cumberland Ankle Instability Tools, SEBT: Star Excursion Balance Test, A: Anterior, PL: Posterolateral, PM: Posteromedial, H/XO: history of, FAOS: Foot Ankle Outcome Score, BMI: body mass index and ADT: Anterior Drawer Test.

Table 7:

Study name	Variables	OR/coefficient	CI (95%)	P-Value
de Noronhan et al (5)	1-Hx/O previous ankle sprain	0.795	1.07-4.57	0.03
	2-SEBT PL	-0.432	0.92-0.99	0.03
Verdan et al (7)	1- PF strength	1.2	1.04-1.43	0.05
	2-Active ankle DFROM	0.63	0.41-0.97	0.07
Engebretsen et al (14)	Previous ankle injury	1.95	0.99-3.84	0.05
Konstantinos et al (17)	1-Eccentric ankle DF and PF strength asymmetry	8.88	1.95-40.36	0.005
	2-BMI	8.16	1.42-46.63	0.018
	3-Weight	5.72	1.37-23.95	0.17
Kobayashi et al (4)	1-NMMD	1.419	1.12-14.30	0.025
	2-Ankle DFROM	0.115	1.05-1.20	0.000

Table illustrates study name, variable measured by regression model, OR: odd ratio, CI: confidence interval and the P-value. No study was rated as having excellent methodological quality. Two studies had fair methodological quality with score 17 and 18 (5,17). Methodological quality was poor in three studies; less than 14 (4,7,14). No study was rated as having excellent methodological quality. Only one poor quality study concluded an association between increase in NMMD and lateral ankle sprain (4).

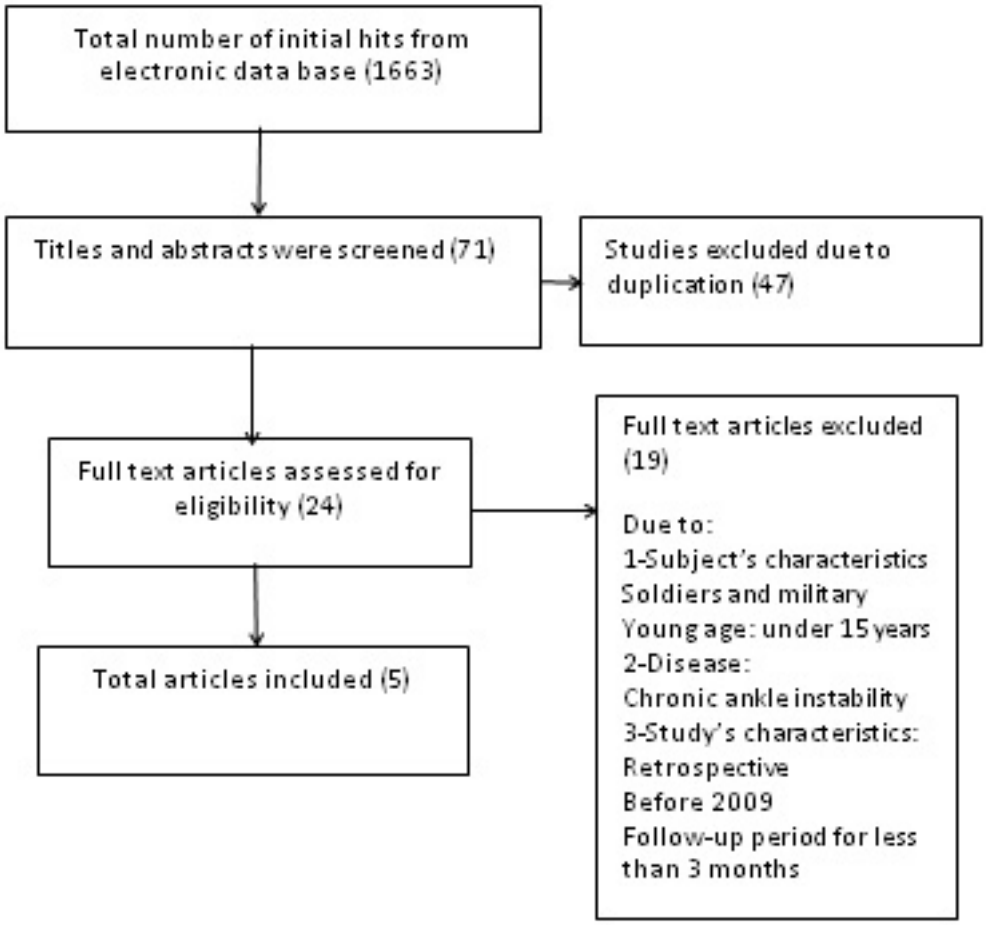

Figure 1:QUOROM (Quality Of Reporting of metanalysis) flow chart diagram of the review process

Discussion

This systematic review presents a observational studies concerning intrinsic risk factors (personal-related) that could identify players at increased risk of initial and recurrent lateral ankle sprain. Most of the studies were conducted between 2009 to 2014.

Previous history of ankle sprain:
Despite using different statistical tools to analyse the result; two prospective studies showed a significant relation between previous lateral ankle injury and future ankle sprain(5,14). Engebresten et al added in their study that this risk increases with the number of previous ankle injuries and decreases with the time since the last injury (14). Rachel and Todd 2011; investigated the effect of previous ankle sprains on predicting future ankle sprain on athletes. They concluded from 3 studies that athletes were at high risk of ankle sprain if they have a history of ankle injury (15).

Niyonsenga and Philips 2013 also found a link in their retrospective study between previous was not eligible for our systematic review because the authors chose to conduct less reliable study design (retrospective) with no follow up period.

The aforementioned results further support our findings that a previous history of lateral ankle sprain increases the risk of future ankle sprain.

Tropp et al's study showed that players with previous history of ankle sprain did not run ahigher risk of future ankle sprain compared to players without previous injury. They explained that if ankle with previous ankle injury that did not impair the functional stability it will not put the athletes at risk for ankle injury (23).

Dorsiflexion range of motion:
From the studies there were conflicting results regarding ankle dorsiflexion range of Motion (DFROM). One study did not confirm that ankle DFROM as a risk factor for acute and recurrent ankle sprain (5). While Kobayashi 2013; found that athletes with increased ankle DFROM with a cut point of 49.5 degrees exhibited more risk for recurrent lateral ankle sprain (4). This similar result was reported by Niyonsenga and Phillips 2013, but by using different procedure (subjects were sitting and goniometer was used) (16). Both Kobayashi 2013 and de Norhan's 2013 studies utilized K. Bennell et al's method to measure ankle DFROM (19).
Verdan et al indicated the decreased active ankle DFROM below 16 degrees associated with recurrent lateral ankle sprain; this finding was not statistically significant (p value: 0.07). In addition it used a different protocol to measure DFROM; subjects were in sitting position (7).

One systematic review reported conflicting evidence on ankle DFROM as a proportion of initial and recurrent ankle sprain in a mixed population (athletes, students, patients and infantry and army recruits) (20).

Ankle strength:
Two authors reported an association between ankle strength with ankle injuries. Both utilized Biodex system and dynamometer with ankle Dorsi-Flexion (DF) and Plantar-Flexion (PF) (7,17).

Konstantions et al concluded that more than or equal to 15% asymmetries of dorsiflexion and plantar-flexion eccentric strength in the ankle joint had 8.8 times to sustain noncontact ankle sprain (17). Verdan et 2009; suggested that bilateral concentric strength differences in both PF and DF was higher in previously injured athletes. Both were clinically significant, but with low statistical value (p: 0.068 for PF differences and p: 0.092 for DFdifferences) (7). This study did not measure eccentric strength as done in Konstantinos study.

Postural dynamic balance:
Only two studies evaluated postural dynamic balance using different equipment (5,7). One study examined the balance by utilising Biodex Balance system and platform and it found no relation between balance deficiency and ankle injury (5). While the other study measured the balance manually by the Star Excursion Balance Test in 3 directions and revealed a protection effect of better reach in posterolateral direction and future ankle sprain (7).

BMI and weight:
Two studies provided valuable information regarding body weight and BMI in relation to the occurrence of future ankle sprain (14,17). They were conflicting each other; one reported that the higher BMI and weight (23.1 and 72.6 kg) respectively have been recognized as potential risk for ankle joint injury (17). While the other did not find a relation between weight and BMI and ankle injury (14).

Other variables:
Studies did not confirm the following variables as predictors for initial and recurrent lateral ankle sprain:
- CAIT questionnaires and central programming (motor imagery) (5)
- Active ankle plantar-flexion range of motion (5,7)
- Single leg stance-balance test (14)
- Height (4,14)
- Angles: leg to heel and foot internal rotation and mortis test (4)
- Postural dynamic balance
- Static balance (5,14)
- Foot type, rearfoot alignment and hallux position (14)
- Anterior drawer test (14,17)

Limitation:
Limitations of review process included: there were differences in studies' quality and restriction to English-language publication. There was heterogeneity in an index and case definition across the study. Most studies were not sufficiently powered, with fair to poor quality and no adequately mentioned concealment and blindness from the outcome measure.

Different equipment was used to investigate the variables.

Conclusion

In athletes and the physically active population, the primary factors that appear to put individuals at risk for acute and recurrent ankle sprain are previous history of ankle injuries,asymmetry in ankle plantar flexion strength and change in ankle dorsiflexion range of motion. Therefore; addressing these risks is crucial in order to develop and implement an effective preventive (screening) and intervention program in the clinical practice. There is a requirement for high quality prospective studies with more homogenous subjects and consistent definitions of acute and recurrent lateral ankle sprain. This will allow others to conduct meta-analyses that would pool the results of multiple primary studies to explore how the presence of combined factors affects ankle sprain risk.

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Sulfonylureas and Mortality Risk

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Abstract

Sulfonylureas are a group of anti-diabetic medications, commonly used in the management of Type 2 diabetes mellitus. Sulfonylureas have been used as a second line option after metformin world-wide for better glycaemic control for the last few decades. Recently newer evidence has emerged highlighting the adverse effects of sulfonylureas in terms of increased cardiovascular risks, stroke risk and increased mortality overall. Despite this Sulfonylureas are still used commonly as being cost effective.

This article focuses on literature review giving evidence around sulfonylureas and associated mortality risks.

Key words: sulfonylureas, mortality, evidence base

Introduction

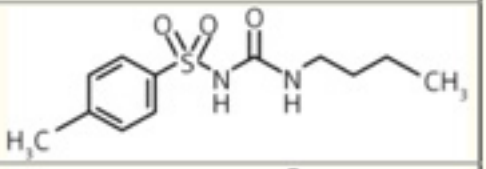
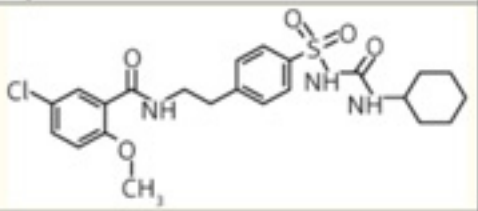
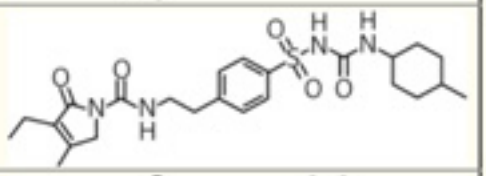
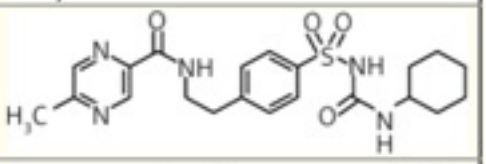
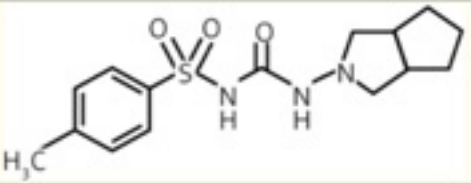
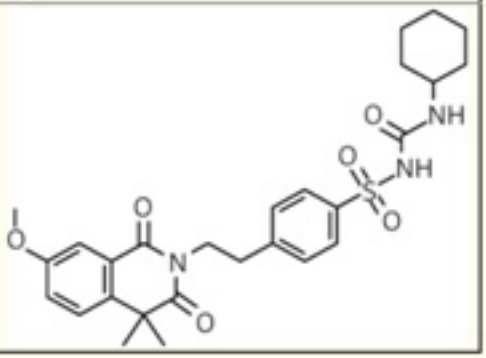
Sulfonylureas (SU) are a group of medications used in the treatment of Type 2 diabetes mellitus (T2DM). Sulfonylureas were first discovered in 1942 when Marcel Janbon found that some sulfonamides lowered blood sugar levels in experimental animals. Carbutamide was the first SU synthesised and used in the management of T2DM but was withdrawn subsequently due to its bone marrow toxicity. Since the 1960s, several sulfonylureas have been made available and are classified into first and second generations varying in their pharmacodynamic and pharmacokinetic properties (Figure-1) (1).

