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Editorial

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This issue is rich with papers from the region and with COVID 19 epidemic still raising research interest in the area.

In two papers medical students were used as research subject. Alyahya et al., did a cross-sectional questionnaire based study. The aim of this study is to assess the desired future medical specialties and what are the motivational and influential factors for such decision. It was found that the most commonly indicated perceived specialty was pediatrics (8.3%), followed by internal medicine (8%), orthopedic (6.6%) and general surgery (6.6%). The most commonly mentioned source of advice regarding specialty was family (38.4%), followed by practicing doctors (33.5%) and friends (18.4%). The authors concluded that College of medicine in King Faisal University needs to engage the practicing doctors with students for a better guidance and mentorship. The extra-curricular mentorship programs need to be implemented from the first year of college, so students have a wider range of exposure towards different specialties. While Ilyas, et al ., cross-sectional study was conducted from August 2019 - September 2019 in Jinnah Sindh Medical University (JSMU), Karachi, Pakistan, according to non-probability purposive sampling. This study aimed to explore FC's prevalence and associated lifestyle factors among undergraduate medical students at Jinnah Sindh Medical University, Karachi, Pakistan. A total of 365 medical students were included in this study. The authors concluded that the prevalence rate, FC is a widespread issue among medical students. Low fibre diet, low water intake, stool with-holding, and less frequent defecation are the most apparent risk factors among the constipated subjects.

Ali et al., aims to analyze the image reject rate for radiographs at PHCC and determine the reasons for rejection. The data was retrospectively collected from January 2020 to December 2020 to include all rejected images. The reject rate per each reason, anatomical area and health centers were analyzed. The reject rate in PHCC radiology department is within the accepted limits of quality control and assurance studies. However, it is highly important to carry on quality improvement projects with proper training and education based on utilization of regular reject analysis and feedback tool.

Alamri et al., did a descriptive cross-sectional approach was used targeting all adults in Aseer region. The aim to assess adults' awareness, attitude, and practice regarding testicular cancer (TC) and testicular self-examination (TSE) in Aseer region, Saudi Arabia. The survey included 809 male participants who completed the questionnaire. Participants ages ranged from 18 to 55 years old with mean age of 26.9 12.7 years. Majority of participants (73.1%; 591) were single while 23.7% were married. Exact of 591 (73.1%) participants heard about cancer tests and 651 (80.5%) know it affects men. The authors concluded that male adult's awareness about TC and TSE are inadequate and the proportion who is performing is below the average. Also, Male adults' attitude towards TSE and its importance was not promising.

Dr. AlQaatri did a study aimed to determine how shared information databases and common spreadsheets can be used in disaster management communication in the primary health care command center (PHCCs) in Qatar to respond appropriately to any kind of disaster. The research established that current communication frameworks between PHCCs and emergency command centers are weak. The sharing of resources and capacity information is not done well and regularly from the PHCCs to the emergency command center. Consequently, live shared spreadsheets would ensure the PHCCs distribute capacity information with the command center. The Spreadsheets would also act as a backup in case the phone communication links were broken. The tools should improve communication between the two levels, including disaster preparedness and response. They should solve the current problems of communication breaks between the PHCCs and command centers related to emergency and disaster planning.

Dr. Al-Otaibi, did a retrospective study of patients is 20 patients underwent total hip procedure with 6 month flow up divided in two groups, to see the effect of other musculoskeletal changes on outcome. To compare the effects of disease manifestation other than that on the replaced hip on out come of hip replacement in sickle cell anaemia patients. The authors concluded that catego rizing all sickle cell hip avascular necrosis in one group is un fair for patients and surgeons. Patients with multiple sites of disease manifestation must be considered difficult primary hip and handled with care, while some patients with Isolated hip involvement have comparable results to hip replacement in other conditions.

The issue of COVID epidemic received attention from three authors. Alrubaysh. et al., conducted a cross-sectional study using an online questionnaire on adults over the age of 18 living in Saudi Arabia from January to February 2021. This study aims to assess the lifestyle changes that are considered risk factors of cardiovascular diseases (CVD) among the Saudi population during the COVID-19 lockdown. The authors concluded that dietary and exercise habits among the Saudi population have changed significantly during the COVID-19 pandemic which subsequently resulted in an increase in CVD symptoms. Dr. Alshaiby did a descriptive prospective study conducted in Aden to delineate the different development patterns of olfactory disorders in covid-19 patients. Seventy ENT patients underwent covid-19 testing by real-time PCR in the Center of Covid-19 at Algamhoria Hospital during 1June to 31 August 2020. Comorbid conditions were diabetes mellitus in (11.4%) patients and hypertension in (7.1%). Anosmia found in (85.7%) and hyposmia in (14.3%) patients. The situation of a significantly higher proportion of patients with anosmia followed by hyposmia supports the need for ENT health care for patients with Covid-19 diseases. Whereas Dr. A.Alqaatri, looked at COVID 19 Mass Vaccination. While the COVID-19 pandemic has adversely affected global economies and healthcare systems, mass vaccination presents a permanent way to transition out of it. However, accessibility of the vaccines and vaccine hesitancy provide significant challenges to mass vaccination programs. Nevertheless, the WHO-approved vaccines, including Pfizer, AstraZeneca, Janssen,

and Moderna, have helped reduce the global infection curve, severe cases, and mortality associated with the disease. Consequently, governments and non-governmental organizations globally should raise awareness among the public about the benefits of taking COVID-19 vaccines. The vaccines should also be made widely available, particularly to the underdeveloped and developing nations, through the manufacturing of generic forms of COVID-19 vaccines that are relatively affordable.

Dr. Alharthi, carried a study in the outpatient clinic of Primary Health Centers (PHC) across Bisha Governorate in Saudi Arabia. The study objective was to determine the knowledge and management practices of primary care physicians on the management of asymptomatic hyperuricemia (AH). The mean age of the respondents was 41.3 years, with a standard deviation of 8.6. All the respondents work in public health facilities. The authors concluded that in the primary care setting studied, a high proportion of the physicians have adequate Knowledge about AH, but less than half of them put this Knowledge into practice. Good practices of AH management was determined by years of experience and revising the literature. Emphasis should be made on the practices of the physicians for proper service delivery.

Ghazanfar, & Zafrani presented a case of degeneration of a fibroid. Haemorrhagic degeneration occurring in a young 23 year old nulliparous women with a small fibroid. Uterine fibroids are the most common solid tumours found in the uterus. Prevalence varies significantly and research shows that women with African ancestry have a greater risk for these. Though the majority of cases are asymptomatic and therefore require conservative or no treatment, in some cases, fibroids can be troublesome and undergo complications that have a significant impact on patients lives. These include degeneration of fibroids, often a misdiagnosis best detected on an Magnetic Resonance Imagining scan.

Al Zahib , et al., A cross-sectional study was conducted among 385 type-1 diabetics in Abha City, Saudi Arabia. The aim to assess prevalence of ketoacidosis and to identify risk factors associated with it among patients with type-1 diabetes mellitus (T1DM) in Abha City, Saudi Arabia.Our study included 228 males (59.2%), 44.2% were diabetic for more than 5 years, 48.3% had positive family history of diabetes, while 70.9% reported past history of DKA. Last recorded HbA1c levels for 53.5% were >9%. The authors concluded that most T1DM patients experience DKA, mainly with their first presentation of disease or due to discontinuation of treatment. DKA tends to occur more frequently among patients with poor glycemic control, those with less educated or unemployed parents, and those with positive family history of diabetes.

Saleh, et al., did a retrospective study of all patients who presented with alopecia areata and seen in our two private dermatology clinics in Aden. The aim of the study was to describe the demographic and clinical characteristics of alopecia areata and to determine the associated diseases among patients. The total patients were 264 (females 61.7% and males 38.3%). The mean age of patients was 18 years. The relation between age means of gender showed statistically highly significant ($p = 0.000$). This study highlights the importance of further studies in this field.

Dr. GhazanfarDiscussed Why are SGLT2 inhibitors a good choice in the management of Type 2 Diabetes Mellitus? Sodium-glucose co-transporter 2 inhibitors (SGLT2) are the most recent addition to the oral management of type 2 diabetes mellitus. This chronic progressive disease is linked to cardiovascular and renal disease causing millions of deaths each year worldwide. As oral treatment options have expanded over the years, this has made the management of diabetes mellitus more tailored to individuals taking into account their co-existing comorbidities and therefore slightly more challenging. Several benefits have been reported from SGLT including their ability to improve plasma glucose levels, lower blood pressure, weight loss and more importantly their cardiovascular and renal beneficial outcomes making them one of the popular choices for add on to monotherapy in current guidelines.

Ahmed et al., looked at Pituitary dysfunction following a traumatic brain injury (TBI) at the disk of General Practitioner. Traumatic brain injuries are among the serious causes that affect the health of many people around the world. There are many causes for traumatic brain injuries such as road traffic accidents, work-related accidents, sports activities, falls, and assaults. The injuries could cause transient or permeant pituitary dysfunction which affects a lot of body activities and may decrease significantly the quality of life of such victims. Diagnosis of pituitary dysfunction associated with brain injuries constitutes a real challenge for physicians. This review aims to discuss the current knowledge about this condition and simplify current recommendations to the busy general practitioner at his/her clinic.

Desired Future Specialty and Influential Factors Among Medical Students in Al-Ahsa in Saudi Arabia: A Perceptual Study

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Abstract

Background: Future medical specialties must be chosen carefully by medical students. Several motivational and influential factors play a role during the career choice process. Appropriate choice of the medical specialty by students has an influence on the future healthcare delivery and workforce. Medical schools and practicing doctors have an important role for guidance and mentorship for students. This is the first study of its type to be done in College of Medicine, King Faisal University, Saudi Arabia. So, the aim of this study is to assess the desired future medical specialties and what are the motivational and influential factors for such decisions.

Methods: This is a cross-sectional questionnaire based study. The data was collected in a period between January – February 2021, through an online questionnaire. The questionnaire was composed of biographical data, desire of future medical specialty, and the underlying motivational and influential factors.

Results: This study enrolled 301 medical students with nearly two-thirds (65.8%) males. It was found that the most commonly indicated perceived specialty was pediatrics (8.3%), followed by internal medicine (8%), orthopedic (6.6%) and general surgery (6.6%). The most commonly mentioned source of advice regarding specialty was family (38.4%), followed by practicing doctors (33.5%) and friends (18.4%). It is found that the top 5 most common reasons for choosing future specialty were; good outcomes on patients, followed by having a good social life, high income, good reputation and prestige, and a challenging specialty.

Conclusion: College of Medicine in King Faisal University needs to engage the practicing doctors with students for better guidance and mentorship. The extra-curricular mentorship programs need to be implemented from the first year of college, so students have a wider range of exposure towards different specialties.

Key words: Influential, medical students, specialty, King Faisal University, Saudi Arabia.

Introduction

Medical students are in continuous confusion regarding what future specialty they need to choose; it is considered a disconcerting experience. It is necessary to go through a good career choice process, to shape up a good career. Medical schools worldwide involve graduate and undergraduate students getting acquainted with different medical specialties, which can be an influencing factor when applying for a residency training program. Thus, medical schools play an important role to guide students to their proper pathways (1, 2). With that being said, a number of medical students already have a strong preference for a specific specialty, even prior to enrolling in medical schools (1-3).

Choosing the desired specialty and residency program has a strong impact on the future healthcare delivery as well as on the future workforce in the healthcare system, particularly in times of oversupply or shortage of physicians in different specialties (1-3, 5). Moreover, in the 1980s, "career counseling" specialty was introduced to guide students in setting the priorities and plans for their future concerning their career paths, which might be helpful to medical students (2).

Furthermore, the decision-making process of medical students to choose their specialty is supposed to be filled with passion and enthusiasm, in contrast, studies have found that this process was imposing stress and pressure on students (4). The 2020 report of The Association of American Medical Colleges (AAMC) on Residents, reported that only 26.1 percent of medical students have manifested the same interest in the specialties that they have chosen before the completion of medical school (6).

There are multiple factors that play an important role in making that decision, such as, controllable lifestyles, job vacancies, social status or even the expected income (2, 3, 4, 7). Furthermore, gender usually influences the decision process when choosing the specialty (5, 8).

Studies have shown and classified a number of specialties with controllable lifestyle, where physicians are in control of their working hours, such as "radiology, neurology, pathology, psychiatry, ENT, and dermatology" (2). In contrast, it was explored that "surgery, internal medicine, family practice, pediatrics, orthopedic surgery, and obstetrics & gynecology" are non-controllable lifestyle specialties (8).

The lack of realizing what are the medical students' desired specialties and their underlying motivations by the medical schools could influence the future workforce in the healthcare system and healthcare delivery significantly. This is the first study of its type to be done in the Eastern region in King Faisal University, Saudi Arabia. So, the aim of this study is to assess the medical students' future specialty career and what are the influencing factors in King Faisal University, Saudi Arabia.

Methodology

This is qualitative cross-sectional questionnaire based study, that was performed among medical students and interns in College of medicine, King Faisal University, Saudi Arabia, as an example of a single medical institute. The data was collected through an online questionnaire, in the period between January – February 2021. The total number of students who filled in the questionnaire was 301. The questionnaire used in this study was obtained from a previous study in the literature with similar research objectives (13). Informed consent was obtained stating the demands of the study before doing the questionnaires with those who agreed to participate and who were enrolled. There were no exclusion criteria.

Statistical Analysis

Descriptive statistics were presented using numbers and percentages. The relationship between clinical exposure to general, orthopedic and plastic surgery in regards to the different clinical scenarios was conducted using Chi-square test. P-value of 0.05 was considered statistically significant. A multivariate regression was also performed for selecting plastic surgery based on prior clinical exposure to plastic, orthopedic and general surgery where the odds ratio as well as 95% confidence interval were also reported. All data analyses were carried out using Statistical Packages for Software Sciences (SPSS) version 21 Armonk, New York, IBM Corporation.

Results

This study enrolled 301 medical students to evaluate their perception regarding desired future specialty. Table 1 presents the socio demographic characteristics of the medical students. The most common age group was 22 – 24 years old (48.5%) with nearly two-thirds (65.8%) males. With respect to their academic year level, 21.3% were in the fifth year level, 19.9% were fourth year and 19.6% were third year level. Furthermore, nearly 60% obtained grades between 4.5 – 5 GPA. In addition, 61.5% received advice regarding future specialty. The most commonly mentioned source of advice regarding specialty was family (38.4%), followed by practicing doctors (33.5%) and friends (18.4%).

Figure 1, shows the perceived specialty choices by the medical students. It was found that the most commonly indicated perceived specialty was pediatrics (8.3%), followed by internal medicine (8%), orthopedic (6.6%) and general surgery (6.6%) while histopathology (0.7%) and psychiatry (0.7%) were the least chosen.

Table 1: Socio demographic characteristics of medical students (n=301)

Study Variables	N (%)
Age group	
• 18 – 21 years	141 (46.8%)
• 22 – 24 years	146 (48.5%)
• 25 – 27 years	14 (04.7%)
Gender	
• Male	198 (65.8%)
• Female	103 (34.2%)
Current academic year level	
• First year	51 (16.9%)
• Second year	51 (16.9%)
• Third year	59 (19.6%)
• Fourth year	60 (19.9%)
• Fifth year	64 (21.3%)
• Internship	16 (05.3%)
GPA	
• <4.0	64 (21.3%)
• 4.00 – 4.49	62 (20.6%)
• 4.50 – 5.0 0	175 (58.1%)
Received advice for future specialty	
• Yes	185 (61.5%)
• No	116 (38.5%)
Source of advice (n=185)	
• Family	71 (38.4%)
• Practicing doctors	62 (33.5%)
• Friends	34 (18.4%)
• Faculty staff	14 (07.6%)
• Others	04 (02.2%)

Figure 1: Percentage of perceived specialty choices by the medical students

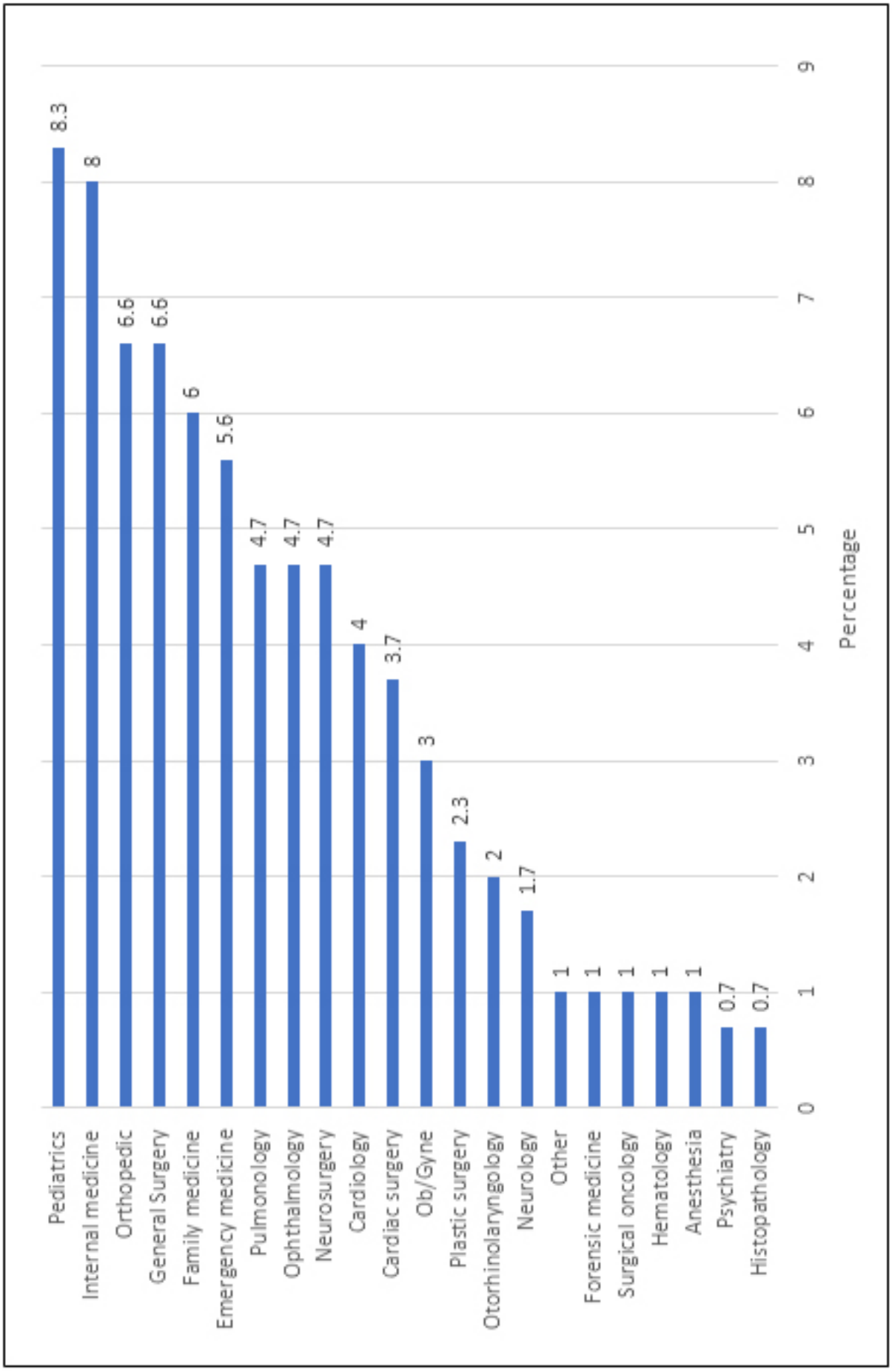

Table 2: Reason for choosing a future specialty of medical students

Reasons		N (%)
1.	I would like to see good treatment outcomes on my patients	131 (43.5%)
2.	I want to have a good social life	118 (39.2%)
3.	I want a high income	97 (32.2%)
4.	I'm looking for specialty with good reputation and prestige	89 (29.6%)
5.	I'm looking for a challenging specialty	85 (28.2%)
6.	I'm looking for a specialty with acceptable working hours	80 (26.6%)
7.	I would like to see a wide variety of patients with different conditions	71 (23.6%)
8.	I had a personal experience that stimulated my interest in this specialty (me/family member had a condition related to the specialty stimulated my interest)	61 (20.3%)
9.	I prefer to treat non-urgent cases	58 (19.3%)
10.	I'm looking for a specialty with acceptable on-call duty	49 (16.3%)
11.	I prefer to treat emergency cases	45 (15.0%)
12.	I'm trying to become like a doctor known to me	42 (14.0%)
13.	I would like to focus on treating patients in clinics (outpatients)	39 (13.0%)
14.	I will have better opportunities in the private sector	38 (12.6%)
15.	I would like to have a long-term relationship with my patients	36 (12.0%)
16.	Lack of specialists in this specialty in my country	35 (11.6%)
17.	I would like to focus on treating patients in the ward (inpatients)	34 (11.3%)
18.	I would like to see a narrow group of patients with specific problems	32 (10.6%)
19.	I want to treat less complicated patients	30 (10.0%)
20.	The specialty I want offers more research opportunities	29 (09.6%)
21.	I'm looking for a specialty program with a short duration	23 (07.6%)
22.	I do not want to have a direct interaction with patients	20 (06.6%)
23.	Other reasons	06 (02.0%)

In Table 2, the top 5 most common reasons for choosing future specialty were; "I would like to see good treatment outcomes on my patients" (43.5%), followed by "I want to have a good social life" (39.2%), "I want a high income" (32.2%), "I'm looking for specialty with good reputation and prestige" (29.6%) and "I'm looking for a challenging specialty" (28.2%) while "I do not want to have a direct interaction with patients" was the least mentioned (6.6%).

Discussion

We have enrolled a total of three hundred and one students as well as interns from college of medicine in King Faisal University, Saudi Arabia. This is the first study to be done to assess the students' perception of their future desired specialty and what are their motivational and influential factors to choose this specialty.

It is found as in figure 1 that the most common desired specialty is pediatrics, followed by internal medicine, orthopedics, general surgery and family medicine. This is opposite to what is found in the literature, where the internal medicine was the most common chosen specialty in Saudi universities (9, 10). Moreover, studies in Pakistan and Germany showed similar results as well (11, 12). However, a study conducted in Kuwait found a similar result as in our students (13). These results could be attributed due to high exposure to these specialties when compared to others as in the case of our university. However, although efforts are made by Saudi Arabia's vision 2030 to increase family medicine's number of physicians, it came as the 5th desired specialty by our students and interns (14). This can be attributed to the fact that family medicine's clerkship in King Faisal University is taught to final year students only, so by that time students may already have chosen other specialties that they have been exposed to and prepared for them well.

Students were asked about whether they were advised for their chosen desired specialty, and 61.5% of students were advised as shown in Table 1. Moreover, the most common source of their advice was from their families, followed by practicing doctors and friends. This is different from a study conducted in Kuwait, in which less than half of participants were advised and the most common source of their advice was from their practicing doctors, followed by families (13). The point of families being the most common source of their advice needs to be highlighted more with our students, as this can be attributed due to parental pressure, family's income, family background. However, this can influence the student's process to choose their desired specialty, and follow the commands of their family members instead, which can lead to unwanted consequences when they proceed with their specialties. However, practicing doctors play an important role in terms of guidance and mentorship for students to help them choose the future specialty, as seen in a study conducted in the United States (15), so they must be more involved with students in King Faisal University to help the students choose the proper future specialty.

It is observed in Table 2 the most common reasons behind their choice of the selected desired future specialty. It is found that the top 5 most common reasons for choosing future specialty were; good outcomes on patients, followed by having a good social life, high income, good reputation and prestige, and a challenging specialty, while avoiding interaction with patients was the least to be mentioned. Two studies conducted in Pakistan and Saudi Arabia, found that the most common influential factor was personal interest, followed by having a role model and the need of the region (11, 16). Another study conducted in Germany, found that students' top motivational factors were the reconciliation between work and family, career goals and workload (12). In Kuwait, the top most common reason was similar to our study, which is having good outcomes for patients (13).

Conclusion

Faculty in College of Medicine in King Faisal University needs to be more involved with students to guide and mentor them throughout their journey to choose their proper specialty, instead of the random assignment of students with the faculties and for a short period of time. Moreover, students need to be enrolled in extra-curricular activities for mentorship from the start of the first year so that they can be exposed to different specialties, which will allow them to build up their experience and preferences.

Limitations:
Although the study achieved its aim, there are several limitations that need to be considered. First, this study was conducted in a single medical institute and does not represent all medical students in Saudi Arabia. Thus, other institutes need to conduct such studies for their own students. Furthermore, this study is a cross-sectional study with small sample size.

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Reject rate analysis in radiography in Primary health care corporation, Qatar

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Abstract

Background: The optimum objective of a radiographic study is to provide images that can be diagnostic to assist in the management of the patient; on the other hand the ionizing radiation exposure received by the patient should be minimized. A rejected radiograph image is a poor quality image that does not provide the necessary information to help clinical diagnosis, subsequently it is repeated. Analysis of image rejection is an important part of the quality assurance programs for a radiology department to determine the reason for rejection which can assist to arrange for proper radiographer training as well as help smooth workflow and consequently reduce the ionizing radiation to the patients.

Aim of work: The current study aims to analyze the image reject rate for radiographs at PHCC and determine the reasons for rejection.

Material & Methods: The data was retrospectively collected from January 2020 to December 2020 to include all rejected images. The reject rate per each reason, anatomical area and health centers were analyzed.

Results: The total sample size was 581 rejected cases with overall reject rate of 0.78 %. The most frequently recorded causes for image rejection were patient movement during the procedure or non-cooperative patient (37.86%) and off-center study (21.17%). The frequency of image rejection was higher in some studies such as spine (24.44%), chest (23.41%), and lower extremities examination (18.24%).

Conclusion: The reject rate in PHCC radiology department is within the accepted limits of quality control and assurance studies. However, it is highly important to carry on quality improvement projects with proper training and education based on utilization of regular reject analysis and feedback tool.

Key words: Radiography-Reject rate- Images-Quality- ALARA

Abbreviations:
ALARA: As Low As Reasonably Achievable
IAEA: The International Atomic Energy Agency
PHCC: Primary Health Care Corporation
HC: Health center

Background and Aim of the Work

The optimum objective of a radiographic study is to provide images that can be diagnostic to assist in the management of the patient; on the other hand the ionizing radiation exposure received by the patient should be minimized. A rejected radiograph image is a poor quality image that does not provide the necessary information to help clinical diagnosis, subsequently it is repeated (1-7). This repeat will increase the radiation dose received by the patient, which is not coinciding with the ALARA principle (patient's exposure to ionizing radiation should be As Low As Reasonably Achievable); additionally this will reduce patient satisfaction and increase departmental costs (8-11).

Quality is the measurement that leads the organization to achieve its desired outcomes. Some quality indicators are applied in radiology departments to improve the effectiveness and to rule out any error or defects which thus can improve services to achieve the required goals (2-4).

Analysis of image rejection is an important part of the quality assurance programs for a radiology department to determine the reason for rejection which can assist to arrange for proper radiographer training as well as help smooth workflow and eventually reduce the ionizing radiation to the patients (5,7,8-11). The International Atomic Energy Agency (IAEA) (1) recommended areject rate within 5% to 10%.

The Australian Code of Conduct for medical radiation practitioners states that it is the responsibility of the medical radiation practitioner to promote the safe use of radiation. This includes justifying, limiting the dose and optimizing the exposure while still acquiring quality diagnostic images (2-4).

Primary Health Care Corporation (PHCC) is responsible for providing, facilitating access to and delivering a range of coordinated health and community care services to the population of Qatar. This occurs through a wide range of programs, services and partnerships. Measuring the performance of the programs and services of the organization is crucial for all levels of management in order to harness, direct and support teams and individuals to engage in delivering the organization's mission and objectives (12).

In PHCC, a performance indicator report is released on a monthly basis. The diagnostic imaging key performance indicators (KPIs) are highly valuable data points and measurement tools that can be used to monitor and evaluate the quality of services provided by a radiology operation. Reject rate is one of the important released KPIs. The current reject rate in PHCC is generally below the standard international reject rate, however there is still a need to elaborate more about the reason for rejections
The vision of PHCC is to be the leader in transforming the health and wellbeing of people's lives in Qatar. PHCC now provides the radiography service to date.

This study can identify the rate and reasons for image rejection in primary health care radiology department. This can help in arrangement of plans to reduce the rejection rate thus reduce department expenses and patient radiation exposure doses.

The current study aims to analyze the image reject rate for radiographs at PHCC and determine the reasons for rejection.

Material and Methods

The study was approved by the Research subcommittee of PHCC research department (reference number PHCC/DCR/2020/08/95).

No informed consent was needed as all the data were de-identified. The data was retrospectively collected from January 2020 to December 2020 to include all rejected images. The data was extracted from PHCC's shared folders anonymously. The image overall reject rate was calculated. The reject rate per each reason, anatomical area and health centers were analyzed. No sampling is required for this study. All images rejected were included in the study; no exclusion was done.

The variables:
Data was delivered in an Excel sheet. Statistical analysis was done using IBM SPSS version 23 computer software. The average reject rate was calculated by dividing the total number of rejected images by the total number of images acquired in the same period and expressed as percentage along with the standard deviation. The data was expressed as percentages in order to assess the reasons and anatomical area for image rejection. The REPORT statement, which is an extension of the STROB statement checklist (international, collaborative initiative of epidemiologists, methodologists, statisticians, researchers and journal editors involved in the conduct and dissemination of observational studies, with the common aim of Strengthening the Reporting of Observational studies in Epidemiology) specially designed to assure the quality of reporting of secondary data analysis was followed during analysis and writing of the research paper. There was no direct contact with study participants. Therefore, no physical and mental discomfort, harm, and danger arose from research procedures. The investigators abided by the ethical rules and regulations of MOPH concerned with research.

Results

Sample size and overall reject rates:
The total sample size was 581 rejected cases. They were collected from examinations done over 12 months from January 2020 to December 2020. Overall reject rate was 0.78 %.

Reasons for image rejection:
The identified reasons for image rejection are shown (Table 1, Figure1):

The most frequently recorded causes for image rejection were patient movement during the procedure or non-cooperative patient (37.86%), off-center study (21.17%), presence of artefact (16.5%), improper positioning (12.7%); while other reasons included forgetting to use grid (5%), patient is not well prepared (3.6%), while machine breakdown was the reason in only (0.2%).

Reject rates per anatomical area:
The reject rate per different types of examinations is shown in (Table 2, Figure 2).

The frequency of image rejection was higher in some studies, such as spine (24.44%), chest (23.41%), lower extremities examination (18.24%), while it was in upper extremities study (12.74 %), skull (10.84%), pelvis (5.68%), and abdomen (4.65%).

Health Center reject rates:
Individual health centers reject rate were analyzed (Figure 3). These data showed a considerable variation in the reject rates among different health centers.

Reject rates per month:
Individual months reject rate were analyzed (Figure 4). These data showed a drop in April 2020 (2.4%) and May 2020 (1.5%) while the rest of 1st 2020 quarter and 3rd quarter had a very close rejection rate.

Table 1: Reason for image rejection

Reason for image rejection.	Number of images	%
Patient movement	220	37.9
Off centered	123	21.2
Foreign body/Artefacts	96	16.5
Improper position	74	12.7
Grid problem	29	5
Patient is not well prepared	21	3.6
Machine Breakdown	10	1.7
Not recorded	6	1
Connection Breakdown	1	0.2
Wrong marker	1	0.2
Total	581	100

Table 2: Image rejection in different anatomical areas

Reason for image rejection.	Number of images	%
Patient movement	220	37.9
Off centered	123	21.2
Foreign body/Artefacts	96	16.5
Improper position	74	12.7
Grid problem	29	5
Patient is not well prepared	21	3.6
Machine Breakdown	10	1.7
Not recorded	6	1
Connection Breakdown	1	0.2
Wrong marker	1	0.2
Total	581	100

Figure 1: Reason for image rejection

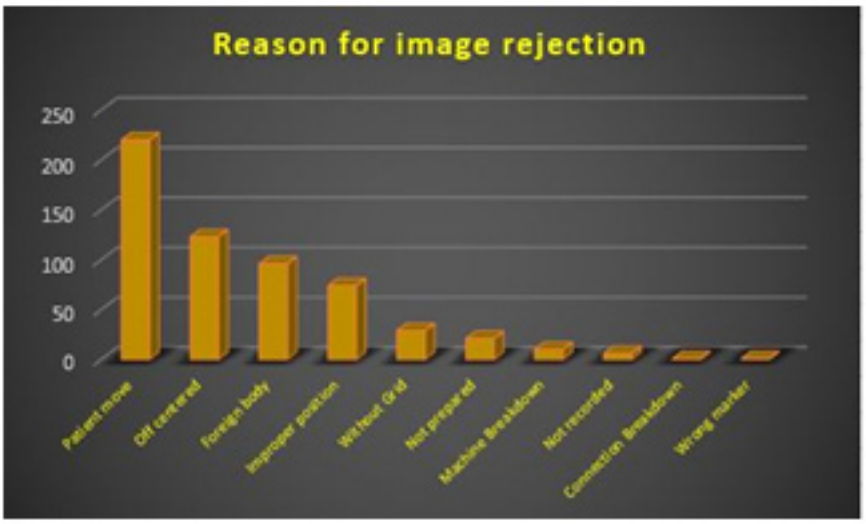


Figure 2: Image rejection in different anatomical areas

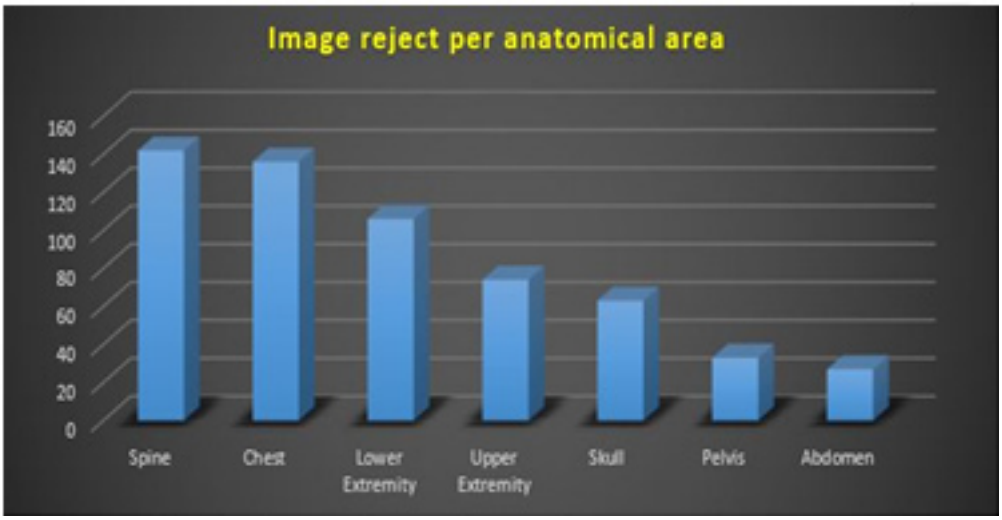


Figure 3: Image rejection in different HCs

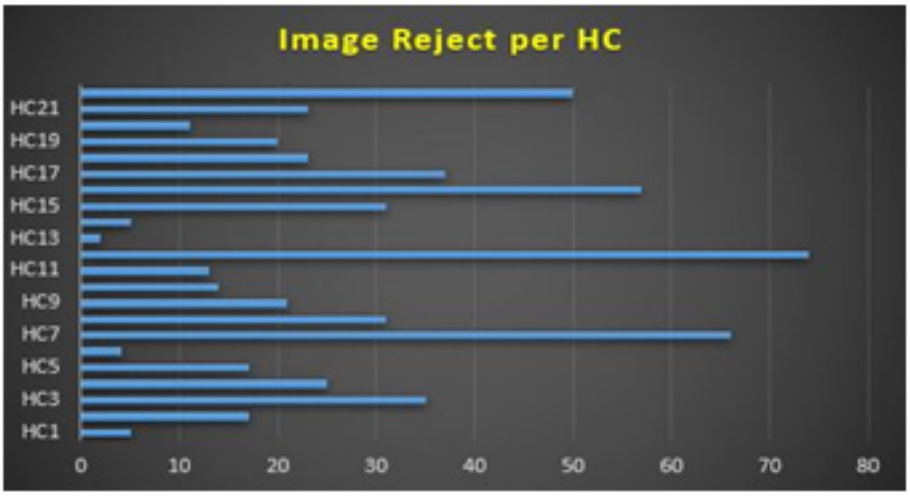
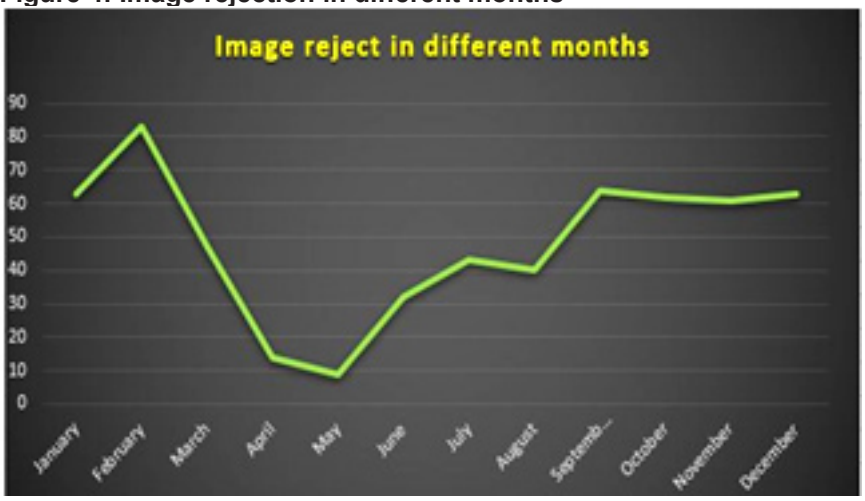


Figure 4: Image rejection in different months



Discussion

As the rejected images are not transferred to the radiologists for reporting their high ratio can affect the radiation dose the patient receives and passively influence the radiology department performance (13).

