Depression among Elderly Subjects Attending Primary Health Care Centers in Abha City, Kingdom of Saudi Arabia

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From the Editor

In this issue authors discuss various aspects of family medicine from the public health and community aspect to the individual level. A paper from Australia looked at malaria epidemics. The authors stated that the disease is generally prevalent in tropical countries, specifically, in sub-Saharan Africa where more than 80% of fatal cases occur, Southeast Asia, India, some areas of the Middle-east, South America and Central America (AJBR 2006). As a result, people living in countries where malaria is almost non-existent would have limited knowledge about the disease, including its symptoms, how it is spread, and its treatment because most of the time, they have no practical use for it. However, there are cases where people should become aware and be knowledgeable about malaria, specifically, when there is a need to travel to countries where malaria is endemic. In response to this learning need, a brochure that aims to educate people living outside of malaria endemic regions is suitable. Below is a discussion about the structure of the proposed brochure, its content, and how information about malaria is presented to facilitate the education of people about the disease.

A cross-sectional study from Saudi Arabia estimated the prevalence of depression and identified associated risk factors among elderly attendants of primary health care centers in Abha City, KSA. The study included 400 elderly patients. Depression, regardless of its severity, was recorded among 63.7% of elderly patients. Elderly patients of the following characteristics showed more significant depression according to multivariate logistic regression analysis results; females, singles or divorced, smokers, diabetics, cancer patients, osteoarthritis patients, patients with end-stage renal disease, hepatic patients and those having visual impairments. The authors concluded that depression constitutes a health problem among Saudi geriatrics in Abha, especially among women, those having history of chronic diseases and those having sensory impairment. These results provide insight to all physicians and nurses caring for elderly, researchers in the field of Geriatrics, and health educators into the particular care needs of elderly patients in Abha, KSA.

A cross sectional study from Australia was conducted among 110 individuals diagnosed with hypertension and from an Arabic speaking country. The Hill-Bone scale includes three subscales that measure salt intake, medication adherence and appointment keeping. Given the focus on the pharmacological management of hypertensive patients, only items related to medication adherence and appointment keeping subscales were used. The aim was to show the validity and reliability of the translated Hill-Bone scale on 110 hypertensive participants from an Arabic speaking country. The results indicate that the Arabic translated version of the Hill-Bone scale has an acceptable level of reliability and validity and therefore can be used in Arabic speaking populations.

A paper from Turkey looked at whether to look at body mass index or body weight alone in patients with metabolic syndrome. Consecutive patients with coronary heart disease (CHD) were studied. The study included 1,620 females and 1,240 males. Prevalence of CHD was similar in both sexes (3.8% versus 4.4%, respectively, p>0.05). Smoking and chronic obstructive pulmonary disease (COPD) were higher in males with CHD (p<0.001 and p<0.05, respectively). Low density lipoprotein cholesterol (LDL-C) and triglyceride (TG) were higher in females (p= 0.008 and p= 0.002, respectively). Hypertension (HT) and diabetes mellitus (DM) were higher in females, too (p<0.001 and p<0.05, respectively). The authors concluded that metabolic syndrome is a systemic atherosclerotic process mainly caused by aging, excess weight, and smoking. Smoking and excess weight come with a similar degree of clinical severity. CHD, as a major consequence of the syndrome, is seen with similar prevalences in both sexes with the higher prevalence of smoking in males against the higher prevalences of BMI and its consequences including LDL-C, TG, WCH, HT, and DM in females. Although body weight is higher in males, BMI and its consequences are higher in females, thus BMI should be preferred to determine excess weight rather than weight alone.