First generation SU can cause more hypoglycaemia and are not prescribed as frequently nowadays. The second generation SU have replaced the first generation in clinical use as these can be used in smaller doses and have more potency and safety as compared to the first generation SU. Also, second generation SU are usually preferred when there is poor kidney function (2)(3). The first generation group have longer half-lives, more risk of hypoglycemia and more drug interactions as compared to the second generation group (4).

Sulfonylureas act by increasing the release of insulin from Pancreas and are only effective when there is residual pancreatic β-cells function and this is the reason for their effectiveness in T2DM rather than Type 1 diabetes. SU act by blocking the K-ATP channels in pancreatic β-cells, causing reduced K+ permeability and increasing intracellular depolarisation. This causes opening of voltage dependent Ca+ channels causing calcium influx in pancreatic β-cells, triggering exocytosis of preformed Insulin granules within pancreatic β-cells (Figure-2) (1) (5).

Although Sulfonylureas are commonly used in the management of T2DM worldwide, they do carry potential side effects which include risk of hypoglycemia, weight gain and allergic reactions during the first 6 to 8 weeks of treatment (6). This literature review has looked at the effects of SU in terms of cardiovascular mortality, stroke and risk of death.

Various generations of sulfonylureas

Molecules	Gen.	Dose [mg]	Duration of action* T1/2	Activity of metabolites T1/2	Elimination	Structure
Tolbutamide	I	500–2000	Short 4.5 to 6.5 h	Inactive	Urine ≈ 100%	
Glibenclamide	II	2.5–15	Intermediate to long 5 to 7 h	Active 10 h	Bile ≈ 50%	
Glimepiride	II	1–6	Intermediate 5 to 8 h	Active 3 to 6 h	Urine ≈ 80%	
Glipizide	II	2.5–20	Short to intermediate 2 to 4 h	Inactive	Urine ≈ 70%	
Gliclazide	II	40–320	Intermediate 10 h	Inactive	Urine ≈ 65%	
Gliquidone	II	15–180	Short to intermediate 3 to 4 h	Inactive	Bile ≈ 95%	

*Short duration of activity means < 12 h, intermediate 12–24 h, long over 24 h.

Figure 1 – Taken from Sola D et al – Various generations of Sulfonylureas and their properties (1)

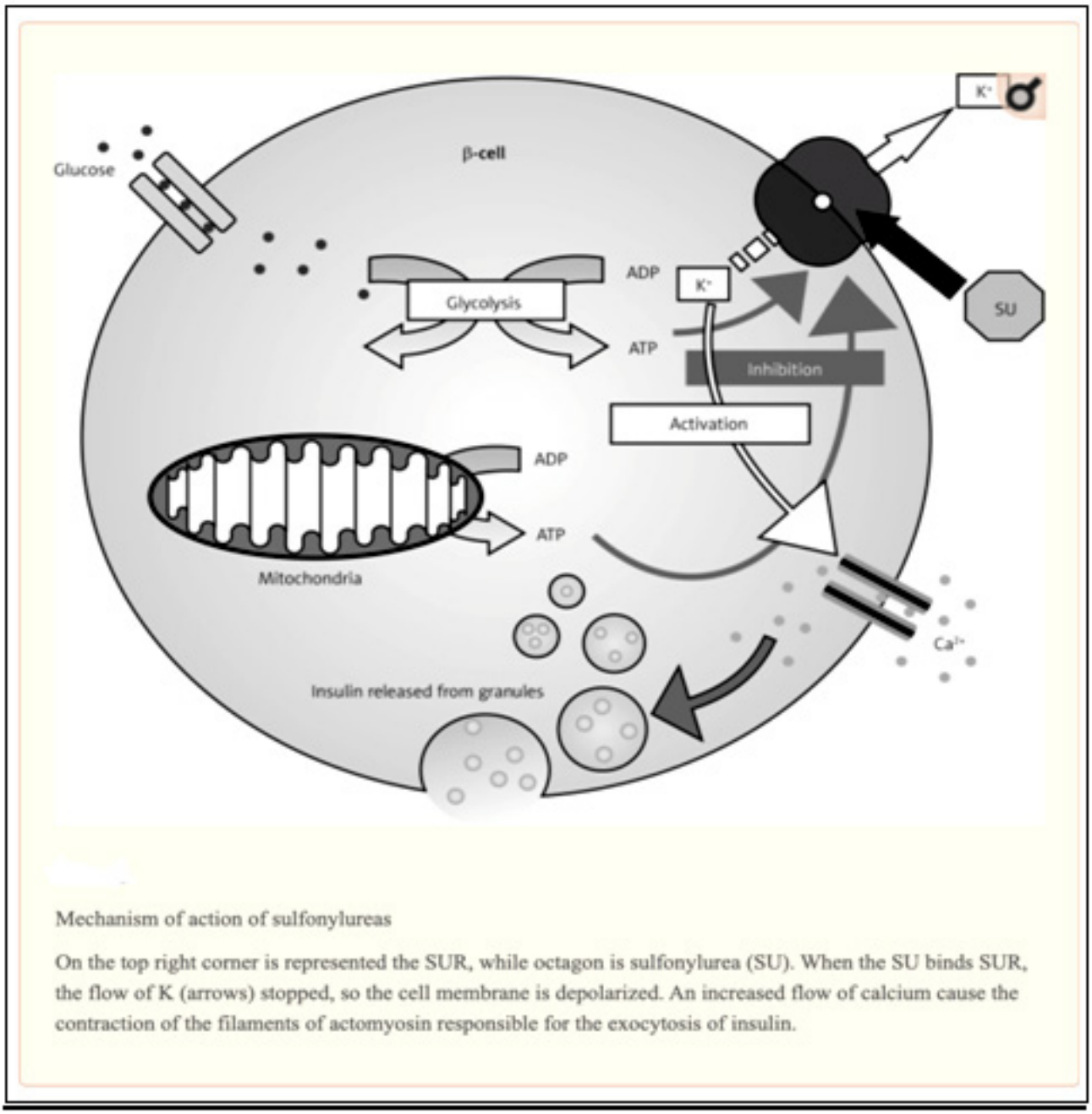


Figure 2 – Taken from Sola D et al – Mechanism of Action of Sulfonylureas

Literature Review

It is well established that T2DM itself is associated with various complications including increased risk of cardiovascular mortality as well as morbidity. Apart from this risk associated with T2DM, there is an increased interest if certain antidiabetic medications can influence the cardiovascular risks and outcomes. As sulfonylureas have been the second most commonly used antidiabetic medications after metformin, there have been increased concerns around their cardiovascular safety profile (7). The University Group Diabetes Program (UGDP) conducted a long-term prospective trial, evaluating the effects of Tolbutamide, a first generation SU in prolonging patients' life. The study showed that the Tolbutamide treated group had a higher risk of cardiovascular mortality and all-cause mortality than any of the other treatment groups (8).

Douros et al's population-based cohort study looked at patients with T2DM who were already on metformin and were either switched to SU or had SU added as second line treatment. The study looked at if there was an increased risk of ischemic stroke, myocardial infarction, cardiovascular death and all cause mortality with SU use. The study looked at patients with T2DM who started metformin between 1998 to 2013. After a mean follow up of 1.1 years, SU use was associated with an increased risk of myocardial infarction (incidence 7.8 vs 6.2 per 1000 patients), increased all cause mortality (27.3 vs 21.5), increased risk of ischemic stroke (6.7 vs 5.5) and increased cardiovascular deaths (9.4 vs 8.1) (9).

A systematic review of 31 published observational studies looked at the risk of acute myocardial infarction (AMI) with use of sulfonylureas, metformin and glitazones use in T2DM patients. Sulfonylurea use increased AMI risk

by 24% when compared to metformin. The relative risk of AMI for sulfonylureas vs metformin was 1.24 (CI 1.14-1.34) (10). Azoulay et al (2017) described 6 observational studies with no major biases that assessed the cardiovascular events and all-cause mortality with sulfonylurea vs metformin use and looked at major adverse cardiovascular events (MACE) and myocardial infarction. A summary of all 6 observational studies is given as under showing relative risks (7).

A meta-analysis of 115 selected trials with a duration of 6 months, compared sulfonylureas with other oral anti-diabetic medications. From 115 selected trials, 62 trials reported information on major cardiovascular events and 30 reported one event at least. In T2DM, SU use was associated with increased risk of stroke and increased mortality (11). Garratt et al (1999) looked at the impact of SU on outcomes in diabetic patients undergoing direct coronary angioplasty after acute myocardial infarction. The trial looked at 67 diabetic patients taking oral SU and 118 patients not on SU. The results showed that the hospital mortality was significantly high among the SU treated group vs those not on SU (24% vs 11%). The study showed sulfonylurea usage was associated with a higher risk of in hospital mortality among diabetic patients having coronary angioplasty after myocardial infarction (12).

Discussion

Sulfonylureas have been used as second line anti-diabetic medications in the treatment of T2DM for a long time. Despite strong recommendations, in many instances SU are also used as first line anti-diabetic medications where metformin is not appropriate to use (13). As per the previous American Diabetes Association (ADA) and European Association for the study of diabetes (EASD) published guidelines, SU were recommended as second line agents in the management of T2DM after metformin and have been widely used as anti-diabetic medication worldwide (14). SU represent an important class of drug in patients who do not achieve ideal glucose control on metformin therapy alone. SU are inexpensive and per dose cost is much lower than the newer anti diabetic medications including Sodium glucose co-transporters 2 inhibitors (SGLT-2i).

Recently, a lot of evidence has emphasized that SU are associated with increased risk of cardiovascular disease, risk of stroke and overall risk of mortality. Many clinical trials and observational studies have shown similar results as discussed in literature review.

A large retrospective cohort study looked at risk of cardiovascular death and risk of heart failure among 253, 690 patients started on SU vs metformin from 2001 to 2011. There was an increase in cardiovascular risk in the SU group compared to metformin initiators, hazards ratio 1.21 (CI 1.13 – 1.30) (15). A population-based cohort study of adults ≥ 35 years of age with T2DM between 2004 to 2014, looked at MACE with SU use within different ethnic groups. With a total number of 208,870 patients, 13,755 were South Asians, 172,244 were Canadians and 22,871 were Chinese population; the MACE and mortality were higher in the South Asian and Chinese population (16).

Similar results have been seen with different studies as mentioned in the literature review above. In general SU use is associated with increased risk of ischemic stroke, myocardial infarction, risk of overall mortality in patients with T2DM who are already at increased risk of these complications given their diabetes (7) (9)(12).