The aim of image rejection analysis is to find out the areas which need improvement as well as to identify the limitations in the performance, therefore be able to help in drafting some recommendations that can be helpful in improving the performance and empower the future analysis of image rejection.

Moving from conventional radiography to digital radiography was theoretically expected to reduce the reject rate from 10-15% down to 3-5 %. This was supported by several studies' results (14-18), while it was not the case in other situations (11,13,19,20).

Previous reports showed some overall hospital's rejection of 1- 1.2% (10, 21) while some other studies were higher (4.8-11%) (9,11,19).

In a study conducted on a large sample size of (98,503 images) over 6 months the reject rate was about 9% which is towards the higher end of reject rates reported for DR and higher than CR reported average (5%) (13,15,22). This was comparable to film-screen studies (8-16%) (14,22,26) yet this study may be representing reject rates in radiography done in the emergency department.

In the current study the reject rate was 0.78% which is below the WHO recommendation of 5% (18) and below 2% which is that expected in the DR department (15).

Upon analysis of the cause of image rejection in the current study, it was found that the most common causes are patient movement during the procedure or non-cooperative patient (37.86%), off-center study (21.17%), presence of artefact (16.5%) and improper positioning (12.7%).

Positioning error was the most encountered problem in the CR systems too (13,14,17,23,24).

In a previous study (9,11,13,25) the most common cause was error in 'positioning' and 'anatomy cut-off', while in older film-screen radiography the exposure error was on top of image rejection reasons. In current CR and DR systems, the position error was reported in an earlier study (10) the most common technical reason for rejection was error in patient positioning (36.11%) while it constituted a higher percentage in some other studies (51-77% (9-11,19).

A study by Dunn and Roger (26) found that radiologists are more lenient with image quality and can accept up to half of images that are rejected because of positioning error by technologists. In line with this also, another study conducted by Nol et al (14) assumed that the increased prevalence of positioning error can be attributed to less communication between radiologist and radiographer regarding the quality of images.

Another technical error in the collimation error, in a previous study (10) it was 13.1% while it was about 6.4% in another study (11).

These errors can be attributed to inability of the technicians to apply their theoretical knowledge in the practice to achieve proper collimation.

Some types of examination can have higher rates of image rejection than others. t+This was confirmed in the study of Dunn and Rogers (26) who found that reject rates are sensitive to the type of examination and claimed that using a single average reject rate as a quality indicator can have some misrepresentation of the actual performance. In some earlier studies (10, 13) the highest reject was in the chest radiograph (38% in adults and 10% in children) while the least was in cranial (3%), the lower extremity (15%) and upper extremity (8%). In another study (11) it was 59.1% for lower extremity and 25.4% for the upper extremity (8).

In a study of Zhang (27) he noticed that radiographers prefer higher exposure to have a higher image quality. Foos et al (23) attributed the reduction of exposure errors to improvement in detector systems in CR machines and this was encouraged as it results in keeping patient dose in line with the ALARA principle (13,27-28).

While in the current study exposure errors were not a significant reason in image rejection, yet it is recommended in a future study to consider the exposure index analysis as in DR as there may be a possibility of over-exposure of patient by more than the average as claimed in previous studies to be 5-10 times the average (8,13,27).

In the current study, when rejected images of different individual examinations were analyzed, some anatomical regions showed a higher image rejection. The reject rate per different types of examinations is shown in (Table 2, Figure 2). The frequency of image rejection was higher in some studies such as spine (24.44%), chest (23.41%), and lower extremities examination (18.24%), while it was in upper extremities study (12.74 %), skull (10.84%), pelvis (5.68%), and abdomen (4.65%).

This identifies these areas to be of potential concern that may need additional focused training on these specific examinations to lower the image rejection and radiation dose delivered to the patient.

In the current study the reject rate was variable among different health centers. This also can indicate that the image standard quality may be not consistent among different health center radiographers so improvement can be achieved through regular feedback in order to have standard technical aspects and image quality achieved among different radiographers.

Reject analysis is an accurate efficient tool that can collect the feedback and keep these standards.

In the current study, individual months reject rate were analyzed. These data showed a drop in April 2020 (2.4%) and May 2020 (1.5%) likely attributed to reduced workflow due to COVID-19, while the rest of 1st 2020 quarter and 3rd quarter had very close rejection rate.

There were some limitations in the current study such as data are collected manually from technologists and not exported from the automatic dedicated reject analysis software, so there was possibility to miss some data as not recorded by them so it is recommended in future studies to export data periodically through dedicated software. In this way we can avoid any data loss or incorrect categorization by radiographer. Access to rejected images can verify the rejection cause retrospective. This could be done by having a dedicated folder for rejected images on PACKS (Picture Archiving and Communication System).

Conclusion

This result showed that the reject rate in PHCC radiology department is within the accepted limits of quality control and assurance studies.

However, it is highly important to carry on quality improvement projects with proper training and education based on utilization of regular reject analysis and feedback tool.

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Hip replacement in sickle cell anemia patient and the effect of Musculoskeletal changes other than hip joint on outcome

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Abstract

Introduction: Sickle cell anemia is endemic in south west of Saudi Arabia, and patients with hip pain and sickle cell anemia are frequently seen in orthopedic clinics and are a challenge to treat. Total hip replacement is proven to be of benefit for patients with secondary hip joint degeneration due to avascular necrosis. Patient's other musculoskeletal manifestations of sickle cell anemia have their impact on patient's outcome following hip replacement.

Objective: To compare the effects of disease manifestation other than that on the replaced hip on outcome of hip replacement in sickle cell anemia patients.

Material and Methods: Retrospective study of 20 patients who underwent total hip procedure with 6 month follow up divided into two groups, to see the effect of other musculoskeletal changes on outcome.

Results: The total hip procedure was done for all 20 patients; all patients were aged 25 to 52-years old; females were 13 patients and Males 7 patients; Left hip was affected in 12 patients and right hip in 8 patients. All patients had uneventful post-operative recovery; all patients' data is shown in Table one. 6 months post op showed less satisfaction in patients with manifestation of sickle cell anemia involving, in addition of the replaced hip, spinal disorders such as scoliosis or back pain due to infarct and collapse or soft tissue contractures of hips or knees.

Conclusion: Categorizing all sickle cell hip avascular necrosis in one group is unfair for patients and surgeons. Patients with multiple sites of disease manifestation must be considered a difficult primary hip and handled with care, while some patients with isolated hip involvement have comparable results to hip replacement in other conditions.

Key words: Sickle cell anemia, Total hip, hip scores, hip replacement, avascular necrosis.

Introduction

Sickle cell anemia is endemic in the south west of Saudi Arabia; patients with hip pain and sickle cell anemia are frequently seen in orthopedic clinics and are a challenge to treat. Although medical treatment has been developed over recent years, surgical treatment namely total hip replacement, is the last resort to address the changes happening to the hip joint due to avascular necrosis and secondary osteoarthritis in sickle cell anemia and there are less invasive procedures such as core decompression and trap door procedure that can and should be offered earlier to alter the natural history and delay the need for total hip replacement. Once total hip replacement is offered it should be remembered that its outcome correlates to the presence of soft tissue changes such as contracture or infection and skeletal findings like the loss obliteration of the medullary canal variation of bone quality, bone load resistance and spine vertebral segmental collapse with avascular necrosis. Patients who only have their changes limited to the hip joint are expected to have a better outcome, while those with other musculoskeletal changes have varying outcomes.

Nearly over 50 years of progressing success, total hip replacement is one of the most rewarding surgeries and named the century surgery (1). In the 1960s, total hip replacement started in an attempt to restore hip function and therefore restore activities of daily living. Since then, improvement in many aspects of this procedure have brought it to today's current situation of high-quality prosthetic implants and well proven surgical indication and contraindication together with evidence proof pre- and post-operative management, with reproducible results in so many hands thanks to improvement in the surgical technique and surgeons training. In general, survival of hip replacement ranges from 85 to 95% (2). Proven to be a complex procedure, total hip replacement for sickle anemia is of concern due to its medical, intraoperative and postoperative complications. The success required to optimize patients medically as well as improving surgical techniques and prosthetic implant manufacture have led recently to comparable outcomes for the sickle cell anemia patient. Adherence to adequate perioperative measures such as hydration, maintenance of body temperature, oxygenation and above 10 mg/dl hemoglobin level factors positively in the outcome and are somewhat easy to apply. Dealling with intraoperative challenges such as soft tissue contractures, bony fracture or perforations are difficult and the major factor for poor outcomes (3). The effects of other bony involvement like scoliosis or soft tissue conditions such as Periarticular Contracture on hip replacement is discussed for other conditions in literature for example degenerative hip and spine in elderly but for sickle cell anaemia patients there is need to study this effect further to improve outcomes for hip replacement for these patients.

Material and Methods

Ethical approval Number [ECM#2019-20] was approved by King Khalid University, Research Ethical Committee. Retrospective study took place at our hospital during the period between November 2007 to April 2011. Total number of patients was 20 patients who underwent total hip procedure divided into two groups:

Group A patient inclusion criteria: no previous back pain or spine clinic follow up, no history of skeletal infection or joint contractures. All patients had pathology localized to the joint articulation only.

Group B patient inclusion criteria:
1: radiological evidence of vertebral column changes requiring previous spine unit care
(Chronic back pain, vertebral column changes e.g., scoliosis, collapse or infection)
2: radiological evidence of femoral canal obliteration
3): evidence of flexure contractures of the knees or the hips
(Unable to stand or stand with difficulty, uses wheel chair or walking aid)

Results

The total hip procedure was done for all 20 patients; all patients were age 25 to 52 years old. Female 13 patients and Males 7 patients, Left hip affected in 12 patients and right hip in 8 patients. All patients had uneventful post-operative recovery. All patient data is shown in Table one. 6 months post op Harris Hip Score obtained for all patients (Table 1).

Table 1: 6 weeks Post-operative all patients involved

	Group A	Group B
Total patients	10	10
Males	4	3
Females	6	7
Site of skeletal changes	Hips only	Hips/spine/femoral canal
Presence of soft tissue contractures	None	Hip and knee contractures
Number of admissions per year	Less than 4	More than 4
Wound infections	1	3
Transient femoral nerve palsy	1	4
Aseptic loosening	0	2
Septic loosening	0	1
Femoral canal violation	0	2
Medial acetabular violation	0	1
Leg length discrepancy	0	2
Average intraoperative blood loss	1100(+/-150ml)	1500(+/-200ml)
Average intraoperative blood loss	120 (+/-30) minutes	180(+/-30) minutes
Average Harris hip score: Preoperative	45.22+\-3.021	25.94±4.437
Average Harris hip score: 6 weeks postoperative	92.53±1.419	88.82±1.845

In Table 2 the females dominated the younger group of patients although the oldest patient in the study was female.

Table 2: Age Distribution of Patients (n=20)

Age Distribution (n=20)						
Age Groups (years)	Males	%	Females	%	Total	%
20-25	0	0.00	3	15.00	3	15
26-29	5	25.00	7	35.00	12	60
30-35	2	10.00	2	10.00	4	20
36-39	0	0.00	0	0.00	0	0
40-45	0	0.00	0	0.00	0	0
46-49	0	0.00	0	0.00	0	0
50-55	0	0.00	1	5.00	1	5
Total	7	35%	13	65%	20	100
Median Age (years)	29		27			
t test-unpaired (p value)=0.9315						
95% CI	(6.07 to 5.58)					

[Unpaired t test was used to compare between the Groups A and B]

In Table 3 most complications happened to the patients in group B which is the group with disease manifestation which included other musculoskeletal sites with the hip involvement.

Table 3: Surgical Complications

Complications	Group A	Group B
Wound infections	1	3
Transient Femoral N Palsy	1	4
Septic loosening	0	2
Femoral Canal Violation	0	2
Medial Acetabular Violation	0	1
Leg length Discrepancy	0	2
Mean	0.33	2.33
SD	0.52	1.03
SEM	0.21	0.42
t test (unpaired)	4.2426	(95% CI=-3.05 to-0.95)
p value	0.0017	

[Unpaired t test was used to compare between the Groups A and B]

Table 4 showed the statically significant changes between the two groups marking the group with other musculoskeletal manifestations low satisfaction due to more frequently occurring complications.

Table 4: Comparison between Groups A and B

Categories	GROUP A	GROUP B	t test *(unpaired)*	95% CI	*p* value
Average Intra-operative Blood loss (ml)	1100	1500	5.6882	(-547.74 to -252.26)	<0.0001
Average operative Time (min)	120	180	9.2445	(-73.64 to-46.36)	<0.0001
Average Harris hip Score: Preoperative	45.22	25.94	27.5206	(17.80 to 20.74)	<0.0001
Average Harris Hip score: Post operative	92.53	88.82	5.66	(2.33 to5.08)	<0.0001

[Unpaired t test was used to compare between the Groups A and B]

In Table 5 functional scores favoured those with solitary hip manifestations over patients with multiple musculoskeletal manifestations.

Table 5: Comparison between Pre and Post-operative Harris Hip Scores

	Preoperative Hip Score	Postoperative Hip Score
Statistical Values	Group A *(n=10)*	Group A *(n=10)*
Mean	45.22	92.53
Paired t test	89.4035	
95% CI	(-48.60 to -46.01)	
p value	<0.0001	
	Group B (n=10)	Group B (n=10)
Mean	25.94	88.82
Paired t test	119.5067	
95% CI	(-64.0264 to -61.7336)	
p value	<0.0001	

[Paired t test was used to compare pre and post operative Hip scores

Discussion

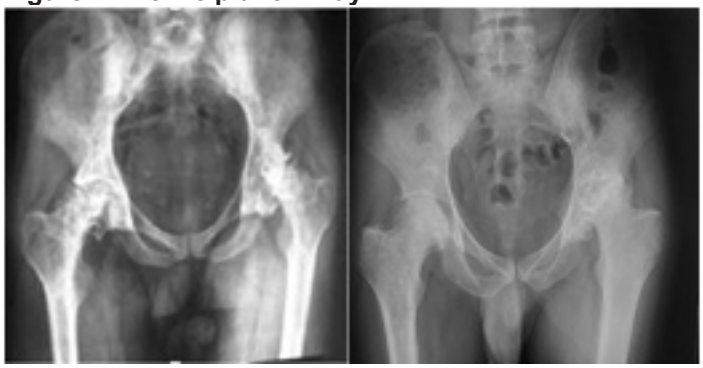
The prevalence of sickle cell anaemia in southern region Saudi Arabia is one of the largest among a patch incidence ranging from 2 to 27 % with the eastern region being the second with higher incidence [4].

Our study describes peculiar findings of the medullary obliteration figure, acetabular periarticular infarct Figures (1A&B) and spine vertebral column collapse with kyphoscoliosis Figure (2) and presence of soft tissue hip and knee contractures Figure (3) in sickle cell disease patients correlates proportionally with the severity of pre-operative symptoms, intraoperative difficulties and the patient post operative Harris Hip Scores. Severe soft tissue contractures, leg length discrepancy, poor bone quality and medullary cavities obliteration are found to be other factors of lower hip score. Sickle cell disease is quite common in our region and is associated with orthopaedic pathologies of which osteonecrosis of the femoral head is common. Lumbar spine involvement with osteonecrosis and collapse with secondary scluosis contributes to leg length discrepancy. Intraoperative blood loss which can be anticipated in patients with high difficulty index should be minimized as possible and blood transfusion is given as necessary. Sickle cell anaemia vascular necrosis involves hip joint early in patients life and with improvements in sickle cell anaemia patients survivor it is highly possible hip replacement will be required early than anticipated as well as revision surgeries than in other conditions [5]. Presentation of boney infarct without loss of congruency which accounts for the majority of cases pain is due to infarcts with intraoseous compartmental pressure of the femoral head and may benefit from core decompression [6]. Hips become complex because by the time they eventually present, the pathology has worsened due to weakness, stiffness and lack of motivation.

Duration of surgery comparable to time required for difficult primary hip and our study matcheswhat other authors established [7]. Technical difficulties encountered in the course of the surgery related to extent of local changes of the disease with stiffness, femoral canal obliteration and acetabular bone stock variation from cysts, sclerosis and protrosio in rare cases. Intraoperative blood loss in our study varies according to these technical difficulties and thus the need for more blood transfusions. Compared to works on primary THR where mean operative time of 89 minutes [14] and 123±28 minutes [15], duration in our study is higher than expected. Mean intra operative blood loss of 1600 ml is higher than 1090 ml, 984 ml and about 371 ml respectively reported in primary THR [8,9 & 10].

Perforation or fracture is of either the acetabulum or the femur. The patients that had femoral perforation did not need any further intervention. The canal was eventually located and stem bypassed the area of perforation. Acetabular perforation occurred in a sickler and a young man with steroid induced AVN. The perforation occurred during reaming due to extensive irregularity and weak acetabular floor respectively. Al-Mousawi reported acetabular perforation, femoral perforation and fracture similar to our report in sicklers [11].

Figure 1: Pelvic plane x-ray



A **B**

A (advanced bilateral avascular necrosis beyond the hips)
B (unilateral avascular necrosis isolated to the left hip)

Figure 2: Scoliosis of the spine secondary to avascular necrosis contributes to leg length discrepancy

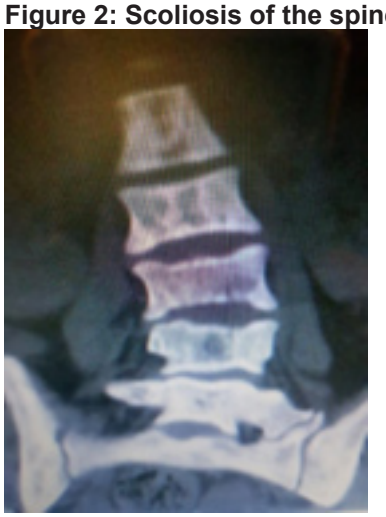


Figure 3: Presence of soft tissue hip and knee contractures

Conclusion

The primary total hip in sicklers should be prepared well; we think categorizing all sickle cell hip avascular necrosis in one group is unfair for patients and surgeons. While some of these patients can be dealt with low difficulty others have higher difficulty, index indicated by the presence of the musculoskeletal changes other than those restricted to the hip joint. Careful history, physical and radiological examination exploring these factors of poor outcome must be exercised to differentiate between the two groups. Strict pre-operative optimization and in terms of implants one should have a well-equipped armamentarium for hip replacement. Sickler hips with high difficulty index is challenging technically; difficulties should be anticipated and dealt with to avoid high incidence of intraoperative complications, increased operation time and blood loss. The complexity of primary hip replacement in sickle cell disease patients is common and poses a surgical challenge. The main limitation of this study is that it is a single center study; multicenter future studies are needed to increase the number of cases in this specific condition. We recommend routine categorization of these patients into low and high difficulty index groups as well as multi-disciplinary approach in preoperative optimization for patients for surgery and if possible to have this procedure done in an experienced center familiar with its technical difficulties and ready to deal with complications in case they occur. The use of image intensifiers to deal with the femoral canal preparation in case of its obliteration to avoid canal violation and to seat the acetabular cup during acetabular reaming can avoid violation of medial wall. Patient understanding of the effect of remote manifestation away from the hip such as vertebrae infarct and lower limb joints and soft tissue contracture on outcome helps alleviate the unpleasant high expectation feelings of the patients and gathers efforts toward maximum cooperation among all members of the multidisciplinary treating team.

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Risk Factors of Diabetic Ketoacidosis among Type 1 Diabetic Patients in Abha City, Saudi Arabia

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Abstract

Aim of Study: To assess prevalence of ketoacidosis and to identify risk factors associated with it among patients with type-1 diabetes mellitus (T1DM) in Abha City, Saudi Arabia.

Methods: A cross-sectional study was conducted among 385 type-1 diabetics in Abha City, Saudi Arabia.

Results: Our study included 228 males (59.2%), 44.2% were diabetic for more than 5 years, 48.3% had positive family history of diabetes, while 70.9% reported past history of DKA. Last recorded HbA1c levels for 53.5% were >9%. The main predisposing factors for DKA were being first presentation (59%) or treatment discontinuation (53.1%). DKA occurred significantly more in patients with family history of diabetes ($p<0.001$), in patients with poor glycemic control ($p<0.001$), and in patients whose parents were less educated or unemployed. However, its occurrence did not differ significantly according to patients' age or their duration of disease.

Conclusion: Most T1DM patients experience DKA, mainly with their first presentation of disease or due to discontinuation of treatment. DKA tends to occur more frequently among patients with poor glycemic control, those with less educated or unemployed parents, and those with positive family history of diabetes.

Key words: Type 1 diabetes, ketoacidosis, HbA1c, risk factors, Saudi Arabia.

Introduction

Diabetes mellitus (DM) is a chronic endocrine disorder associated with abnormal blood glucose metabolism. It results in both short-term and long-term complications, such as diabetic ketoacidosis (DKA) (1). Due to hyperglycemic emergencies, case fatality ranges from 4% to 40% in developing countries (2).

It is the most common acute hyperglycemic emergency in people with DM. It is the consequence of an absolute or relative lack of insulin and concomitant elevation of counter-regulatory hormones, usually resulting in the triad of hyperglycemia, metabolic acidosis and ketosis, often accompanied by varying degrees of circulatory volume depletion (3).

DKA occurs mostly in people with uncontrolled type 1 diabetes mellitus but can also occur in adults with poorly controlled type 2 diabetes mellitus under stressful conditions, such as acute medical or surgical illnesses, and, in adolescents, in new-onset T2DM. Although any illness or physiological stress can precipitate DKA, the most frequent causes are infections, particularly urinary tract infections and gastroenteritis (1).

DKA presents with several vague symptoms, e.g., nausea, vomiting, and abdominal pain, excessive thirst and polyuria. Kussmaul breathing and fruity odour are specific signs present on examination of a patient with DKA (4). It is the presenting manifestation of diabetes in about one-third of type 1 diabetics, mainly in children (5). Its incidence is as high as 5.6 events per 100 person-years, with a prevalence of up to 12.8 per 100 people (6-7), depending on the clinical setting, region of the world, state of development of a country, and level of income inequality (8-9).

There are several precipitating factors of DKA, especially missed insulin dose and an ongoing infection. The clinical outcomes of DKA depend upon the patients' response to initial medical intervention, the precipitating factor for DKA, and biochemical values (10).

It is necessary to identify risk factors of DKA. For the prevention of DKA, interventions that address its modifiable risk factors or target management of ketosis are largely needed. Such preventive strategies should be tailored to the non-modifiable risk factors to match the needs of these risk groups to increase their effectiveness in preventing DKA. This approach also includes specific interventions, such as peer support and community-based approaches that actively seek populations at high risk, with little access to health care (11).

Advances in technology have provided more efficient means of monitoring diabetes and maintaining glycemic control in an outpatient setting. The use of real-time continuous glucose monitoring in patients with T1DM has been shown to significantly lower hemoglobin A1c. Real-time continuous glucose monitoring also has the advantage of signaling to patients the early detection of glucose abnormalities, allowing for prompt intervention (12).

At-home use of ketone meters that detect blood β-hydroxybutyrate has also been shown to aid in early detection and management of ketosis, which may decrease the need for specialized care. Short-acting insulin can be administered with fluids early on to prevent DKA (13).

Atkilt et al. (14) reported that the odds of developing DKA in newly diagnosed T1D children was 49% lower for children whose parents knew its signs and symptoms than parents' who didn't know. They explained their finding by that parents who know its signs and symptoms seek health care before their children develop DKA.

Study rationale

DKA is the most severe health problem among diabetic children (15). It is typically caused by treatment non-compliance, i.e., shortage of insulin and may be precipitated by several factors, e.g., infections. Although DKA can be a life-threatening event for type 1 diabetics, it is a preventable condition. Recent advances in diabetes management could not minimize prevalence of DKA among children with T1DM (6).

This study aimed to assess prevalence of ketoacidosis and to identify risk factors associated with it among patients with type 1 diabetes mellitus (T1DM) in Abha City, Saudi Arabia.

Methodology

A cross-sectional study design was followed at the Diabetes and Endocrine Unit in the Maternity and Children Hospital, and the Diabetes Center in Abha City, Saudi Arabia. A total of 385 type-1 diabetic children, aged 3-18 years were included.

Based on relevant literature, a study questionnaire was designed in a simple Arabic Language by the researchers.
It comprised the following:
• Personal data: Age, gender, duration of diabetes, parents' education, parents' employment status, and family history of diabetes.
• DKA data: Number of DKA incidents, expected cause(s) related to DKA, HbA1c level.
The study settings were visited
by the researchers during the June and July 2019. All type-1 diabetic patients attending the Endocrine Clinic (and their caregivers) were interviewed.

The Statistical Package for Social Sciences (SPSS), version 25, was used for data entry and statistical analysis. Descriptive statistics (e.g., number, percentage, mean, range, standard deviation) and inferential statistics, using chi-square "$\chi 2$" test was applied. P-values <0.05 were considered as "statistically significant".

Results

Table 1 shows that 59.2% of patients were males, and their age (Mean±SD) was 11.0±4.9 years. Almost two thirds of the fathers had either secondary level of education (34.8%) or university qualifications (32.2%). One-third of fathers (33.2%) and 72.7% of mothers were unemployed.

Table 1: Demographic characteristics of the patients

Characteristics	No.	%
Gender		
• Male	228	59.2
• Female	157	40.8
Age (Mean±SD)	11.0±4.9 years	
Father's education level		
• Primary	25	6.5
• Intermediate	72	18.7
• Secondary	134	34.8
• University	124	32.2
• Postgraduate	30	7.8
Mother's education level		
• Illiterate	34	8.8
• Primary	37	9.6
• Intermediate	60	15.6
• Secondary	108	28.1
• University	137	35.6
• Postgraduate	9	2.3
Father's job		
• Unemployed/Retired	128	33.2
• Teacher	100	26.0
• Military	50	13.0
• Physician	15	3.9
• Others	92	23.9
Mother's employment		
• Unemployed	280	72.7
• Employed	105	27.3

Table 2 shows that most patients were diagnosed since 1-5 years (40.3%) or >5 years (44.2%). Almost half of patients (48.3%) had positive family history of diabetes; diabetes was present in 12.7% of first-degree relatives, in 30.9% of second degree relatives, and in 4.7% of first and second degree relatives. Last recorded HbA1c levels for more than half of patients (53.5%) were >9% and 37.4% had 7-9%, while its level in 9.1% of patients was ≤7%

Table 2: Clinical characteristics of type 1 diabetic patients

Characteristics	No.	%
Duration of diabetes		
• < one year	60	15.6
• 1-5 year	155	40.3
• >5 years	170	44.2
Family history of diabetes		
• No	199	51.7
• Yes	186	48.3
• First degrees relative	49	12.7
• Second degree relative	119	30.9
• Both first and second degree relatives	18	4.7
HbA1c level		
• ≤7	35	9.1
• 7-9	144	37.4
• >9	206	53.5

Table 3 shows that 273 patients (70.9%) had history of diabetic ketoacidosis, only once in 43.6%, or twice in 24.5%. Main predisposing factors were being first presentation (59%) or treatment discontinuation (53.1%).

Table 3: Characteristics of ketoacidosis among type 1 diabetics

Characteristics	No.	%
History of ketoacidosis		
• Absent	112	29.1
• Present	273	70.9
Frequency of ketoacidosis (n=273)		
• Once	119	43.6
• Twice	67	24.5
• Three times	39	14.3
• Four times	23	8.4
• Five times	25	9.2
Predisposing factors for ketoacidosis (n=273)		
• First presentation	161	59.0
• Treatment discontinuation	145	53.1
• Non-adherence to diet	42	15.4
• Infectious diseases	25	9.2
• Others	12	4.4

Table 4 shows that diabetic ketoacidosis occurred significantly more in patients with less educated fathers and mothers (p=0.010 and p=0.002, respectively), and also in patients with unemployed fathers or mothers (p=0.002 and p<0.001, respectively). Ketoacidosis occurred more frequently among female than male patients (74.5% and 68.4%, respectively). However, diabetic ketoacidosis did not differ significantly according to their gender.

Table 4: Differences in occurrence of ketoacidosis according to demographic characteristics of patients

Personal Characteristics	History of ketoacidosis				P Value
	Yes (n=273)		No (n=112)		
	No.	%	No.	%	
Gender					
• Male	156	68.4	72	31.6	
• Female	117	74.5	40	25.5	0.196
Fathers' education					
• Primary	23	92.0	2	8.0	
• Intermediate	51	70.8	21	29.2	
• Secondary	102	76.1	32	23.9	
• University	81	65.3	43	34.7	
• Postgraduate	16	53.3	14	46.7	0.010
Mothers' education					
• Illiterate	30	88.2	4	11.8	
• Primary	32	86.5	5	13.5	
• Intermediate	41	68.3	19	31.7	
• Secondary	81	75.0	27	25.0	
• University	82	59.9	55	40.1	
• Postgraduate	7	77.8	2	22.2	0.002
Fathers' job					
• No job	102	79.7	26	20.3	
• Teacher	72	72.0	28	28.0	
• Military	39	78.0	11	22.0	
• Physician	9	60.0	6	40.0	
• Others	51	55.4	41	44.6	0.002
Mothers' employment					
• Unemployed	223	79.6	57	20.4	
• Employed	50	47.6	55	52.4	<0.001

* Statistically significant

Table 5 shows that diabetic ketoacidosis occurred significantly more in patients with family history of diabetes (p<0.001) and in patients with higher levels of HbA1c (p<0.001). However, its occurrence did not differ significantly according to patients' age or duration of disease.

Table 5: Differences in occurrence of ketoacidosis according to clinical features of the patients

Personal Characteristics	History of ketoacidosis				P Value
	Yes (n=273)		No (n=112)		
	No.	%	No.	%	
Duration of diabetes:					
• < One year	41	68.3	19	31.7	
• 1-5 years	106	68.4	49	31.6	
• >5 years	126	74.1	44	25.9	0.468
Family history of diabetes					
• Yes	110	59.1	76	40.9	
• No	163	81.9	36	18.1	<0.001
HbA1c:					
• ≤7	8	22.9	27	77.1	
• 7-9	84	58.3	60	41.7	
• >9	181	87.9	25	12.1	<0.001
Age of patient (Mean±SD)	10.9±4.8		11.3±5.2		0.469

Discussion

Results of this study showed that more than two thirds of the participants experienced DKA at least once. Moreover, 59% attributed their DKA to their first presentation of the disease, while 53.1% attributed their incidents to discontinuation of treatment.

This occurrence is higher than what has been reported in Szypowska et al. (16), in Poland, who reported that one-quarter of type 1 diabetic children presented with DKA at their first diagnosis, while Jefferies et al. (7), in New Zealand, reported that it occurred in 27% of type 1 diabetic patients. Nevertheless, it is lower than that reported by Onyiriuka et al. (17) in Nigeria, where about three-quarters of diabetics presented with DKA.

In Saudi Arabia, Al-Hayek et al. (18) reported all their 103 adolescent T1DM patients had DKA, where 54.4% experienced one episode, and the main reason was the discontinuation of insulin treatment.

Results of our study indicate the pressing need for increasing parents' awareness regarding and premonitory symptoms and signs of diabetes and diabetic ketoacidosis and the need to facilitate prompt access to health care.

Moreover, health education to patients and their parents at primary health care centers is important as it is considered an effective method to prevent DKA. Consequently, every consultation at a health care facility should be used ideally so that diabetic patients can get the maximum benefits from healthcare providers at each visit (16).

Our study showed a significant association between diabetic ketoacidosis and family history. This finding is consistent with those reported in Saudi Arabia by several studies (19-20).

Results of our study did not show significant difference regarding the occurrence of diabetic ketoacidosis according to gender, despite its higher occurrence among females. This finding is in accordance with that reported by Al-Hayek et al. (18) study. Several studies reported that diabetic ketoacidosis is frequently higher among female than male young diabetics. This could be explained by several factors. The first one is attributed to puberty-associated hormonal changes, especially the raising in the serum levels of some counter-regulatory hormones, e.g., estrogen, which is, by far, higher in girls than boys at puberty. The second factor is related to body-image psychiatric problems, including eating problems, since adolescent diabetic girls often miss insulin injections for the sake of losing weight. Moreover, girls with diabetic ketoacidosis may have more behavioral problems, lower social competence, and higher levels of family struggle (17; 20).

Our study revealed significantly higher occurrence of diabetic ketoacidosis among children with poor glycemic control. This finding is in accordance with several other studies, which reported that patients with high levels of HbA1c had significantly higher risks for diabetic ketoacidosis (20-22).

Conclusion

More than two thirds of type 1 diabetic children aged below 18 years, experience ketoacidosis. The main risk factors for diabetic ketoacidosis include first presentation of disease, and discontinuation of treatment. Female patients are more likely to suffer from ketoacidosis than males. Most cases with history of DKA have uncontrolled HbA1c. DKA is higher among patients with less educated and unemployed parents. DKA is significantly higher among patients with a positive family history of diabetes.

Therefore, primary health care physicians should provide the necessary health education on diabetes care and diabetic ketoacidosis for all T1DM patients and their caregivers during each visit to primary care centers. Health education messages should cover the main points of knowledge, especially how to identify and manage hyperglycemia. Raising the public's awareness regarding DM and DKA through mass media is required.

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Assessment of Knowledge of Physicians and their Practices in Managing Asymptomatic Hyperuricemia at Primary Health centers in Bisha Province, Saudi Arabia

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Abstract

Objectives: The study objective was to determine the knowledge and management practices of primary care physicians on the management of asymptomatic hyperuricemia (AH).

Setting: The study was carried out in the outpatient clinic of Primary Health Centers (PHC) across Bisha Governorate in Saudi Arabia.

Method: We report on 165 primary care physicians involved in the management of AH. The Knowledge of basic pathophysiology of AH, clinical and laboratory assessments, as well as management recommendations based on dietary and initiation of urate-lowering therapy (ULT), were part of the adapted questionnaire. Their Knowledge of AH and their practices were assessed based on a scale developed to determine the appropriateness of their practices against the gold standard. Knowledge and practices were graded to good/adequate or poor/inadequate as observed and reported. Data was analyzed using SPSS v 23.

Primary outcome measure: The primary outcome measure was determining the proportion of the respondents with adequate Knowledge and practices of AH management.

Results: The mean age of the respondents was 41.3 years, with a standard deviation of 8.6. All the respondents work in public health facilities. Good knowledge and practices of AH were observed among 142 (86.6%) and less than half (72, 43.9%) of the physicians. Years of experience and having read about AH in the last 12 months were the factors found to be associated with good practice (P<0.05). When compared, significant association was found between GPs and other doctors on treating patients with comorbidities and arthropathy using urate-lowering therapies(P<0.05).

Conclusions: In the primary care setting studied, a high proportion of the physicians have adequate Knowledge about AH, but less than half of them put this Knowledge into practice. Good practices of AH management were determined by years of experience and reviewing the literature. Emphasis should be made on the practices of the physicians for proper service delivery.

Key words: Asymptomatic hyperuricemia, Primary health care physicians, Bisha Governorate, KSA

Introduction

Gout is the most common inflammatory arthritis in men(1) and results in considerable morbidity and utilization of healthcare resources(2). The past 30 years have witnessed a steady increase in the prevalence of gout(3).