Author	Study design	Comparison	Outcome(s)	Relative risk[a] (95% CI)
Cardiovascular events				
McAfee et al. (21)	Cohort	Sulfonylureas vs. metformin	MI and coronary revascularization	1.30 (1.04–1.61)
Schramm et al. (38)	Cohort	Glimepiride vs. metformin	MACE	1.32 (1.24–1.40)
		Glyburide vs. metformin	MACE	1.19 (1.11–1.28)
		Glipizide vs. metformin	MACE	1.27 (1.17–1.38)
		Tolbutamide vs. metformin	MACE	1.28 (1.17–1.39)
Roumie et al. (43)	Cohort	Sulfonylureas vs. metformin	MACE	1.16 (1.08–1.25)
All-cause mortality				
Gulliford et al. (11)	Cohort	Sulfonylureas + metformin vs. metformin	All-cause mortality	0.95 (0.64–1.40)
Azoulay et al. (29)	Nested case-control	Sulfonylureas vs. metformin	All-cause mortality	1.43 (1.33–1.56)
Wheeler et al. (46)	Cohort	Glyburide vs. metformin	All-cause mortality	1.38 (1.27–1.50)
		Glipizide vs. metformin	All-cause mortality	1.55 (1.43–1.67)

MACE, major adverse cardiovascular event; MI, myocardial infarction. [a]Relative risk is used as a generic term for rate ratio, HR, and odds ratio.

Figure 3 – Taken from Azoulay et al – Observational studies comparing cardiovascular safety of SU (7)

Conclusion

Sulfonylureas have been in use for decades as second line medications in management of T2DM. Although they are quite effective medicines, their use has been associated with more risk of mortality and deaths in terms of cardiovascular disease and stroke. Their use should be limited as newer antidiabetic medication groups now can be used and are recommended in the management of T2DM. Metformin still remains the drug of choice in T2DM and for further glycaemic control newer medicines are a better option.

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Diabetic Foot Disease and its Management

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Introduction

Diabetic foot ulcer (DFU) without treatment and regular review will progress from an ulcer to an infection (1). An estimated 10-15% of people with diabetes will have a DFU at some point in their lives. More than 80% of the amputations in patients with diabetes are due to DFU. This makes diabetes the most common cause of non-traumatic limb loss greatly impacting the quality of life of patients and their families. It is associated with major morbidity and mortality (2).

National Institute for Clinical Excellence (NICE) recognized the need for detailed and structured guidelines to be applied across all the National Health Service (NHS) areas that care for patients with DFD (2). The main aim of this guideline was to avoid variation in clinical practice both in primary and secondary care and to ensure adequate training and expertise is available when managing these patients.

The guidelines may also help standardize the non-surgical care of DFU in a multi-disciplinary (MDT) diabetes foot clinic setting. It also looks at different aspects of the care from conservative management using dressings to assessing the risk and management of infections (2). When there has been a delay in seeking medical review of affected foot lesion, it has resulted in a 25-50% risk of immediate amputation by the first clinical encounter with the health professionals (3).

Background

Diabetes is a serious chronic metabolic disease. The prevalence has increased from 108 million in 1980 to 422 million in 2014. The World Health Organization (WHO) estimates a 114% increase during the next 20 years leading to the emergence of 330 million new cases. The International Diabetes Federation (IDF) estimated that the total global health-care spending on diabetes has more than tripled over the period from 2003 to 2013. This was due to the increase in those affected and, as a result, an increase in spending per capita on diabetes. Beyond the financial costs, diabetes was the direct cause of 1.6 million deaths globally in 2015 (5,6).

Poor diabetes management was associated with micro and macro-vascular complications such as nephropathy, neuropathy, and retinopathy that damage vital organs and the development of foot ulcers that could result in lower extremity amputations (7). DFU has received more attention because of the high rates of amputation and mortality (8).

In addition to the physical and psychological costs to the individual, the societal costs of diabetes care are staggering. In 2011, the cost to the NHS (UK) was almost £10 billion. This formed 10% of the total NHS budget and most of this cost (80%) was spent on managing avoidable complications. When indirect costs, which included potential loss of productivity due to sickness for example, were added, the cost increased to £23.4 billion (9).

Foot disease in Diabetes

This disease is defined as a “foot affected by ulceration that is associated with neuropathy and/or peripheral arterial disease (PAD) of the lower limb in a patient with diabetes” (10). If the ulcerated lesion affects the toes and if it is not treated adequately, it may lead to toe necrosis and gangrene (11) and eventual amputation. Overall, it is estimated that approximately 50-70% of all lower limb amputations are due to diabetes (12). In England, approximately 60,000 people with diabetes present with DFU annually and the rates of recurrence of foot ulcers are greater than 50% after three years (13). The five-year mortality rate for these patients is around 50% (12).

DFD poses a significant economic problem, particularly if amputation results in prolonged hospitalization, rehabilitation, and an increased need for home care and social services input (14). In 2014-15, the annual cost to the NHS was estimated at £1 billion; this is in addition to the high personal and social costs (£972m–£1.130bn) of reduced mobility and sickness absence which is equivalent to 0.7–0.8 percent of the entire NHS budget (12). As primary care clinicians, we need to make our patients aware of these risks to prevent ulcer formation in the first place, and once affected by ulcers, to prevent their recurrence.

An infected foot is the outcome of progressive vascular and neurological damage caused by persistent chronic hyperglycaemia. Additionally, peripheral diabetic neuropathy is present in almost 100% of these patients (12).

Due to acute hypoxia and infection, the tissues develop an ulcer which may lead to extensive necrosis and gangrene often requiring amputation if left untreated (15). With dry gangrene, blood supply is impaired to the affected area due to peripheral vascular disease (PVD); consequently, the tissue dries up and a well-demarcated area is noted often leading the affected area of the digit to auto-amputate eventually (16). Infection is usually not present with dry gangrene; but when present, the lesion progresses to wet gangrene which, if it is not treated rapidly, can spread and lead to sepsis. This makes wet gangrene a very serious and potentially life-threatening condition (17).

There are two main types of conditions leading to ulceration: neuropathic and neuro-ischaemic foot (18). This classification by Pecoraro et al. (1990) was published in 1990 but it is still relevant to current day practice as explored by both papers of Dalla Paola et al. (2006,2015) (19, 20):

1. Neuropathic foot develops ulceration at the sites of high mechanical pressure usually on the plantar surface. It is usually difficult to treat these ulcers due to the loss of protective sensitivity to pain and the weakening of the intrinsic foot muscles giving rise to foot deformity. Therefore, insults and infection proceed rapidly.

2. Neuro-ischaemic foot has both neuropathy and ischaemia. It develops ulcers on the margins of the foot and toes often at sites of pressure from poorly fitted shoes. This pressure is unperceived by patients because of a coexisting neuropathy.

In a systematic review of available literature published between 1980 and 2003, Jupiter et al. (2016) examined the role of foot ulceration on mortality. They identified common risk factors for death in patients presenting with foot ulceration and amputation which were: increased age, male gender, peripheral vascular disease and renal disease (21, 22). Shahbazian et al. (2013) identified statistically significant risks for DFU (22) with similarities to Jupiter et al.'s paper (2016) (21). Patients in the higher-risk groups in Shahbazian et al.'s paper (2013), had higher age, longer diabetes duration, retinopathy, and higher HbA1C (p=0.0001, 0.001, 0.005, 0.0001 respectively) (22). However, patients' gender and nephropathy risks were different between the two papers (21, 22). Yazdanpanah et al. (2015) described localized contributors for ulcer formation including peripheral neuropathy which can cause local trauma leading to the formation of the ulcer. General reasons included uncontrolled hyperglycaemia, as an example (23).

Management of established DFD

NICE in its latest guidance focused on the importance of managing the causes which lead to amputation such as uncontrolled infection. It highlighted the important role the multi-disciplinary diabetic foot clinic plays in the prevention and the management of DFD and DFU (2).

To examine clinical outcome of the care provided by the MDT foot clinic, the relevant literature that explored different treatment options available for the management of a DFU as well as the necrotic toe were reviewed. A structured search was carried out using OVID/MEDLINE, Google scholar, and the Web of Science databases looking for cohort studies, conference abstracts, systematic reviews or case reports, and clinical trials on the management of infected and/or necrotic toe in a diabetic foot. The searches were limited to studies published in English between 2000 and 2016, on adult humans over 18 years old, diagnosed with T1DM or T2DM.

The key words used included: necrotic toe, auto-amputation, T1DM, T2DM, gangrene, dry gangrene, diabetic foot, and amputation. In total, 192 papers were identified in OVID and an additional 170 papers from Google scholar and PubMed combined. Web of Science search yielded no results. Out of the 192 papers from Ovid, only 30 were suitable for this project; another 35 from Google scholar/PubMed included the key words. Treatment options for this patient population were divided into conservative management, antibiotics therapy, surgical management, and auto-amputation. Below is a brief description of each option.

Conservative management:
Appropriate ulcer dressing is an essential part of foot care once ulcers are established. The choice of the dressings depends on the characteristics of the ulcer but the main aim is to alleviate symptoms such as pain, provide wound protection, and to encourage healing. Non-adhesive dressings are simple, inexpensive, and well tolerated. Foam and alginate adhesive dressings are highly absorbent and are effective in heavily exuding ulcers. For DFU treatment, non-adhesive dressings usually fulfil all the requirements (24, 25).

Snyder et al. (2014) sought to develop a consensus statement for the use of offloading in the management of DFU. They found that off-loading was important but they recognised the difficulty in applying this in clinical practice usually due to the lack in patient adherence to the use of the offloading devices (26). This is a common problem encountered by those who treat DFU in primary as well as in secondary care. The use of a non-removable cast has recently been shown to be a more effective treatment choice than a half-shoe for the management of plantar neuropathic ulcers.

This is important when making recommendation to patients who may develop plantar ulcer to prevent the progression to infection or necrosis (20). Simple offloading techniques may include casts and boots, sandals, half shoes, or felted foam dressings. In a systematic review and meta-analysis of offloading methods for the treatment of DFU, Elraiyah et al. (2016) found that benefits were demonstrated when total contact casting and irremovable cast walkers were used. The results of this review were based on low quality evidence and they found that the risk of bias in the included studies was moderate; so results should be interpreted cautiously (27).

A substantial number of patients with diabetes are often elderly who may suffer from peripheral neuropathy and/or PVD and who may have difficulty accessing medical care. These patients are at a higher risk of foot ulceration and would benefit from preventive foot care such as appropriate footwear, especially as some are frail with multi co-morbidities. When ulcers occur, early and effective conservative management is critical because surgical intervention in these patients, if required, may not be possible due to this complex profile (28).

Management with antibiotics therapy:
Infections in the feet of patients with diabetes are common, complex and costly (29). Infections may spread rapidly leading to an overwhelming tissue destruction and amputation which is why 85% of amputations are usually preceded by an ulcer (20). The International Working Group on the Diabetic Foot (IWGDF) recognised the lack of published guidelines and recommendations for the treatment of DFU despite the large number of infections and complications. Therefore, they published their guidelines at the last International Symposium in 2004 (20).

Infections of DFU can be classified into mild, moderate, or severe. This classification, along with a vascular assessment, helps determine which patient should be hospitalized, which may require special imaging or surgical interventions, and which will require amputation (30). Most diabetic foot infections (DFIs) are poly-microbial with aerobic gram-positive cocci (GPC), especially staphylococci, being the most common causative organism. Aerobic gram-negative bacilli are frequently co-pathogens in infections that are chronic. This can also occur following repeated antibiotic treatment. Obligate anaerobes may be co-pathogens in ischaemic or necrotic wounds (30).

Fungal communities found in chronic wounds can form mixed bacterial-fungal biofilms. This can be associated with poorer outcomes and longer healing times and may lead to complications such as bone infection and amputation. Up to 80% of the infected DFI harboured the fungi with no single species being responsible (31).