Gout is a chronic crystal deposition disorder in which crystals of monosodium urate can cause chronic arthritis, tophi, urolithiasis and renal disease, as well as recurrent acute arthritis and bursitis. Gouty arthritis and tophi can lead to chronic disability and impairment of health related quality of life(4), but gout is also frequently associated with comorbidities such as obesity, diabetes mellitus, hypertension, and cardiovascular disease(5,6), as well as with increased mortality(6,7). Elevation of serum uric acid (SUA) levels, or hyperuricemia, is an essential prerequisite for gout development. Hyperuricemia is defined as a serum uric acid level greater than 7.0 mg/dL in men or greater than 6.0 mg/dL in women(8).

As SUA levels rise, and the physiological saturation threshold for uric acid is exceeded in body fluids, the formation and deposition of monosodium urate (MSU) crystals occur in and around joints (9). The clinical picture of gout is divided into asymptomatic hyperuricemia, acute gouty arthritis, and chronic tophaceous gout. The progression from asymptomatic hyperuricemia to advanced gout is quite variable from person-to-person. In most people, it takes many years to progress(10).

Asymptomatic hyperuricemia is common and does not in itself constitute a disease. During this period, urate deposits may directly contribute to organ damage. This does not occur in everyone, however, and at present, there is no evidence that treatment is warranted for asymptomatic hyperuricemia(10). Diagnosis of gout is made through laboratory and radiological investigations.

The causes of hyperuricemia are known, and urate-lowering treatments can maintain serum urate concentrations at less than saturation, which prevents crystal formation and dissolves existing crystals, making gout the only joint arthritis where the pathogenic agent can be eliminated. Addressing risk factors for hyperuricemia (e.g., overweight, excessive alcohol intake, high dietary intake of purines and fructose) is advised along with medical treatment.

The general prevalence of gout is 1-45% in the general population (11). This prevalence differs between men and women and rises with increasing age. Hyperuricemia is considered the most critical risk factor for the development of gout. Although hyperuricemia and gout have historically been considered men's conditions, growing evidence suggests a substantial disease burden of gout among older women. In the last few decades, the prevalence of hyperuricemia is increasing rapidly in the world population. Emerging evidence shows that hyperuricemia is prevalent not only in developed countries (12) but also in low and middle-income countries with a high frequency (13). Lifestyle factors like obesity, abundant purine diet and alcohol intake are determined to be independent predictors for hyperuricemia (14-16).

Asymptomatic hyperuricemia and gout are predominantly managed in the primary care setting. However, the current medical management of gout is often reactive rather than preventative(17) . Hyperuricemia and gout are common diseases that can, as a general rule, be treated by general and family physicians. However, there is a wide variety of diagnosis and treatment departments that treat hyperuricemia and gout. These are diseases for which guidelines recommended are demonstrably useful (18).

The availability of curative treatment for gout care remains suboptimum(19,20). In the UK, gout is managed predominantly in primary care by general practitioners (GPs), but less than half of patients receive urate-lowering therapy(19,21). In those who do, the dose is usually fixed without titration to achieve a target serum urate concentration(21), and adherence is low (22).

Common misconceptions about gout (e.g., that it is not a serious condition and that it is self-induced by lifestyle) are significant barriers to care(20,23) and, therefore, education of patients is central to management(19,24). Unfortunately, some physicians share these misconceptions(25), and many, because of factors such as work pressures, might have insufficient time to educate patients adequately. Similarly, deficits in the quality of care provided to gout patients have been well documented in both the acute and chronic management of gout (26,27). These deficits include medication errors with inappropriate dosing of allopurinol and colchicine (26) and initiation of a ULT during an acute gout attack(27).

Besides, there is inadequate patient education on gout, including lifestyle recommendations and the role of medications (28,29). In recognition that gout is often poorly managed and misdiagnosed or diagnosed late in its course, both European rheumatology societies and American researchers have published evidence-based recommendations for the diagnosis and medical management of gout.

The European League Against Rheumatism published updated recommendations for the management of gout in 2016, comprising 3 overarching principles and 11 key recommendations for clinical practice (30). Patient education about the pathophysiology of gout and its comorbidities and the existence of effective treatments are essential, and understanding the principles of managing acute attacks and eliminating urate crystals by the lifelong lowering of the serum urate (SU) below a target level are essential. Advice about lifestyle, diet, weight, and other risk factors and the need to screen for and manage comorbidities are emphasized (30). For the treatment of flares, colchicine, nonsteroidal anti-inflammatory drugs (NSAIDs), and oral or intraarticular steroids, or a combination thereof, are recommended. Most of the guidelines recommended for gout management were short of stating clearly the steps that could be used to manage asymptomatic hyperuricemia. Although asymptomatic hyperuricemia has been recognized as an initial trend towards gout development, primary care physicians are left with conflicting personal information on when to

initiate treatment to avert the progression of asymptomatic hyperuricemia full-blown gout. Our study, therefore, examines the knowledge of primary care providers and their practices regarding the management of AH and compares them with recommended standards.

Methodology

Study Area:
The study area is Bisha, a province under the Asir region, Southwestern Saudi Arabia. Health services are administered under the supervision of the Directorate of Health service. There are 92 PHCs in the province and a secondary health facility that serves as a referral center.

Study Design:
This study followed a cross-sectional study design.

Study Population: (including Inclusion and Exclusion Criteria)
The study populations included all physicians that provide primary healthcare in the selected facilities. These are board-certified physicians and of different nationalities and medical specialties. Physicians working outside the study area were excluded.

Sample size:
A whole population study was carried out. The primary care physicians who work in the province were all eligible to participate in the study. The physicians who provide services at public health centers were obtained from the Directorate of health services in Bisha. These constitute our study population. A mail-in questionnaire was sent to them for their responses.

Data Collection Plan:
The questionnaire for the study was adapted from similar studies done elsewhere (31) to address our study objectives. The questionnaire was semi-structured and had different sections. The first section collected information on sociodemographic data of the participant (race, gender, board certification, location of practice), physician clinical practice characteristics (practice setting, hours involved in patient care daily and weekly and years since completion of residency). AH/gout patient experience; Knowledge of AH/gout, its pathophysiology, etiology, management, comorbid conditions, treatment used, and counselling of patients. Additionally, there were questions on exposure to continuing medication education, awareness of the gout quality of care indicators and treatment recommendations. Diet and alcohol intake, which are risk factors for incident gout and triggers for recurrent attacks, were explored. We used the EULAR guidelines to develop some of these questions. Five research assistants were trained on how to collect data. The research assistants were healthcare students who had previous experience in research. The questionnaire was be pre-tested on four primary care physicians to identify any need for further validation before the study's commencement. Questionnaires were administered to the respondents at their various healthcare facilities during working hours.

Collected data were entered into the Statistical Package for Social Sciences (IBM, SPSS version 20) for analysis. Categorical variables were presented in frequencies, proportions and percentages. The knowledge of the physician was assessed based on a scoring system carefully developed. For every correct response, one mark's score is given and a zero score for the wrong answer. Similarly, the practice was assessed on a practice scale and graded accordingly. The Knowledge and Practice of AH/gout were graded based on a score scale as either GOOD/adequate or poor/inadequate. Reported treatment/management practices for AH/gout were compared with the published quality of care indicators and treatment recommendations. Tests of associations between categorical variables were performed, and significant association was considered ($P<0.05$).

Ethical Considerations:
Permission to carry out this study was sought from the ethical committee of UBCOM-RELOC. Ethical clearance was obtained from the Directorate of Health Services, Bisha, and consent from the physicians before participating in the study.

Results

Table 1 shows that the total number of questionnaires filled and returned was 164. The age of the respondents ranged from 27-64 years. The mean age of the respondents was 41.3 years, with a standard deviation of 8.6. All respondents (n=164) worked in public health facilities and the number of patients seen per week with AH ranges from one to four. Table 1 also shows that the number of physicians that have ever attended a continuous medical education (CME) on hyperuricemia or gout was 45 (27.4%), though 88.4% (n=145) have claimed to have read about AH/gout within the last 12 months. The majority (82.3%) have reported being aware of guidelines in existence for the management of AH and gout. Thirteen physicians (7.9%) admit to be suffering from gout, and 39.6% claimed they have relatives suffering from either AH or gout.

Figure 1 shows that good knowledge of asymptomatic hyperuricemia was observed in 142 (86.6%) of the physicians interviewed, while 13.4% (n=22) had inadequate knowledge of asymptomatic hyperuricemia. Only 72 physicians (43.9%) had good practices regarding asymptomatic hyperuricemia.

Physicians' knowledge about AH did not differ significantly according to their sociodemographic features, while their practices of AH management were observed to be significantly associated with their years of experience and reading about AH ($p=0.043$ and $p=0.023$, respectively), as shown in Table 4.

The practice of general physicians was compared with that of other physicians in PHCs. Table 5 shows AH management practices that were compared and significant practices were observed using ULT to treat patients with comorbidities ($P=0.02$) and arthropathies ($P=0.019$).

Table 1: Sociodemographic characteristics of the respondents

Sociodemographic features	Frequency (n=164)	Percentage
Age		
• 25-34	46	28.0
• 35-44	62	37.8
• 45-54	40	24.4
• 55-64	16	9.8
• Mean±SD	41.3±8.6 years	
Sex		
• Male	107	65.2
• Female	57	34.8
Medical specialty		
• General practitioners	103	62.8
• Family physicians	48	29.3
• Paediatrics	5	3.0
• Gynaecology	4	2.4
• Surgery	2	1.2
• Community medicine	2	1.2
Place of practice		
• Urban	73	44.5
• Rural	91	55.5
Board certification		
• Yes	105	64.0
• No	59	36.0
Years of experience		
• <5	29	17.7
• 6-10	63	38.4
• 11-15	24	14.6
• >16	48	29.3
Attending CME on AH or gout		
• Yes	45	27.4
• No	119	72.6
Reading about AH or gout within last year		
• Yes	145	88.4
• No	19	11.6
Awareness of guidelines on management of AH or gout		
• Yes	135	82.3
• No	29	17.7

Table 2: Knowledge of Asymptomatic hyperuricemia (n=164)

Knowledge of AH assessed	Correct No. (%)	Incorrect No. (%)	Do not know No. (%)
Serum uric acid level is >7.0 mg/dl in men	141 (86.0)	18 (11.0)	5 (3.0)
Serum uric acid is >6.0 mg/dl in women	112 (68.3)	44 (26.8)	8 (4.9)
Serum urate level is less than urate solubility	59 (36.0)	58 (35.4)	47 (28.7)
Uric acid precipitates cause an inflammatory response	80 (48.8)	77 (47.0)	7 (4.3)
Uric acid manifests as monosodium crystals	96(58.5)	34(20.7)	34(20.7)
AH always progresses to gouty arthritis	115 (70.1)	41(25.0)	8 (4.1)
AH may persist without progression	127(77.4)	28(17.1)	9(5.5)
AH is the same as gout	120 (73.2)	35(21.3)	9(5.5)
AH is different from gout	111(67.7)	45 (27.4)	8 (4.1)
Elevated serum urate corresponds with symptoms	117(71.3)	38(23.2)	9(5.5)
Normal urate level may occur with gouty arthritis	108(65.9)	39(23.8)	17(10.4)
AH Always needs treatment	45(27.4)	111(67.7)	8(5.5)
In AH there is increased urate production	158(96.3)	0 (0.0)	(3.7)
In AH there is decreased renal excretion of urate	142(86.6)	17(10.4)	5(3.0)

Figure 1: Physicians' grades of knowledge and practice regarding Management of asymptomatic hyperuricemia

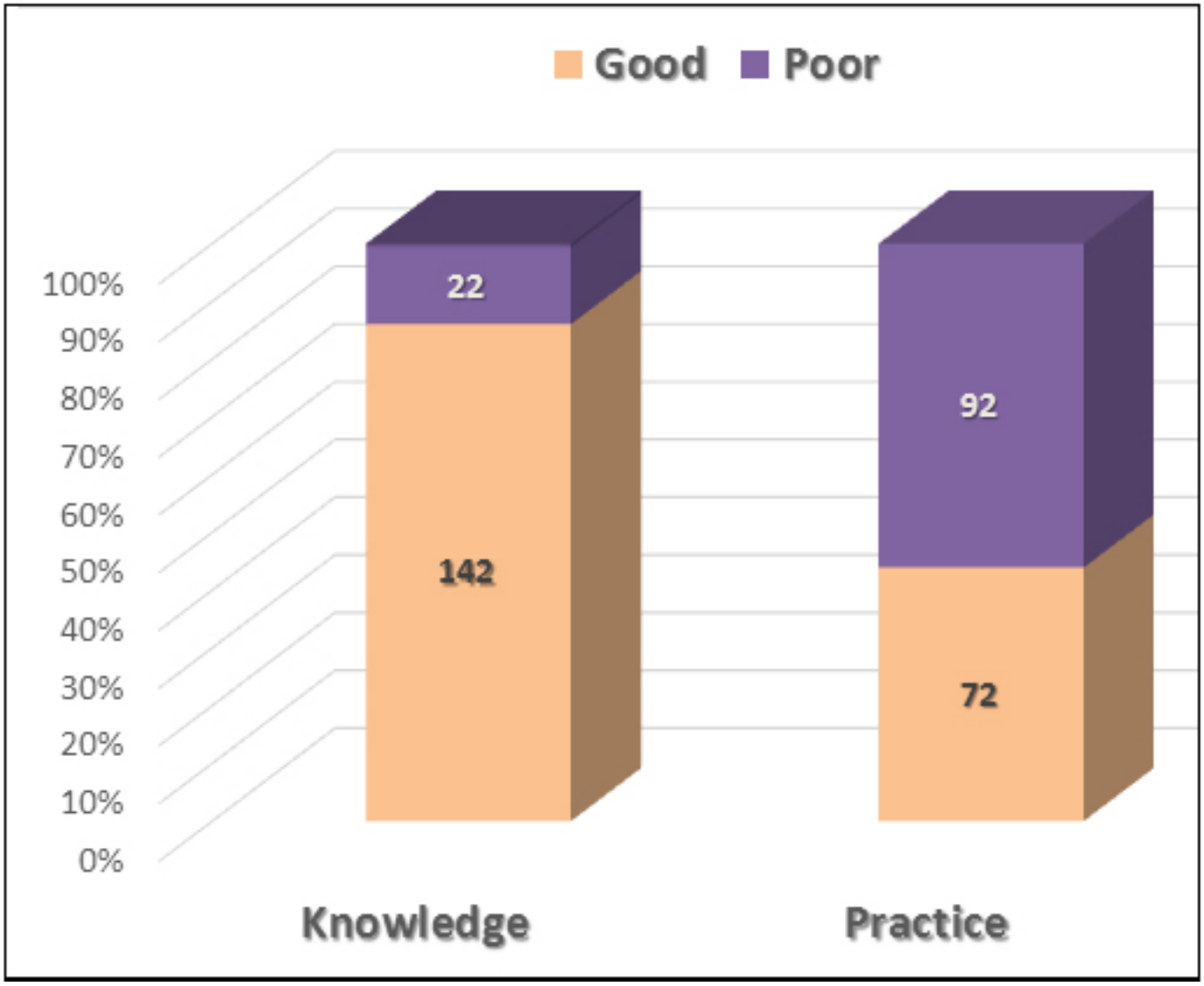

Table 3: Management Practices of AH in the Health centers (n=164)

Management of AH	Good Practice No. (%)	Poor practice No. (%)
History		
Renal stone	159 (97.0)	5 (3.0)
Diabetes	141 (86.0)	23 (14.0)
Ischemic Heart Diseases	141 (86.0)	23 (14.0)
Thyroid diseases	109 (66.5)	55 (35.5)
Asthma	78 (47.6)	86 (53.4)
The decision not affected by any condition	39 (23.8)	125 (76.2)
Family History	138 (84.1)	26 (15.9)
Intake of high purine diets	155 (94.5)	9 (5.5)
Drugs history e.g. Thiazides	154 (93.9)	10 (6.1)
History of blood dyscrasias, e.g. multiple myeloma	134 (81.7)	30 (18.3)
Alcohol intake	141(86.0)	23 (14.0)
Laboratory requests for AH management		
24 h urine uric acid	92 (56.1)	72 (43.9)
Serum creatinine	103 (62.8)	61 (37.2)
Urinalysis	96 (58.5)	68 (41.5)
LFT	43 (26.2)	121 (73.8)
CBC	52 (31.7)	112 (68.3)
Ca level	103 (62.8)	61 (37.2)
ECG	41 (25.0)	123 (75.0)
Drug management of AH		
Knows at least one condition to initiate drug therapy: *(contraindications, flare onset, number and type of joints involved or previous experience with treatments)*	152 (93.7)	12 (7.7)
Initiate low-purine diet and lifestyle recommendations in a patient with AH	145 (88.4)	19 (11.6)
Knows when to initiate non-steroid anti-inflammatory drugs (NSAIDs) in a patient with AH	64 (39.0)	100 (61.0)
Knows when to initiate treatment with colchicine in a patient with AH	100 (61.0)	64 (39.0)
Recommends allopurinol in patients with normal kidney function for first-line ULT	154 (93.9)	10 (6.1)
Use Febuxostat or a uricosuric where allopurinol cannot be tolerated	101(61.6)	63 (38.4)
Check serum urate levels monthly in patients with AH	19 (11.6)	145 (88.4)
Knows when to start ULT in AH patients	72 (43.9)	92 (56.1)

Table 4: Relationship of respondents' knowledge and practice regarding asymptomatic hyperuricemia with sociodemographic features. (n=164)

Sociodemographic features	Knowledge		P-value	Practice		P-value
	Good	Poor		Good	Poor	
Age (years)						
• <30	14	1	Fisher	4	11	Fisher
• >30	128	21	0.371	68	81	0.127
Sex						
• Male	91	16	χ^2	43	64	
• Female	51	6	0.43	29	28	0.865
Medical specialty						
• General practice	88	15		47	56	
• Family medicine	42	6	χ^2	18	30	
• Paediatrics	2	0	0.848	2	3	0.520
• Gynaecology	3	1		3	1	
• Surgery	5	0		1	1	
• Community medicine	2	0		1	1	
Place of practice						
• Urban	66	7	χ^2	33	40	
• Rural	76	15	0.198	39	52	0.763
Board certification						
• Yes	91	14	χ^2	45	60	
• No	51	8	0.967	27	32	0.719
Years of experience						
• <10	78	14	χ^2	34	58	
• >10	64	8	0.44	38	34	0.043*
Attended CME						
• Yes	41	4	χ^2	22	23	0.253
• No	101	18	0.296	49	70	
Have Hyperuricemia/gout						
• Yes	56	9	χ^2	4	9	Fisher
• No	86	13	0.895	68	83	0.243
Read about AH						
• Yes	125	20	χ^2	68	77	Fisher
• No	17	2	0.694	4	15	0.023*

*Statistically significant: P<0.05

Table 5: Comparing the GPs Management Practice with that of other doctors

Statements	GPs N=103	Other N=61	Test Statistics	P-Value
Knows when to choose ULT	100	60	Fisher's Exact	0.524
Knows when to initiate low-purine diet and lifestyle recommendations	92	53	χ^2	0.638
Initiates non-steroid anti-inflammatory drugs (NSAIDs) to a patient newly diagnosed with AH	42	22	χ^2	0.550
Initiates treatment with colchicine to a patient newly diagnosed with AH	64	36	χ^2	0.692
Initiates urate-lowering therapy (ULT) using xanthine oxidase inhibitor	98	56	Fisher's Exact	0.294
Uses ULT for treating patients with flares	7	6	Fisher's Exact	0.339
Uses ULT for treating patients with tophi	22	12	χ^2	0.797
Uses ULT for treating patients with arthropathy	46	16	χ^2	0.019*
Uses ULT for treating patients with renal stone	18	12	χ^2	0.725
Uses ULT for treating patients with comorbidities	10	14	χ^2	0.020*
Allopurinol is recommended for first	72	48	χ^2	0.220
Febuxostat or a uricosuric is indicated where allopurinol cannot be tolerated	63	38	χ^2	0.886

Statistically significant: P<0.05

Discussion

We assessed the knowledge of physicians in the management of asymptomatic hyperuricemia at primary health centers. Our finding shows a very high level of knowledge of causes and the pathophysiology of asymptomatic hyperuricemia. This result differs from what was reported by Alqarni in Saudi Arabia(32) where she reported that about a third of the physicians have adequate knowledge of AH at primary health centers.

Though the geographical settings and methodological issues could have accounted for these differences, this study focused on the disease pathology's technical aspect. Hyperuricemia is considered the most critical risk factor for the development of gout, and knowledge and proper management at the primary care level will help reduce the progression of the disease to gout. Several studies have demonstrated suboptimal management of gout in primary care, often attributable to poor management skills(33,34).

Our study reported primary care physicians having high knowledge or information on AH, similar to what was reported by Spencer et al. (35) and that physician education is essential if patient and provider barriers are to be managed. Several studies have shown that an inadequate understanding of gout's causes and consequences, together with distorted, stereotypical, and generally negative views about gout and its treatment, is associated with lower adherence to ULT and suboptimal disease control(36,37). Thus, this study has demonstrated that better provision of information and a package of care based on guideline recommendations will provide better options for patient management.

The dietary recommendation practices were shown to be a demonstration of good practice by the physicians. George Nuki has also advocated dietary advice to patients with AH or gout. Thus, regular exercise, weight loss, avoidance of alcohol, meat, seafood, cheese, sugar¬ sweetened drinks must be discouraged(30).

Our study further demonstrated that the practice of initiating urate-lowering drugs by physicians varies. The physicians have demonstrated the knowledge of conditions needed to avoid placing the AH patients on ULT. While the target was to maintain a serum urate level below 6 mg/dl for optimal control of AH, certain circumstances may prompt the commencement of ULT for the patients as practiced by our respondents. The presence of acute joint flares, tophi, and comorbidities was shown to warrant ULT by the supervising physicians.

This is similar to practices reported by Schumacher (38) that ULT can reduce gout flares and tophi and improve the quality of life of patients with chronic gouty arthritis(39). The respondents have a good practice regarding caution and screening all their patients for associated comorbidities like cardiovascular risk factors, renal diseases, heart disease, obesity etc. The use of steroids and uricosuric medications has also been highlighted as part of the management practices.

Conclusion

Less than half of the PHC physicians have good or adequate practices regarding management of AH. However, they demonstrate the capacity to handle AH and gout at the primary care level effectively. More needs to be done to address the practice gap identified and improve service delivery at our primary health centers.

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Lifestyle changes that can increase the risk of cardiovascular disease during the COVID-19 pandemic: a cross-sectional study

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Abstract

Objectives: In December 2019, coronavirus disease of 2019 (COVID-19) emerged in Wuhan, China, and in March 2020 the World Health Organization (WHO) declared it a global pandemic. Therefore, many countries including Saudi Arabia enforced lockdowns and quarantine restrictions to help contain the disease. These restrictions lead to changes in lifestyle, diet, and physical activity habits among the world population. This study aimed to assess the lifestyle changes that are considered risk factors of cardiovascular diseases (CVD) among the Saudi population during the COVID-19 lockdown.

Methods: We conducted a cross-sectional study using an online questionnaire on adults over the age of 18 living in Saudi Arabia from January to February 2021.

Results: We collected a total of 2,069 responses of which 64.7% were between 18 – 35 years old and 68.1% were females. During the COVID-19 pandemic, 83% of participants reported having homemade meals. The consumption of meat, fish and seafood, and fat products decreased and the consumption of snacks and beverages increased significantly during the pandemic. The average hours spent on physical activities as well as screen time increased during the pandemic. Moreover, the participants reported changes in sleeping habits and weight gain (43%) during the lockdown. Poor lifestyle habits were associated with increased CVD symptoms.

Conclusion: Dietary and exercise habits among the Saudi population have changed significantly during the COVID-19 pandemic which subsequently resulted in an increase in CVD symptoms.

Key words: COVID-19, pandemic, lifestyle, cardiovascular disease

Introduction

In December 2019, coronavirus disease of 2019 (COVID-19) which originated from Wuhan, China rapidly emerged and spread globally causing mild to severe illness of the respiratory system. The World Health Organization (WHO) officially declared COVID-19 a global pandemic in March 2020(1,2). By September of that year, more than 32.7 million people had been affected by COVID-19 and around 991,000 deaths were reported worldwide(3). The Saudi Ministry of Health reported the first COVID-19 case in the Kingdom of Saudi Arabia in March 2020. Consequently, Saudi Arabia announced a partial lockdown followed by a full lockdown by the end of March(4). Although these restrictions were mandatory to control the spread of COVID-19, they lead to a significant change in lifestyle, diet, and physical activity(5).

Cardiovascular disease (CVD) is still the leading cause of death worldwide. Additionally, those infected with COVID-19 with established CVD usually have a worse prognosis and a higher mortality when compared to a healthy population(6). Although quarantine and restriction measures are a crucial step in the containment of COVID-19 outbreaks, they may lead to lifestyle, diet, and physical activity changes that might potentially increase the incidence of cardiovascular diseases(7,8). This study aimed to assess the changes in dietary and lifestyle habits during the COVID-19 lockdown that could increase the risk of cardiovascular diseases (CVD) among the Saudi population.

Methods

We conducted a cross-sectional study through an online questionnaire from January 2021 to February 2021. The inclusion criteria consisted of all adults ≥18 years old living in Saudi Arabia. Respondents who did not meet the criteria or did not complete the questionnaire were excluded.

An online self-administered questionnaire was used for data collection to determine the changes in lifestyle, eating habits, and physical activity caused by the COVID-19 lockdown that could increase the risk of CVD among the Saudi population. We distributed the survey via social media through an invitation letter and an online link which included a request to circulate the survey broadly to other contacts in Saudi Arabia (snowball sampling).

The questionnaire was composed of closed-ended questions that were divided into 4 sections. The first section consisted of 6 questions about the participants' socio-demographic characteristics. The second section included 16 questions that investigated eating habits and meal patterns. The third section contained 9 questions that assessed physical activity levels, weight changes, and sleeping habits while the fourth section of the questionnaire had 6 questions regarding the participants' past medical, surgical and medication history. The questions were asked in pairs in order to compare habit changes that occurred before and during the pandemic.

A study information sheet and the aim and motivations of the study were provided at the beginning of the survey, followed by a consent form indicating the participants' rights and ability to withdraw at any time without any consequences. Data was collected anonymously and treated with confidentiality. The questionnaire was developed and guided following a review of related literature and revised by two cardiologist consultants.

Statistical Analysis

The data was analyzed using the Statistical Package for the Social Sciences (IBM SPSS version 23). Frequency and percentages were used for description of categorical variables while mean values were used for continuous variables. Chi-square test and t-test were used to compare the differences between variables. A p-value less than 0.05 was considered statistically significant.

Participation was voluntary and informed consent was obtained from all participants. The collected data was kept confidential in compliance with the laws set by the National Committee of Bio and Medical Ethics (NCBE) that operates under King Abdulaziz City for Science & Technology (KACST). The study was approved by the Institutional Review Board of Imam Mohammed Ibn Saud Islamic University.

Results

A total of 2,069 responders completed the questionnaire. The majority of the sample were between 18–35 years old (64.7 %) while 20.7% of the participants were over 46 years of age. The study sample consisted of 1,408 females (68.1%) and 661 males (31.9%) and were mostly of the Saudi nationality (96.5%). More than half of the sample were from the central region (79%), were single (56.2%), and had a university degree (64.7%). Ninety percent of the sample were non-smokers while 8% indicated smoking one pack daily (Table 1).

The majority of our participants (83%) reported that they mostly had homemade meals during the COVID-19 lockdown while 15.3% reported frequently having take-out food. Half of the sample had two meals daily (50.7%) and considered lunch the main meal of the day (50.8%), and 45.2% reported skipping breakfast often. Moreover, 55.9% of participants reported that they sometimes had a late-night snack or meal and 47.2 % indicated that they consumed fast food not more than once per week (Table 2).

Table 1: Socio-demographic characteristics of the study participants			
Demographic characteristics of the study		Count	Column N %
Age	18-35	1338	64.7%
	36-45	303	14.6%
	46-55	291	14.1%
	56-65	126	6.1%
	Older than 65	11	0.5%
Gender	Male	661	31.9%
	Female	1408	68.1%
Nationality	Saudi	1997	96.5%
	Non-Saudi	72	3.5%
Residency	Northern region	53	2.6%
	Southern region	102	4.9%
	Western region	204	9.9%
	Eastern region	76	3.7%
	Central region	1634	79.0%
Marital status	Single	1163	56.2%
	Married	840	40.6%
	Divorced	47	2.3%
	Widow	19	0.9%
Education	Lower than secondary school	53	2.6%
	Secondary school	486	23.5%
	University	1339	64.7%
	Above education (PhD)	191	9.2%
Smoking	Not smoking	1871	90.4%
	Smoking one pack daily	165	8.0%
	Smoking two pack daily	23	1.1%
	Smoking morethan two packs daily	10	0.5%

Table 2: Eating habits and meal patterns during the COVID-19 lockdown			
		N	N %
Your meals are usually	Homemade	1718	83.0%
	From restaurant	317	15.3%
	Frozen, ready to be heated and eaten	34	1.6%
How many times a day do you eat?	One time	180	8.7%
	Two meal	1049	50.7%
	Three meal	699	33.8%
	Four meal	102	4.9%
	More than four meal	39	1.9%
What meal would you consider to be your main meal?	Dinner	582	28.1%
	Lunch	1052	50.8%
	Breakfast	435	21.0%
Which meal could be skipped	Dinner	546	26.4%
	Lunch	510	24.6%
	Breakfast	935	45.2%
	I skipped none of these	78	3.8%
Who usually prepared the food	Mother	1245	60.4%
	Father	79	3.8%
	Sister	552	26.8%
	Wife	440	21.3%
	Husband	58	2.8%
	Housekeeper	746	36.2%
How likely are you to have a late night snack or meal?	Rarely	537	26.0%
	Sometimes	1156	55.9%
	Always	376	18.2%
Number of times a week you consume fast food	Once weekly	977	47.2%
	Twice weekly	487	23.5%
	Three times weekly	322	15.6%
	More than three times weekly	283	13.7%

As described in Table 3, there was a significant decrease in the consumption of meat, fish and seafood, and fat products during the pandemic compared to the pre-COVID-19 period (p-value < 0.05). However, the consumption of chicken, canned meat, fruits, and vegetables markedly increased (p-value < 0.05).

Table 3: Consumption of different food groups before and during the COVID-19 pandemic

Food	Variable	Before the pandemic		During the pandemic		Mean difference†	*p*-value
		N	N%	N	N%		
Meat	Yes	1148	55.5%	1092	52.8%	-0.027	0.000*
	No	921	44.5%	977	47.2%		
Chicken	Yes	1823	88.1%	1867	90.2%	0.021	0.002*
	No	246	11.9%	202	9.8%		
Fish and seafood	Yes	700	33.8%	642	31.0%	-.028	0.001*
	No	66.2%	1427	69.0%	1932		
Canned meat	Yes	137	6.6%	181	8.7%	.021	0.000*
	No	1932	93.4%	1888	91.3%		
Canned fish like tuna	Yes	667	32.2%	695	33.6%	0.013	0.105
	No	1402	67.8%	1374	66.4%		
Fruit	Yes	1198	57.9%	1319	63.8%	0.053	0.000*
	No	871	42.1%	750	36.2%		
Vegetable	Yes	1341	64.8%	1476	71.3%	0.056	0.000*
	No	728	35.2%	593	28.7%		
Baked	Yes	1624	78.5%	1603	77.5%	-0.010	0.280
	No	445	21.5%	466	22.5%		
Dairy product	Yes	1425	68.9%	1425	68.9%	0.000	1.000
	No	644	31.1%	644	31.1%		
Fat products, such as oils, used for cooking	Yes	1001	48.4%	966	46.7%	-0.11	0.017*
	No	1068	51.6%	1103	53.3%		

*Significant at *p*-value less than 0.05
†Difference between score during pandemic and before pandemic where – mean indicates a decrease in usage in pandemic time

Additionally, the consumption patterns of snacks and beverages, such as biscuits, nuts, vegetables, fruits, water, tea, and fresh juices showed a significant increase during the pandemic with the exception of energy drinks which showed a significant decrease compared to the pre-COVID-19 period (p-value < 0.05).

The average hours spent on physical exercise per week markedly increased during the pandemic. Overall, 831 participants (40.2%) did not exercise pre-COVID-19 compared to 758 participants (36.6%) who did not exercise during the pandemic (p-value = 0.001). Despite the increase in physical activity, 1,514 participants (73.2%) reported using electronic devices such as mobile phones for more than 4 hours daily during the pandemic compared to 1,020 participants (49.3%) who used electronic devices for more than 4 hours daily pre-COVID-19 (p-value = 0.000). Only 4.3% spent their spare time with family and friends, while 76.2% had spent their spare time watching television or on social media. Approximately 80% usually slept at night before the pandemic compared to 56.7% who slept at night during the pandemic with a significant increase in the number of participants who slept for more than 8 hours daily (p-value = 0.000). Although the majority of participants did not report insomnia or other sleep disturbances, there was a significant increase in the number of participants who suffered from insomnia during the COVID-19 pandemic (Table 4).

Table 4: Physical activity, sleep, and lifestyle habits before and during the pandemic

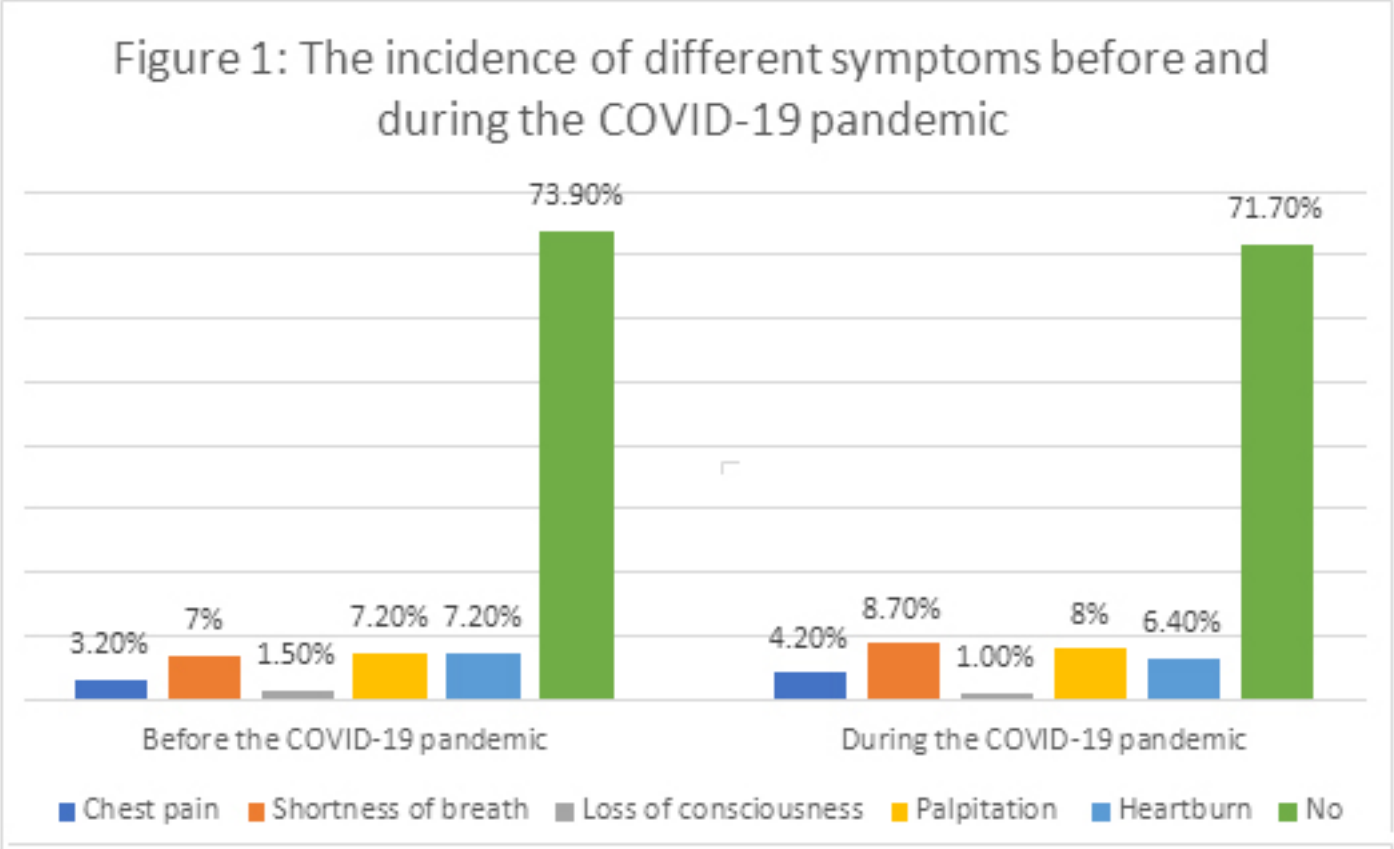
Item	Variable	Before the pandemic		During the pandemic		Mean difference†	*p*-value
		N	N%	N	N%		
Average hours spent practicing physical activities	No exercise	831	40.2%	758	36.6%	0.07	0.001*
	Less than 2 hours/ week	635	30.7%	674	32.6%		
	2-4 hours/ week	369	17.8%	354	17.1%		
	More than 4 hours / week	234	11.3%	283	13.7%		
The average number of hours you spend on devices such as phones and others in the day	Less than 2 hours	313	15.1%	178	8.6%	0.304	0.000*
	2-4 hours	736	35.6%	377	18.2%		
	More than 4 hours	1020	49.3%	1514	73.2%		
You usually spend your spare time	Walking / sport	269	13.0%	345	16.7%	-0.25	0.000*
	Shopping	261	12.6%	60	2.9%		
	TV/ Social media	865	41.8%	1576	76.2%		
	Visiting family and friends	674	32.6%	88	4.3%		
You usually slept in:	Night	1651	79.8%	1173	56.7%	0.23	0.000*
	Morning	418	20.2%	896	43.3%		
Average hours of sleep	Less than 6 hours	556	26.9%	356	17.2%	0.318	0.000*
	6-8 hours	1232	59.5%	972	47.0%		
	More than 8 hours	281	13.6%	741	35.8%		
Were you suffering from insomnia or sleep problems	Yes	565	27.3%	732	35.4%	-0.08	0.000*
	No	1504	72.7%	1337	64.6%		

*Significant at *p*-value less than 0.05
†Difference between scores during and before the pandemic where – mean indicates a decrease in usage in pandemic time

Regarding the COVID-19 lockdown's impact on body weight, 34% of participants reported no weight changes, a quarter reported a weight gain of less than 5 kg, and 18.4% reported weight gain of more than 5 kg. Nearly 23% of our participants reported a decrease in body weight during the pandemic.