Post-debridement specimen should be collected for aerobic and anaerobic culture from infected wounds. Empiric antibiotic therapy can be narrowly targeted at GPC in acutely infected patients, but those at risk of infection with antibiotic-resistant organisms or with chronic, previously treated, or severe infections usually require broader spectrum regimens (30, 32). NICE guidance supports this approach (2). The primary goal remains to expedite complete healing; secondary goals include the avoidance of superimposed infection, repeated hospitalisations, and subsequent amputations (33).

Due to the overuse of antibiotics, the fact that poor infection control procedures enable resistant organisms to spread, and the ability of the bacteria to mutate, antibiotics resistance has reached a critical point, especially since no new types of antibiotics are being developed (34). Antimicrobial stewardship defined as “an organisational or healthcare system wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness” is critical and the responsibility of each provider. This emphasis on stewardship was introduced due to the emergence of antimicrobial resistance and the loss of effectiveness of the current available therapies (35).

Surgical Management

Most DFIs require some surgical intervention ranging from debridement to amputation (30). Following the first amputation, patients are twice as likely to have a subsequent amputation (19, 36). The rate of complications and of mortality appeared to be greater the more proximal a surgeon needs to go to amputate. As such, when a minor amputation of a toe and part of the corresponding metatarsal bone (ray amputation) was removed, it seemed to carry a lower mortality rate when compared to below knee amputation (BKA) (37, 38).

In a retrospective study by Evans et al. (2011), eighty percent of the minor amputees were still alive after two years, and sixty four percent were fully mobile compared to the BKA group. Fifty two percent of BKA died within two years and only sixty four percent of patients were mobile with a prosthetic limb (38).

In a population-based survey carried out between 1982 and 2006, Svensson et al. (2011) reported that they were able to avoid major amputation in almost two-thirds of the patients who already underwent minor amputations. However, these patients had prolonged healing process. Despite this, sixty-four percent of all amputations and seventy-eight percent of amputations in surviving patients healed at a level below the ankle (39).

The Eurodiale study (2011) was a large prospective cohort multi-center study carried out in different European centers. It involved a total of 1,232 patients with new DFU who were followed regularly until healing, death, or major amputation occurred up to a maximum of one year. A small number of patients (18%) underwent minor amputation, which was a procedure frequently carried out in these centers. However, a variation was noted in terms of the triage system and when the amputation was performed which depended on the center’s assessment of the depth

of the ulcer, PAD, and infection (40). This may suggest that early referral to the foot clinic can prevent minor amputations and emphasized the need for an organized approach to the management of a DFU, which is an issue that NICE has highlighted in their current guidelines (2, 40).

Auto-amputation

Patients with diabetes undergoing surgery have greater complication rates, higher mortality rates, and prolonged length of hospital stay (41) with peri-operative mortality rates of up to 50% greater than those without diabetes (42). A few studies found that smokers, older patients with longer history of uncontrolled diabetes, and those with gangrenous infections and large ulcers have poorer outcome with amputations in general (43-45). Due to all these factors, an alternative to surgical amputation with less impact on the patient and less associated complications may be advantageous. Auto-amputation may possibly be this alternative.

Auto-amputation is the "spontaneous separation of non-viable tissue from viable tissue, and is usually associated with dry gangrene, occurring in the distal portions of the lower extremities" (46). Fikri et al. (2011) showed positive outcome when auto-amputation was offered in the management of a dry well-demarcated gangrenous toe (5). This was the first paper to describe this practice. The authors cited two papers (Levy et al.(1962) and Bronzini et al. (1962)) discussing case reports of patients with evidence of successful auto-amputation of the 5th necrotic toe (47). The literature search was unable to find RCT or systematic review to support this choice of treatment. However, weaker evidence from case reports were identified.

In a case managed by Boffeli et al. (2015), a neuropathic DFU affecting plantar hallux interphalangeal joint area was successfully managed by resecting the ulcer and aggressively treating the infection before it spread, followed by offloading. This resulted in complete healing of the ulcer with the avoidance of hallux amputation and the patient was ulcer free for six years (48).

Looking specifically at available literature on the use of auto-amputation for the management of a necrotic toe, there was a case report from India. An elderly patient with poorly controlled diabetes, presented with dry gangrene affecting both feet. Over the subsequent 18 months, she was managed conservatively as she was unwilling to consent for surgical intervention, resulting in the loss of the right foot and digits on the left foot. In this case, the gangrene was limited to below the knee area and did not result in her death (46).

MDT Clinical Management

"Tell Me and I Will Forget; Show Me and I May Remember; Involve Me and I Will Understand." Confucius (14)

The importance of educating patients, especially through involving them in their care, is paramount in achieving a successful outcome. Historically, Laffon in 1885 and Pryce in 1887 were the first to describe cases of DFU due to neuropathy (49). Until the 1980s, uncontrolled infections, "salami" procedures, major amputations and deaths were alarmingly common (50).

A retrospective study carried out between1981 and 1995 in Copenhagen, found a 75% reduction in the incidence of major amputations. This coincided with a sevenfold increase in revascularization procedures, such as infra-popliteal arterial bypass, being introduced for the treatment of critical lower limb ischaemia and the establishment of a MDT foot clinic. This has suggested that these measures were important in the prevention of leg amputations due to diabetes (51).

Rönnemaa et al. (1997) found that patients who were seen by a podiatrist had a statistically significant improvement in knowledge of diabetic foot care ($P = 0.004$), self-care ($P < 0.001$), and improvements in the prevalence of some minor foot problems such as callus formation when compared with the control group (52).

In the 1980's, great developments in foot care were taking place, including establishing MDT diabetic foot clinics and the publishing of the international consensus on the care of the diabetic foot by IWGDF(36). On the World Diabetes Day in 2005, IDF launched a year-long campaign with the slogan "Put Feet First: Prevent Amputations" (14).

There has been a long-standing interest in the role of MDT in achieving optimal outcomes for patients with DFU. Employing multidisciplinary foot teams' expertise in wound management in terms of appropriate dressings, the provision of the necessary footwear to allow adequate off-loading of pressure to the affected wound, and patients regular follow-up in the clinic have improved outcome for these patients (30). NICE supports this approach and incorporated this into their guideline (2).

In May 2017, the podiatry Clinic relocated from Hamad General Hospital (HGH) to its new facility at the Ambulatory Care Centre (ACC) in Doha, Qatar. A specialist Diabetic Foot and Wound Care Clinic was also set up within this clinic. This provided outstanding care for all patients with lower extremity and diabetic wound needs, using the most advanced techniques. Between May and September 2017, around 6,400 patients were seen, at a rate of 80 to 100 patients each day. The main goal of all the services provided by this clinic was to enable patients to live a healthy life and prevent wherever possible any re-occurrence of the condition being treated (53).

Conclusions

DFD with its disabling effects and the high mortality rate is an important disease to be aware of, treat, and try to prevent. The number of patients with diabetes are increasing and presenting with more and more complications of the disease with some being unsuitable to undergo surgical procedure due to their multiple co-morbidities. To ensure continuity of care and regular follow up, especially in these high-risk patients, utilization of the outpatient appointments is deemed necessary as part of the patient's commitment.

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Economic burden of diabetes care: The economic burden on health systems of low and middle-income African countries

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Abstract

Background: There has been recognized documented increase in diabetes prevalence worldwide and even regions with known low prevalence of diabetes such as Africa, started to register increase in prevalence of diabetes. The overstretched health care systems in most African countries faces many challenges to offer resources for the rapidly growing health problems such as Diabetes Mellitus.

Objective: To assess the magnitude of economic burden of diabetes care in low- and middle-income African countries.

Method: Literature review using systematic approach was conducted for the evidence on the cost of diabetes in low- and middle-income African countries. Search was conducted mainly through PubMed. Other search engines such as Google Scholar, and University of South Wales library were used. Search terms were carefully used. Found results were filtered used selective criteria for inclusion and exclusion. Data from included studies was extracted using multiple sheets. Results were presented in tables and discussed for their meanings.

Results: Twenty-four (24) articles were selected based on defined selection criteria. There is variation in the annual national direct cost between countries. Indirect costs per patient were higher than direct costs per patient for diabetes care in studies that calculated both. Outpatient costs varied between studies. Cost of drugs, diagnostic, medical supply and consultation costs are the common included outpatient costs. In studies that included total costs and drug costs, the drug costs consumed a significant portion of total cost. The large burden of diabetes care cost fell on individuals within low-income countries.

Conclusion: There is a considerable economic burden associated with diabetes mellitus. Future research should focus on standardization of the methodologies for cost calculation, enhancing the interpretation of study findings and facilitating comparisons between studies.

Key words: Diabetes, Cost of care,
Low and middle income countries.

Introduction

Diabetes Mellitus was considered a costly disease due to its prolonged nature that is associated with many serious complications (1). Cho et al – 2017 (2) stated that the total global healthcare expenditure due to diabetes for people in the age group 20–79-years was estimated at to be $US727 billion in 2017. This number is expected to rise in 2045 to be $US776 billion (1.75 billion / year) with an approximately 7% increase during a period of 28 years (2).

The rising pattern of the prevalence of Diabetes Mellitus and the early mortality due to diabetes increased the financial costs over families and governments (3) with noticeable press on the already over-strained healthcare systems in African countries (4). IDF stated that 6 – 16% of the total healthcare budgets were allocated to diabetes with the lowest budget for diabetes care being in the African region (5) (2). The IDF estimates that Africa spends 7% of its healthcare budget on diabetes care (2).

The cost of non-communicable diseases such as diabetes has considerable impact on the macro and microeconomics. At the level of macro-economics, the long-term cost of care could have impacts on work resources and productivity, accumulation of capital and Gross Domestic Product (GDP) (6). At the level of the micro economy, the cost of diabetes care could represent a real threat to the household's financial capacity. Even, relatively small expenditures on health expenses can be financially disastrous for poor households. In many low-income countries and some middle-income countries, out of pocket payments are the predominant way to pay for health care (7). In the absence of other mechanisms it may absorb the risk of sudden need to pay such items as insurance systems and with the increasing of level of poverty in these countries, catastrophic health care expenditure can result (8). It is very interesting to note that in Germany where the GDP is US$ 32,860 per capita, only 11.3% of all medical expenses is paid by households and the rest by social health insurance or by the government. The picture is inverted in the Democratic Republic of the Congo, one of the low-income countries, where GDP per capita is only US$ 120, where 90% of the money spent on health care is paid directly by households to providers (WHO, 2007).

There are important points when looking into the cost of diabetes care in Africa. The number of diabetic patients is rising and mostly affects young adults. This has the power to affect the economic output and has negative effects in the social security of many families within the region (9). Health care systems in African countries depend deeply on out of pocket (OOP) expenses to cover diabetes care and it was found to be the lowest spending in comparison with other regions in the world (4).

Methodology

1. Literature review

A literature review was conducted using a systematic approach to answer the research question. The systematic approach aims to consider all available and eligible evidence based on inclusion and exclusion criteria.

2. Search strategy

Personal computer search was conducted to identify studies for inclusion. The literature search was undertaken in PubMed and University of South Wales library. Additional searches were also undertaken in Google Scholar. Key words were carefully selected to ensure that all relevant material was included and to avoid including unnecessary articles. Assess ment for eligibility through full text review to determine if the inclusion and exclusion criteria were satisfied. Articles were then downloaded for a full-text review.

3. Key terms for search

The key words used in the search were carefully selected to cover all necessary materials and avoid unnecessary articles. The medical subject heading (MeSH) terms used for search were cost of illness and diabetes and the terms used in the search were ''Burden of illness'' ,''cost'', ''cost analysis'', ''cost of disease'', ''cost of illness'', ''disease burden'', ''economic burden'', ''healthcare cost'' ,''health expenditures'', ''Africa'', ''south africa'' ''sub-Saharan africa'' , '','' african countries'' and ''african country (name of country added)''. All searches were done in April 2019.