Around 92% of participants did not take any medications, 81.1% did not have any medical history of cardiac-related conditions, and 97.7% never had cardiac surgery. The prevalence of cardiac diseases was 2.7% while the prevalence of diabetes mellitus, hypertension and hypercholesterolemia was 6.8%, 7.6%, and 9% respectively. Only 9.7% of the participants reported having an issue dispensing their medication during the pandemic.

Figure 1 shows a list of symptoms some of the participants suffered from before or during the pandemic. Generally, the majority of the participants never experienced any of the symptoms before (73.9%) or during the pandemic (71.7%).



Participants who frequently consumed fatty foods reported symptoms like chest pain, loss of consciousness, and palpitations more than participants who rarely consumed fatty products during the COVID-19 pandemic. There was a significant correlation between shortness of breath and lower levels of physical activity. Additionally, less time on social media was associated with a lower incidence of most symptoms. Weight gain was linked to increased incidence of chest pain, loss of consciousness, heartburn, and palpitations during the pandemic (Table 5).

Table 5: The relation between lifestyle changes during the COVID-19 pandemic and CVD symptoms

Change in life style	Did you suffer from these symptoms during the Corona pandemic?					
	Chest pain	Shortness of breath	Loss of consciousness	Palpitation	Heartburn	No (Control)
	Mean	Mean	Mean	Mean	Mean	Mean
Fat consumption	.02	-.01-	.05	.02	-.04-	-.02-
Increase in physical activity	.02	-.13-	.29	.09	.03	.10
Less time spent on social media	.31	.42	.10	.23	.44	.29
Sleep pattern	.30	.35	.19	.33	.36	.31
Increased weight	2.63	3.05	2.86	3.12	2.92	3.14

Discussion

Adhering to a balanced and healthy diet as well as exercising regularly has a significant role on health maintenance(9). The lockdown and quarantine restrictions which were imposed by many countries to control COVID-19 outbreaks are believed to contribute to poor lifestyle habits which may lead to the development of serious medical conditions such as obesity, diabetes, cardiovascular diseases, and mortality in patients infected with COVID-19(10,11). A study conducted in Korea showed a significant relationship between higher mortality rates in COVID-19 patients and CVD risk factors such as unhealthy eating habits and physical inactivity(12,13). This study assessed the lifestyle changes that can impact cardiovascular health and increase the risk of CVD during the COVID-19 pandemic among the Saudi population. We distributed an online questionnaire and received 2,069 responses from various Saudi regions.

Our study identified multiple changes in eating and physical exercise habits in adults during the COVID-19 lockdown in Saudi Arabia which match the findings of similar studies conducted in Italy and China(14,15). The majority of our sample reported eating homemade food regularly during the lockdown. This is similar to a Saudi study that demonstrated an increase in the consumption of daily home-cooked meals from 35.6% pre-COVID-19 to 85% during the COVID-19 pandemic(16). Two other studies conducted in Italy showed corresponding results(17,18). Skipping breakfast and late-night snacking were the 2 major unhealthy eating habits detected in this study. This is in accordance with findings reported by Husain and Ashkanani(2). Moreover, almost half of our participants (47.2%) indicated that they had a take-out meal once per week during the pandemic as compared to a previous study that reported consumption of take-out meals 1-2 times per week in 17% of participants(16).

In this study, there was a decrease in the consumption of meat, fish and seafood, and fat products but a significant increase in the consumption of chicken, fruits, vegetables, and canned meat during the pandemic. These findings notably differ from previous results reported in the literature which showed a marked increase in the ingestion of fat products and an inability to reach the minimum daily requirement of fruits and vegetables during the pandemic (2). However, our results were consistent with a study conducted on the Spanish population that showed a decrease in the consumption of fat products (96.5% versus 91.7%) and red meats (87.1% versus 82.7%) as well as an increase in the intake of fruits and vegetables(9). A likely hypothesis for the improved intake of fruits and vegetables could be due to the noticeable increase in home cooking and the well-known conception amongst the population that fruits and vegetables can enhance the body's immunity against COVID-19. The decreased consumption of meat and fat products reflects the high level of awareness of the Saudi population about the risks of overindulging in fatty foods and their negative effect on weight. Conversely, the lower intake of fish may be of particular concern, since it may translate to a reduced intake of vital nutrients such as long-chain n-3 polyunsaturated fatty acids and iodine(21).

The present study revealed an increase in the consumption of most snacks and beverages during the COVID-19 pandemic which opposes the recommendation to reduce the intake of fats, sugars, salt, and irregular snacking during the lockdown(22). Our findings support past literature that found that the consumption of unhealthy foods such as potato chips, fried food, red meat, and sugary foods and drinks significantly increased 3 weeks into lockdown(19,20,23). Scarmozzino and Visioli (14) indicated that 50% of Italian participants showed an increase in the consumption of sweet and salty snacks during COVID-19. According to Husain and Ashkanani , this could be a result of boredom, anxiety and stress which may lead to a higher consumption of energy-dense foods including snacks and beverages rich in fats and salt2.Click or tap here to enter text. We assume that the increased consumption of snacks and beverages is due to their wide availability and long shelf life compared to fresh produce which makes them more suitable for storage during a health crisis.

Physical activity and a healthy sleep hygiene are known to improve overall wellbeing and decrease the risk of CVD(24). In this study, our participants reported an increase in both the average hours of physical exercise as well as the average hours spent on electronic devices during the pandemic. This is partially contradictory to previous findings that demonstrated a significant decrease in physical activity during the pandemic but an increase in hours spent on electronic devices similar to our results(2,25). Multiple other studies conducted globally have also shown an increase in screen-time during the lockdown(3,18,26). The increased physical activity in our participants could be explained by the easy accessibility of home workouts through various social media platforms. In line with previous studies, our findings suggested that many participants changed their sleep schedule from night to morning during the COVID-19 pandemic with an increase in the average hours of sleep(2,19,20).

The increased consumption of snacks and beverages found in our study could explain the weight gain reported by 40% of our sample during the COVID-19 pandemic, which agrees with results of other studies conducted in Poland and Northern Italy(27,28). According to literature review, obesity and low physical activity are important modifiable risk factors of CVD (5). In our study, symptoms of CVD were related to a decrease in activity, an increase in fat consumption, an increase in time spent on social media, and poor sleep habits which match the results of several previous studies(2,18,26,27).

This study utilized an online survey, which proved to be an excellent research tool in recruiting a wide sample of participants without direct contact. Additionally, the questionnaire provided an extensive amount of information about dietary and lifestyle changes before and during

the pandemic. However, it is plausible that a number of limitations might have influenced the results obtained. The use of a self-reported questionnaire is subject to social desirability bias as well as recall bias. Although we collected data from various regions of Saudi Arabia, most of the responders were from the central region and were of the female gender which could negatively affect the generalizability of our results.

Conclusion

The present study indicates that the Saudi population experienced major dietary and lifestyle changes during the pandemic which included positive modifications such as the consumption of less fatty food and more fruits and vegetables and an increase in physical activity. However, some negative changes were also detected such as an increase in the frequency of snacking and the use of electronic devices, weight gain, and poor sleep habits. These findings were associated with a significant increase in CVD symptoms. Public awareness programs and further data collection is required to determine the extent of poor lifestyle changes among the Saudi population and their effect on cardiovascular health on a wider region.

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Development patterns of olfactory disorders in Covid-19 patients, Aden, Yemen

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Abstract

Background: Covid-19 is characterized as a global pandemic and health emergency. Post viral olfactory dysfunction maybe conductive due to swelling of the mucosa in the olfactory cleft, or sensorineural impairment due to degeneration of olfactory neuroepithelium.

Objective: To delineate the different development patterns of olfactory disorders in Covid-19 patients.
Materials and method: This was a descriptive prospective study conducted in Aden. Seventy ENT patients underwent Covid-19 testing by real-time PCR in the Center of Covid-19 during June 1 to August 31, 2020

Data were collected and analyzed by SPSS software version 17 and the results were presented as mean values with the standard deviation (SD), frequencies and percentage. The statistical significance of differences between data was evaluated using Fisher test. A level of significance of $p < 0.05$ was used.

Results: Among the 70 patients, (78.6%) were females and (21.4%) were males.

Their age ranged between 18-51 years and the mean age was 29.2±8.8 years.

The largest age group of patients was 21–30 years (41.9%) followed by 31–40 years (27.1%). Generalized body ache was the most common nonspecific symptom (24.3%). High nonspecific symptoms occurred more in female patients, ($p > 0.05$).

Comorbid conditions were diabetes mellitus in (11.4%) patients and hypertension in (7.1%). Anosmia was found in (85.7%) and hyposmia in (14.3%) patients.

Parosmia was the most common development pattern of olfactory disorders in covid-19 patients 24 (34.2%). Full recovery was found in 14.3% of patients.

Conclusion: The situation of a significantly higher proportion of patients with anosmia followed by hyposmia supports the need for ENT health care for patients with Covid-19 diseases.

Key words: patterns, olfactory dysfunctions, Covid-19, Aden

Introduction

The coronavirus disease of 2019 (Covid-19) is an infection caused by the severe acute respiratory syndrome coronavirus type 2 (SARS-CoV-2), which is characterized by respiratory failure in its most severe form of presentation. The first case was described in Wuhan, China, from where it rapidly spread to 188 countries. In March 2020, it was declared a pandemic by the World Health Organization (WHO) [1].

The disease caused by the new coronavirus (Covid-19) has brought about a worldwide viral pandemic, which emerged in East Asia and quickly spread to the other continents. This infection, caused by the type-2 coronavirus, is responsible for triggering severe acute respiratory syndrome (SARS-CoV-2), and symptoms such as fever, cough, fatigue, and myalgia are usually reported [2].

Covid-19 was characterized by the World Health Organization (2020) as a global pandemic and health emergency on March 11, 2020, which led to a worldwide concern [3].

The most reported symptoms of Covid-19 are fever, cough, dyspnea, myalgia, arthralgia, headache, diarrhea, rhinorrhea, and sore throat [4]. The British association of otolaryngology has recently identified the sudden loss of sense of smell and taste as “significant symptoms” which were found even in the absence of other symptoms [5].

The post-viral olfactory dysfunction maybe conductive due to swelling of the mucosa in the olfactory cleft [6].

Olfactory dysfunction can be classified as quantitative which implies an alteration in intensity, or qualitative when there are changes in the quality of the perception of smells. While normal olfactory function is defined as normosmia, quantitative disorders are classified as partial (hyposmia) or total (anosmia) loss of smell [7].

Objective

Objective: To delineate the different development patterns of olfactory disorders in Covid-19 patients, Aden, Yemen

Materials and Method

This was a descriptive prospective study conducted in Aden. A total of 70 ENT patients were seen in our private clinic during the period from June 1 to August 31, 2020, in Aden, Yemen. These patients were tested by real-time PCR at the Center of Covid-19 at Algamhoria Teaching Hospital.

The Ministry of Health has designated this Center as the referral center uniquely for testing and admission of patients with Covid-19. Our 70 patients were tested by real-time PCR and all patients were positive with Covid-19.

Data including sex, age, nonspecific symptoms, comorbid conditions, olfactory disordersand development pattern of olfactory disorders, were collected.

SPSS Statistics software version 17 was used to perform all statistical analyses. Data are presented as mean values with the standard deviation (SD). The statistical significance of differences between data was evaluated using a Fisher test. A level of significance of $p < 0.05$ was used.

Results

There were 70 patients with olfactory disorders in Covid-19 during the study period June 1 to August 31, 2020. Among the Covid-19 patients, 55 (78.6%) were females and 15 (21.4%) were males. Female to male ratio was 3.7:1; (Table 1 and Figure 1).

The age of the patients ranged between 18-51 years. The mean age at the time of infection for all patients was 29.2±8.8 years, for male patients was 32.5±8.9 years and for female patients was 28.3±8.6 years.

The largest age group was 21–30 years (n=30, 41.9%), followed by 31–40 years (n=19, 27.1%) as shown in Table 1 and Figure 2.

Table 1: Distribution of demographic characteristics of the study patients (n = 70)

Variable	Ratio	Range	Mean	No.	%	p-value
Sex:						
Females				55	78.6	
Males				15	21.4	
Female to male	3.7:1					
Age range (years):		18 – 51				
Mean age ± SD* (years):						
All patients			29.2 ± 8.8			P > 0.05
Male patients			32.5 ± 8.9			
Female patients			28.3 ± 8.6			
Age groups (years):						
≤ 20				11	15.7	
21 – 30				30	42.9	
31 – 40				19	27.1	
41 – 50				10	14.3	

SD*: Standard deviation;

Figure 1: Sex percentage of the study patients

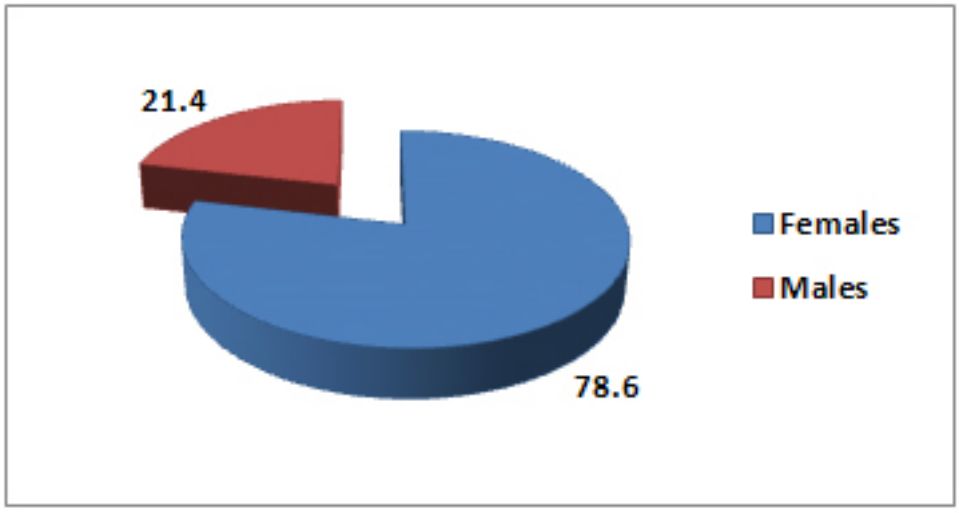
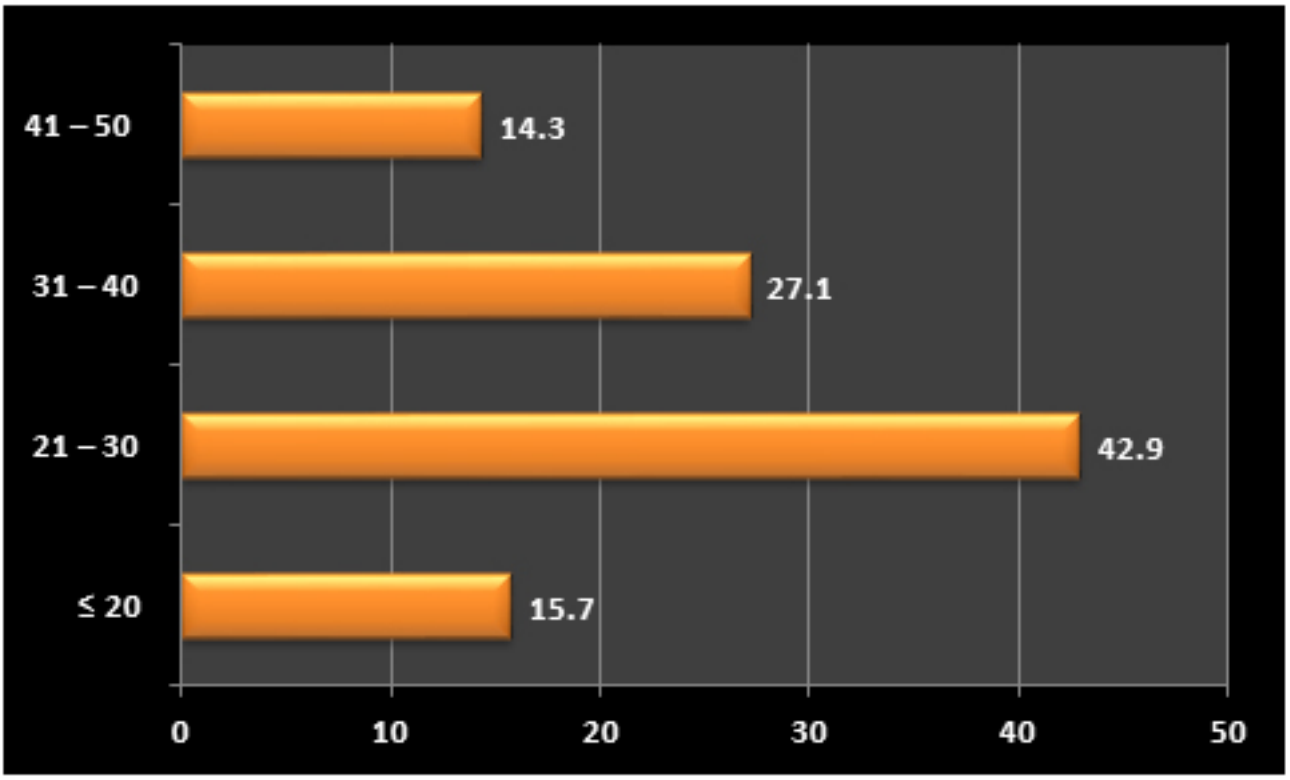


Figure 2: Distribution of age groups percentage of the study patients



In Table 2 we observed generalized body ache was the most common nonspecific symptoms 17 (24.3%), followed by headache and mild fever 12 (17.1%), cough 8 (11.4%) and slight dyspnea 3 (4.3%); (Figure 3).

High nonspecific symptoms occurred more in female patients. The difference between values showed no statistical significance ($p > 0.05$).

In all, there were 18 (25.6%) patients with comorbid conditions; diabetes mellitus 8 (11.4%) patients, hypertension and allergic rhinitis each one in 5 (7.1%) patients.

As olfactory disorders, we found anosmia in 60 (85.7%) patients and hyposmia in 10 (14.3%) patients; (Table 2 and Figure 4).

Parosmia (which is a distorted olfactory sensation in the presence of an odor) was the most common development pattern of olfactory disorders in Covid-19 patients 24 (34.2%), followed by cacosmia 14 (20.0%). Cacosmia is a distorted or perverted smell perception to odour stimulation.

Table 2 shows heterosmia (which is a condition where all odours smell the same) in 10 (14.3%) patients. Phantosmia {which is a dysosmic sensation perceived in the absence of an odour stimulus (a.k.a. olfactory hallucination)}; was found in 4 (5.7%); (Table 2 and Figure 5). Full recovery was found in 10 (14.3%) patients while no recovery was found in 8 (11.5%) patients.

Figure 3: Distribution of nonspecific symptoms of study patients

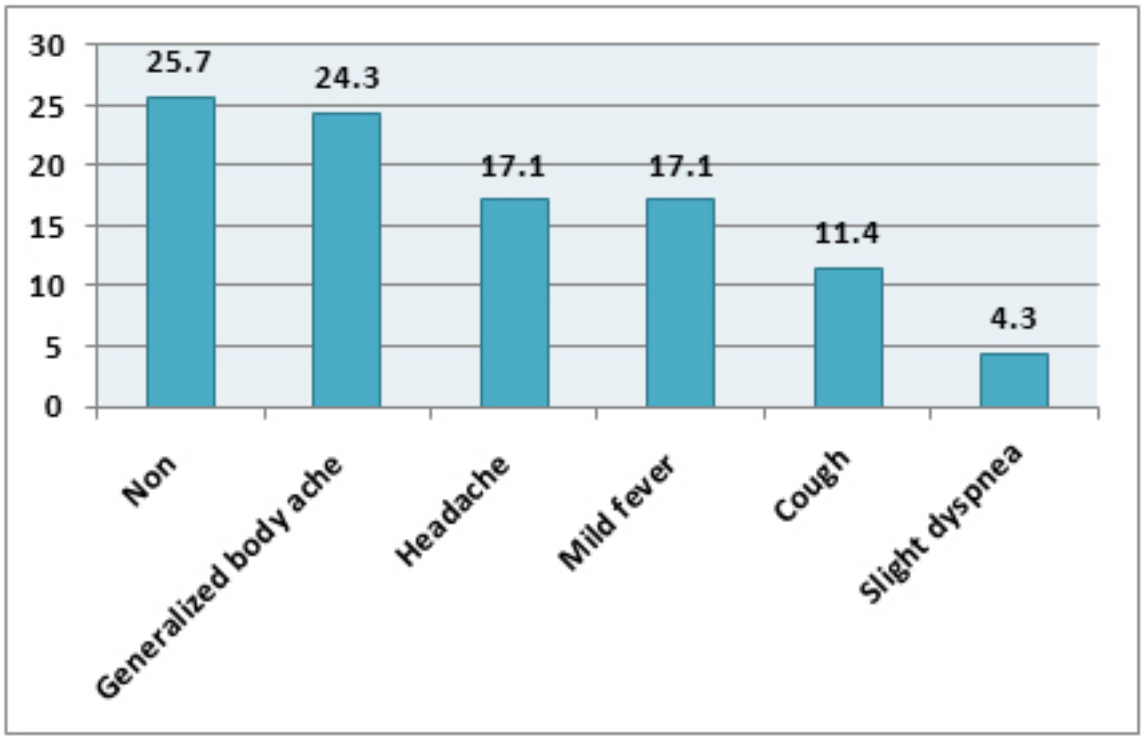


Figure 4: Anosmia & Hyposmia percentage in the studied Covid-19 patients

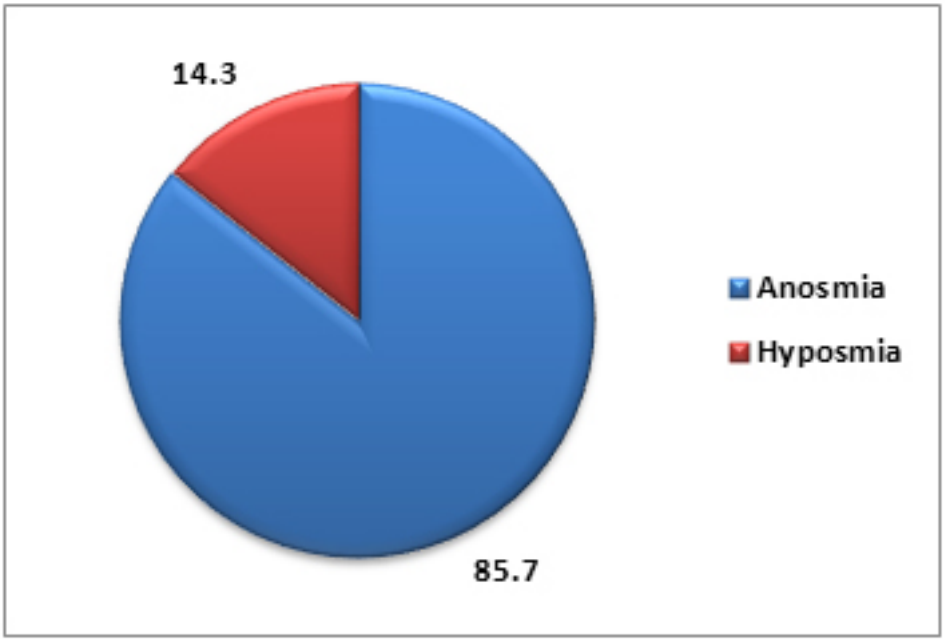
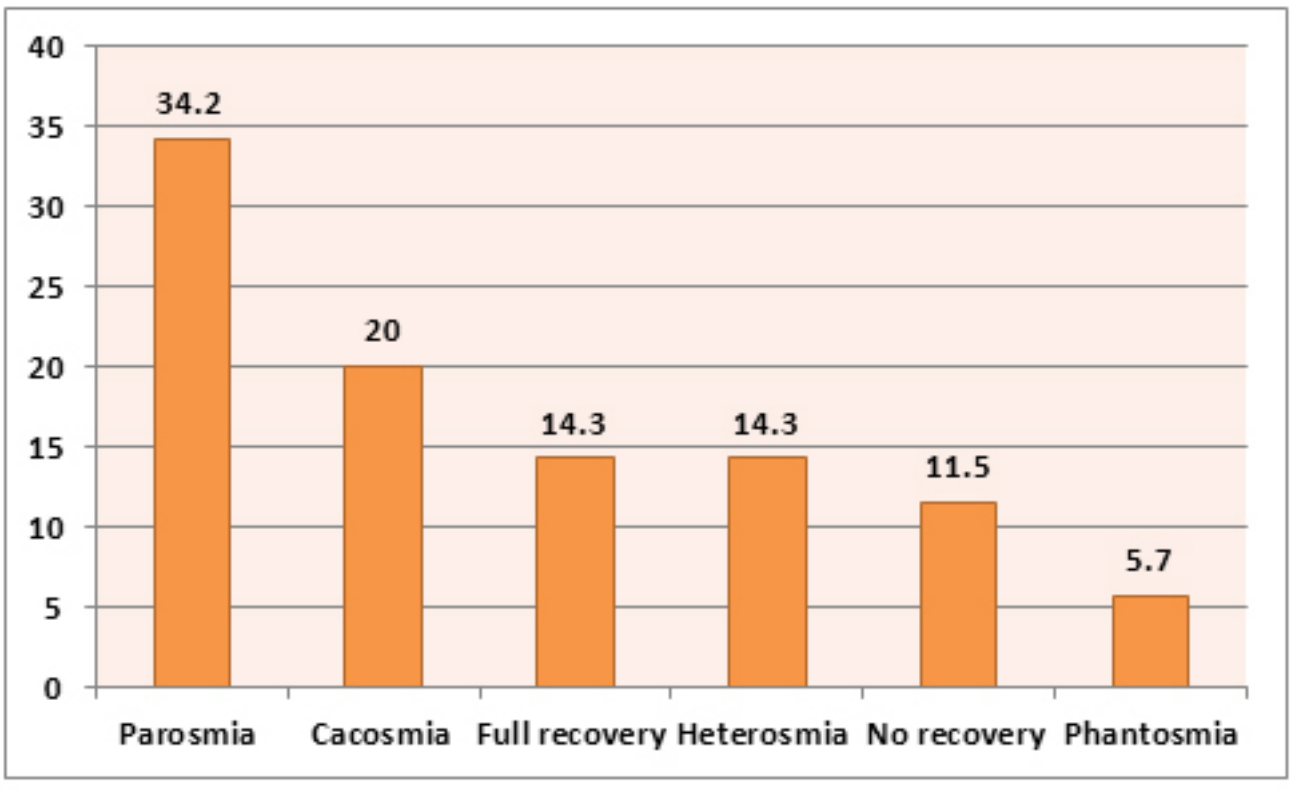


Table 2: Distribution of nonspecific symptoms, comorbid condition, olfactory disorders and pattern of development related to sex (n = 70)

Variables	Sex				Total		p-value
	Female		Male				
	No	(%)	No	(%)	No	(%)	
Nonspecific symptoms:							
None	15	(21.4)	3	(4.3)	18	(25.7)	P > 0.05
Generalized body ache	11	(15.7)	6	(8.6)	17	(24.3)	
Headache	8	(11.4)	4	(5.7)	12	(17.1)	
Mild fever	11	(15.7)	1	(1.4)	12	(17.1)	
Cough	7	(10.0)	1	(1.4)	08	(11.4)	
Slight dyspnea	3	(4.3)	0	(0.0)	03	(4.3)	
Comorbid condition:							
None	41	(58.7)	11	(15.7)	52	(74.4)	P > 0.05
Diabetes mellitus	05	(7.1)	03	(4.3)	08	(11.4)	
Hypertension	04	(5.7)	01	(1.4)	05	(7.1)	
Allergic rhinitis	05	(7.1)	0	(0.0)	05	(7.1)	
Olfactory disorders:							
Anosmia	47	(67.1)	13	(18.6)	60	(85.7)	P > 0.05
Hyposmia	08	(11.4)	02	(2.9)	10	(14.3)	
Pattern of development:							
Parosmia	17	(24.2)	7	(10.0)	24	(34.2)	P > 0.05
Cacosmia	12	(17.1)	2	(2.9)	14	(20.0)	
Full recovery	8	(11.4)	2	(2.9)	10	(14.3)	
Heterosmia	8	(11.4)	2	(2.9)	10	(14.3)	
No recovery	6	(8.6)	2	(2.9)	8	(11.5)	
Phantosmia	4	(5.7)	0	(0.0)	4	(5.7)	

Figure 5: Patterns of olfactory developments in the study patients



Discussion

The presentation of olfactory dysfunction (OD) in viral infections such as the common cold or flu is very common, and many viruses lead to OD due to an inflammatory reaction in the nasal mucosa, with increased production of mucus (rhinorrhea), and/or in the neuroepithelium olfactory. The commonly known agents are rhinovirus, parainfluenza, Epstein–Barr virus and some coronaviruses. The follow-up of post-viral olfactory loss showed that over 80% of patients had subjective recovery at one year. The exact pathophysiology of post-viral OD remains under study. No specific upper respiratory symptoms allow Covid-19 to be reliably distinguished from other types of viral respiratory infections [8].

There appear to be two likely causes:
(a) during an upper respiratory infection the loss of smell occurs as a result of nasal swelling, mucosal oedema and obstruction of the airflow into the olfactory cleft, and/or (b) a postviral loss of smell is caused by infection and direct swelling of the olfactory mucosa, leading to the subsequent neurodegeneration of the olfactory neuroepithelium. Damage and dysfunction of the peripheral olfactory system, revealed by hyposmia or anosmia, could be a relevant indicator of disease progression [9].

Since the beginning of the pandemic coronavirus disease (Covid-19), an increasing number of patients have sought medical assistance reporting loss of smell [10,11]; and, thereby, a number of studies have been conducted to analyze the prevalence and determinants of olfactory dysfunction in coronavirus disease patients.

Our present study found 70 patients with olfactory disorders in Covid-19 during the 3 months of the study period and they were (78.6%) females and (21.4%) males. Female to male ratio was 3.7:1.

Amer et al [12] found in their study a predominance of females; they were (58%) females and (42%) males with female to male ratio 1.4:1.

Gorzkowski et al [13] reported in their study that the female patients were (64.2%) while the male patients were (35.8%) with female to male ratio 1.8:1.

Females have been reported [2,14] as significantly more affected by Olfactory and Gustatory dysfunctions in Covid-19 diseases.

According to our analysis, young patients aged ≤ 40 years could have a higher rate of olfactory dysfunction (85.7%) compared with elderly individuals (14.3%).
Similar findings have been reported in the study of Speth et al [3] who investigated self-reported olfactory dysfunction in 103 Covid-19 patients.

In the present study, the mean age of patients was 29.2±8.8 years; 55 females (78.6%) and 15 males (21.4%) with evident female predominance. This goes in accordance with Amer et al [12] who reported that the mean age of their study patients was 34.26±11.91 years and they were 56 (58.3%) females and 40 (41.7%) males. Also, our finding goes in accordance with Kosugi et al [15] who studied 183 olfactory patients of Covid-19 with mean age of 36 years and female predominance 53.1% of their patients. Similarly, in a multicentric study of Covid-19 patients studied by Lechien et al [2] 357 patients were recruited with mean age 37 years and female predominance 63.1%.

We are also in agreement with Kosugi et al [15] and Lechien et al [2] who attribute this female predominance as regards olfactory complaints to the fact that females have a greater concern for their health as well as the decreased capacity of men to perceive olfactory disorders.

In our current study we observed generalized body ache was the most common nonspecific symptoms (24.3%), followed by headache and mild fever for each one (17.1%), cough (11.4%) and slight dyspnea (4.3%).

Kosugi et al [15] reported in their published study that most patients had sudden anosmia (83.8%) instead of sudden hyposmia, and most cases of olfactory dysfunction were accompanied by nonspecific inflammatory symptoms (coughing, fever, headache, fatigue/malaise, myalgia/arthralgia and/or anorexia).

In our present study we found in all study patients, there were 18 (25.6%) patients with comorbid conditions. They were diabetes mellitus in 8 (11.4%) patients, followed by hypertension in 5 (7.1%) patients.

Mendonça et al [16] reported that in olfactory dysfunction in Covid-19: diabetes mellitus was a significantly a more frequent comorbidity in hospitalized patients. Similar to our finding was that reported by Amer [12] that some patients reported comorbidities as diabetes mellitus (16%), and hypertension (8%).

Regarding olfactory disorders, we found in our present study anosmia in 60 (85.7%) patients and hyposmia in 10 (14.3%) patients.

Galougahi et al [17] found in their study in Tehran, Iran, that of the 76 participants, 46 patients (60.5%) had anosmia and 30 (39.5%) hyposmia.

The clinical picture of the infection with Covid-19 may vary regarding the disease severity and usually includes general otolaryngological and neurological symptoms [18,19]. Olfactory dysfunction is one of the most prevalent symptoms [18]. The prevalence of olfactory dysfunction may vary regarding the clinical setting, with rates of total loss of smell as high as 70% patients with mild Covid-19 form [18,20,21].

The prevalence of olfactory dysfunction in moderate to critical Covid-19 forms was poorly investigated [22,23].

In our study, we found parosmia was the most common development pattern of olfactory disorders in Covid-19 patients 24 (34.2%).

Dysosmia is more common. Usually dysosmia reflects dynamic alterations of degeneration or regeneration within the olfactory neuroepithelium over time [24].

Parosmia or distortion of smell is currently regarded as one of the long Covid-19 syndromes or chronic Covid-19 syndromes. Carfi et al [25] found that (87.4%) of patients in their study who recovered from Covid-19 had at least one persistent symptom with loss of smell among them.

Full recovery was found in 10 (14.3%) patients while no recovery was found in 8 (11.5%) patients.

Amer et al [12] reported in their study that, (33.3%) patients experienced full recovery while, (41.7%) patients showed partial recovery within one month from loss of olfaction, however, (25%) of patients showed no recovery within 4 weeks of onset. However, full recovery from sudden olfactory dysfunction was reported by only 11.5% of their patients, and only 5.3% of patients in the study were tested for Covid-19, making it early to extrapolate their results [5,15].

Conclusion

The high prevalence of olfactory dysfunction in Covid-19 patients in our study, appeared with a significantly higher proportion of patients with anosmia followed by hyposmia.

Hyposmia recovers more rapidly than anosmia. Co-morbid conditions worsen the recovery and females develop a different olfactory disorder pattern more than males. Parosmia follow by cacosmia were the most common development patterns of olfactory disorders.

This situation supports the need for primary care, ear, nose and throat (ENT) physicians to be able to counsel patients regarding the likelihood of recovery, and to identify those at risk of persistent olfactory dysfunction, such that therapeutic strategies can be targeted appropriately.

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Functional constipation and its association with lifestyle habits of medical students using Rome IV Diagnostic Criteria

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Abstract

Background: Functional constipation (FC) is widespread with various symptoms that impose considerable effects on the quality of life and puts a burden on medical resources. During their education, medical students are more likely to adopt an unhealthy lifestyle that can lead to gastrointestinal problems. This study aimed to explore FC's prevalence and associated lifestyle factors among undergraduate medical students at Jinnah Sindh Medical University, Karachi, Pakistan.

Methods: The present cross-sectional study was conducted from August 2019 - September 2019 in Jinnah Sindh Medical University (JSMU), Karachi, Pakistan, according to non-probability purposive sampling. Data were collected by a pre-tested, self-administered questionnaire designed according to Rome IV Criteria. For data analysis, SPSS version-26 was used.

Results: A total of 365 medical students were included in this study. The prevalence of FC among medical students as per Rome Criteria IV was 36.3%. Functional constipation was significantly higher in women (72.7%). The hard and lumpy stool was the most experienced symptom (33%). About 123(40.6%) subjects had self-reported constipation. Low fibre consumption (fruits and vegetables), low water intake, and imperfect bowel habits were the most prominent characteristics among constipated subjects. Concerning treatment intervention, high fibre food consumption was noticed as the most frequently used intervention by constipated subjects.

Conclusion: Regarding the prevalence rate, FC is a widespread issue among medical students. Low fibre diet, low water intake, stool with-holding, and less frequent defecation are the most apparent risk factors among the constipated subjects.

Key words: Functional constipation,
medical students, Fibre diet, lifestyle factors.

Introduction

In the general public, constipation is one of the most frequent gastrointestinal complaints, more prevalent among females and the older populations with 37.2% and 12%-19% prevalence, respectively (1). Its prevalence in Pakistan was found to be 16.1% (2). It badly affects the quality of life, reduces working capacity, and increases healthcare costs (3). Constipation is a global health concern associated with fecal incontinence, low self-esteem, social withdrawal, depression, anxiety, anger, and so forth (4).

Constipation is defined as persistent difficult and ungratified defecation characterized by reduced bowel movements, straining, the passage of painful hard stools, and feeling of distress (3). It is worth noting that there is a wide variation in defining functional constipation (FC) among clinical physicians and patients (5). ROME IV criteria that was revised in 2016, offer a more accurate and precise definition of FC. According to these criteria, "FC is assessed concerning the presence of at least two of the following symptoms for the last three months which include straining (> 1/4 of defecation), lumpy and hard stools (> 1/4 of defecation), feeling of incomplete defecation (> 1/4 of defecation), feeling of anal obstruction (> 1/4 of defecation), physical maneuver to ease defecation (> 1/4 of defecation) and less than 3 unconstrained bowel movements per week (6)."

Painful passage of stool during constipation further decreases the defecation frequency and a vicious cycle sets in that impairs the health-related quality of life (HRQOL) (3, 7). Few long-term complications of chronic constipation include inguinal hernia, hepatic encephalopathy, and colorectal carcinoma (3). The alarming complaints that can complicate constipation are bloody stools, anemia, weight loss, symptoms of obstruction, and age of more than 50 years with rectal bleeding, rectal prolapse and no history of colorectal carcinoma screening (8).

Pathogenesis of functional constipation is multi-factorial with multiple causes and risk factors such as genetic factors, low socioeconomic factors, any underlying organic disease (gastrointestinal, neurological, psychogenic, metabolic and endocrine disorders), drug side effects and behavioural factors (low fibre intake and drinking, lack of physical activities, changes in eating habit and inadequate response to the call of defecation) (3, 9). A study conducted in 2011 reported a greater frequency of functional constipation among young adults and the reason for this could be the poor lifestyle habits as they are significantly correlated with the development of functional constipation (2). In this regard, it is necessary to identify the lifestyle habits among them.

The students are the building block for the nation's development, and the entire success of a nation depends on the youth. A study reported that gastrointestinal disorders (like heartburn, diarrhea, irritable bowel syndrome, constipation, etc.) are common, especially among medical students (2). During their education, the frequency of fruit and vegetable consumption decreases day by day while unhealthy habits like smoking, drinking, and substance abuse increase (10). For medical students, being a part of a future health care providing team, it is mandatory to undertake an appropriate healthy lifestyle early during their student years to inspire patients by setting an example of healthy behaviour. Therefore, this study aimed to explore the frequency of FC using ROME IV criteria and its associated risk factors among medical students.

Methods

The present questionnaire-based cross-sectional survey was conducted at JSMU, Karachi, Pakistan, between August 2019 to September 2019. The authors obtained the ethical approval from JSMU with reference code: JSMU/IRB/2019/227. A sample size of 345 was recruited, having a confidence level of 95% and an anticipated population proportion of 0.34 in the OpenEpi sample size calculator (2). A non-probability purposive sampling technique was used to enrol participants.

Undergraduate students of JSMU who were present at the time of data collection and gave informed consent were included in the study. Participants with any additional systemic disease, organic bowel disease, and IBS were excluded from this study. A pre-tested self-administered questionnaire was designed for data collection by reviewing the literature on constipation (6). A pilot study was conducted among undergraduate medical students for content validity and to standardize the questionnaires. Data collected were analyzed using SPSS software version 26.0. The qualitative data were presented as frequencies and percentages, and the Chi-square test was used for categorical data analysis. The p-value was taken statistically significant at <0.05.

Results

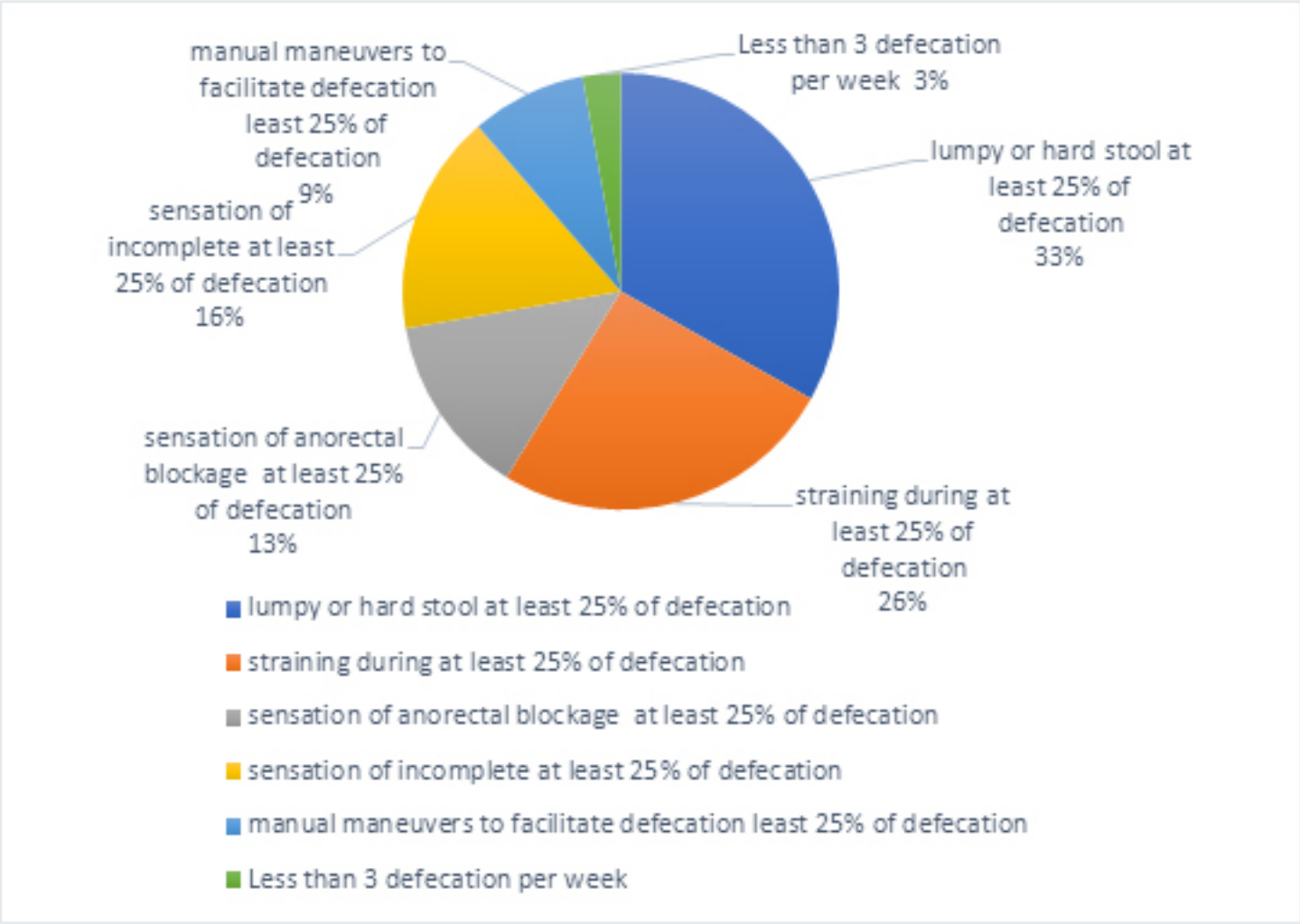
Initially, a total of 365 undergraduate medical students were included in the study, and 62 responders were excluded from the study due to the ineligibility of the participants. Out of 303 responders, 200 (66%) were females. and 103 (34%) were males. The mean age (SD) of students was 21.7 ± 2.2 years, and the majority of students were unmarried 297 (98%). All the sociodemographic characteristics are shown in Table 1.

Table 1: Sociodemographic characteristics of study participants (n = 303)

Variable	N (%)
Age (Years)	
< 20 yrs.	112 (37.0)
20 – 22 yrs.	151 (49.8)
> 22 yrs.	40 (13.2)
Mean age +/- SD (Years)	21.7 ± 2.2
Gender	
Male	103 (34)
Female	200 (66)
Marital status	
Unmarried	297 (98)
Married	6 (2.0)
Department	
MBBS	277 (91.4)
D-Pharmacy	26 (8.6)
Year of study	
1st year	73 (24.1)
2nd year	42 (13.9)
3rd year	42 (13.9)
4th year	114 (37.6)
5th year	32 (10.6)
Financial support	
Family	268 (88.4)
Family + self	34 (11.2)
Self	1 (0.3)
Place of Residency	
At home	268 (88.4)
At hostel	35 (11.6)

The self-reported constipation was found in 123 (40.6%) individuals and FC, as per ROME IV criteria, was found in 110 (36.3%) individuals.

Figure 1: Symptoms of functional constipation experienced by study participants.



Among 110 (36.3%) functionally constipated individuals, FC's symptoms characteristics were assessed (Figure 1). Most of the constipated individuals (33%) experienced hard or lumpy stools, which were found to be the most frequent symptoms faced by the constipated individuals as per Rome IV criteria. Gender and FC were significantly correlated ($p<0.05$). FC was found to be more prevalent among females than males. FC was significantly correlated with nutritional status ($p<0.05$).

Table 2: Sociodemographic characteristics of individuals with constipation (n=110)

Variables	Individuals with constipation	p-value
Age (Years)		0.224
under 20	4/112	
20 - 22	60/151	
Above 22	10 /40	
Gender		0.04
male	30/103	
female	80/200	
Marital status		0.118
unmarried	106/297	
married	4 / 6	
Department		0.851
MBBS	101/277	
D-Pharmacy	9 / 26	
Year of study		0.338
1st year	28/73	
2nd year	12 / 42	
3rd year	19/42	
4th year	43/114	
5th year	8 / 32	
Financial support		0.743
family	98/268	
family + self	12 / 34	
self	0/1	
Place of Residency		0.312
at home	100/268	
at hostel	10 / 35	
Nutritional Status		0.06
normal	59/187	
underweight	34/69	
overweight	13/35	
obese	3 / 6	

Among the 110 (36.3%) constipated individuals, most of the students were non-smokers (97.2%). Most of them were non-daily consumers of fruits and vegetables (60.9% and 72.7%, respectively). Two-thirds of the students (68.1%) drank an inadequate amount of water (less than 8 glasses/day), while 72% of students defecated more than 3 times per week, and 28% of students defecated less than 3 times per week. Surprisingly, 11.8% of students withheld stool daily, 57.2% of students sometimes and 30% rarely. Statistically, significant relationships of constipation were noted with vegetable consumption ($p<0.05$), water intake (<0.05), defecation frequency (<0.05). Smoking habits, fruit consumption, exercise, and sleep habits were found to be non-significantly associated with FC (Table 3).

Table 3: Lifestyle factors (LSF) of individuals with constipation (n=110)

Characteristics	Individuals with constipation (total Number)	*p-value*
Number	110 (303)	-
LSF 1		0.488
daily	1 (4)	
sometimes	2 (10)	
never	107 (289)	
LSF 2		0.014
daily	29 (93)	
sometimes	62 (178)	
rarely	18 (30)	
LSF 3		0.056
daily	43 (135)	
sometimes	50 (147)	
rarely	17 (31)	
LSF 4		0.01
< 6 glasses	37 (72)	
6-8 glasses	38 (87)	
8-10 glasses	23 (90)	
> 10 glasses	12 (54)	
LSF 5		0.458
daily	13 (42)	
sometimes	34 (93)	
rarely	43 (124)	
never	20 (43)	
LSF 6		0.874
4-6 hours	29 (74)	
6-8 hours	57 (168)	
8-10 hours	22 (57)	
> 10 hours	2 (6)	
LSF 7		0.01
after every meal	3 (16)	
once a time daily	61 (181)	
> 3 times a week	22 (70)	
< 3 times a week	24 (36)	
LSF 8		0.03
daily	13 (16)	
sometimes	63 (134)	
rarely	33 (152)	

Where, LSF 1 = Smoking Habits, LSF 2= Vegetables Consumption, LSF 3= Fruit Consumption, LSF4= Water Intake, LSF 5= Exercise, LSF 6= Sleeping Habits, LSF 7= Defecation, LSF 8= Stool Withholding Habits

Discussion

Medical students are future health care providers. However, with the ever-increasing academic stress, the students often ignore the symptoms of various common ailments (11). Depending on the diagnostic criteria used, the prevalence of FC varies among different populations (9). In a study conducted among tertiary education students of Malaysia, FC's reported prevalence based on ROME III criteria was 16.2%(5). Another study conducted by students at Dow University of Health and Sciences, Karachi, in 2011, inferred that the frequency of FC among medical students, hospitalized patients, and their attendants was 34%, 53%, and 52%, respectively (2). We could not discover any review that used ROME IV criteria to find the prevalence of functional constipation in Pakistan, as the criteria was updated in May 2016 (12). In our study, based on ROME IV diagnostic criteria, prevalence of FC among medical students was found to be 36.3%, which was relatively higher than previous literature.

Our results are in accordance with a recent study that demonstrated 36.5% of individuals had self-reported constipation, and out of those, more than four-fifths fulfilled the ROME IV diagnostic criteria(13). Therefore, these findings were suggestive that perception regarding FC among medical students and the general population was compelling. Considering the FC symptoms, frequently reported symptoms in our study were straining during stool passage and hard stool consistency. Wald and Lim elucidated the same result in their reviews (14).

As for sociodemographic factors, gender was found to be significantly associated with FC (p-value <0.05) in our study. As per our survey, a high prevalence of FC was found in female students (72.7%) with a sex ratio of 0.37. This finding was in agreement with other research outcomes, which stated that FC was more prevalent among females (15-17). A Malaysian study reported higher incidence of FC among female students (12). Women's higher predominance could be attributed to hormonal factors (increased risk of constipation during menstrual cycles) (18). Moreover, eating behaviour, physical and emotional problems could also impact FC in females (19,20).

Our study found no significant association between FC and other factors like age, body mass weight (BMI), marital status, and place of residence (home or hostel). Certainly, a high fibre diet and good water intake keep the bowel healthy(21,22). In a study, it was observed that many constipated patients in Berlin, Germany, got relief after using a high fibre diet as a treatment of FC (23). Another study deduced that low intake of water is strongly associated with FC (p-value <0.05) (20). Our results showed a significant correlation between FC and high fibre consumption as fruits and vegetables and increased water intake (p-value <0.05).

Our study did not find exercise to be significantly associated with FC. This contrasted with other studies, which had reported that moderate-intensity exercises could improve stool consistency and frequency(24, 25). A study suggested that due to decreased defecation frequency and stool withholding, the transit time of faeces passing through the intestine increases, making the stool harder (26). According to our study, we found a significant relation of functional constipation with stool withholding and infrequent defecation in medical students. As far as this association is concerned, we were unable to obtain it in any other studies. It can be described how medical students' life is very stressful and busy, so they usually avoid defecation during long working hours that is an apparent risk factor for functional constipation among medical students, which was not referred to in other studies. Further research should be undertaken to explore this risk factor.

Evidence from various research also indicated that a high fibre diet, increased fluid intake, herbal supplements, and laxatives are the most preferable and effective means to counter constipation symptoms. It is important to urge medical students to assume a healthy lifestyle and consume a balanced diet (2, 27-28).

Limitations

Our study's limitations are limited sample size and cross-sectional nature. It was also a study based on questionnaire; therefore, it is likely for students to pick acceptable responses regardless of what the real response might be.

Conclusions

This study concludes that according to ROME IV criteria, FC was prevalent among medical students. Medical students had a good perception of FC. Straining during defecation and lumpy hard stool showed great accuracy in diagnosing FC in medical students. Females were more prone to functional constipation. Low fibre diet decreased water intake, less frequent defecation, and stool withholding were found to be the major lifestyle factors contributing to FC among medical students.

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Alopecia areata: characteristics and associated diseases among patients in Aden, Yemen

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Abstract

Objective: The aim of the study was to describe the demographic and clinical characteristics of alopecia areata and to determine the associated diseases among patients.

Materials and method: This is a retrospective study of all patients who presented with alopecia areata and who were seen in our two private dermatology clinics in Aden. The patients' charts retrieved obtained the study data. The data was analyzed using SPSS version 17.

The relationships between study variables and sex were examined using Pearson's Chi-square Test. Significance was considered at P value ≤ 0.05.

Results: The total patients were 264 (females 61.7% and males 38.3%).

The mean age of patients was 18 years. The relation between age and means of gender were statistically highly significant (p = 0.000).

The age group 1 – 10 years represented (36.7%) cases, followed by the age group 11 – 20 years with (24.1%) of cases.

In male patients the peak age of onset was in the ages 21-30 years with (13.3%).

Ninety (96%) of the cases occurred in the age of ≤ 40 years (p = 0.003).

Family history was positive among 9.9% of patients and the most of alopecia areata patterns were patchy with (83.3%).

Also, multiple patches were the most common type (60.0%) followed by single patches (33.3%).

Pitting was the most common presenting nail changes, being found in (11.6%) patients. Atopic dermatitis (4.4%), hypothyroid (2.8%), were the most common comorbidities. The most site involvement was the scalp (89.2%). The mean disease duration at the time of presentation for all patients was 3.7 months.

Conclusion: This study highlights the importance of further studies in this field.

Key words: Alopecia areata, clinical characteristics, associated diseases, Aden

Introduction

Alopecia areata (AA) is a form of alopecia caused by autoimmune attack of the hair follicles. This most commonly results in discrete, circular patches of alopecia on the scalp or in the beard region [1].

This hair follicle disorder is a common disease with an incidence of 2-3% among the dermatoses and 0.1% in the population at large [2].

Alopecia areata is manifested as the loss of hair in well-circumscribed patches of normal-appearing skin, most commonly on the scalp and in the region of the beard [3]. The onset is typically rapid, and the disease can progress to the point where all the hair is lost on the scalp (alopecia areata totalis) or even on the whole body (alopecia areata universalis). Variants of this disorder include ophiasis, (in which hair loss affects the occipital scalp); diffuse forms of alopecia; and "sudden graying," a variant in which pigmented hair follicles are attacked, with the result that preexisting gray hairs are demasked [4,5].

Hence, it has now been widely postulated that AA is an organ-specific autoimmune disease with genetic predisposition and an environmental trigger [6,7].

The aim of the study was to describe the demographic and clinical characteristics of alopecia areata and to determine the associated diseases among Yemeni patients in Aden.

Materials and Method

This is a retrospective study of all patients who presented with alopecia areata and who were seen in our two private dermatology clinics in Aden during the period from January 2016 to December 2018.

The total study patients during this period were 264. The patients' charts were retrieved and obtained data about sex, age, alopecia areata patterns, family history, type of patches, nail changes, the variables of associated diseases, site involvements and the mean disease duration at the time of presentation.

The data was analyzed using SPSS version 17. Data was presented as frequencies and percentages for categorized variables and as means and standard deviation for continuous variables. The relationships between study variables and sex were examined using Pearson's Chi-square Test. Significance was considered at P value ≤ 0.05.

Results

A total of 264 alopecia areata patients were included during the study period; out of them 163 (61.7%) were females and 101 (38.3%) were males, with a female to male ratio of 1.6:1. The mean age of females was 15.8 years (SD = ±11.6 years) and the age ranged between 1 year to 58 years, while the mean age of males was 21.4 years (SD = ±12.1 years) and the age ranged between 1 year to 60 years.

The mean age of all patients was 18 years (SD = ±12.1 years) and the age ranged from 1 year to 60 years. The relation between means showed statistically highly significant (p = 0.000).

Table 1: Mean age of patients related to sex

Sex	No (%)	Mean age (years)	SD* (years)	Minimum (years)	Maximum (years)
Female	163 (61.7)	15.8	11.6	1	58
Male	101 (38.3)	21.4	12.1	1	60
Total	264 (100)	18.0	12.1	1	60

* SD = Standard deviation
P = 0.000

Table 2 shows the age group 1 – 10 years represented 97 (36.7%) cases, followed by the age group 11 – 20 years with 64 (24.1%) cases, the age group 21 – 30 years with 63 (23.9%), and the age group 31 – 40 years with 30 (11.4%).

The age group 41 – 50 years were 8 (3.2%) patients and the age group ≥ 51 years were 2 (0.8%). It is also, noted that in male patients the peak age of onset was in the ages 21-30 years with 35 (13.3%).

Ninety (96%) of the cases occurred in the age of 40 years and less than 40 years.

The difference between values of gender related to age groups is statistically significant (p = 0.003), (Table 2).

Also, Table 2 reveals that in 26 (9.9%) patients, their families had a history of the disease. They were 15 (5.7%) females and 11 (4.2%) males, (p-value > 0.05).

Most alopecia areata patterns were patchy with 220 (83.3%) followed by patchy + ophiasis with 27 (10.2%), alopecia universalis 8 (3%), alopecia totalis 7 (2.7%) and alopecia ophiasis 2 (0.8%), (p-value > 0.05); see images 1 and 2.

Table 2 also illustrates the number of patches. Multiple patches were the most common type 161 (61.0%) followed by single patches 88 (33.3%), see images 3 and 4.

Pitting was the most common presenting nail changes, being found in 30 (11.6%) patients followed by trachyonychia in 6 (2.4%) patients and were more common in male patients 5 (2.0%) cases.

We found 3 (1.2%) cases of leuconychia and 2 (0.8%) cases of Beau's line and both nail changes were in female patients.

The difference between values of gender related to nail changes is statistically not significant (p > 0.05), as shown in Table 2.

Table 2: Distribution of demographic and clinical characteristics related to sex of the study patients (n=264)

Variables	Sex				Total		p-value
	Females		Males				
	No	(%)	No	(%)	No	(%)	
Age group:							
1-10	73	(27.6)	24	(9.1)	97	(36.7)	
11-20	42	(15.9)	22	(8.2)	64	(24.1)	P = 0.003
21-30	28	(10.6)	35	(13.3)	63	(23.9)	
31-40	15	(5.7)	15	(5.7)	30	(11.4)	
41-50	4	(1.6)	4	(1.6)	8	(3.2)	
≥51	1	(0.4)	1	(0.4)	2	(0.8)	
Family history:							
Yes	15	(5.7)	11	(4.2)	26	(9.9)	P = 0.402
No	148	(56.0)	90	(34.1)	238	(90.1)	
Pattern:							
Patchy	136	(51.5)	84	(31.8)	220	(83.3)	
Patchy + ophiasis	16	(6.0)	11	(4.2)	27	(10.2)	P = 0.67
Universalis	4	(1.5)	4	(1.5)	8	(3.0)	
Totalis	6	(2.3)	1	(0.4)	7	(2.7)	
Ophiasis	1	(0.4)	1	(0.4)	2	(0.8)	
Patches number:							
Multiple	97	(36.8)	64	(24.2)	161	(61.0)	
Single	56	(21.2)	32	(12.1)	88	(33.3)	P = 0.483
Universalis	4	(1.5)	4	(1.5)	8	(3.0)	
Totalis	6	(2.3)	1	(0.4)	7	(2.7)	
Nail change:							
Pitting	19	(7.2)	11	(4.4)	30	(11.6)	
Trachyonychia	1	(0.4)	5	(2.0)	6	(2.4)	P = 0.081
Leuconychia	3	(1.2)	0	(0.0)	3	(1.2)	
Beau's line	2	(0.8)	0	(0.0)	2	(0.8)	
No change	138	(52.1)	85	(31.9)	223	(84.0)	

Associated diseases were found in 27 (10.8%) patients. Atopic dermatitis 11 (4.4%), Hypothyroid 7(2.8%), were the most common comorbidities, followed by vitiligo in 4 (1.6%) patients, hyperthyroidism and diabetes mellitus each were found in 2 (0.8%) patients. Down syndrome was found in 1 (0.4%) patient, as shown in Table 3.

Also, Table 3 reveals the most site involvement is the scalp 237 (89.2%) followed by a few percentages of different sites: universalis 8 (3.2%), scalp + eye brows 6 (2.4%), scalp + barbae + moustache 6 (2.4%), scalp + barbae 5 (2.0%) and scalp + eye brows + moustache 2 (0.8%).

Table 3: Frequency of associated diseases and site involvement of patients with alopecia areata (n=264)

Variables	No	%
Associated diseases:		
Atopic dermatitis	11	4.4
Hypothyroid	7	2.8
Vitiligo	4	1.6
Hyperthyroidism	2	0.8
Diabetes Mellitus	2	0.8
Down syndrome	1	0.4
Non	237	89.2
Site involvement:		
Scalp	237	89.2
Universalis	8	3.2
Scalp + eyebrows	6	2.4
Scalp + barbae + moustache	6	2.4
Scalp + barbae	5	2.0
Scalp eye brows + moustache	2	0.8

Table 4 shows the mean disease duration at the time of presentation for all patients was 3.7 months (for females was 3.7 and for males was 3.9 months).

Table 4: Mean disease duration at the time of presentation

Sex	No (%)	Mean duration (months)	SD* (months)	Minimum (months)	Maximum (months)
Female	163 (61.7)	3.7	3.7	0.25	36
Male	101 (38.3)	3.9	3.1	0.25	14
Total	264 (100)	3.7	3.6	0.25	36

* SD = Standard deviation
P > 0.05

Image 1: Alopecia Ophiasis

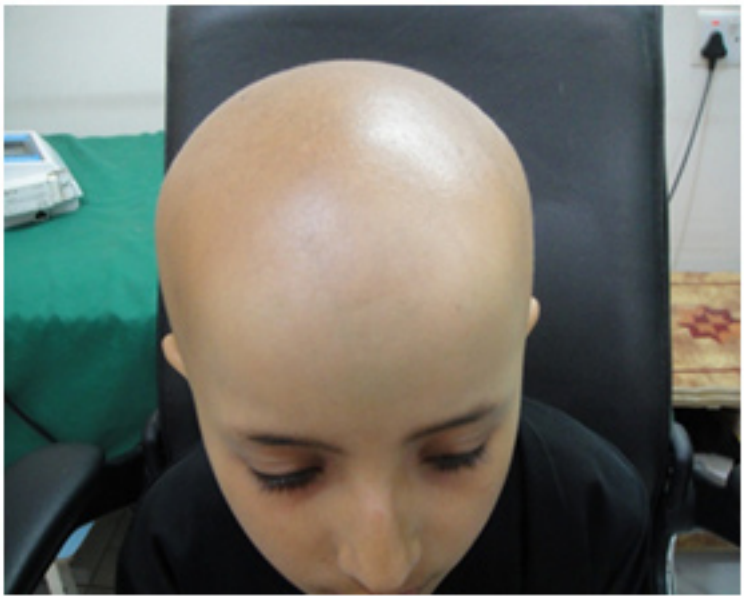

Image 2: Alopecia totalis

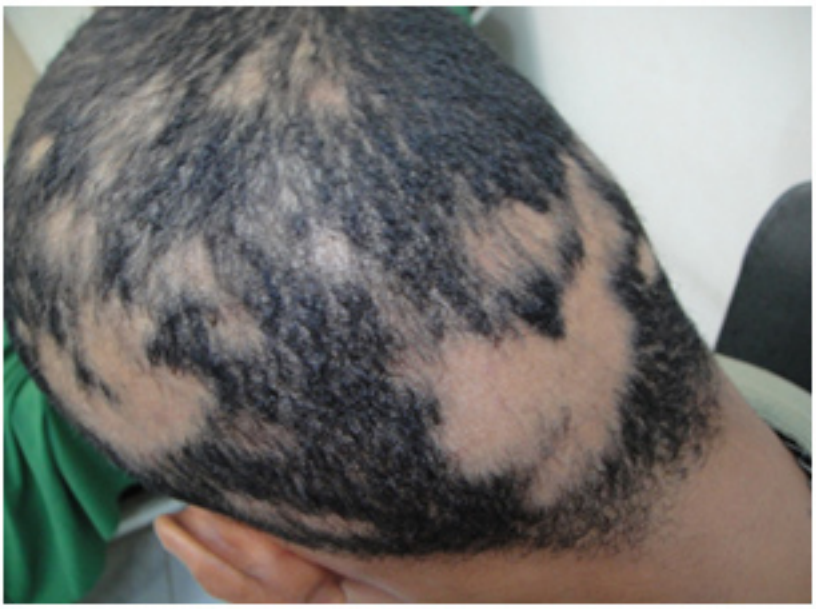

Image 3: Multiple patches alopecia areata

Image 4: Single patch alopecia areata

Discussion

AA is a condition in which hair is lost from some or all areas of the body, usually from the scalp. Commonly, AA involves hair loss in one or more round spots on the scalp. Hair may also be lost more diffusely over the whole scalp, in which case the condition is called diffuse AA [8].

Amin et al [9] reported that AA is a disease characterized by areas of non-scarring hair loss that may take the form of a single round, oval patch or even multiple patches that might become confluent. It can affect both men and women equally at any age. Children and young adults are prone more to have the disease, with 30% to 48% of the patients being affected before the age of 20 years [10].

A systematic review in the United States of America concluded that there is no difference in the incidence of AA between males and females [11].

In our study, we observed female predominance for AA, with a female to male ratio of 1.6:1. This finding is in agreement with other studies [12,13], while other studies showed male predominance [14,15,16, 17].

However, the results of the literature are disparate. Thus, for some authors, AA affects men and women with the same proportions [18,19].

In our current study we found the mean age of onset of AA was 18 years (SD = ±12.1 years) with 96% of the cases occurring in the age 40 years and less than 40 years. Our finding was in accordance with a study conducted in Saudi Arabia by Al-Khawajah [20] in which the mean age of onset was 18.9 ±11.2 years with 95% of the cases occurring before the age of 40 years.

In previous studies done in Singapore, and India, the majority of cases occurred before the age of 40 years [15, 21].

The mean age of females was 15.8 years (SD = ±11.6 years) while the mean age of males was 21.4 years (SD = ±12.1 years). The relation between means showed statistically highly significant (p = 0.000).

It is also, noted that in male patients the peak age of onset was in the ages 21-30 years with 35 (13.3%). Achar et al [22] reported similar finding from Pakistan.

In our present study (9.9%) patients, their families had a history of alopecia areata. Similar findings reported from Pakistan [23] and from Saudi Arabia [17].

Review of literature has revealed variable results [24]. Kavak et al [13] have shown a positive family history in 24.1% of their patients. In a Chinese study, incidence of family history was found in 8.4% of patients [16].

Several lines of evidence support the notion that alopecia areata has a genetic basis. In general, the prevalence of adult patients is between 0% and 8.6% [16,25], whereas in children data between 10% and 51.6% are reported [26,27].

We found in our study that most alopecia areata patterns were patchy with (83.3%) followed by patchy + ophiasis with 27 (10.2%). Similar findings to ours were reported by others [17,28].

Alshahrani et al [17] found in their study the most common type of AA in both adult and pediatric groups was the patchy type involving the scalp.
A study conducted in Saudi Arabia by Alsaiari et al [29] found the patchy alopecia areata was the most common pattern seen in (73.6%) patients followed by ophiasis in (12%) patients.

In the present study multiple patches were the most common type (60.0%) followed by single patches (33.3%).

Alopecia areata is characterized by single or multiple well demarcated patches of hair loss, typically on the scalp and occasionally in the beard, eyebrows, eyelashes, or other hair-bearing areas of the body [18,30].

In the current study, we found pitting was the most common presenting nail changes, being found in (11.6%) patients followed by trachyonychia in (2.4%) patients and more common in male patients (2.0%).

We also found, (1.2%) cases of leuconychia and (0.8%) cases of Beau's line and these two clinical pictures of nail changes were in female patients.

Ranawaka [31] reported that nail changes consisting of pitting, trachyonychia, and longitudinal ridging, were seen in (9%) and were more frequent in those with extensive disease (52%). Nail pitting was the commonest association observed.

Nail changes occur in 10.5%–38% of AA patients, with common findings including pitting, trachyonychia, and longitudinal ridging [15,21]. Nail changes correlated with disease severity, as they were found in more severe AA [15,21]. Furthermore, nail dystrophy is a poor prognostic indictor of AA [32].

In our study, the associated diseases were found in (10.4%) patients. Atopic dermatitis (4.2%), Hypothyroid (2.7%), were the most common comorbidities, followed by vitiligo in (1.6%) patients, hyperthyroidism and diabetes mellitus with each one were found in (0.8%) patients. Down syndrome was found in (0.4%) of patients.

Alopecia areata is associated with several concurrent diseases (comorbidities) including depression, anxiety, and several autoimmune diseases including thyroid disease (hyperthyroidism, hypothyroidism, goiter and thyroiditis), lupus erythematosus, vitiligo, psoriasis, rheumatoid arthritis and inflammatory bowel disease [33].

The frequency of these concurrent diseases varies between geographically separate populations, which may suggest genetic variability within these different populations [34].

Severe alopecia areata might be accompanied by nail changes [20].

Atopic diseases, such as sinusitis, asthma, rhinitis, and especially atopic dermatitis, are also more common than expected in populations with alopecia areata, and are associated with early-onset and more severe forms of hair loss [33].

In a Korean population, atopic dermatitis was significantly more common in patients with early-onset alopecia areata, whereas thyroid disease (hyperthyroidism, hypothyroidism, goiter and thyroiditis) was the most common in late-onset disease [35]; similar findings were reported by Ranawaka [31] from Sri Lanka.

In a review of 17 studies, investigators found higher odds of atopic dermatitis in patients with alopecia totalis or alopecia universalis compared to those with patchy alopecia areata [36].

In our study, we found the most site involvement is the scalp 237 (89.2%). Alsaiari et al [29] reported that the scalp was found to be the most commonly affected site (82.4%).

Previous studies reported that the scalp is the most common site of involvement, with or without involvement of other body sites (such as the eyebrows, eyelashes, and beard) [21,25].

Alopecia totalis and universalis occurred in 7.3% of AA cases and always occurred before the age of 30 years [21].

In our study, we found the mean disease duration at the time of presentation for all patients was 3.7 months (for females was 3.7 and for males was 3.9 months).

Alsaiari et al [29] reported in their study from Najran in Saudi Arabia that the duration of the disease was found to be extremely variable and the majority of the patients (67.6%) suffered from alopecia for more than 1 year.

Conclusion

AA is a form of alopecia caused by autoimmune attack of the hair follicles and sometimes the nail. We observed female predominance for AA and the mean age of onset of AA was 18 years and the most cases occurring in the age ≤ 40 years. In male patients, the peak age of onset was in the ages 21-30 years with 35 (13.3%). Family history of alopecia areata was positive among 9.9% of patients and most AA patterns were patchy with multiple patches. Nail changes, were found in (11.6%) patients and most site involvement was the scalp (89.2%). Several comorbid diseases were found among our patients including atopic dermatitis, hypothyroid, vitiligo, hyperthyroidism, diabetes mellitus and Down syndrome. This study highlights the importance of further studies in this field.