4. Inclusion and exclusion criteria

The following inclusion criteria were selected:

- Papers published between 2005 and 2016.
- Papers in English language; as the researchers do not have access to English translation services for non-English papers.
- Systematic review published in peer-reviewed journals; Secondary studies represent summary and statistical analysis of collective selected studies based on research question. This increased the sources of studies included in the research. Primary studies were included if they were relevant to the research question.
- Papers that reported original research findings on diabetes COI or health expenditure data.

List of abbreviations:

ADA	*American Diabetes Association*
COI	*Cost of Illness*
GDP	*Gross Domestic Product*
GDPD	*Gross Domestic Product deflator index*
GNI	*Gross National Income*
ICER	*Incremental Cost-Effectiveness Ratio*
ID	*International Dollar*
IDF	*International Diabetes Federation*
LMICs	*Low- and Middle-Income Countries*
NGOs	*Non-Governmental Organizations*
NCDs	*Non-Communicable Diseases*
OOP	*Out of Pocket*
WHO	*World Health Organization*

• Papers covered at least one African country as defined by the United Nations (table 1a).
• Studies included low- and middle-income African countries by the World Bank classification
• Studies included human participants.

The following exclusion criteria were selected:
• Papers reported only costs related to diabetes prevention.
• Studies that did not provide original research or details on how costs were calculated. This was to exclude studies not included the process of cost calculation. Original research means research with defined methodology and results either primary or secondary.
• Conference abstracts or poster presentations as the details of the studies cannot be found to judge on their eligibility.
• Animal studies.
• Studies that do not have full text. Those studies with no full text will remain obscure and cannot be assessed for their quality and relevance to the research question. In addition, data cannot be extracted from them.
• Studies included a cost- effective analysis of drug intervention and treatment. Such studies do not consider the total cost (direct, indirect and intangible costs) of economic burden of diabetes care on health care systems, which is identified, measured and expressed in monetary terms.
• Studies conducted in non-African and / or high-income countries.

Data extraction
Data extraction is an important process where the data from the selected studies are extracted and presented in tables for analysis. Two tables were created to accommodate these data. The first table was created to represent data such as year of publication, research objectives and type of estimated cost. Cost was grouped as out-patient cost, in-patient cost, cost of drugs and joint cost. Joint cost was used when in-patient and out-patient are not separated. It also included indirect costs such as loss of work, disability and premature mortality.

Whenever the costs were not mentioned clearly in a study, data from the study was used where possible to calculate the cost to improve the comparability of costs across the studies. Purchasing Power Parity (PPP) is a popular metric used by macroeconomic analysts. It compares economic productivity and standards of living between countries.

The costs which were reported in local currency were converted to international dollars using Purchasing Power Parity (PPP) by using the following equation:
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Value in international dollars = value in national currency / PPP exchange rate.

To estimate the PPP exchange rate, a web based tool developed as a joint initiative between the Campbell and Cochrane Economics Methods Group (CCEMG) and the Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre) was used (10). Cost was first adjusted to inflation in their costing original year and local currency and then adjusted for inflation to give target year cost by using inflation factor. Gross Domestic Product deflator index (GDPD values) was used to adjust the original price to a target price year. The GDPD values are a measure of the change over time in prices within an economy. This can be viewed as a measure of general inflation within an economy over time, which takes account of inflation across a broad range of economic sectors. GDPD values are obtained from the International Monetary Fund (IMF) World Economic Outlook Database 'GDP deflator index' dataset (11). This dataset contains GDPD values for 184 countries (currencies) from 1980 onwards (International Monetary Fund, 2018). It is updated biennially in April and October and each new release dataset is imported into the database underlying this web-based tool (11).

Due to the lack of detail in published original, some modulations were done. In studies where the year of data collection was not clear, the date of publication was used. In extended studies where the study extended for more than a year, the final year in which the study concluded was used.

The second table was created to assess the quality of each study. There are many checklists developed to evaluate the economic studies, many of them focus on cost benefit studies, cost effective studies and cost utility studies (12). For COI studies, there are some checklists that have been used (13), (14). In this research, the ten points check list for economic evaluation which was developed by Drummond (15) and later adopted to COI studies by Molinier et al (14) and several COI studies (16) (17) that used it, were adopted.

Results

The initial search strategy detected a total of 356 articles, from which 15 duplicates were excluded. Of the remaining 431 articles, 282 were removed during the first level of title screening and 19 removed during the second level of abstract screening leaving 40 articles for full text evaluation. Of the 40 studies that underwent full text review, 16 were excluded for one of the following reasons: was a literature review of diabetes (not costs), did not provide patient specific costs or presented costs that had been calculated in another included study, or a cost–effective study that compared different interventions. Twenty-four studies were identified that met the inclusion criteria (Table 1).

All studies in this review provided good information to calculate per capita costs. Some studies (n=4) even showed national costs of diabetes (18), (19), (20). In Nigeria, national costs of diabetes was found to be in a range of I$ 3.5 billion – I$ 4.5 billion per annum (18),(20) In Morocco it was higher than Nigeria; the calculated national cost (direct and indirect costs) ranged from I$ 5.9 – I$ 8.2 billion per annum (19).

In this review, direct cost involved medical and non-medical cost. Tables 5 a, b and c, showed details of the costs. The tables gathered costs based on outpatient, inpatient and combined gathered costs. Some studies (n=11) showed outpatient costs per individual per annum (21) , (18) , (22) , (23) ,(24) , (25) , (20) ,(26) , (27) , (28). An interesting point is that calculation of cost used various data, so the results should not be used for direct comparison of costs between countries, as the data sources were different.

For direct cost, the most common used data from health care items was drug costs, then diagnostic costs, used medical supply and consultation costs. Through the review, outpatient costs differed through included studies, so to make comparison easier, this cost was presented as per capita costs. Interestingly, it found that there is no linear increase in costs through 2002 – 2016 for individual country estimates. There was no specific explanation for this finding. For example, in Nigeria the direct per capita cost in 2004 was I$ 1143 while in 2012 it was I$ 616. More research is recommended to focus on this point to find explanation for this finding.

The studies included in the review showed wide variation in costs between countries and this was attributed to the differences in costing methods and cost items included in the calculation. In studies when the costing methods and costs items were similar, it was noticed that Burkina Faso had the higher outpatients cost, followed by Mali, Benin and Guinea (21) .

In addition, it was noticed that the cost of hospitalization varies considerably within and between countries. For example, in South Africa the cost in 2005 was I$ 1813 and raised to I$ 6871 in 2009.

Out of pocket, (OOP) expenditure was mentioned as challenge for health care flow in some studies. It could obstruct access to health care services and leave the health problems to grow to a complicated status (29) which could lead to catastrophic health expenditure and subsequent impoverishment. The WHO – African region -2014 (30) expenditure atlas, showed that catastrophic health expenditure is low in countries where OOP expenditure < 20% of total health expenditure (30). Based on the WHO – African region (2014) expenditure, South Africa was the only country in which OOP expenditure was <20%. This finding reflects that diabetes is a chronic disease and needs frequent and continuous access to health care services.

Drug cost it was noticed, was mentioned separately in the majority of studies included in this review. It was found that in studies mentioned both drug costs and cost of treatment, drug cost composed the significant part, for example, it was 14% - 90% in Nigeria, 64% in Ethiopia, 53% in Sudan, 4% - 7% in South Africa and 5% in Uganda . Variation in methodology, number of participants and different treatment costs may create variation in the percentage of cost of drugs from the total treatment cost such as in Nigeria and South Africa. In addition, it was noticed that some costs were mentioned separately in most of the studies. Diagnostic costs (n=12), transportation (n=9) and consultation costs (n=7) were among costs mentioned separately in the studies included in this review.

In some studies (n=3) which showed separately the cost associated with type 1 diabetes and type 2 diabetes, they showed that the direct costs of type 1 diabetes was higher than type 2 diabetes (18). Although, this was a significant finding, still the bulk of diabetes mellitus cases was from type 2 (85 – 90% of diabetes) while type 1 constituted 5 – 10% of the diabetes mellitus bulk.

Some studies included in this review (n=5), calculated the cost of certain complications (21), (18), (31), (32), (33). Among these studies, there are some studies (n=3) which concentrated primarily on calculating the cost related to diabetic foot ulcer (31), (32), (33).

The cost of diabetic foot ulcer varied based on the stage of ulcers. Interestingly, two studies (n=2) showed that presence of complications increased the costs of diabetes care (31), (32). Such findings pointed to the importance of pre-action and presented evidence to the decision-makers to create plans for preventing future complications to decrease the cost of care.

Studies showed that the highest burden of diabetes was among patients of low socio-economic status (24), (27). Three studies investigated the relation of age to cost of care. In Nigeria, Ipingbemi and Erhun (27), showed that the mean of outpatient cost of diabetes was highest among those in the age group 60-69 years. In Sudan, Elrayah-Eliadarous et al (23) also showed that the cost was highest in those > 60 years. In Zimbabwe, Mutowo et al (34) found that hospitalization costs were lower in those > 65 years. Alouki et al (21) and Elrayah-Eliadarous et al (23) found that cost of care in public sector was less than cost in private sector. Lack of guidelines and standards for practice could create variation in practice and variation in cost of care.

Discussion

Over the last two decades, numerous economic studies of diabetes have showed that diabetes mellitus is attributed to a huge economic burden. This research aimed to identify the evidence and summarize the findings concerning the economic burden.

The findings found through the twenty-four (n=24) selected studies included in this research pointed to a huge annual economic burden of diabetes in Africa. The majority of these costs were related to patients and reflected large pressure on the accessibility and continuity of the health care services (4). Unfortunately, these costs will increase with the presence of complications (32). It was expected from other studies that direct costs were always higher than indirect costs but an interesting finding from two studies included in the research showed that indirect costs are higher than direct costs. These findings were

contrary to findings identified by Seruing et al (35) who found that direct cost related to diabetes care was higher than indirect cost. Seuring and colleagues' finding was based on a total of twenty-six (n=26) studies while the finding in this research was based on two studies.

Seuring et al (35) in their systematic review stated that there are some studies included in their search that did not specify the type of diabetes. The same happened in this research where some studies did not identify the types of diabetes.

The uncertainty on specification type of diabetes make it difficult to compare differences on cost of care between type 2 diabetes which is the most common in Africa (5) and which can be prevented (36) and type 1 diabetes. Nevertheless, three studies (n=3) included in this research showed that the cost of type 1 diabetes care is higher than the cost of type 2 diabetes care. The cost ratio (cost of type 1 diabetes / cost of type 2 diabetes) was found to be in the range of 1.8 – 5.66 in this research. Ng et al (37), found that the cost ratio ranged between 1.5 – 4.4 in their systematic review.

For the cost ratio for diabetes with complications vs no complications, it was found in the range of 1.08 – 4.38 in this research while in Ng et al it was found in the range of 1.9 -2.1.

In this research, studies showed total treatment costs; the drug cost constituted the large part of these costs. This finding was noticed also by Yesudian et al (38) who found that drug cost participates by 50% in the total cost care. The explanation for this finding could be the habit of the physician to prescribe branded drugs. The change of habit to write generic drugs may help in Africa to reduce the drug cost (39).

Through the studies included in this research, findings showed that diabetes care affects heavily the low-income groups (27). Yesudian et al (38), also made this finding. Most of the studies in this research were prevalence based which was found by many as the most suitable approach for COI studies measuring cost of chronic diseases (13). Yesudian et al, and Ng et al adopted the same approach in their systematic review (38), (37).

Policymakers used COI studies as a tool for education or source for information to support their decision-making processes. It is crucial that COI studies be adequately designed to assess the economic burden of diabetes. The design of such studies should also account for the variability in costs identified and the results need to be interpreted carefully. Therefore, it is recommended the development and implementation of guidelines to standardize study methodology for COI studies.