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Knowledge, Attitudes and Practice toward Testicular Cancer and Testicular Self-Examination among adolescents and young adults in Aseer region, Saudi Arabia

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Abstract

Background: Testicular cancer incidence rates are increasing worldwide making it the most common malignancy in males aged 15 to 45 years. More than 90% of patients are cured with surgery, radiotherapy, and chemotherapy alone or a combination of them. This success depends on early and accurate disease diagnosis and the application of optimum treatment.
Aim: to assess adults' awareness, attitude, and practice regarding testicular cancer (TC) and testicular self-examination (TSE) in Aseer region, Saudi Arabia.
Methodology: A descriptive cross-sectional approach was used targeting all adults in Aseer region. The study was conducted during the period from February 2020 to May 2020. Data were collected using a structured questionnaire which was developed by the researchers after intensive literature review and expert's consultation. Adults' awareness regarding testicular cancer (TC) was assessed covering its main domains including general definition, signs and symptoms, age of incidence, self-examination methods, and curability. The questionnaire was uploaded online, using social media platforms, by the researchers and their relatives and friends. All adults fulfilling the inclusion criteria who received the electronic questionnaire during the study period were invited to participate through filling out the questionnaire.
Results: The survey included 809 male participants who completed the questionnaire. Participants ages ranged from 18 to 55 years old with mean age of 26.9 12.7 years. The majority of participants (73.1%; 591) were single while 23.7% were married. Exactly 591 (73.1%) participants had heard about cancer tests and 651 (80.5%) knew it affects men. Regarding age susceptible to testicular cancer, 218 (26.9%) of the participants reported 15-40 years old. About 5.1% of the participants agreed that routine self-examination for TC is not important, 194 (24%) reported it is important.
Conclusions: In conclusion, the study revealed that male adult's awareness about TC and TSE are inadequate and the proportion who are performing it is below the average. Also, male adults' attitude towards TSE and its importance was not promising.
Key words: Testicular cancer, awareness, knowledge, testicular self-examination, practice, attitude, adults

Background

Testicular cancer (TC) is a tumour that develops in the testicles, a part of the male reproductive system (1). Testicular cancer (TC) is the most common cancer in men especially at the ages of 15 to 34 years, and the incidence is rising. About one in 500 men will develop TC before the age of 50, and nearly 25% will die of the disease. However, the cure rate is exceeding 90% if detected early (2, 3). During the middle of the last century, increased trend of the incidence of testicular cancer has been reported in many countries, including Canada, (4) the United States, (5) the Nordic countries (6) and England, (7) with the probable exception of children aged 14 years or less, where less likelihood for temporal variation has been detected (8). In spite of improved treatment methods, testicular cancer (TC) remains the third significant cause of cancer deaths among young men aged 18 to 50 years (9).

Recent studies illustrated that the cancer is easily detected at its early stage through frequent routine self-examination and can be effectively treated. Early diagnosis is associated with a reduced associated mortality, and in first stages of the disease, management is more likely to be associated with easier and less harmful treatment (10-12).

The largest portion of men have scrotal symptoms. Consequently, periodic testicular self-examination (TSE) has been advised for early detection of TC (13-15). Although there are few studies that have evaluated the usefulness of TSE, the case for men being aware of the occurrence of TC and that if they find a lump in their testes they should seek medical attention appears to be overwhelming. (1). Poor health education in some patients is thought to contribute to their undue delay before seeking medical advice (13).

Public awareness regarding TC and the importance of TSE is vital in early detection and reduced burden. The current study aimed to assess awareness, attitude and practice of public adults in Aseer region, Southern Saudi Arabia, regarding testicular cancer and TSE.

Methodology

A descriptive cross-sectional approach was used targeting all adults in Aseer region. The study was conducted during the period from February 2020 to May 2020. All those below the age of 18 years and those who were not permanently living in Aseer region (or for at least 1 year) were excluded. Data were collected using a structured questionnaire which was developed by the researchers after intensive literature review and expert's consultation. The questionnaire data included the person's socio-demographic data such as age, gender, education and monthly income. Adults' awareness regarding testicular cancer (TC) was assessed covering its main domains including general definition, signs and symptoms, age of incidence, self-examination methods and curability. The participant's attitude and practice regarding routine testicular examination was also covered in the questionnaire. A panel of 3 experts reviewed the questionnaire independently for content validity and all reported changes and modifications were applied till the final tool was achieved. A consecutive convenience sampling method was used due to the current lockdown and lack of physical contact due to the COVID-19 pandemic. A pilot study was conducted to assess tool applicability and reliability. The tool reliability coefficient (Alpha Cronbach's) was assessed and equalled 0.76. Ethical approval was obtained from REC of the college and informed consent was taken from the participants.

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 tests. 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 score less than 60% (5 points) of the maximum score was considered to have poor awareness while good awareness was considered if he had a score of 60% (6 points or more) of the maximum or more. Descriptive analysis based on frequency and percent distribution was done for all variables including demographic data, awareness items and adults' practice and attitude.

Results

The survey included 809 male participants who completed the questionnaire. Participants' ages ranged from 18 to 55 years old with mean age of 26.9 12.7 years. The majority of participants (73.1%; 591) were single while 23.7% were married. Exactly 635 (78.5%) of participants were university graduated and monthly income was just sufficient among 396 (48.9%) of them (Table 1).

Table 2 illustrates distribution of testicular cancer awareness among adolescents and young adults. Exactly 591 (73.1%) participants had heard about cancer tests and 651 (80.5%) knew it affects men. Regarding age –susceptible to testicular cancer, 218 (26.9%) of the participants reported 15-40 years old. As for signs and symptoms, 244 (30.2%) reported for testicular oedema and swelling while 67 (8.3%) reported testicular heaviness. Exactly 377 (46.6%) of the participants said that testicular cancer is treatable and only 85 (10.5%) reported a cure rate of 75% to 100% if treated early. Also, 731 (90.4%) reported that they want to know more about cancer tests and their examination method. About 43% of the participants know about routine tests examination. Totally, 277 (34.2%) participants had good awareness regarding testicular cancer and its examination methods.

Table 3 demonstrates attitude regarding cancer tests examination among adolescents and young adults in Aseer region. Exactly 41 (5.1%) participants agreed that routine self-examination for TC is not important, 194 (24%) reported it is important and 238 (29.4%) agreed that it is very important. Regarding comparison between importance of routine testicular examination in males

relative to cancer of the cervix and breast self-examination in females, 364 (45%) participants reported they are equal regarding importance while 166 (20.5%) reported it is less important. Also, 645 (79.7%) participants agreed that it's important to examine testes regularly.

Regarding participants practice of routine testicular examination in Aseer region (Figure 1), exactly 61.4% had not done it before, 17.2% did the routine examination every 1-12 months while 12.4% did at longer periods (> 12 months).

Table 4 shows distribution of adults' awareness regarding testicular cancer by their personal data and practice. Good awareness was detected among 63.2% of adults who were aged 50 years or more compared to 29.1% of young age group with reported statistical significance (P=.001). Also, 46.2% of adults who were divorced/widowed had good awareness level in comparison to 30.6% of the single group (P=.002). Exactly 44.2% of participants with secondary school level of education had good awareness compared to 33.3% of those with a lower level of education (P=.019). Nearly 50% of participants with high income had good awareness level compared to 16.7% of others with insufficient income (P=.001). Also, 39.1% of those who agreed on the importance of regular testicular examination had good awareness compared to 15.2% of those who did not (P=.001). Regarding practice, 64.4% of those who perform testicular examination monthly had good awareness regarding testicular cancer compared to 24.3% of those who did not perform the examination before (P=.001).

Table 1: Personal data adolescents and young adults in Aseer region, Saudi Arabia

Personal data	No	%
Age in years		
18-29	*578*	*71.4%*
30-39	*121*	*15.0%*
40-49	*91*	*11.2%*
50+	*19*	*2.3%*
Marital status		
Single	*591*	*73.1%*
Married	*192*	*23.7%*
Divorced/ widow	*26*	*3.2%*
Education		
Below secondary	*27*	*3.3%*
Secondary	*147*	*18.2%*
University/ more	*635*	*78.5%*
Monthly income		
Insufficient	*150*	*18.5%*
Just sufficient	*396*	*48.9%*
More than sufficient	*263*	*32.5%*

Table 2: Distribution of testicular cancer awareness among adolescents and young adults in Aseer region, Saudi Arabia

Awareness items		No	%
Know about testicular cancer	Yes	591	73.1%
	No	218	26.9%
Know that most men may have testicular cancer	Yes	651	80.5%
	No	158	19.5%
Age liable for testicular cancer	1-15	60	7.4%
	15-40	218	26.9%
	40-60	361	44.6%
	Don't know	170	21.0%
Signs and symptoms of testicular cancer	Scrotal heaviness	67	8.3%
	Testicular pain	133	16.4%
	Testicular oedema	244	30.2%
	Swelling	244	30.2%
	Lower abdomen pain	105	13.0%
	Don't know	260	32.1%
Testicular cancer is treatable	Yes	377	46.6%
	No	115	14.2%
	Don't know	317	39.2%
Cure rate in case of early treatment	0-25%	90	11.1%
	25%-50%	186	23.0%
	50%-75%	182	22.5%
	75%-100%	85	10.5%
	Don't know	266	32.9%
Want to know more about cancer tests and examination methods	Yes	731	90.4%
	No	78	9.6%
Know about routine testicular examination	Yes	351	43.4%
	No	458	56.6%
Overall awareness level	Poor (0-5)	532	65.8%
	Good (6-9)	277	34.2%

Table 3: Attitude regarding cancer tests examination among adolescents and young adults in Aseer region, Saudi Arabia

Attitude items	No	%
Importance of routine self-examination for TC		
Not important at all	*41*	*5.1%*
May be important	*163*	*20.1%*
Important	*194*	*24.0%*
Very important	*238*	*29.4%*
Don't know	*173*	*21.4%*
Routine self-examination for cancer tests relative to that for cancer cervix and breast among females		
Less important	*166*	*20.5%*
Same importance	*364*	*45.0%*
More important	*53*	*6.6%*
Don't know	*226*	*27.9%*
It's important to examine testes regularly		
Yes	*645*	*79.7%*
No	*164*	*20.3%*

Figure 1: Frequency of routine testicular examination among adolescents and young adults in Aseer region, Saudi Arabia

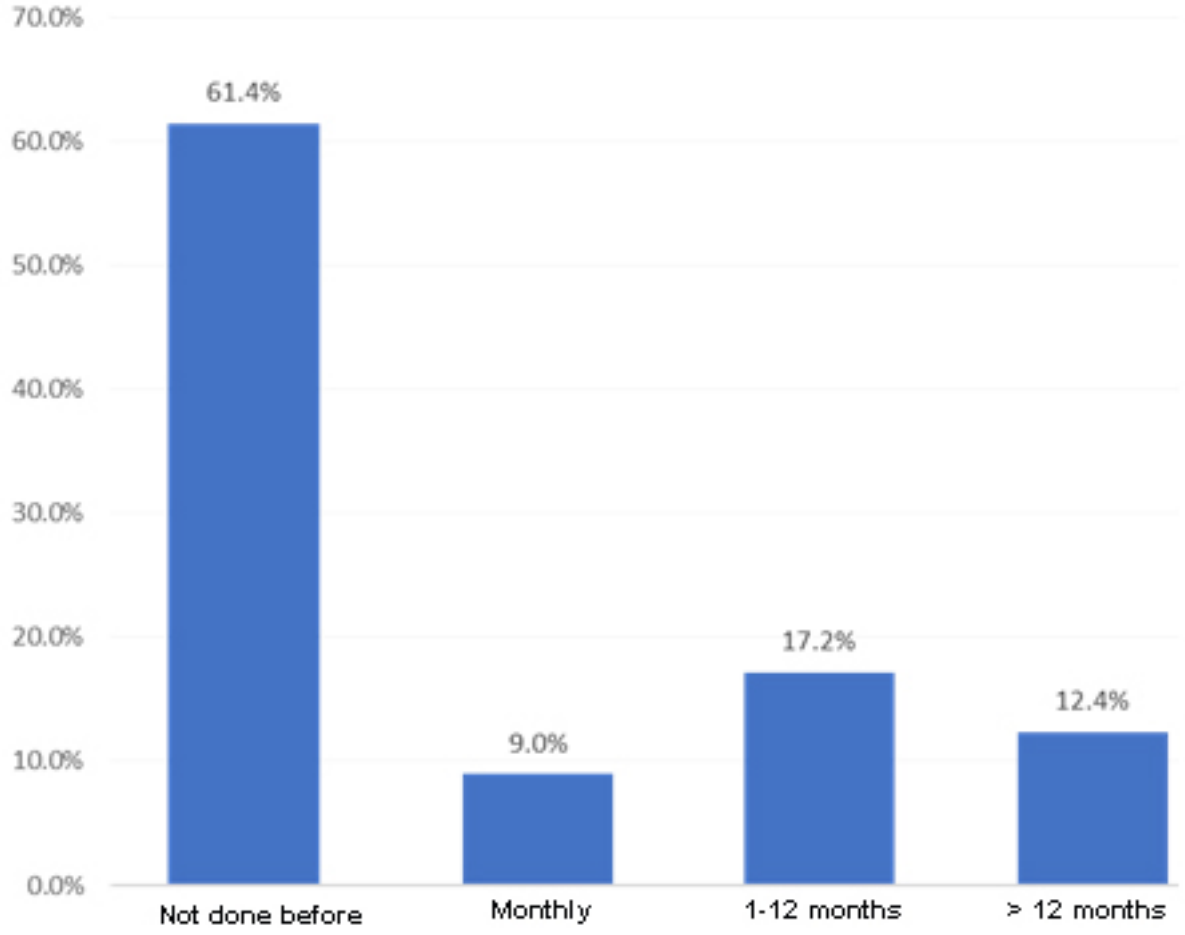

Table 4.:Distribution of adults' awareness regarding testicular cancer by their personal data and practice

Factors		Awareness level				P-value
		Poor		Good		
		No	%	No	%	
Age in years	18-29	410	70.9%	168	29.1%	.001*
	30-39	51	42.1%	70	57.9%	
	40-49	64	70.3%	27	29.7%	
	50+	7	36.8%	12	63.2%	
Marital status	Single	410	69.4%	181	30.6%	.002*
	Married	108	56.3%	84	43.8%	
	Divorced/ widow	14	53.8%	12	46.2%	
Education	Below secondary	18	66.7%	9	33.3%	.019*
	Secondary	82	55.8%	65	44.2%	
	University/ more	432	68.0%	203	32.0%	
Monthly income	Insufficient	125	83.3%	25	16.7%	.001*
	Just sufficient	273	68.9%	123	31.1%	
	More than sufficient	134	51.0%	129	49.0%	
It's important to examine testes regularly	Yes	393	60.9%	252	39.1%	.001*
	No	139	84.8%	25	15.2%	
Previously did testicular examination	Not did before	376	75.7%	121	24.3%	.001*
	Monthly	26	35.6%	47	64.4%	
	1-12 months	64	46.0%	75	54.0%	
	> 12 months	66	66.0%	34	34.0%	

P: Pearson X2 test
* P < 0.05 (significant)

Discussion

Testicular cancers are not common but highly curable and reported mostly in young and middle-aged males (1, 16). Testicular cancer was detected as one of the cancers with a high cure rate by radiation and/or chemotherapy, and treatment has been improved over the last two decades (17). Currently, over 70% of all patients are curable regardless of the extent of cancer. So, all treatment of testicular cancer is significantly intending cure (18). However, it is important to know the extent of cancer and the specific type of testicular cancer to administer the best therapy. Males with an undescended testicle are reported at higher risk of developing testicular cancer than others whose testicles have moved normally down into the scrotum. This is true even if surgery has been performed early in life to place the testicle in the appropriate place in the scrotum (19).

The current study aimed to assess male adults' awareness, attitude and practice regarding testicular cancer and TSE in Aseer region. The study revealed that nearly 3 out of each four participating adults had previously heard about testicular cancer and know its affects in males. Regarding age group who are more at risk to develop testicular cancer, only one quarter of males reported the correct age (15-40 years), but the majority thought it affects older age groups. As for symptoms associated with testicular cancer, testicular oedema and swelling were the most reported (by only one third of the participants) while scrotal heaviness was identified poorly. Also, less than half of the participants know that testicular cancer is highly curable and poorly reported the expected cure rate with early discovery. As for routine testicular self-examination, less than half of the male participants know about it and how to do it. Those all said that public adult male awareness regarding testicular cancer was poor (more than two thirds) which is an important finding due to the high curability if adults detect early any testicular tumours which will be affected by their awareness level. These findings were concordant with that reported by Khadra A et al, (20) who assessed awareness of TC and practice of TSE in a general practice population. The study revealed that 91% know about TC but only 26% knew both the age group most affected (25–34 years) and that TC can be curable if detected early. Belgam HI et al, (21) conducted a study to determine the knowledge of testicular cancer, risk factors and testicular self-examination (TSE) among university students. Less than half of them (44%) had heard of TC during their education and life but most of them had poor knowledge about signs and symptoms of TC. Only 5.9 % of them (n=38) indicated they had received information on TSE. Many other studies attribute the poor awareness regarding TC to lack of health education programs with lack of information during study

regarding TC (22-24). As for factors related to participant's awareness level, the study showed that higher awareness was significantly associated with old age, high income, and participants awareness of TSE and its importance. The surprising finding was that higher awareness was associated with secondary level of education rather than university graduation which most probably means that no information for TC was provided during study years and it is a personal duty.

Regarding Testicular self-examination, the current study revealed that nearly one third of the study participants reported that they previously did TSE (38.6%). Most of the participants did TSE nearly annually and others did it over longer time periods (more than 12 months). This was concordant with literature findings regarding frequency and attitude toward TSE. (19, 21, 23-30) This poor practice was mostly related to participant's poor attitude and lack of knowledge regarding this practice. About one quarter of the participants reported that TSE may not be important or may have some importance and 21% didn't know about it at all. On the other hand, three quarters agreed that it is important to do TSE regularly which means they may accept some knowledge regarding disease nature and curability which encouraged them to do the examination in future.

Conclusions

In conclusion, the study revealed that male adult's awareness about TC and TSE are inadequate and the proportion of those who are performing it is below the average. Male adults know about their lack of information regarding TC and TSE and are ready to learn.
Male adults' attitude towards TSE and its importance was not promising. Based on that, their information needs will be met; adding the education on testicular cancer, risk factors and TSE into study curriculum proposed with health education programs through media or at health care facilities will improve public awareness and practice preventing all irreversible consequences for a highly curable disease.

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Why are SGLT2 inhibitors a good choice in the management of Type 2 Diabetes Mellitus?

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Abstract

Sodium-glucose co-transporter 2 inhibitors (SGLT2) are the most recent addition to the oral management of type 2 diabetes mellitus. This chronic progressive disease is linked to cardiovascular and renal disease causing millions of deaths each year worldwide. As oral treatment options have expanded over the years, this has made the management of diabetes mellitus more tailored to individuals taking into account their co-existing comorbidities and therefore slightly more challenging.

Several benefits have been reported from SGLT2 including their ability to improve plasma glucose levels, lower blood pressure, weight loss and more importantly their cardiovascular and renal beneficial outcomes making them one of the popular choices for add on to monotherapy in current guidelines.

This article looks at why SGLT are likely to be considered sooner for initiation of the management of diabetes compared to other available medication.

Key words:
Sodium-glucose co-transporter 2 inhibitors (SGLT2); management Type 2 diabetes

Introduction

Type 2 diabetes mellitus (T2DM) is a global epidemic affecting millions of people worldwide. In 2017 it was reported to have affected 462 million people ranging from ages 15- 70+ years and was the cause of over 1 million deaths. This chronic condition is expected to increase in prevalence by 2030 carrying a huge economic burden and becoming a significant health concern (1).

Diabetes Mellitus is a metabolic disorder causing hyperglycemia as a result of two main factors. These are the failure of the beta cells in the pancreas's ability to secrete insulin and insulin sensitive tissues to respond to the insulin secreted (2). As a result, hyperglycemia occurs and over a prolonged period, is damaging to several different systems within the human body including the cardiovascular, renal and nervous systems. Other organs affected also include the eyes.

Risk factors for type 2 diabetes mellitus include increasing age, family history, high body mass index and sedentary lifestyle. Obesity and overweight are found to be one of the strongest risk factors for the condition (3). It has been demonstrated by epidemiological studies that managing the modifiable risk factors can therefore help prevent or delay the onset of the diabetes (2).

Although type 2 diabetes mellitus in some cases can be managed initially with modifying risk factors such as diet and weight, many people will require pharmacological management in order to establish glucose hemostasis to prevent associated microvascular and macrovascular complications due to hyperglycemia and its progressive nature (4). This may be with monotherapy initially followed by combination therapy if treatment targets are not successfully reached with one group of anti-hyperglycemic agents (AHA) (4).

Diabetes control is established on how well the glycemic measurements are and include A1c readings as well as self-monitoring of blood glucose or continuous glucose monitoring. Most patients' control is monitored using the Hba1c measurement which reflects the glycemic control over a period of months (5).

Currently there are several groups of medication used for glycemic control and these include biguanides, sulphonylureas, thiazolidinedione, Sodium- glucose co transporter 2 inhibitors and dipeptidyl peptidase 4 inhibitors (DPP4-I) (6). Unfortunately, they are associated with adverse effects which can affect patient compliance. Common side effects include gastrointestinal disturbance, weight gain and hypoglycemic events with older drugs (6).

SGLT2 are a novel group of medications compared to other classes of AHA which have a unique mode of action. They lower glucose levels by reducing glucose reabsorption at the renal tubular level without the assistance of insulin, resulting in glucosuria (7).

There are 3 different SGLT2 which are in use for the management of T2DM, with others undergoing trials. These are Campagliflozin, Empagliflozin and Dapagliflozin.

Their ability to improve glycemic control, cardiovascular benefits as well as causing weight loss and improved blood pressure targets are just some of the reasons why this group of medications is gaining popularity for an early adjunct in the management of diabetes management.

This article will look at the key benefits of SGLT2 in the management of diabetes mellitus and why they may be considered earlier in the pathway than they currently are.

Benefits

Several benefits have been demonstrated in the control of diabetes mellitus when SGLT2 have been studied individually and compared to other groups of drugs such as DPP4-I and Sulphonylureas. Benefits do appear to be dose dependent and some SGLT2 demonstrate this better than others (8).

Reduced Hba1c levels

Trials have demonstrated that SGLT2, in particular Canagliflozin, have the ability of causing modest reduction in Hba1c levels up to 1.%. These medications have been studied individually and against other drugs as combination therapy and found that over a prolonged period of time (2 years), SGLT2 are better at maintaining the reduction in Hba1c levels when compared to Sulphonylureas (8,9).
Better reduction in Hba1c are dependent on the dose of medication and initial Hba1c levels (8). In addition, they are associated with fewer hypoglycaemic events and can be used with other groups of AHA's.

Weight loss

This group of medications cause glycosuria which in turn leads to caloric loss and this has been seen with all 3 medications. The weight loss is considered to be 2.5kg at one year (mean weight loss) (10).

Blood pressure

SGLT2 drugs have been associated with a small reduction in blood pressure due to the resulting osmotic diuresis effect and were found to cause a reduction in systolic blood pressure of 3.4-5.4 mmHg and 1.5-2.2 diastolic value (11).

Cardiovascular benefits

Empagliflozin and Canagliflozin trails have both demonstrated their ability to reduce Cardiovascular events, hospitalization and heart failure. This is particularly the case for patients with pre-existing cardiovascular disease.

These medications were compared to patients taking a placebo and empagliflozin cardiovascular outcome event trial (EMPA-REG OUTCOME) has shown that a reduced rate of primary major adverse cardiac events (MACE) were seen (8).

This trial showed a risk of death by any cause was reduced by 32% and heart failure hospitalization was reduced by 35% (8).

Canagliflozin similarly demonstrated the reduction of heart failure hospitalization reduction rates in the Canagliflozin Cardiovascular Assessment Study (CANVAS) study (8).
It is thought that this cardiovascular benefit is seen amongst the group especially with the current SGLT2 that are in use.

Nephropathy
Canagliflozin and Empagliflozin have both been shown to reduce nephropathy in diabetic patients. This was demonstrated in the outcomes of the trials named above. Empagliflozin was shown to slow the progression of renal disease whereas canagliflozin was found to reduce progression of albuminuria and renal replacement therapy as well as death secondary to a renal cause (8,9). These outcomes were observed when compared to placebos.

Adverse Effects

Similarly to most medication, SGLT2 medication do not come without their adverse effects. They are known for causing an increase in genital mycotic infection, diabetic ketoacidosis, volume depletion, amputations (with canagliflozin in patients with pre-existing peripheral vascular disease and previous amputations) and skeletal fractures (8).

Conclusion

The SGLT2 being the newest addition to the diabetes mellitus oral medication treatment options are currently recommended to be used as second or third line add on agents in the management of type 2 diabetes mellitus. Their beneficial effect such as the ability to reduce Hba1c levels, low hypoglycemic risk when used individually and their ability to reduce primary major adverse cardiac events in particular with empagliflozin make them more appealing to add on to initial monotherapy when treating diabetes mellitus. This is particularly the case for patients with pre-existing cardiovascular and renal disease. More research needs to be done to look into newer SGLT2 medication to see if the benefits are seen across the class of medication and whether they may be recommended for second line agents or monotherapy in the future.

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Degeneration of a fibroid: A challenging diagnosis – Case report

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Abstract

Uterine fibroids are the most common solid tumours found in the uterus. Prevalence varies significantly and research shows that women with African ancestry have a greater risk for these. Though the majority of cases are asymptomatic and therefore require conservative or no treatment, in some cases, fibroids can be troublesome and undergo complications that have a significant impact on patients' lives. These include degeneration of fibroids, often a misdiagnosis best detected on a Magnetic Resonance Imaging scan.

Here we present a case of red/haemorrhagic degeneration occurring in a young 23 year old nulliparous women with a small fibroid.

Key words: fibroid, degeneration, diagnosis

Introduction

Uterine fibroids are hormone dependent benign tumours affecting women of African ancestry two to 3 times more than their white counterparts (1). They are oestrogen dependent and therefore have a tendency to become less significant and bothersome after the menopause (2). They can vary in their size, location and in their clinical manifestation and associated complications.

One recognised complication of fibroids is red degeneration. These are usually associated with large size fibroids and pregnancy. Very few cases , if any, are reported in non pregnant women with small size fibroids. This case report describes the case of an uncommon presentation of red degeneration of a fibroid highlighting the diagnostic challenge faced by the clinicians.

Case

A 23 year old nulliparous women presented to the emergency department with an acute onset of severe suprapubic and groin pain, pyrexia of 39.2°C and an episode of Intermenstrual bleeding on a background history of a known fibroid measuring 1cm, two years earlier, on a pelvic ultrasound scan. She had similar presentations in the last 2 years, where she had one episode of severe abdominal pain each year and was discharged with no cause. The pain subsided with analgesia after a week each time.

She reported to have a regular menstrual cycle. Past medical history was significant for moderate eczema and an egg allergy only.

This particular admission was the 4th visit to the ED department with severe abdominal pain in the previous five weeks. She underwent a CT abdomen/pelvis which showed a ?cystic fibroid on a recent admission. Urinalysis was unremarkable for infection and blood investigations showed normal inflammatory markers and acute appendicitis was excluded (raised LDH, blood ++ urinalysis). Each time she was discharged with analgesia and no formal diagnosis and a plan for an MRI pelvis to be performed.

A further flare of the abdominal pain resulted in an admission to the gynaecology ward where an MRI was performed and showed the following:

“ 2.9x3.1x3.1cm well demarcated rounded lesion within the posterior uterine wall. Appearance favouring fibroid with red/haemorrhagic degeneration“.

It was decided that medical management was the most appropriate in this case and although she continues to have ongoing suprapubic pain, her symptoms are better where she is able to continue with her daily life and is controlled with diclofenac suppositories and codydramol 2-3 times a day with a view to having a laparoscopy in the near future.

Discussion

Leiomyoma Uteri, more commonly referred to as fibroids, are the most common tumours found in the uterus (1). These smooth muscle tumours can be found at different layers of the uterine walls. In a systematic review, both the incidence (217-3745 per 100,000) and prevalence seems to vary considerably ranging from 4.5-68.6% depending on the study population sampled and the method of diagnosis used. Several studies have shown a preponderance for uterine fibroids in the black races (3). The exact cause for uterine fibroids remains unknown however risk factors include age, race, perimenopausal state, hypertension and a family history of fibroids.

Symptoms of fibroids include abnormal uterine bleeding, pelvic pressure pain, menorrhagia, dyspareunia, constipation and urinary frequency and infertility (1). A large number of cases however are asymptomatic (4).

Fibroids can degenerate or rarely undergo malignant transformation (Leiomyosarcomas) and account for 1% of all uterine malignancies (5).

The prevalence of degeneration of fibroids is reported to be 3% (6). They are more likely to be seen in pregnancy and tend to occur in the later stages and are usually seen when the fibroids are large in size.

They occur when fibroids increase in size and then outgrow their blood supply, causing a hypoxic injury and ultimately leading to necrosis and release of prostaglandins causing significant pain (6).

The preferred method of diagnosing fibroids would initially be ultrasonography (¹). followed by Magnetic Resonance Imaging for more complex fibroids and pelvic masses.

Degeneration of fibroids can be divided into the following 4 groups, hyaline (most common accounting for 60%), cystic (4%), calcific and red/haemorrhagic, commonly seen in pregnancy (6).

Management of degeneration depends on the symptoms, age, parity and desire to preserve fertility. The majority of cases are managed conservatively as pain tends to subside after 2-4 weeks (6). A smaller proportion of patients in whom the symptoms are not controlled adequately with conservative management may require surgical intervention such as myomectomy, uterine artery embolization or a hysterectomy, the only cure for fibroids (7).

What makes this case unique is that this patient was not pregnant and presented with what would otherwise be considered as a small fibroid, not large enough to degenerate. Therefore the index of suspicion of this diagnosis was low to begin with. Although other acute causes of severe abdominal pain were excluded on each attendance, she was discharged multiple times with analgesia and no diagnosis until she was finally admitted to the gynaecology ward and had an MRI scan.

Unfortunately, this resulted in immense stress, anxiety and significant reduction in her quality of life.

Conclusion

This case highlights that unusual presentation of degenerating fibroids do exist and are often misdiagnosed. Therefore, clinicians should be mindful of this diagnosis when more common causes have been excluded. Earlier suspicion of this diagnosis would have led to a reduction in emergency department admissions and a management plan being formed much sooner, reducing the impact on the patient's physical and mental health.

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Pituitary dysfunction following a traumatic brain injury (TBI) at the desk of a General Practitioner

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Abstract

Traumatic brain injuries are among the serious causes that affect the health of many people around the world. There are many causes for traumatic brain injuries such as road traffic accidents, work-related accidents, sports activities, falls, and assaults. The injuries could cause transient or permanent pituitary dysfunction which affects a lot of body activities and may decrease significantly the quality of life of such victims. Diagnosis of pituitary dysfunction associated with brain injuries constitutes a real challenge for physicians. This review aims to discuss the current knowledge about this condition and simplify current recommendations to the busy general practitioner at his/her clinic.

Key words: Pituitary dysfunction, traumatic brain injury (TBI), general practitioners

Abbreviations

GH	Growth Hormone
TSH	Thyroid Stimulating Hormone
ACTH	Adreno-Cortico-Trophic Hormone
LH	Luteinising Hormone
FSH	Follicle-Stimulating Hormone
ADH	Anti-Diuretic Hormone
SIADH	Syndrome of Inappropriate Diuretic Hormone
CDI	Central Diabetes Insipidus
TBI	Traumatic Brain Injuries
PTHP	Post Traumatic Hypo-Pituitarism
APA	Anti-pituitary antibodies
AHA	Anti-Hypothalamic antibodies

Introduction

Traumatic brain injuries are the commonest cause of morbidity and mortality among adolescents in developed countries (1). Traumatic brain injuries have consequences that vary from acute physical disability to long-term cognitive, behavioural, social, and psychological defects (2). Hypopituitarism is not common but an important consequence of traumatic brain injuries (3). This condition was long time reported. It was reported 80 years ago in literature (1) but considered as a rare consequence. Recently studies have shown that traumatic brain injuries could cause hypothalamic-pituitary axis dysfunction and delayed recovery from brain injuries (4). Patients who faced moderate to severe head trauma are at increased risk of developing post-traumatic hypopituitarism (3). Studies showed that even mild trauma could cause post-traumatic hypopituitarism (1). Precise assessment and follow-up are necessary to detect post-traumatic hypopituitarism (1). Hormonal replacement therapy is important to improve the outcome and the quality of life (1). This review will discuss the epidemiology, causes, clinical presentation, investigations, and management of post-traumatic brain injury hypopituitarism.

Epidemiology

Post Traumatic Hypopituitarism is generally considered to be a medical problem for young people. Benvenga et al (5) studied 218 cases of hypopituitarism post head trauma and they observed that the majority of the cases were seen under the ages of 40 years. Out of 218 cases, the highest number of cases were seen in the third decade of life between the ages of 20-29 years. After the third decade of life, the incidence of hypopituitarism decreases progressively. In 2007 a meta-analysis of about 700 adult patients (6) was carried out and this showed that about 35% had acquired some degree of pituitary dysfunction post major head trauma in the first five months. There are little data on the pituitary outcomes of TBI in children. A prospective French study of 87 children, mean age of 6.7 years, reported a prevalence of 7% for GHD, 2% for thyroid, and 1% for adrenal insufficiency evaluated 5 months after head trauma (6). Most patients who have PTHP (Post Traumatic Hypopituitarism) are men (Male: Female ratio is 5:1) (6). Schneider et al (6) studied about 357 cases of hypopituitarism post-TBI and they observed that the majority of the cases were male patients (frequency around 84%). Post-traumatic hypopituitarism may develop any time after the initial trauma and many patients go on to develop pituitary dysfunction many years later after the initial trauma (about 15% of patients went on to develop pituitary dysfunction about 5 years after the initial traumatic brain injury) (6). Most cases of hypopituitarism happen within the 1st year; however, cases have been reported up to 20 years after the initial trauma. In terms of the type of trauma responsible for pituitary dysfunction, in about three-quarters of the cases, they are represented by road accidents. (There is more on this in the causes section) (6). In one study (5) that included 147 cases of hypopituitarism, the investigators found that more than 70% of cases were because of road traffic accidents.

Etiology

There are many causes for TBI. These causes can be categorized into:

i) Closed head injury – such as falls, motor vehicle accident, violence, injuries due to sports, shaken baby syndrome (4). In this case, the brain is left intact, with no breaks or fractures in the skull. It is caused as a result of the sudden movement of the brain (forward, backward, shaking) within the enclosed dura and the skull. The result is damage and tearing of brain tissue and blood vessels (7).

ii) Penetrating brain injury – is the opposite of closed head injury, where here there is a break in the skull, with penetrating blows directly to the brain. Common causes include gunshots, and exploding material (7).

iii) Falls - Falls can occur in patients of all ages and all settings. As toddlers attempt to start walking, they can fall from their height. Later on, in adolescence, falls can occur because of alcohol intoxication and drugs (8). Falls can occur at the place of work or even at home whilst on a ladder, in the bathroom, or tripping on objects that are on the floor such as carpets (9). Falls however are particularly more common in the elderly due to multiple factors:

- Weaker muscles and bones because of osteoporosis resulting in balance problems and consequently greater risk of fall (4).
- Vision problems leading to inability to see clearly and therefore trip on objects easily (4).
- Polypharmacy – as we age, the number of drugs increases, leading to increased chances of blood pressure dropping leading to episodes of fainting and dizziness. Studies conducted to assess the effect of stress related to sickness and effects of medication on pituitary dysfunction found that almost 50% of TBI patient suffered pituitary dysfunction and this could be attributed to the excessive use of certain medications. Opioids, phenobarbitones, high dose heparins cause adverse effects on the endocrine gland and thus caution should be used when administering such medications (9).
- Moreover, older people are at increased risk of suffering from vascular conditions such as strokes, MI and atrial fibrillation leading to episodes of loss of consciousness and falls with risk of resulting in TBI (NHS, 2018) (9).

iv) Violence can involve anything ranging from domestic violence, child abuse, as well as a shaken baby syndrome. In this case, it involves pushing someone against a wall or down the stairs, striking someone with an object, or shaking the individual very vigorously. Strangulation is another form of TBI, resulting in hypoxic brain damage. Gunshot wounds, explosives leading to debris, and objects penetrating the skull are other forms of violence that can result in TBI (10) and (Washington State Department of Social and Health Services).

v) Motor vehicle accidents are another extremely common cause of TBI. They include cars, motorbikes, or even pedestrians. Studies have shown that the most vulnerable individuals to suffer the most severe injuries are pedestrians and motorcyclists (11, 12). Moreover, it was found that pedestrians and motorcyclists suffered significantly more frequently head and neck injuries compared to car occupants (13).

vi) Sports-related activities. The majority of injuries are relatively mild, with many of them going unrecognized and undiagnosed. They most commonly occur in contact sports such as boxing, football, rugby, and martial arts (14).
vii) Intentional self-harm though not so common, is becoming increasingly more frequent (Centre for Disease Control and Prevention 2019). It can involve choking or carbon monoxide poisoning resulting in brain tissue hypoxia and consequent traumatic brain injury (15).
viii) Autoimmunity and genetic predisposition: Recent studies have shown that pituitary dysfunction was prominent in TBI patients who tested positive for Anti-pituitary antibodies (APA) and Anti-hypothalamic antibodies (AHA) (16).
ix) Apolipoprotein E (ApoE) is an essential protein found to play a vital role in membrane repair; studies showed that TBI patients who tested positive to ApoE3 had a better outcome after pituitary injury than those who tested positive to ApoE4 (17).