Limitations

Exclusion of articles not written in English, is one of the limitations that may introduce some bias into this research. Omitted articles not written in English nor had English translation may led to omission of relevant data.

The checklist used in this research to assess the quality of included papers, does not give weighting scores on the various items included in the list and rely on the subjective view of the researcher. As a result, all items were given equal scoring although some items influence results more than others do.

Conclusion

In spite of data limitations, the estimates reported in this research showed that diabetes imposes a substantive economic burden on low and middle African countries. Among total cost of care, drug cost represents the largest burden on total cost estimation. These results ring the bell for more polices to reduce this burden on individuals and decrease the cost of drugs. As the prevalence of diabetes in Africa is expected to rise, these costs are also expected to rise.

Standardization of cost calculation was an important missed issue through studies included. Different methods for calculation were noticed which reflected negatively on comparing between results. COI studies are crucial for decision makers to help them through providing information to design plans to decrease this burden. Future research should work on standardizing the methodology of estimation costs of care. Further research within countries and through countries is recommended to provide more data on diabetes care costs.

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Table 1

Authors	Year of publication	Year of costing	Number of African countries	Region	Type of cost	Perspective	DM type	Sample size	Epidemiological approach	Study focus	Cost data source
Abdulgani ya and Fola (20)	2014	2010	1	Western Africa	Direct	Health system/ patient	Type 2	101 - 1000	Prevalence	General cost	Hospital or medical centre
Alouki et al (21)	2015	2015	>1	Western Africa	Direct	Family/ patient	Type 2	na	Prevalence	General cost	Hospital or medical centre
Boutayeb et al (19)	2013	2013	1	northern Africa	Indirect cost	Not specified	Type 1&2	>1000000	Prevalence	General cost	Various data source
Cavanagh et al (31)	2012	2010	1	Eastern Africa	Direct	Health system/ patient	Not specified	na	Prevalence	Diabetic foot ulcer	Hospital or medical centre
Danmusa et al (32)	2016	2014	1	Western Africa	Direct	Not specified	Type 2	1-100	Prevalence	Diabetic foot ulcer	Hospital or medical centre
Elrayah-Eliadarous et al (23)	2010	2005	1	Northem Africa	Direct	Not specified	Type 2	101-1000	Prevalence	General cost	patients
Enwere, Salako and Falade (39)	2006	2000-2005	1	Western Africa	Direct	Not specified	Not specified	101-1000	Prevalence	drugs	Hospital or medical centre
Fadare, Olamoyegun and Gbadegesin (40)	2015	2013	1	Western Africa	Direct	Family/patient	Type 1&2	101-1000	Prevalence	General cost	Patients plus hospital
Feleke and Enquselassie (41)	2007	2000 -2	1	Eastern Africa	Direct	Not specified	Type 1&2	101-1000	Prevalence	General cost	Hospital or medical centre
Ipingbemi and Erhum (27)	2015	2009-10	1	Western Africa	Direct	Family/patient	Type 2	1-100	Prevalence	General cost	Hospital plus other government institution

Kirigia et al (42)	2009	2005	>1	WHO African region	Indirect cost	societal	Type 1&2	>1000000	Prevalence	General cost	WHO publications and various individual country services
Labhardt et al (43)	2011	2011	1	Central Africa	Direct	Family/patient	Type 2	101-1000	Prevalence	Drugs	Not clear
Mutowo et al (34)	2016	2012-13	1	Southern Africa	Direct	societal	Type 2	1-100	Prevalence	General cost	Various data source
Mwavua et al (44)	2016	2012	1	Eastern Africa	Direct	Not specified	Type 2	101-1000	Prevalence	General cost	patients
Ncube-zulu and Danckwerts (45)	2014	2009	1	Southern Africa	Direct	Not specified	Not specified	101-1000	Prevalence	General cost	Hospital or medical centre
Ogbera et al (33)	2006	2003-4	1	Western Africa	Direct	Family/patient	Type 1&2	1-100	Prevalence	Diabetic foot ulcer	Not clear
Ogle et al (22)	2015	2013-15	>1	Central Africa	Direct	Family/patient	Type 1	Not specified	Prevalence	General cost	Hospital or medical centre
Okoronkwo et al (24)	2015	2015	1	Western Africa	Direct	Family/patient	Type 2	101-1000	Prevalence	General cost	patients
Pepper et al (46)	2007	2005	1	Southern Africa	Direct	Not specified	Not specified	1-100	Prevalence	General cost	Hospital or medical centre
Quaye et al (26)	2015	2009	1	Western Africa	Direct	Health system/institution	Type 1&2	101-1000	Prevalence	General cost	Hospital or medical centre
Settumba et al (47)	2015	2011	1	Eastern Africa	Direct	Health system/institution	Not specified	Not specified	Prevalence	General cost	Hospital or medical centre

Suleiman, Fadeke and Okumanjo (18)	2006	2003-4	1	Western Africa	Direct	Not specified	Type 1&2	1-100	Prevalence	General cost	Hospital or medical centre
Suleiman and Festus (48)	2015	2011-12	1	Western Africa	Direct	societal	Type 1&2	101-1000	Prevalence	General cost	Not clear

A Case of Hyperemesis Gravidarum

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Case Report

A 24 year old lady, Gravida 2 parity 1, with one previous vaginal delivery recurrently presented to her health center from 7 to 10 weeks gestation with symptoms of nausea and vomiting up to 10 times/day. No prior issues or complications were experienced with her first pregnancy and she was generally fit and well with no known co-morbidities. She was treated with IV fluids and IM anti-emetics when seen (metoclopramide/ prochlorperazine were prescribed on separate occasions to treat her acute symptoms in primary care). This helped to settle her symptoms before she was discharged home from the health center.

Initially at earlier presentations to primary care, vital signs and urine tests were normal but by 10 weeks of gestation (3 weeks after initial presentation) she was found to have 4+ketones and 2+protein in the urine as well as a drop of 3Kg in weight from her pre-pregnancy measurement, and elevated liver enzymes. As a result, she was referred to secondary care.

On admission, laboratory tests showed pancreatic enzymes abnormalities, electrolyte imbalance with low potassium and magnesium levels. These were corrected with IV fluids and IV infusion of magnesium and potassium. She also developed abnormalities in the thyroid function, TSH dropped to 0.01 and free T4 increased to 24.2. The medical team were consulted by the A&E team and their advice was to normalize the electrolyte abnormalities and to observe the thyroid function. A possible outpatient follow-up in the endocrine clinic was suggested, if the abnormality persisted. As the cause was related to the severe vomiting and dehydration, this was not required. Antenatal USS showed a viable pregnancy with fetal growth consistent with the gestational age at 11 weeks. After 10 days, she was discharged home with oral pantoprazole and general advice regarding symptoms management and return if symptoms of nausea and vomiting recurred.

Definition:
'Morning sickness' describes symptoms of nausea and vomiting, usually early in pregnancy(1). Up to 90% of women experience nausea during pregnancy. Approximately 27% to 30% of women experience only nausea, while vomiting may be seen in 28% to 52% of all pregnancies (2). In comparison, hyperemesis gravidarum (HG) is a more severe form of this nausea and vomiting symptoms. It can potentially be lethal if not treated, affecting around 1 to 3% of pregnant women. Women usually present with severe, prolonged nausea and vomiting which can lead to weight loss of more than 5% of pre-pregnancy weight, fluid loss and dehydration(1 ,3). In most women, symptoms may improve or disappear by around week 14(1) but up to 22% of the cases, symptoms can last until delivery (4). It has a complex multifactorial aetiology(5).

Epidemiology and Risk Factor for Hg:
Women with HG are more likely to be younger, non-smokers, and non-Caucasian. Also, women with a current or previous history of pre-pregnancy diabetes, depression, thyroid disease, peptic ulceration and multiple gestation are at risk and likely to undergo a caesarean delivery. Risk of admission was found to be 29 times higher if the previous pregnancy also featured an antenatal admission for hyperemesis(5). The risk of HG was 15.2% in the second pregnancy in women with previous HG and 0.7% in women without previous hyperemesis (6).

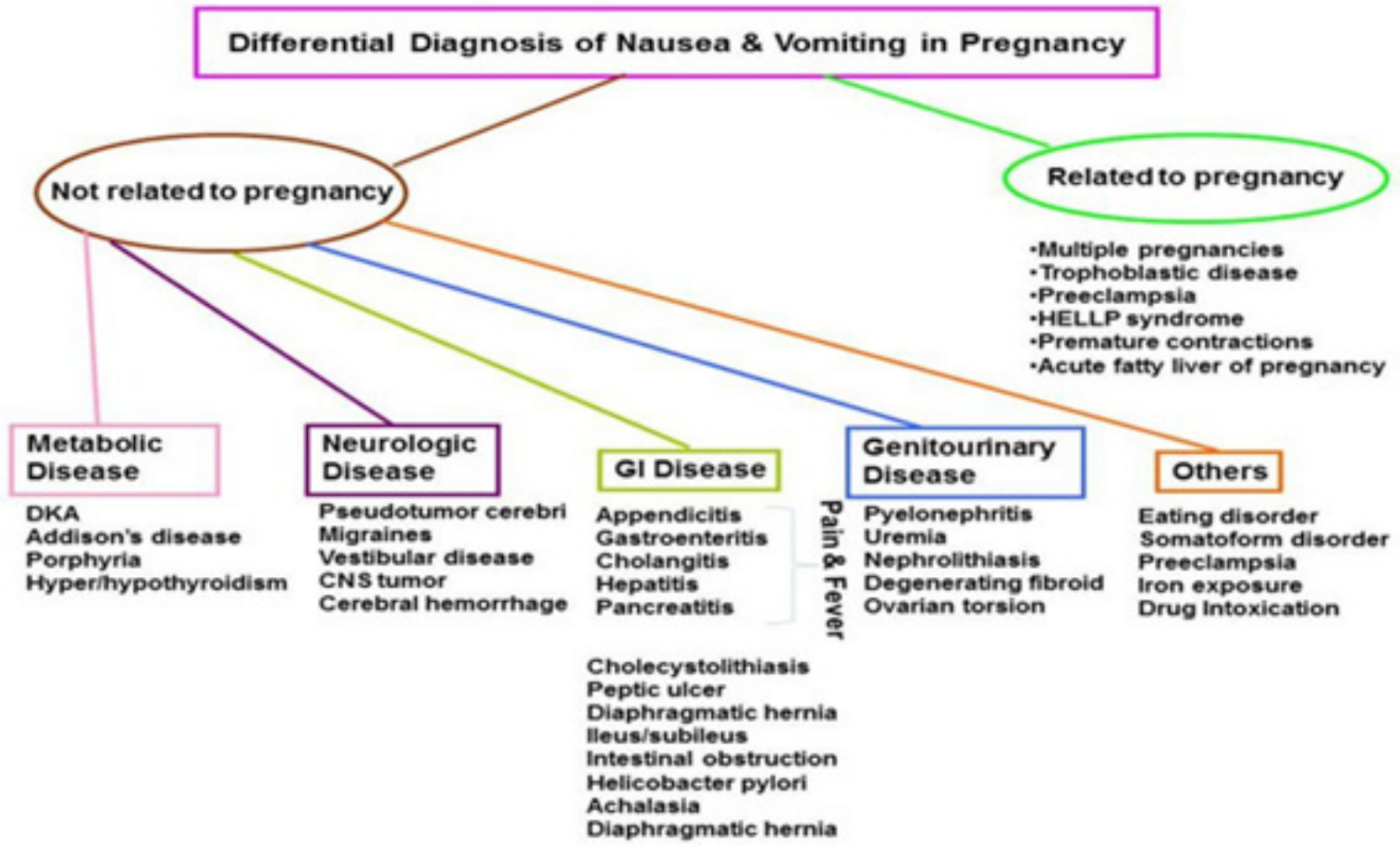
A population-based cohort study of all deliveries in Nova Scotia, Canada between 1988 and 2002 showed that the overall rate of admission for hyperemesis was 0.8% among a total of 157,922 deliveries. These women had a history of hyperthyroid disorders, psychiatric illness, previous molar pregnancy, pre-existing diabetes, gastrointestinal disorders and asthma and these were all statistically significant risk factors for hyperemesis as noted in this study(7). In another study in Egypt, the most common risk factors of HG were gastrointestinal diseases, urinary tract infection and multiple pregnancy(3).