Pathophysiology of post-TBI hypopituitarism

No single mechanism is responsible for causing TBI hypopituitarism. Additional insults from hypoxia, hypotension, anaemia, raised intracranial pressure, and reduced cerebral perfusion pressure (18) are involved in causing hypopituitarism.

Direct mechanical impact on the pituitary gland. The location of the pituitary gland in the Sella turcica makes it susceptible to injuries that result in basal skull fracture (19). A recent study in fatal TBI revealed a high prevalence of stalk rupture and pituitary gland haemorrhage (43.3%) and this was associated with subdural haemorrhage (20).

Clinical Presentation

Traumatic brain injury is a serious problem with a serious consequence to health. It can cause permanent or transient pituitary dysfunction. The part that secretes GH (somatostatin) is the most vulnerable part followed by gonadotropin, thyrotropin, corticotropin, and lastly the secretion of ADH. These disturbances can cause abnormalities in the somatotropic axis, hypogonadism, hypothyroidism, hypocortisolism, and diabetes insipidus. The exact mechanism of pituitary dysfunction after trauma is not yet clear but different hypotheses have been stated (21). Shearing forces during head trauma could lead to the destruction of blood vessels supplying the pituitary gland, and as a consequence gland necrosis occurs (22). Another hypothesis blamed the increased intracranial pressure as a cause of pituitary gland dysfunction (22). Many extracranial causes have been suggested to be the causes of pituitary dysfunction following trauma (23) but, all remain hypotheses till now. The vascular insufficiency hypothesis correlates well with the pattern of hormonal insufficiency. Somatotrophs and gonadotrophs are located laterally in the anterior pituitary gland and pars tuberalis which are areas exposed to ischemia due to portal blood vessel supply (21). The central part of the gland is occupied by cortico- and thyrotrophs which make them less susceptible to ischemia (24).

Traumatic brain injury is a complex disease, and increases over time. It is not a single episode in time (25). Pituitary Trauma Brain Injury (PTBI) can lead to high morbidity and mortality (26). It can lead to a decrease in quality of life, change in body composition, abnormal metabolic tests, and a decrease in bone density (27) (28). Some studies reported memory deficit, attention deficit, worse reaction-time, and emotional problems in patients with GH deficiency post-trauma (29). Increased body weight, total cholesterol, and LDL cholesterol are also reported (26).

Acute phase:
This is the period after traumatic brain injury. It is about two weeks from the trauma date. In this period, the deficit of GH and gonadotropin are the most common changes. At this phase, care should be given to the occurrence of secondary hypoadrenalism (30)(31). Hyperprolactinemia was found to be due to either stress process or pituitary stalk compression. Hypothyroidism and central diabetes insipidus, are temporary consequences in this phase and can be resolved within 3 -12 months (32). Early detection of central diabetes insipidus and SIADH is essential as the hydro – electrolytes balance is a life-threatening condition (33).

Chronic phase:
It is defined as a period starting 3 months after the traumatic brain injury. As in the acute stage, growth hormone deficiency and hypogonadism are the common hormonal abnormalities. Long-term ACTH and TSH deficiency are not common (34). Tanirverdi et al (32) reported that GH, ACTH, and LH/FSH deficiencies were found in 28%, 4%, and 4% respectively of their study participants (20 male, 5 female) after 5 years from the initial trauma. Central diabetes insipidus is found to persist in 7% of patients in some observational studies (35).

Investigations

Pituitary dysfunction is a well-known complication of traumatic brain injuries, but it is underestimated. CT sac can predict post-traumatic hypopituitarism (PTHP) (36) (6). Bondanelli et al (1) did not find a CT scan of benefit to detect PTHP. Agha et al (2) shared the same finding that CT scan was not of benefit to detect PTHP. Screening for pituitary function in all patients with TBI is carrying a great load on health systems.

At admission to hospital (34):
Screening for anterior pituitary function:
Some studies recommended screening of all patients with a clinical picture of (hypotension, hypoglycemia, hyponatremia)/or risk factors for acute hypoadrenalism (37). The authors did not recommend routine screening for serum cortisol in non-suspected cases in the acute phase of post-traumatic brain injury (34). Also, the authors recommended no testing for pituitary function early (acute phase) (34).

Screening for posterior pituitary function:
Cranial diabetes insipidus is associated with poor long-term outcomes (38). Early screening for CDI is important in the context of hypernatremia and hypotonic polyuria. If CDI is suspected, check serum creatinine, electrolytes, plasma glucose, and paired serum/plasma and urine osmolalities (34). SIADH should be considered if hyponatremia found (34).

After hospital discharge (34):
For patients who were admitted for more than 48 hours post-trauma, pituitary function screening should be done after 3-6 months. Those with abnormal results should be referred to an endocrinologist for further assessment. It is important to do a 9 am serum cortisol test to determine the need for glucocorticoid treatment. For patients who did not admit or were admitted for less than 48 hours, if they have symptoms suggesting pituitary dysfunction, they need to undergo pituitary function assessment. Screening for depression is also recommended. If they did not have symptoms, screening at 12 months, if no symptoms, no further action is required. If they have symptoms after 12 months, then refer to an endocrinologist for GH and other pituitary deficiencies' assessment (Table 1).

Management (34)

Most TBI hypopituitarism causes functional, cognitive morbidity, and mortality. GH deficiency has the most effect, with an association with dyslipidemia, hypertriglyceridemia, insulin resistance, and increased CVS risk.

There is a role of GH replacement which improves functional and cognitive impairment. Adrenal crisis after TBI treated with glucocorticoids. Testosterone replacement in hypogonadal men is associated with decreased irritability and increased libido and energy and estrogen replacement in postmenopausal women improves verbal memory and vigilance.

Patients with post-TBI pituitary dysfunction may receive suboptimal rehabilitation unless the underlying hormone deficiency is identified and treated. Also, replacement is important in patients who may require surgery and patients at risk of adrenal insufficiency postoperatively. Once the patient with TBI pituitary dysfunction is identified, TSH, ADH, and ACTH deficiencies should be replaced but GH replacement remains controversial, therefore referral to an endocrinologist is recommended.

Patients with TBI who require hospitalization for at least 24 hours, those with abnormalities on initial CT, and those with symptoms and signs of pituitary failure after TBI, should be screened at 3 months and 12 months post-injury and even further out if symptomatic.

All symptomatic patients should be screened immediately with endocrinologist consultation and hormonal replacement therapy if needed.

Clinicians involved in the treatment of TBI patients should consider hypopituitarism and its impact on health, ongoing evaluation of pituitary, endocrinologist, and psychiatrist for specialized testing and long term follow up is recommended for all TBI patients who were hospitalized with or without symptoms. Hormonal replacement is essential for optimal rehabilitation for TBI patients with a positive screen.

Conclusion

Although TBI is a common incident particularly among adolescents, PTHP remains an under-diagnosed complication. Lack of proper algorithms leads to underestimating the post traumatic hypopituitarism, which may have a great impact on patient's health and their quality of life. Early clinical suspicion is needed to start the cascades of investigation. Early treatment of hypopituitarism can improve the long-term outcome and mortality of traumatic brain injuries.

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Table 1: Screening for pituitary dysfunction post-traumatic brain injury (post-TBI)

For males	For females
Urea, creatinine and electrolytes Free T4 and Thyroid-Stimulating Hormone (TSH) Cortisol Luteinising Hormone (LH), follicle-stimulating hormone (FSH), testosterone, sex hormone-binding globulin, albumin	Urea, creatinine and electrolytes Free T4 and TSH Cortisol In premenopausal women, if menstrual cycle has become abnormal post-TBI, check LH, FSH, oestradiol

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COVID-19 Mass Vaccination

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Abstract

While the COVID-19 pandemic has adversely affected global economies and healthcare systems, mass vaccination presents a permanent way to transition out of it. However, accessibility of the vaccines and vaccine hesitancy provide significant challenges to mass vaccination programs. Nevertheless, the WHO-approved vaccines, including Pfizer, AstraZeneca, Janssen, and Moderna, have helped reduce the global infection curve, severe cases, and mortality associated with the disease. Consequently, governments and non-governmental organizations globally should raise awareness among the public about the benefits of taking COVID-19 vaccines. The vaccines should also be made widely available, particularly to the underdeveloped and developing nations, through the manufacturing of generic forms of COVID-19 vaccines that are relatively affordable.

Key words: COVID-19, vaccination, vaccine hesitancy

COVID-19 Mass Vaccination

Since the World Health Organization (WHO) declared the coronavirus disease of 2019 (COVID-19) as a global pandemic in March 2020, many people have lost their lives to the disease. According to Hasan et al. (2021), over 100 million infections and 2.5 million deaths from the disease had been reported. The pandemic has caused global economic stalls, stretched healthcare systems to the limit, and altered the way people associate. However, mass vaccination against the virus is now presenting a way to transition out the pandemic. In December 2020, a global drive to vaccinate people against the virus began with countries in Europe, Middle East, and North America leading mass vaccination rollout programs (Hasan et al., 2021). Consequently, this literature review focuses on the mass vaccination against COVID-19, its challenges, and its helpfulness to decrease the infection curve, and how it can be improved.

At the beginning of 2021, the WHO had approved various vaccines, including Pfizer, AstraZeneca, Janssen, and Moderna, for roll out in different countries Dagan et al. (2021) reported randomized clinical trials of mRNA-based COVID-19 vaccines indicate 94%-95% efficacy for preventing COVID-19. The findings reveal that mass vaccination may significantly reduce the incidences of severe cases of the disease, morbidity, and mortality, notably if the vaccination can cause “herd immunity” among the vaccinated people. While randomized clinical trials are often regarded as the “golden standard” for examining clinical interventions’ effects, they are associated with sample size and subgroup analysis limitations.

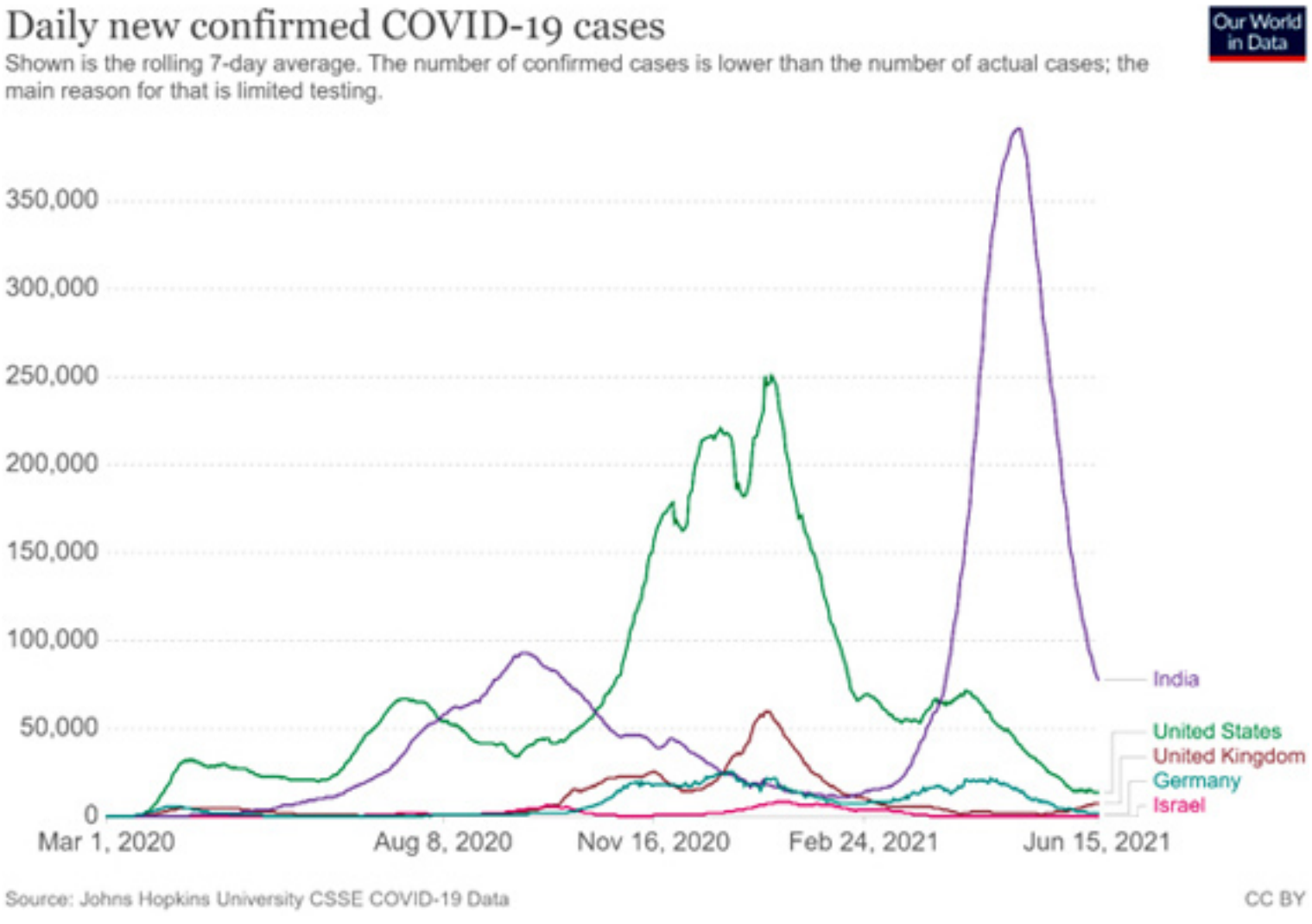
The success of mass vaccination programs depends on governments’ high level of commitment and well-resourced collaboration between healthcare providers and governments. According to Moore (2021), as of March 2021, approximately 300 million vaccine doses

had been administered worldwide, giving hope of a return to normalcy. Nonetheless, the worldwide mass vaccination drive faces various challenges that may adversely influence its success. Accessibility is the primary challenge facing mass vaccination programs globally. For instance, Al Awaidy and Khamis (2020) indicate that the accessibility of the COVID-19 vaccines is insufficient to ensure broad immunological protection because the vaccine should be enough for the public and the healthcare community. Our World in Data (2021) also reveals that only 0.8% of individuals in low-income nations have received at least one dose of the vaccine since its launch in mid-December 2020. Therefore, accessibility of vaccines, especially in underdeveloped countries, is a significant challenge affecting mass vaccination.

Vaccine hesitancy is another obstacle to mass vaccination undertakings. According to Wouters et al. (2021), hesitancy in taking the vaccination is predominant in low-income and high-income nations alike, with disbelievers and critics found in nearly all religious, socioeconomic, and ethnic groups. The speed at which the vaccines have been developed is a primary factor contributing to the challenge of COVID-19 hesitancy (Wouters et al., 2021). Some people and interest groups feel that the vaccine trials were rushed and regulatory standards were relaxed. Additionally, Forman et al. (2021) explain that COVID-19 vaccine hesitancy is prevalent amongst downgraded populations that have been worst affected by the pandemic because of the long history of structurally racist systems that have caused health injustices and inequalities. Thus, interventions are needed to overcome vaccine hesitancy and encourage vaccine uptake.

Mass vaccination programs have been successful in decreasing the curve of COVID-19 infections. Feuer (2021) note that a study conducted in Israel, which is reported to have vaccinated a significant proportion of its population with the Pfizer COVID-19 vaccine, reveals that mass vaccination has prevented severe COVID-19 cases in the country. Data from Israel provides a glimpse into the effectiveness of mass vaccination in decreasing the COVID-19 infections' curve. Figure 1 below shows a decrease in the COVID-19 new confirmed cases in India, United States, United Kingdom, Israel, and Germany since January 2021. The downward sloping of the COVID-19 new cases curve can be attributed to the rollout of the mass vaccination drive.

Figure 1:



Retrieved from: https://ourworldindata.org/covid-cases?country=IND~USA~GBR~DEU~ISR

According to the Israeli health ministry data, only 0.04% of individuals who had been fully vaccinated got infected a week after getting the vaccination against COVID-19 (Holmes, 2021). Hence, mass vaccination has helped decrease the COVID-19 infection curve.

While mass vaccination against COVID-19 has been successful in many European, North American, and Middle East nations, more can be done to improve it. For instance, governments and non-governmental organizations should play an active role in communicating and raising awareness about the benefits of COVID-19 vaccination to the public. Since lack of trust in the vaccines is one of the contributing factors for hesitancy in accepting the vaccines, governments can significantly help enhance public trust in the vaccines. Additionally, vaccines should be made more available globally to increase the rate of administration. Currently, the gap between the population that has been vaccinated in the developed countries and underdeveloped countries is wide. Availing the vaccines would be critical in filling this gap. Another strategy for improving mass vaccination involves manufacturing generic COVID-19 vaccines that developing countries can afford. Therefore, the world would only be safe from COVID-19 if a large proportion of the world population is fully vaccinated.

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Communication Challenges Between the Primary Health Care Command Center and Nodal Health Centers During Disasters in Qatar

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Abstract

The study aimed to determine how shared information databases and common spreadsheets can be used in disaster management communication in the Primary Health Care Command Centers (PHCCs) in Qatar to respond appropriately to any kind of disaster. The first objective was to assess existing communication frameworks between PHCCs and emergency command centers. Others included identifying factors that may be hampering adequate communication flow, analyzing contingency communication measures in place to help deal with many kinds of disasters, and determining the sources of information during emergency situations in Qatar. The last one was to identify the roles of various stakeholders in the communication chain in the PHCC emergency response team.

The research established that current communication frameworks between PHCCs and emergency command centers are weak. The sharing of resources and capacity information is not done well and regularly from the PHCCs to the emergency command center. Consequently, live shared spreadsheets would ensure the PHCCs distribute capacity information with the command center. The Spreadsheets would also act as a backup in case the phone communication links were broken. The tools should improve communication between the two levels, including disaster preparedness and response. They should solve the current problems of communication breaks between the PHCCs and command centers related to emergency and disaster planning.

Key words: Nodal Health Centers, disaster, Qatar

Introduction and Literature Review

Disasters have become a common occurrence in almost all parts of the world, and Qatar is not exceptional. Diverse types of disasters occur across the world, ranging from earthquakes, tsunamis, epidemics, floods, chemical hazards, and many others. This situation has resulted in diverse communication strategies to help in disaster management. The research explores the modern world's disaster management in Qatar. The choice of Qatar is influenced by the increased strategies of communication during disasters using a superior phone communication structure that has been established to ensure communication efficiencies (Medford-Davis & Kapur, 2014). Disasters have resulted in advancement of communication systems, especially the use of phones.

The Association of State and Territorial Health Officials (2018) explain that a communication overload represents a significant challenge in times of emergencies because of the multidirectional flow of information between various departments. The recent outbreaks of H1N1 and the current Covid-19 virus validate the argument. Risk communication principles dictate that communicators during emergencies must be reliable and truthful (Edmond, 2018). Nonetheless, Lundgren and McMakin (2018) observe it is often difficult for emergency agencies to balance these principles in a time when information is rapidly changing. The argument was validated during the 2009 H1N1 pandemic, where data and guidance changed quickly, hampering intervention efforts. Thus, efficient communication is vital for successful interventions during disasters.

The experience of pandemics such as H1N1 and the current Covid-19 indicate that communication is critical in stemming the spread of diseases. Therefore, state health agencies need to anticipate potential communication challenges that may hamper intervention efforts during a disaster occurrence. Specifically, state health agencies should identify the necessary tools that would enhance effective and efficient communication exchange, especially between health centers and the command center of the PHCC established to combat the pandemics. For example, Lu, Cao, and La Porta (2017) mention that cellular and short-range radios like WiFi and Bluetooth are promising communication tools during disaster recovery. Elsewhere, Liu, Fraustino, and Jin (2016) adds that social media, TV, government websites, and federal government websites are reliable sources of information during disasters. Thus, healthcare agencies and governments should ensure that there is reliable and continuous communication during pandemics. .

Because of previous disasters, many countries have demonstrated the desire to implement the necessary structures that would keep communications targeted and manageable. In the wake of pandemics such as the current coronavirus, communications between emergency centers and PHCCs should be prioritized and organized at all levels, ideally with dated entries and documents showing the designated contact, and resources to answer questions when needed.

In this regard, research indicates that spreadsheets can also be used as an alternative communication channel to phone calls. Spreadsheets have a variety of other uses in business, which include modeling datasets, data manipulation, and informing the decision-making process, including aspects of planning and implementation monitoring (Broman & Woo, 2018). Hence, it is presumed that they are a suitable technique for storage of information. Therefore, this study explores how health centers and the command center can ensure the availability of a standard spreadsheet that will be used in the declaration of available resources. The importance of the common spreadsheet is to ensure that the disaster command center is in constant and direct contact with the necessary healthcare resources to guide the disaster victims to the appropriate centers.

Primary Health Care Corporation (PHCC) and its stakeholders will be the main participants of the study. Information and data collected from them will be used to determine the effectiveness of a common spreadsheet to ensure that easy communication aside from the superior phone structure that is currently limited in Qatar, is effective. In the context of Qatar, the use of the common spreadsheet is critical, especially given the current Covid-19 situation and the upcoming world cup tournament, where thousands of fans will be expected to attend. A shared spreadsheet will provide command centers with critical information for guiding intervention efforts. The main participants in the study will be the nodal health centers, supported departments and existing command centers in Qatar. The researcher used primary data to assess the extent of the country's level of preparedness for any kind of disaster response.

Furthermore, disaster management agencies and healthcare institutions should collaborate on ensuring proper communication structure during emergencies. Researchers have further established that coordinating and streamlining messages between critical stakeholders such as health centers and the command center of the PHCC is critical to avoid being overwhelmed by too much information (Davis et al., 2004). The targeted alternative in this research is a collaboration between the disaster management department and primary healthcare facilities in Qatar through the establishment of a typical spreadsheet that can provide communication on the available resources needed during disaster for better responsiveness. The use of conventional spreadsheets as a communication tool in general contexts has been explored in previous research.

The general use of spreadsheets in a business setting includes thorough data representation and information storage. Therefore, the spreadsheets can help the government to maintain communication during disasters. The last decade has seen an increased frequency of disaster, which results in substantial economic loss, deaths of people, and increased public health emergencies. They

strike unexpectedly, causing significant damage to the environment and the population (Mathew & Hubloue, 2018). Some of the effects are irreversible to the extent that some communities lose the ability to cope with their resources. Global data shows that in the last past decade, 33 million people were displaced from their homes, and 4.2 million were injured (Alruwaili, Islam, & Usher, 2019). Over 2 million died because of both natural and human-made disasters, while 3 billion people were affected indirectly. Global data also shows that by the end of 2015, there were 65.3 million internally displaced people and 21.3 million because of a disaster (Ginige et al., 2014). Reports state that the number could be higher than that. Therefore, it can be concluded that the number of catastrophes has been burgeoning over the last decades from both natural and man-made disasters.

The emergence of various disasters results in several communication challenges. Disasters experienced by other countries have become an example of how mobile communication can become easily destroyed, making it difficult for the command center to organize on how to manage the victims (Glaser & Strauss, 1967; Gomes et al., 2016). For instance, after the Katrina emergency, the disaster command center was unable to reach the affected region due to destroyed roads and infrastructure that made communication and transportation difficult (Weinstock, 2014). To contact the casualties and local facilities, the command center used airplanes to drop messages on bottles for the victims who were trapped in the disaster area. The circumstances of poor communication infrastructure forced the command center to use this way of communication, which was less effective (Mathew & Hubloue, 2018). Many disaster occurrences have hindered communication, which has hampered rescue missions or provision of services to affected individuals.

Several studies document the existence of communication challenges caused by disasters. The 21st decade is faced by the consistent challenge of Emergency Risk Communications (ERC), which means challenges with real-time communication between healthcare experts and the disaster command center (Expat, 2019). These challenges have been influenced by the increased migration of people across borders, enhanced communication, biomedical revolutions, and widening societal growth and increasingly , climate changes (Menon et al., 2016). Experts continue to emphasize the importance of ERC in ensuring preparedness during public health emergencies by ensuring consistency in delivering information (Savoia, Lin, & Gamhewage, 2017). The inclusion of ERC in the eight-core capacities of the World Health Organization (WHO) is evidence of the increased attention paid to the issue of disaster preparedness (WHO, 2016). Consequently, ERC is a concern for ensuring that individuals prepare for disasters.

Moreover, institutions and agencies should ensure communication exists to help control disasters. In Qatar, the National Command Center (NCC) has been relegated with the role of managing and coordinating responses to local and national disasters (Rebeeh, 2018). The institution collaborates with other agencies to evaluate potential disasters and implement the necessary prevention or response measures. These agencies include the Hamad Medical Corporation, the Interior Ministry, Internal Security Forces, and Qatar's national ambulance services (Expat, 2019). However, the NCC has reported challenges in retrieving information and communication between the related agencies during disasters in the past (Ginige et al., 2014). To ensure a streamlined workflow, the NCC requires a modern communication method that will facilitate knowledge sharing and enhance its responsiveness to disasters in the country.

Real-time sharing of information is critical during disaster responsiveness. Unfortunately, mobile phone communication, which has been continuously dependent on over the years, has proven to be insufficient during disasters (Kapur et al., 2016). Many scholars argue that mobile phones have the potentials for improving quality, quantity, and timing of information passed during disaster management (Cinnamon, Jones, & Adger, 2016; Yu et al., 2018; Ali et al., 2015). However, Cinnamon et al. (2016) also confirm that it is significant to study the limitations of mobile phone use during disasters. Therefore, Ginige et al. 2014 argue that maintaining a common spreadsheet that is updated regularly between the involved parties would greatly help in ensuring that communication is not paralyzed even when mobile communication is disrupted. Collaboration with primary care institutions and the command centers will ensure that the necessary resources, such as medical practitioners, medications, and equipment, among other needs, are readily available. Therefore, communication during disasters can be enhanced not only through mobile phones but also through spreadsheets.

Another communication challenge during disasters is communication overload. The Association of State and Territorial Health Officials (2018) indicates that a communication overload represents a major challenge in times of emergencies because of the multidirectional flow of information between various departments. Besides, Smith, Stephens, Robertson, Li, and Murthy (2015) confirm that prevalent disasters can overload official agencies' ability to provide communication. This argument is valid, as witnessed during recent outbreaks of H1N1 and the current Covid-19 diseases. Risk communication principles dictate that communicators during emergencies must be reliable and truthful. Nonetheless, Lundgren and McMakin (2018) & Merwaday et al., (2018), observed it is often difficult for emergency agencies to balance these principles in a time when information is rapidly changing. For example, evidence validates the argument by suggesting that during the 2009 H1N1 pandemic, data and guidance changed quickly, hampering intervention efforts. Therefore, communication overload is a vital problem during disasters.

Researchers have further established that coordinating and streamlining messages between critical stakeholders such as PHCCs and command centers is critical to avoid

being overwhelmed by too much information, especially from volunteers and other non-official channels (Davis et al., 2004). Such coordination is especially important due to the large volume of information from different sources. For example, following the current outbreak of Covid-19, there has been conflicting information with regards to how the virus can be transmitted (Porcheddu et al., 2020). Such information gaps deny healthcare facilities and command centers the necessary information that would enhance the formulation of effective intervention measures. Similarly, during the H1N1 outbreak, some states felt that coordination and communication among the federal partners needed improvement (Association of State and Territorial Health Officials, 2018). This approach amounted to a tacit admission that the existing information-sharing systems between command centers and PHCCs were not effective.

Nevertheless, several measures can be used to address the communication issue during disasters. Measures such as proper utilization of common spreadsheets during global or national public health emergencies can improve real-time situational awareness and consistent messaging (Association of State and Territorial Health Officials, 2018). During a pandemic, transparency is essential for the coordination of the response. Moreover, it enables concerned stakeholders to know what others are working on and when they can expect information (Rambhia et al., 2009; Mauthe et al., 2016). Command centers can assist in coordinating messages as received from the ground and relaying the same to PHCCs and other relevant government agencies. Governments can implement these measures to ensure that the issues of communication during disasters are addressed.

So based on the challenges identified from the above studies and literature reviews this study has been initiated.

Research Questions

So the study was initiated to fill the gap that has been found from the above literature review and the following research questions were used to guide the researcher in data collection and analysis:

- What can the command center of the PHCC and health centers use as contingency measures to achieve a proper backup system in case phone systems collapse during a disaster to establish reliable communication capabilities?
- Between the command center and health centers, how effective is the use of common spreadsheets as a tool compared to sharing information through the phone, which currently exists in ensuring effective communication?
- For a nodal health center, how effective and doable is maintaining a regularly updated record of the healthcare resources and capacity compared to not using those records in ensuring effective operation and communication by the disaster command center?

Statement of the Problem

The modern world has been characterized by various disasters, from environmental catastrophes such as earthquakes and tsunamis to health disasters such as viral outbreaks. Regional and global pandemics such as Ebola, SARS, MERS, and recent Covid-19 have continued to threaten human lives, causing deaths and economic losses (Gilbert, 2020). The increase in the spread of global pandemics has been aggravated by the easy movement of people across borders, poor communication, and lack of appropriate preventive measures by the unaffected communities (Bajardi et al., 2009; Greenaway & Gushulak, 2017). Equally, governments have failed to contain pandemics such as H1N1 and Covid-19 because of inconclusive information from the regions where the disease was initially detected (World Health Organization, 2020). Because of the threat of these pandemics, the government should establish measures that inform people of where to seek intervention promptly.

Additionally, there is a need for policymakers to explore appropriate strategies that would allow for sharing information on time to collaborate and help the agencies and stakeholders on a better response measure. Historically, many countries have tended to struggle in the initial stages of pandemics before finally putting the situation under control. This situation is because healthcare facilities lack sufficient data for designing intervention policies, leading to deaths. Likewise, there is a near-complete breakdown of communication between essential entities such as the PHCCs and the command centers, leading to delays in the formulation of intervention measures.

Methodology

Data Collection:

The researcher used a qualitative approach for this study. This method is useful because it helped the researcher to deploy textual explanations and provide more knowledge of the preparedness by Qatar's government agencies such as PHCCs and command centers. Questionnaires were used as a method of collecting primary data. Open-ended questions included in the questionnaire were used to examine the plans that PHCC has put in place to effectively manage future disasters and pandemics. Some of the questions had 'not sure' as one of the response choices to allow for flexibility in the responses. Doing so prevented inaccuracy or blank responses.

Data was destroyed after finalizing the study.

Sample Selection:

No sampling was done as the study population included the on-call stakeholders of nodal health centers and the emergency command center of the PHCC in Qatar. These included managers, physicians in charge (who work in the nodal health center), head nurses, administrative personnel who are part of the response team during disasters and emergency response team from the command Centre, so in total, around (53 participants).

Criteria for Including Participants in the Research:

- Current employees of the PHCC.
- Working as a manager, physician in charge and or head nurse in the nodal health centers.
- Are part of the PHCC command center response team either core or supporting members.
- Can read and speak English.
- All the participants must be equipped with knowledge of the organization's preparedness for disaster management.

Criteria for Excluding Participants in the Research

- Participants who were not a member of the response team of PHCCs and those who did not read or speak English were excluded from the study.

Procedure(s) of Data Collection:

The potential participants were informed by the researcher through notices emailed through PHCC official email and the purpose of the study was explained, informed consent was attached to the email and the researcher informed the participants that participation is voluntary. The researcher sent the email during the working days and gave the participant a week to receive the response; the questionnaire was sent via a web link and the duration to be filled in online by the participants was 10-15 minutes.

Ethical Considerations:

1. Principle of Justice (Belmont Report):

- The study addresses the principle of justice by ensuring that participants are equitably selected for inclusion by sticking to the purposive sampling technique with the first-come, first-served basis.

2. Principle of Beneficence (Belmont Report):

- The research had no direct benefits to the participants besides those to the broader population.
- The participant was anonymous except to the researcher. No personal information was shared; no harm was caused.

3. Privacy/Autonomy of Study Participants:

- All data was collected anonymously through online survey monkey questionnaire.
- No personally identifiable data was collected from the participants.
- The researcher used informed consent to ensure that participants did not feel coerced into giving feedback as well as to assure confidentiality
- Data was stored in a secure database with access only for the researcher and after the termination of the study no storage of data was done

4. Confidentiality/Anonymity of Study Participants:

Only the researcher had access to the confidential information of the survey results. The participants also requested not to give any personal information besides the place of work, Additionally, the raw data collected from participants was stored in confidence by the researchers before the analysis. The data was destroyed

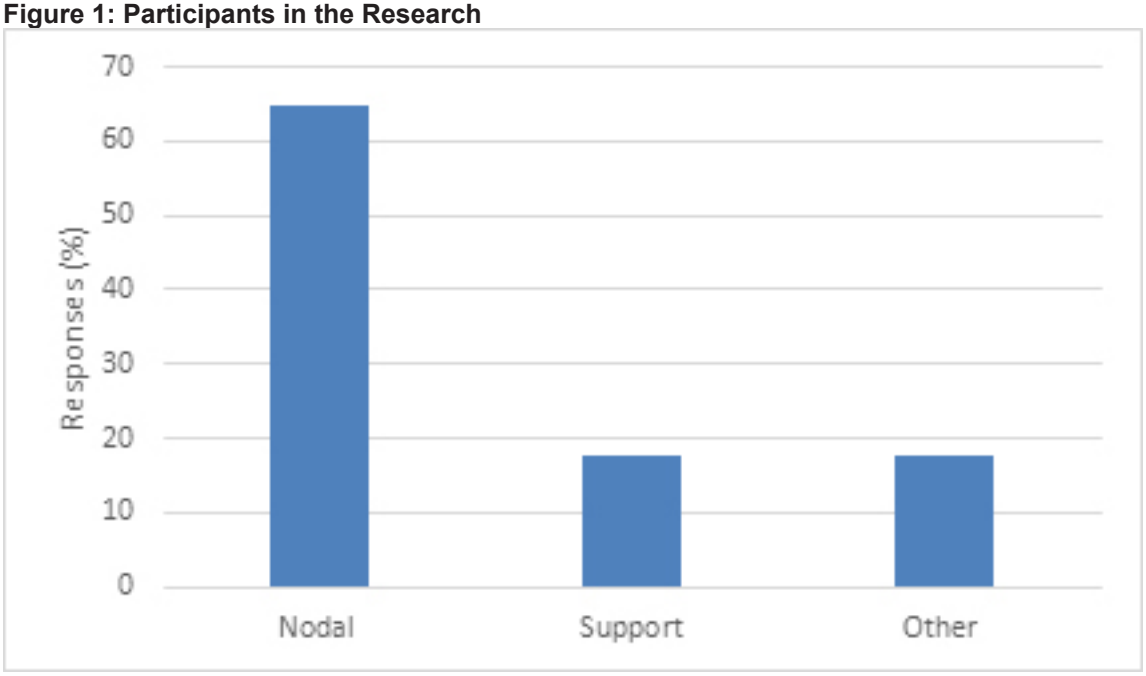
Results, Data Analysis, and Discussion

The study targeted a sample of 53 participants. However, only 17 questionnaires were returned. The response rate is indicated as 32.07%, which is low (Creswell & Creswell, 2017). The low response rate is a direct result of the participants' commitment to the COVID-19 situation. Being the frontline soldiers in fighting the pandemic, the emails were sent twice in a request for participation and were unanswered. The 17 participants who took part in the research were mainly drawn from Nodal Health Centers (64.71%), while the remaining originated from supporting functions in healthcare, as shown in Table 1.

Table 1: Participants of the Research

ANSWER CHOICES	RESPONSES	
Nodal	64.71%	11
support	17.65%	3
Other (please specify)	17.65%	3
TOTAL		17

Figure 1: Participants in the Research

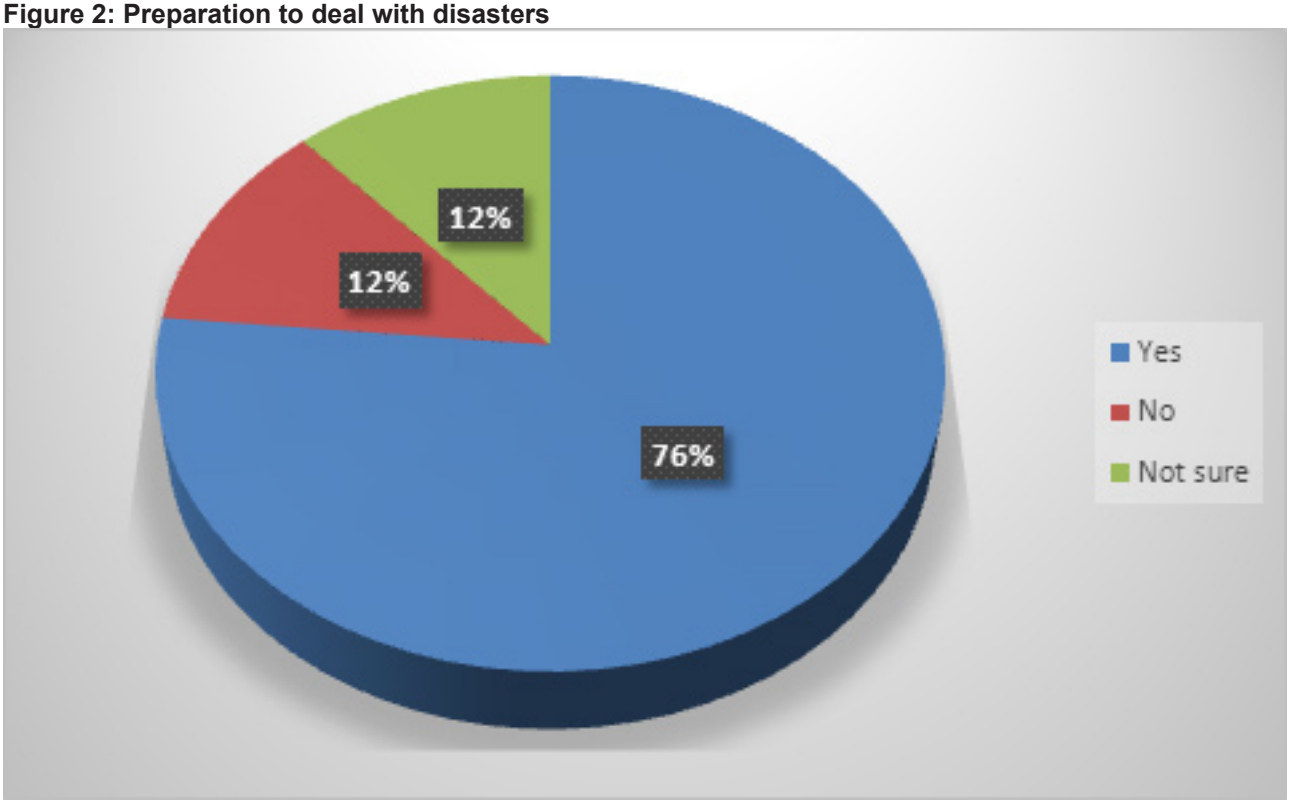


A total (13) 76.46% of the participants reported that the department was prepared to manage casualties in case of disaster. The remaining indicated that the departments were either not prepared or they were not sure if they would deal with emergencies should they occur, as shown in Table 2.

Table 2: Preparation to deal with disasters

ANSWER CHOICES	RESPONSES	
Yes	76.47%	13
No	11.76%	2
not sure	11.76%	2
TOTAL		17

Figure 2: Preparation to deal with disasters

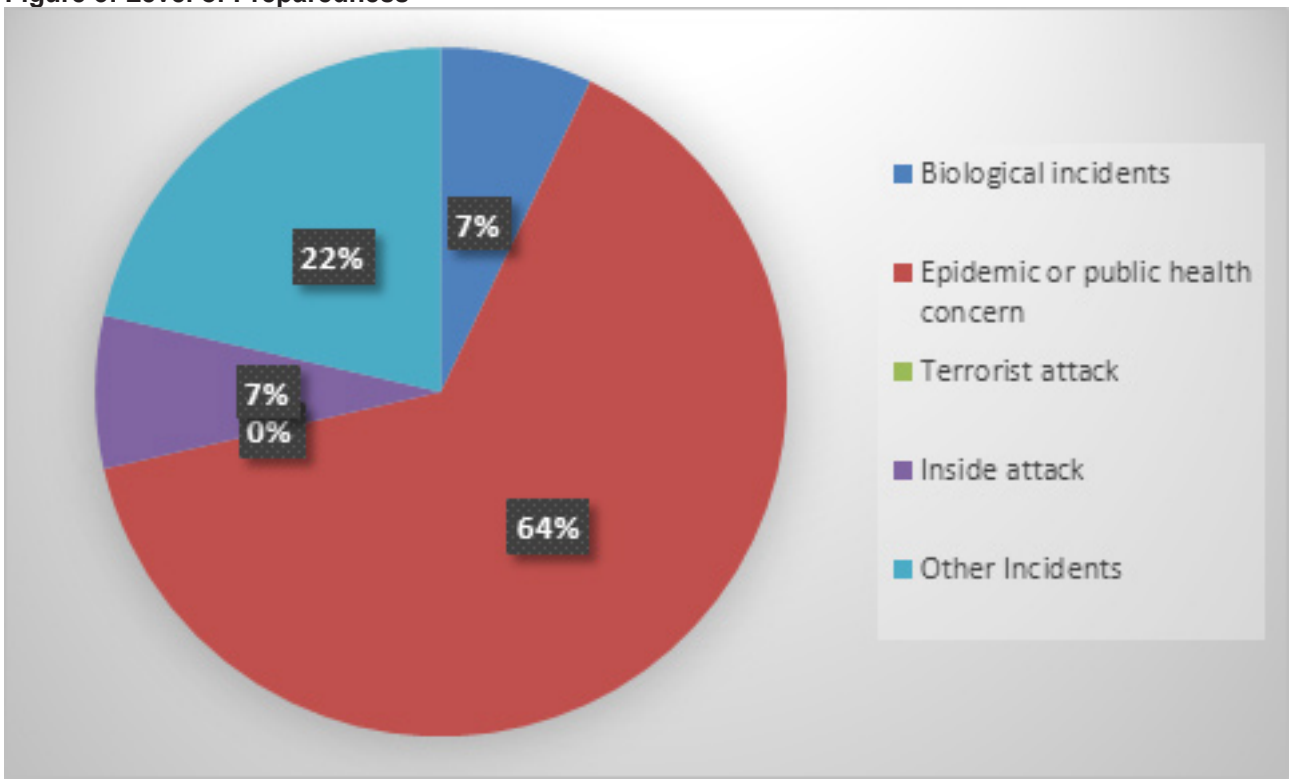


Focusing on the types of disasters that the healthcare centers were prepared to address, the research established that the majority of healthcare centers (64.29%) could handle the epidemic of public health concerns. The centers were less ready to tackle biological incidents or insider attacks. Furthermore, they were completely unprepared to deal with a terrorist attack. The levels of preparedness were as summarized in Table 3.

Table 3: Level of Preparedness

ANSWER CHOICES	RESPONSES	
Biological incidents	7.14%	1
epidemic or public health concern	64.29%	9
terrorist attack	0.00%	0
insider attack	7.14%	1
Other or if you have more than one answer	21.43%	3
TOTAL		14

Figure 3: Level of Preparedness

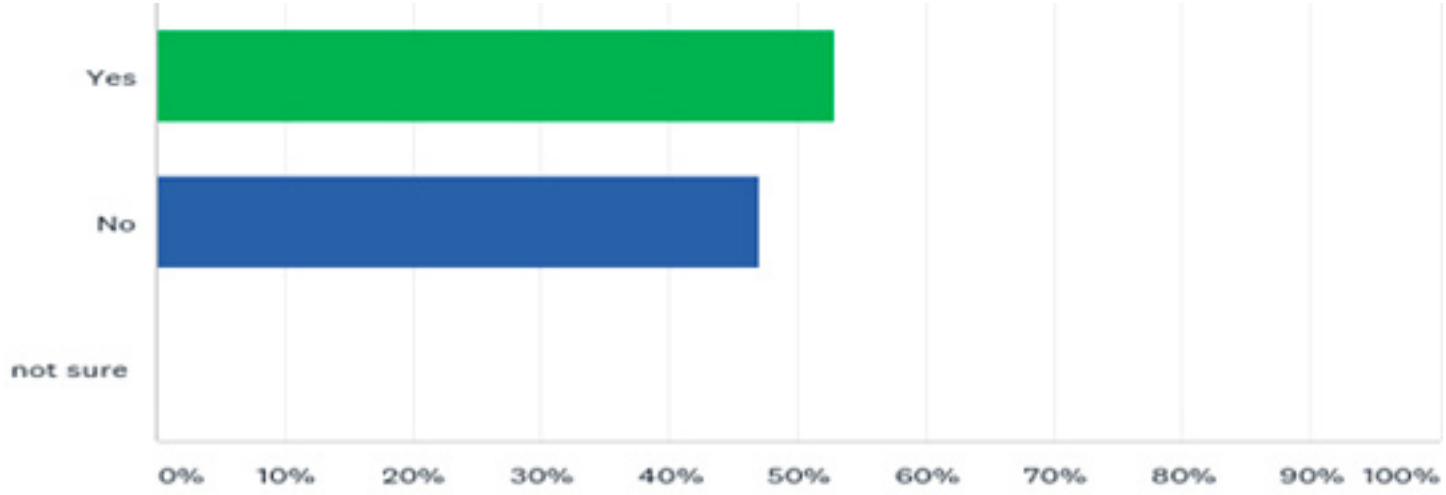


Concerning staff resources, the study established that 70.59% knew the current number of staff operating in their respective departments. Further, the evidence demonstrated that about half (52.94%) of healthcare facilities have a database with each staff's skill set as shown in Figure 4. The remaining half of the participants had no knowledge of the HC possessing such a database, as shown in Table 4.

Table 4: Staff Resources

ANSWER CHOICES	RESPONSES	
Yes	70.59%	12
No	17.65%	3
not sure	11.76%	2
TOTAL		17

Figure 4: Healthcare Facilities having database of Staff skillset

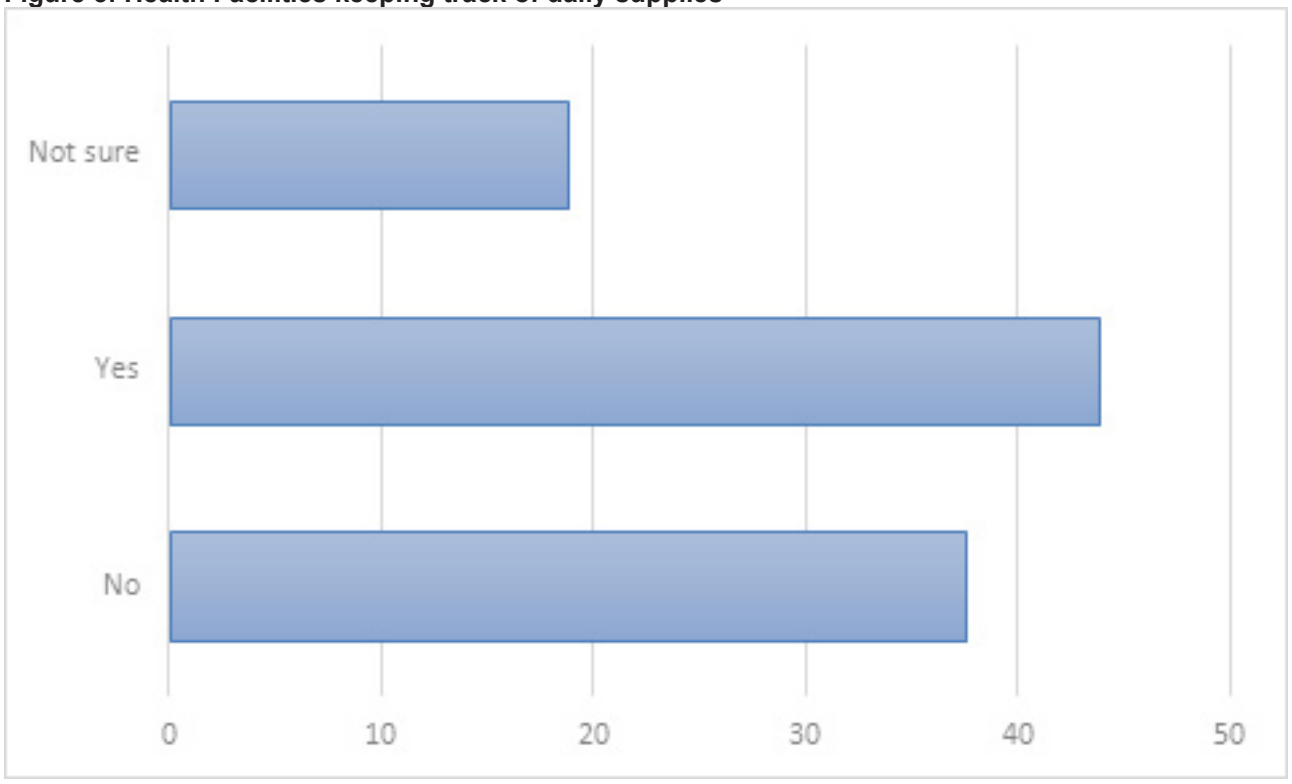


A total of 64.71% of the healthcare facilities have a current list of medical and non-medical supplies needed for a better response to a disaster. About 23.53% of the facilities reported having no such record of supplies while the remaining were not sure. The figures are an indication that, to some extent, some of the facilities were not adequately prepared to deal with a disaster (Masys, 2016). The majority of them also failed to keep track of the expiry dates of the medical supplies, which suggests that they could be carrying stocks that would be unusable in the case of an emergency as shown in Table 5.

Table 5: Keeping track of the expiry dates of the supplies

ANSWER CHOICES	RESPONSES	
No	37.50%	6
Yes	43.75%	7
not sure	18.75%	3
TOTAL		16

Figure 5: Health Facilities keeping track of daily supplies



Healthcare facilities do not share information about resources (staff and supply) with the command center as given in Figure 6. However, a total of 81.25% reported that sharing the information with the command center would help in better management of disaster in case it happened, as illustrated in Figure 7. Such findings create evidence for the creation of platforms for the distribution of information between health centers and the command center (Steelman, McCaffrey, Velez, & Briefel, 2015). The participants recorded that the healthcare facilities have a system of reviewing the supplies.

Figure 6: Health center / support department baseline on sharing information with command center

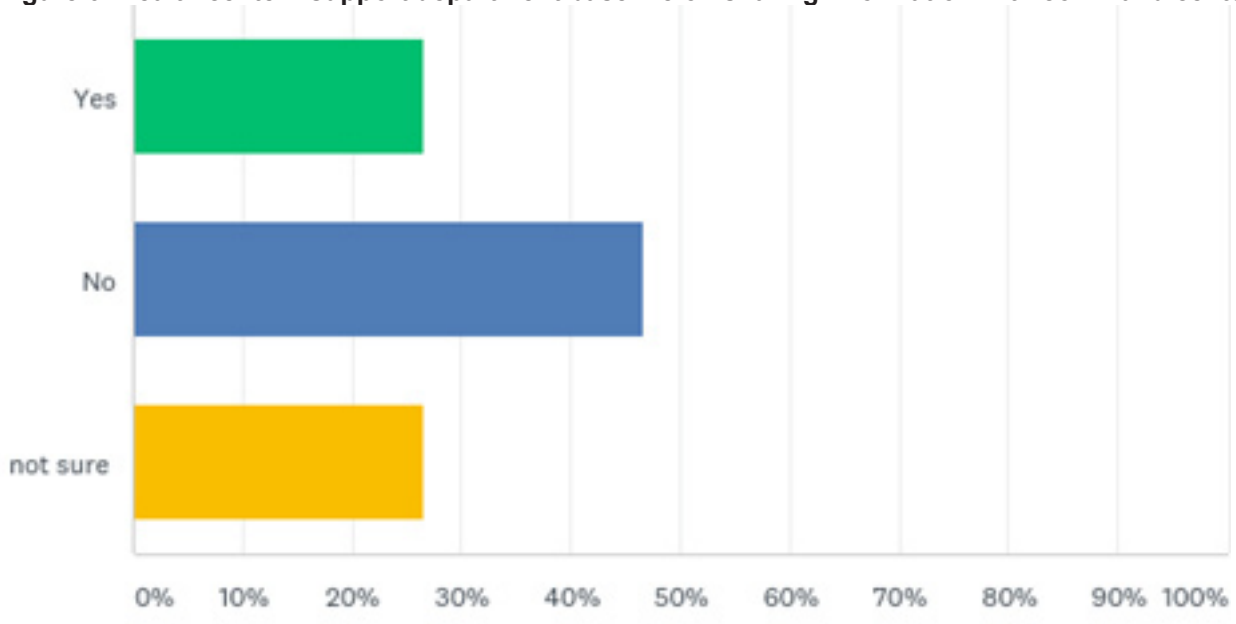
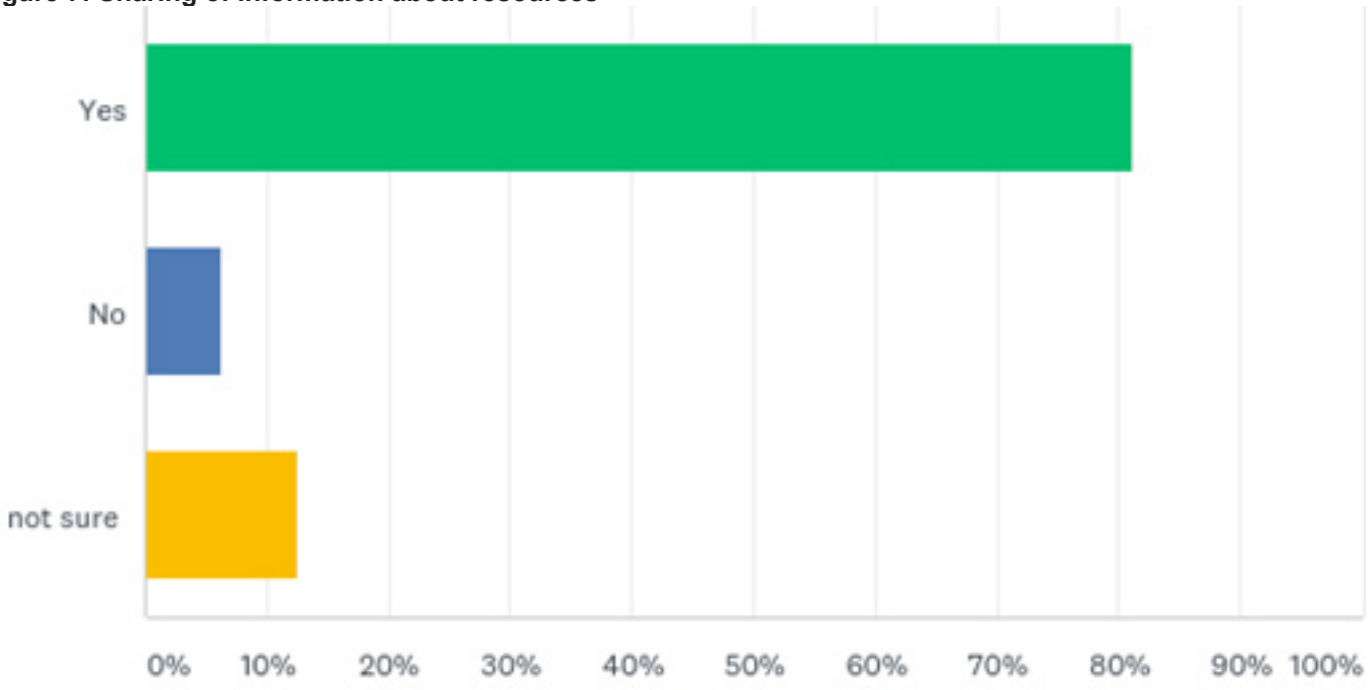
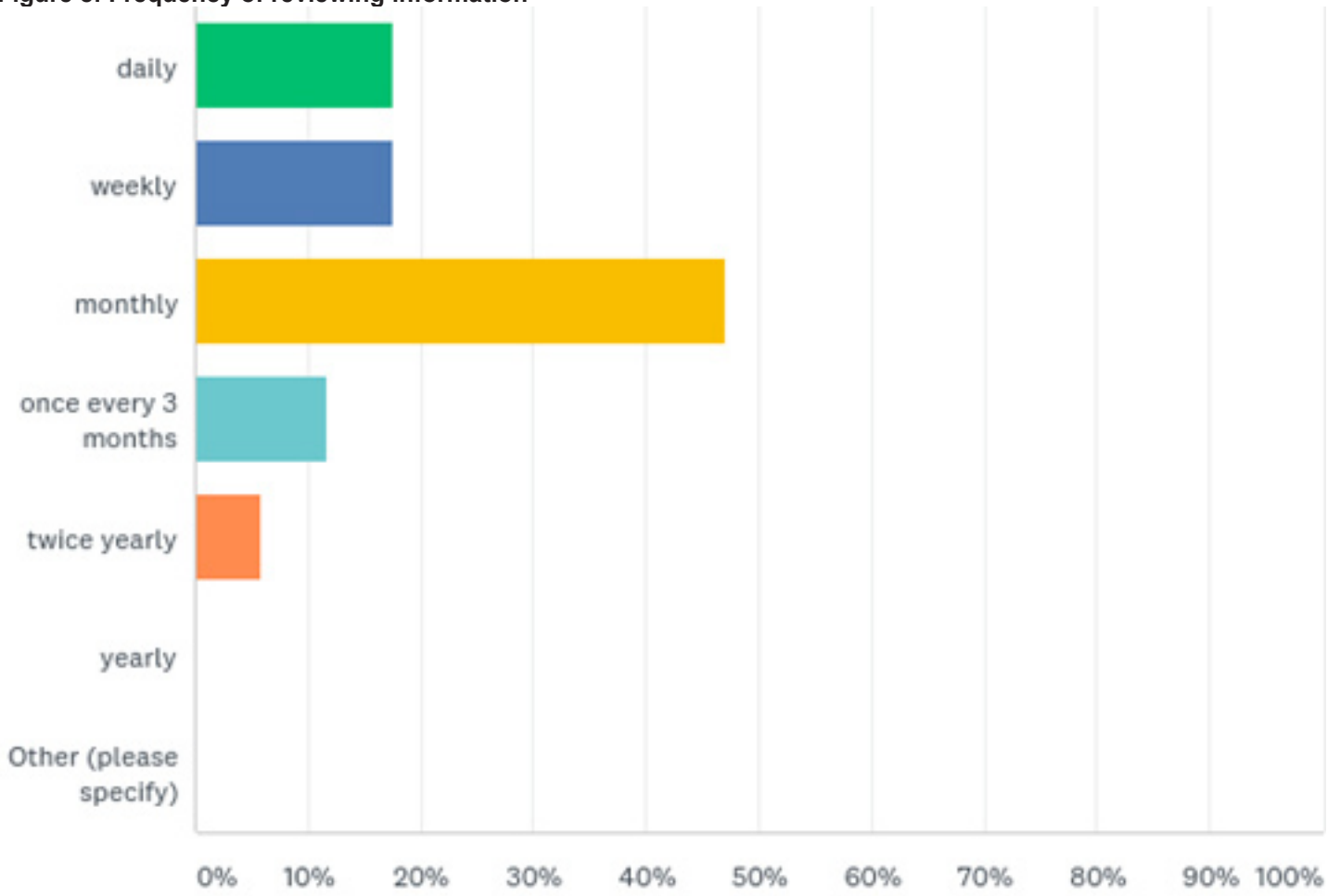


Figure 7: Sharing of information about resources



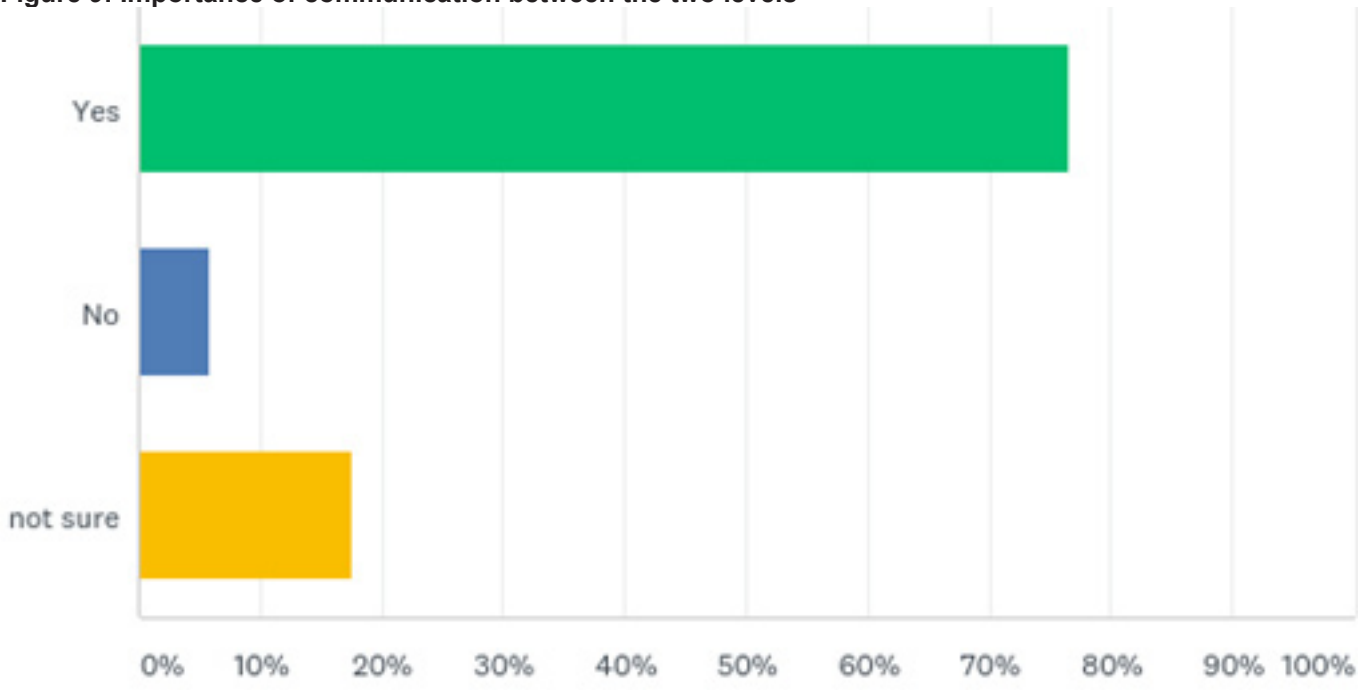
The resources are reviewed monthly in 31.25% of the healthcare centers. In 18.75% of the institutions, the resources are assessed either daily or weekly. The remaining total of 31% conducts either semiannually or annually. The varied timelines of analyzing resources for disaster preparedness are an indication that the emergency and disaster plan does not have clear guidelines on when and how the resources should be assessed and information shared with the command center. Most of the facilities consider that the details ought to be reviewed and shared monthly with the command center.

Figure 8: Frequency of reviewing information



Information should be availed to the command center through a shared spreadsheet, as revealed by 70.59% of the healthcare facilities. A further 11.76% considered that meetings would be appropriate for disseminating the information. Overall, the healthcare facilities discouraged sharing of information through phone and instead favored live spreadsheets with sessions being used to discuss the information. The information is not just evidence of the need to improve the current information-sharing mechanisms but also strengthening communication between the health centers and the command centers. Communication breaks between the two levels were considered a significant gap in the operations and implementation of emergency and disaster plans. 76.47% of the participants reported that communicating resources and capacity for every health center with the command center would be useful in guaranteeing effective operation and communication by the disaster and command center.

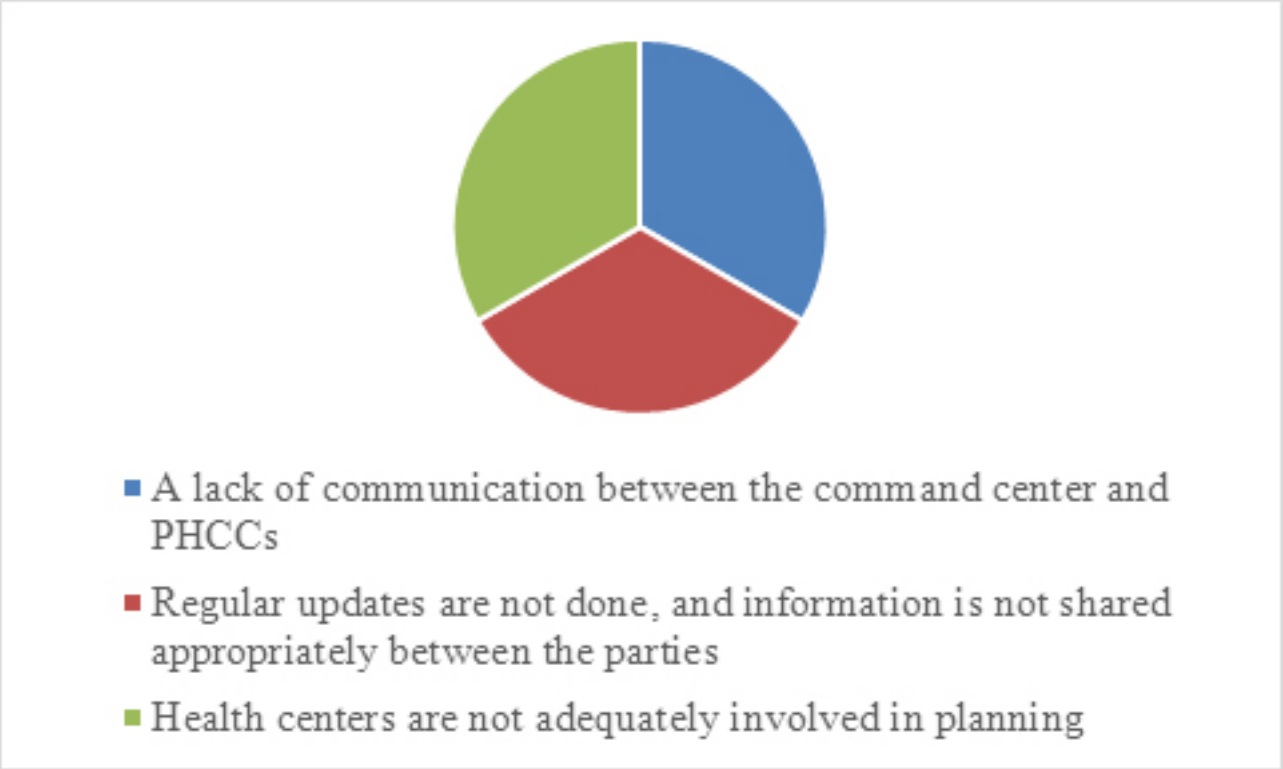
Figure 9: Importance of communication between the two levels



Findings of the study indicate that existing communication frameworks between PHCCs involve sharing information through distributed folders. On most occasions, the details are disseminated monthly. However, the sharing of information with the command center is limited. The implication is that the command center lacks comprehensive information for the running of a successful emergency and disaster plan. As a result, it may suffer setbacks in coordinating the response to emergency and disaster if they materialize.

Different factors hamper effective information flow. The majority of the participants in the study reported a lack of communication between the command center and PHCCs. Since the emergency and disaster plan is not communicated correctly, the staff members require specific training on its operations. Another problem is that regular updates are not done, and information is not shared appropriately between the parties. Some participants reported communication as characterized by confusion and chaos with no cascading of information. Additionally, health centers are not adequately involved in planning. Evidently, the combination of these challenges creates a lack of communication at the two levels, which leads to limited preparedness. Emergency situations would likely devastate the emergency and disaster response due to the evident communication breaks.

Figure 10: Factors hampering effective information flow



Conclusion

Overall, the aim of the study was to determine how shared information databases and common spreadsheets can be used in disaster management communication in the PHCCs in Qatar to respond appropriately to any kind of disaster. The specific objectives included to assess existing communication frameworks between PHCCs and emergency command centers and identifying factors that may be hampering effective communication flow. The research established that current communication frameworks between PHCCs and emergency command centers are weak. As a result, there is no sharing of resources and capacity information from the PHCCs to the emergency command centers. Similarly, the study revealed that a lack of proper communication and training about the emergency and disaster plan results in a limited understanding of the plan. By extension, the challenges contribute to limited disaster preparedness. The evidence is confirmation for improved information sharing, whereby live shared spreadsheets would ensure the PHCCs distribute capacity information with the command centers. The Spreadsheets would also act as a backup in case the phone communication links were broken.

The participants provided various recommendations on the improvement of communication between PHCCs and the emergency command center. Some of them include the need for EDP to establish an easy communication system to enable seamless adding and interpreting of the information from both HC and EDP. Information sharing methods should be standardized (Wang, Wu, Yen, Guo & Cheng, 2016). In addition, they need to be robust with built-in redundancies. Testing ought to be done frequently. The EDP needs to increase the level of communication and attend the health center frequently. The members of the command center and response team should be invited to the headquarters for them to see how the communication is done in their level. The information ought to be passed to each and every member and communicated in a simple way to ensure everyone understands the details. The improvement recommendations would play an important role in influencing the efficacy and effectiveness of communications. The report also adds the importance of shared Spreadsheets as a smooth and efficient strategy of providing standardized live information. The approach is a well-tested and proven mechanism of communication that would aid in strengthening disaster preparedness.

Research gaps

The research identified communication gaps between the PHCCs and the emergency command center. Notably, the study established that the emergency and disaster plan is not considered to be useful in disaster preparedness. Surprisingly, the plans have been the most common method of communicating disaster preparedness. Therefore, the research has identified the need to pursue additional studies on methods to improve communication in disaster planning and preparedness. Some of the techniques include communication backup plans in case phones break (Masys, 2016). The rationale is that disaster planning needs to anticipate all possible challenges that are likely to be encountered in the implementation of emergency protocols.

On the need for improvement, the study identified a gap in understanding the use of data sharing mechanisms, including the timing of data sharing. The most common trend was distribution of information on a monthly basis. However, the sharing of data and information also varied significantly across the different participants in emergency and data planning. While emergencies may be a one in a

lifetime occurrence, the study identified the need to focus on the most appropriate mechanism of sharing information. The goal is to have an evidence-based emergency and disaster plans where standards are anchored on evidence (Masys, 2016). Further research is required to determine the right protocols in data sharing

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Appendix A: Questionnaire

Name of the health center \ department _____

Region _____

1. Type of the health center:
   ( ) nodal ( ) other _____
2. In your opinion do you think your health center \ department is prepared to manage causalities in case of a disaster
   ( ) yes ( ) no ( ) not sure
3. If yes What kind of disaster if any they are prepared for?
   ( ) Biological incidents ( ) epidemic or public health concern ( ) terrorist attack ( ) insider attack ( ) others -----
4. Do you know the current number of staff that operating in your department \ health center yes ( ) ( ) no?
5. If yes can you mention their number and current location and shift (physicians, nurses, lab technicians' others (...)

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6. Do you have a database indicating each staff skillset? ( ) yes ( ) no ( ) not sure
7. Do you have a current list of medical Supplies available in your health center \ department?
   ( ) yes ( ) no ( ) I don't know
8. Do you keep a track of the Expiry date of each of the supply?
   ( ) yes ( ) no ( ) I don't know
9. Do you think having a resource (staff and supply) list shared with the command center will help in a better management of disaster in case happened?
   ( ) yes ( ) no ( ) I don't know
10. What resources the center would like to have it added in the shared list with the command center for better management of a disaster (human or medical supply)?

   ( ) yes ( ) no ( ) not sure
11. If yes do you share this list with the command center?
   ( ) yes ( ) no ( ) not sure
12. How often does the center review their resources?

_____

13. In your opinion what do you think is the Ideal method for sharing this information with the command center?

_____

14. How often can do you think the disaster command center require update to the resource information that is shared with Is there a current process in place to review the current resources in your health center \ department now?
   ( ) once a month ( ) once every 3 months ( ) twice a year ( ) only when there is an update ( ) others _____
15. What do you think is the best way to share information with the command center?
   ( ) spreadsheet ( ) meeting ( ) phone ( ) others _____
16. What do you think is the proper backup system for the disaster command center and health centers if the phone system collapsed during a disaster to communicate the capability of the response HC?

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17. In your opinion what do you think the gaps and limitations exist regarding the use of common communication pathway between the command center and health centers?

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18. Would maintaining a regular updated record of healthcare resources and capacity for every health center be useful in ensuring effective operation and communication by the disaster command centre?
   ( ) yes ( ) no ( ) I don't know
19. Any other suggestions or comments regarding sharing information and disaster response?