In a retrospective cohort study in the Eastern Asian population, they found a higher incidence of hyperemesis gravidarum. Small pre-pregnancy body habitus increased the risk of hyperemesis gravidarum (8). Women under the age of 30, with Asian or Black ethnicity and those living in more socioeconomically deprived areas were more likely to be admitted for HG. Again, multiple pregnancies and female fetal sex were also associated with a significantly increased risk of HG as was history of HG in a previous pregnancy and pre-existing and gestationally developing comorbidities (9).

Diagnosis

HG is typically characterized by severe nausea and vomiting that causes dehydration and imbalances of fluid and electrolytes. This subsequently disturbs nutritional intake and metabolism, and can cause physical and psychological debilitation often requiring admission. The onset of vomiting usually occurs within the first 12 weeks of pregnancy. The Fairweather criteria define HG as vomiting more than three times a day, weight loss, ketonuria, electrolyte imbalance and volume depletion, with typical onset at 4–8 weeks of pregnancy and can continue to weeks 14–16 of pregnancy(5).

The International Statistical Classification of Disease and Related Health Problems ICD-9 Code 643 defines hyperemesis gravidarum as persistent and excessive vomiting starting before the end of the 22nd week of gestation(5). This can cause dehydration and imbalances of fluid and electrolyte, disturbs nutritional intake and metabolism, causes physical and psychological debilitation, and often necessitates hospital care (10). Investigations may reveal hyponatraemia, hypokalaemia, low serum urea, raised haematocrit, metabolic hypochloraemic alkalosis, ketonuria, and a mild rise in liver enzymes may be seen(5). The pathophysiology has not yet been clearly clarified and it involves a complex interaction of biological, psychological, and sociocultural factors(5).

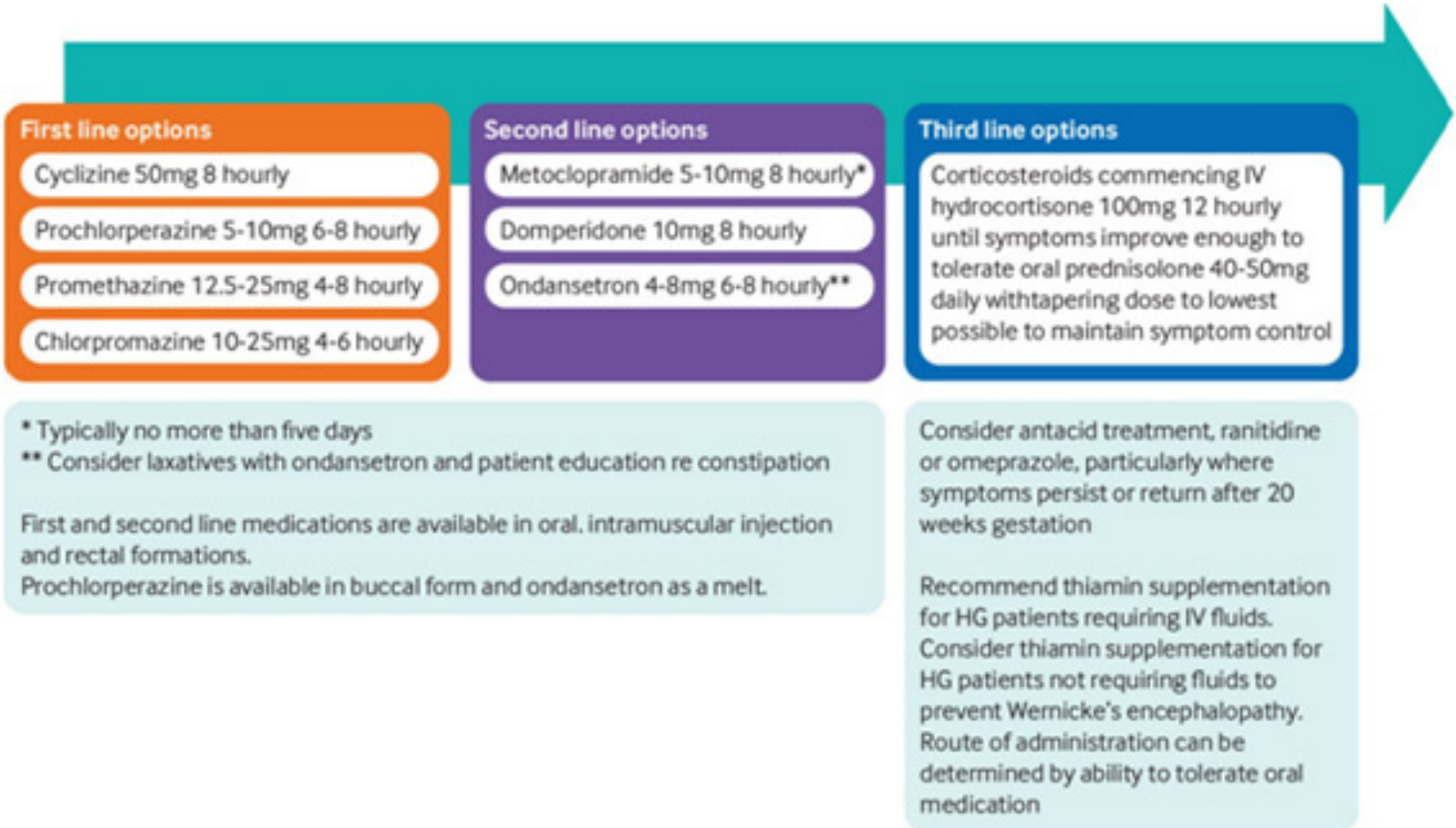


Complications:
HG can lead to maternal conditions such as dehydration, venous thrombosis and depression, while on the developing fetus; fetal growth restriction and neurodevelopmental delay. Considering these reported risks, HG can cause an under-recognized maternal and child morbidity(9).

Infants of women who lost weight early in the pregnancy including in cases of HG, are at increased risk of growth restriction or low birth weight. In severe cases of HG there was an increased risk of fetal death reported, as well as preeclampsia and maternal complications associated with vomiting (e.g., esophageal rupture, retinal hemorrhage, Mallory-Weiss syndrome, pneumothorax) (12).

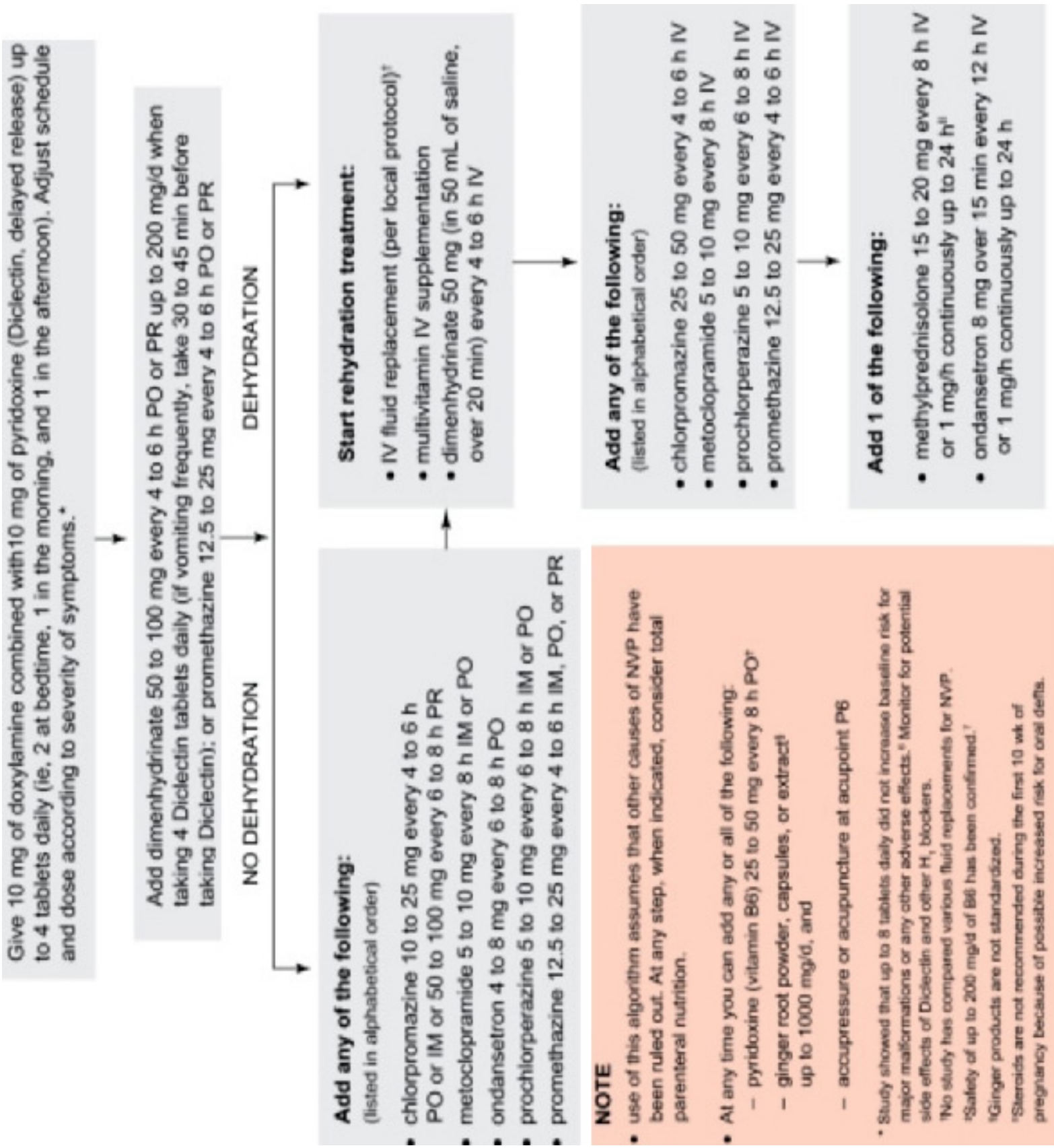
In the past, severe vomiting during pregnancy was often seen as an expression of maternal resentment towards her unwanted pregnancy, and the psychological stresses were perceived as maternal emotional immaturity, strong maternal dependency, or anxiety and tension related to the pregnancy. More recent research argued that the psychological symptoms were as a result of stress arising from the physical burden of hyperemesis rather than a cause(5). Due to this and possibly treatment not always being effective, it may have led to therapeutic termination in as many as 15.2% of cases. One of the main reasons given for the termination were inability to care for the other family members and herself (66.7%), fear that she or her fetus could die (51.2%), or that the baby would be abnormal (22.0%) (13).

Treatment
The following two algorithms summarize the medical treatment of HG including oral as well as intravenous treatment. This can be incorporated in the policy of the management of these women both in primary as well as secondary care (14).

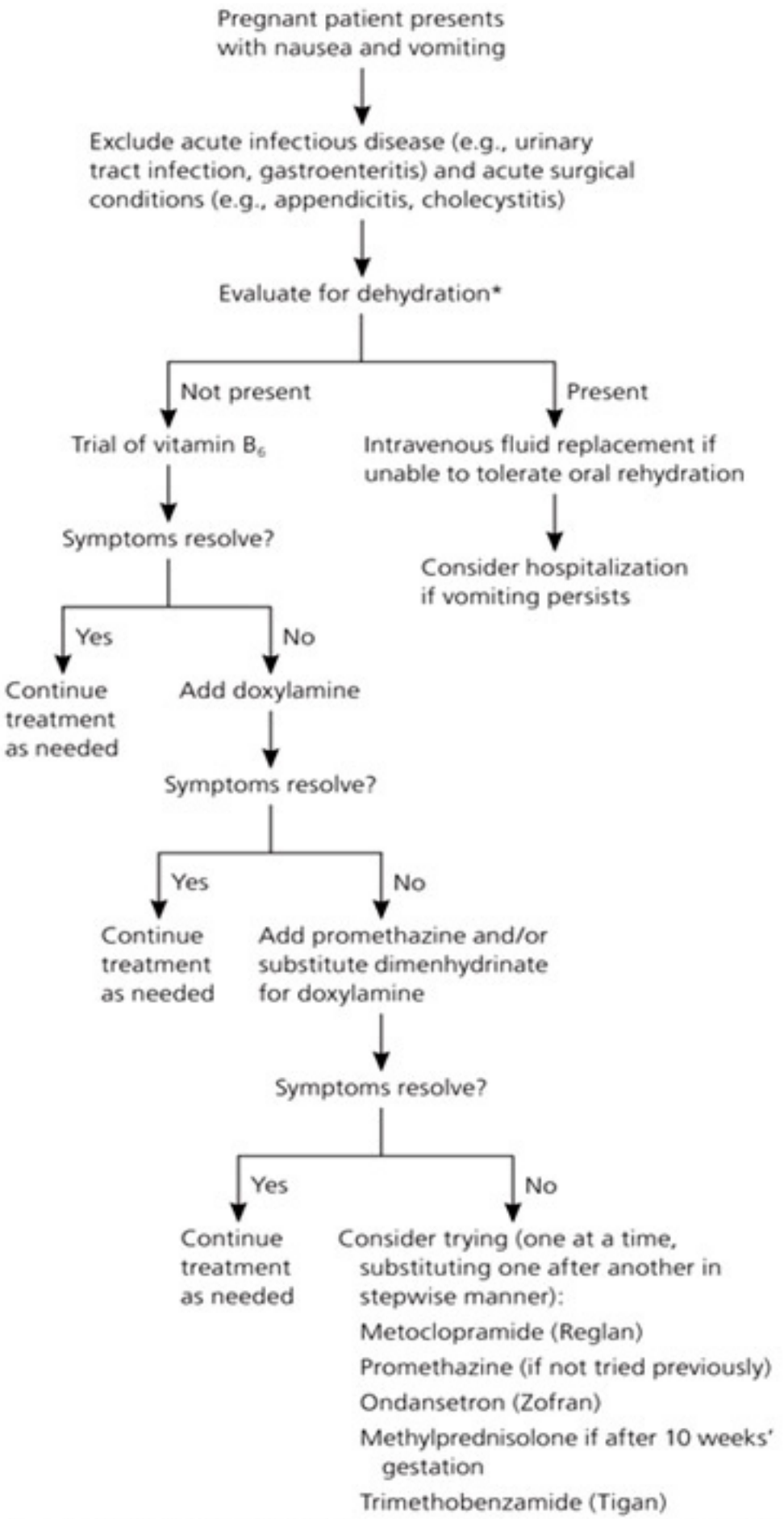


TREATMENT (15)

Pharmacological treatment of nausea and vomiting of pregnancy: if no improvement proceed to next step.
Abbreviations: IM intramuscular; IV intravenous; NVP nausea, vomiting of pregnancy, PO by mouth, PR by rectum



SUMMARY OF OVERALL MANAGEMENT APPROACH TO HG (12)



**—The patient should be assessed for dehydration each time she is reevaluated if symptoms have not resolved.*

Conclusion

HG is an extremely debilitating condition that has physical, psychological, social and economic impact on the affected women and their families. HG can be responsible for a significant proportion of hospital admissions during pregnancy. It is still under diagnosed by the health professional community resulting in inadequate supportive care for the affected women(16). Assessment and prediction using known risk factors and previous antenatal history of HG may help improve care and reduce hospital admission(9).

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Challenges faced by physicians and patients to provide adequate healthcare to patients, particularly the migrant population

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Abstract

Most of the countries we live in today have transformed into multicultural and multilingual societies due to economic needs and the forced mass migration from wars. 2.4 million immigrants entered the EU-27 from non-EU-27 countries in 2018. 21.8 million people (4.9 %) of the 446.8 million people living in the EU-27 on 1 January 2019 were non-EU-27 citizens.

Migrants and refugees often face difficulty in accessing healthcare, housing, and education or employment. Communication barriers compound these problems and provide real challenges not only for the migrants to establish themselves, but also for the healthcare professionals to address the health needs of this population group.

Large number of doctors currently working in hospitals and primary care in the Middle East have migrated from Asian and European countries and may not be adept at speaking the native Arabic language. Similarly, a significant number of doctors working in Europe were born outside Europe and in the first few years of life in Europe, might findght communication with the native population challenging [1].

Migrant and refugee populations are more likely to have untreated chronic diseases like hypertension, diabetes mellitus, and asthma due to them not being able to access effective healthcare prior and after migration [2]. They also have higher incidence of mental health problems like depression, anxiety and posttraumatic stress disorder. Due to communication barriers and unfamiliarity with healthcare systems, they are less likely to seek help and access healthcare [3].

During the current Covid 19 pandemic, a lot of health care providers throughout the world have resorted to virtual consultations to minimise the risk of spreading Covid 19 infection [4]. Most of the virtual consultations conducted are telephonic consultations with some of the centres now being able to provide video consultations to patients.

Virtual consultations throw up challenges of their own and a lot of health care providers have had to learn and adapt themselves to the changed landscape due to the Covid 19 pandemic [5].

For the migrant population, the lack of access to direct healthcare and having to rely on virtual consultation has made it even more difficult to seek medical treatment. Even if these patients get access to telephonic consultation, it would be very challenging for the clinicians to address their health needs. The migrant population would not be able to express their health needs due to language barrier and even if they spoke English, the clinician would have to rely on verbal communication and miss out on the nonverbal component of the basic communication.

It is anticipated that going forward, a lot of healthcare providers would continue to provide virtual consultations to patients even after the Covid 19 pandemic is hopefully resolved. Hence there should be discussion about how virtual consultations can be made robust and safe for healthcare seekers.

In Primary Health Care Corporation (PHCC), Qatar, doctors and patients face similar communication difficulties particularly in the first few years of their arrival to Qatar. We would like to discuss the strategy PHCC employs to overcome this problem and how other nations need to develop their own strategies as well.

Introduction

Effective communication with patients forms a very important part of patient care and studies have shown that poor communication is a leading cause of preventable patient deaths in hospital and primary care settings. One study conducted in the late 1990s found that poor communication was responsible for causing between 44,000 and 98,000 patient deaths annually in American hospitals alone.

Poor communication also results in decreased adherence to treatment, patient dissatisfaction and inefficient use of resources.

Verbal and nonverbal communication forms two essential components of patient communication [7]. Verbal communication involves the use of words to share information with patients and it can include both spoken and written forms. Nonverbal communication involves actions distinct from speech and can involve facial expressions, hand and arm gestures, postures, positions and various movements of the body or the leg and feet.

Albert Mehrabian, a pioneer researcher of communication, reports that the total impact of a message is about 7% (words only) and 38% vocal (including tone of voice, inflection and other sounds) and 55% nonverbal [7]. Another well-known researcher Birdwhistell estimates that 65% of all communication is nonverbal [8].

Dealing with language barriers in Qatar

Qatar has a diverse population with native Qataris accounting for only 10% of the population. The rest of the population is made up of expat population from Egypt, Jordan, India, Pakistan, Bangladesh, Nepal, Philippines and other European countries. Arabic, Hindi, Urdu, Nepali and English are the commonest languages spoken.

The PHCC has a robust mechanism to help doctors to deal with communication problems in Qatar. The majority of doctors working in Qatar come from the United Kingdom, Australia, Canada and USA. Only a few doctors tend to be recruited from Middle Eastern countries. Most of the doctors when they first arrive in Qatar do not speak Arabic which is widely spoken in these parts.

Induction into PHCC/Basic Arabic training

When doctors first join PHCC, they have a three-month induction period to help them adjust to a new health care system. During this period, they sit with doctors who have had plenty of experience working in the PHCC. During this time, they do not consult the patients but observe and learn consultation techniques in native Arabic language. They focus on understanding the different cultural issues and local guidelines and pathways.

During these three months of induction, the PHCC arranges one week of Arabic tutorials for doctors by experienced Arabic teachers. These tutorials focus on general communication in Arabic with special emphasis on medical terminology.

This lengthy induction process helps the doctors to understand not only the common local health problems, but also the local customs and traditions which are very important to be able to deliver effective patient care. Most clinicians are able to understand and communicate in basic Arabic language during this time. This strategy helps to minimise patient harm and improve patient safety.

Use of efficient translation services

The PHCC employs doctors, nurses and allied health staff from many countries who speak different languages. Recognising the importance of good communication, PHCC maintains a list of staff with expertise in different languages in each consultation room. Doctors and nurses are easily able to avail the services of these language experts in case they are not able to communicate with the patients in their native language.

Although there are no studies to compare if using medical staff as translators is better than using professional translators who may not have medical background, it is the experience of the health care staff in Qatar that translators with medical background are able to pick up subtle signs which can help in delivering efficient healthcare to the patient.

Good translation service providers can help to achieve better understanding of patient needs, reduce unnecessary investigations and hospital referrals and prevent patient harm.

Challenges of using translation services in other healthcare settings

Many clinics and health centres may not have multilingual staff. Hence it may not be possible to avail in house translation services like in PHCC. Most clinicians find it difficult to arrange translator services as well particularly if the patient has not pre-arranged an appointment with the doctor and communicated with them of his language difficulties. According to a study in Switzerland, two thirds of physicians with language barriers never get access to a professional interpreter [9].

In reality, a lot of translation for the patient is done by a family member or a minor who might give their own version of understanding and skew the whole diagnosis. The patient might also not wish to involve the family member to become aware of his or her issues and hence the doctor may not become aware of the patient's problems [10].

In the European Union (EU), different rules govern the use of translator services. In Sweden, patients have the right to access translation services in their own language but in the United Kingdom, there are no clear guidelines on this subject. Hence use of professional translators is variable across the EU [11].

Importance of improving the health of all sections of the society

The Covid 19 pandemic has affected those with chronic diseases like diabetes mellitus, hypertension, chronic obstructive airway disease, cardiovascular disease and obesity the hardest [12]. By effectively treating these conditions, the risk of morbidity and mortality could be minimised. Effective communication will form an important part of treating high risk patients with chronic disease as it is known that doctors when faced with communication barriers do not focus on health promotion and such patients tend to receive inadequate health care.

In the last few years, the expenditure on health care has been perceived as spiralling out of control and hence pressure to reduce budget and services. Healthcare is seen as a drag on the economy and the nation. The Covid 19 pandemic has exposed the fragilities of the global health systems and shown that countries with robust healthcare systems have managed to effectively deal with the Covid 19 pandemic with less harm to their economy.

The Covid 19 pandemic has laid bare the fact that the health of any sections of the society cannot be ignored and only by investing in the health of all sections of the society, we can build resilience against future epidemics. This approach should eventually lead to a more productive work force and stronger national economies throughout the world [13].

The health service providers should make it easier for all residents and citizens in their respective countries to access health care and invest in improving professional medical translation services as a matter of urgency.

More emphasis should be placed on improving communication skills of doctors during training in medical school and hospitals. Governments throughout the World should learn lessons from the Covid 19 pandemic and innovation in healthcare will be needed to build stronger nations in the future.

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