A cross sectional study from Kuwait looked at the determinants of smoking initiation and smoking cessation among oil employees in Kuwait; and assessed their association with demographic and work-related variables. The study included a stratified random sample of 2055 employees from 10 oil companies using a modified version of the standard WHO questionnaire for surveying smoking. The multivariate logistic regression analysis was used to identify the independent determinants for smoking initiation, after adjustment for potential confounders. The prevalence of former and current smoking among oil employees were 20.6%. The mean age at initiation of smoking was 19.5 years in males, and 24.8 years in females. The authors concluded that educational programs may be organized to educate these employees about the hazards of smoking and encourage them to practice the preventable measures for quitting smoking. The articles of the tobacco-control legislation approved by the National Assembly of Kuwait should be strictly implemented

A paper from Saudi Arabia looked at Lipid levels and their association with disease activity in Rheumatoid Arthritis and Systemic Lupus Erythematosus patients.
The authors carried a retrospective cohort analysis of patients diagnosed with SLE or RA at the King Abdul Aziz University Hospital, Saudi Arabia from August 2010 to August 2011. Demographic and biochemical data was extracted from medical records. Differences in the levels of total cholesterol (TC), high density lipoprotein (HDL)-cholesterol, low density lipoprotein (LDL)-cholesterol and triglycerides (TG) between RA and SLE patients were analysed using chi square tests. Associations between lipid levels and disease activity were analysed using partial correlations. 250 patients met the inclusion criteria and were included in the study population. 155 patients had been diagnosed with SLE and 135 with RA, of whom 41 had been diagnosed with both diseases. Patients diagnosed with both SLE and RA had lower mean ANA and RF titres compared to those diagnosed with a single disease (p<0.001 and p=0.040 respectively). CRP and ESR levels were similar in the three groups. The authors concluded that higher concentrations of markers and mediators of inflammation and disease activity in patients with SLE and RA are associated with changes in lipid levels which may infer greater cardiovascular risk.

A study from Iraq looked at the frequency of scabies among patients attending the dermatology department in Erbil. The study is a hospital-based cross sectional descriptive study conducted over a six month period. The frequency of scabies was 4.48%. Out of this 56.2% were female and 43.8% were male. The highest frequency of scabies was among patients aged 21-50 years (55.8%) and the lowest was among infants (1.6%). The duration of the condition varied from one week to more than 16 weeks. Family history was positive in 82.1%. The authors concluded that scabies is a common dermatologic problem and public health measures should be undertaken to control the infestation.

Depression among Elderly Subjects Attending Primary Health Care Centers in Abha City, Kingdom of Saudi Arabia

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Abstract

Objectives: To estimate the prevalence of depression and identify associated risk factors among elderly attendants of primary health care centers in Abha City, KSA.

Methodology: A cross-sectional approach was carried out among a representative random sample of registered patients, who are 65 years of age or more, at the randomly selected three PHCCs in Abha, KSA. The tool used for data collection consisted of two parts; the first part was about personal information of the participants, while the second part was a validated geriatric depression scale-short form.

Results: The study included 400 elderly patients (200 males and 200 females). Their age ranged between 65 and 80 years with a mean of 71.9 years and a standard deviation of 4.2 years. Depression, regardless of its severity, was recorded among 63.7% of elderly patients. Mild and moderate depression was reported by 47.5% and 14.5% of elderly patients respectively while severe depression was reported by only 1.8% of them. Elderly patients of the following characteristics showed more significant depression according to multivariate logistic regression analysis results; females, singles or divorced, smokers, diabetics, cancer patients, osteoarthritis patients, patients with end-stage renal disease, hepatic patients and those having visual impairment.

Conclusions: Depression constitutes a health problem among Saudi geriatrics in Abha, especially among women, those having history of chronic diseases and those having sensory impairment. These results provide insight for all physicians and nurses caring for the elderly, researchers in the field of Geriatrics, and health educators into the particular care needs of elderly patients in Abha, KSA.

Key words: Depression, elderly, osteoarthritis, hepatic, visual impairment

Background

More than 6 decades ago, the World Health Organization (WHO) defined health as "a complete state of physical, mental and social well-being, and not merely the absence of disease or infirmity."(1) Bircher, 2005 defined health as "a dynamic state of well-being characterized by a physical and mental potential, which satisfies the demands of life commensurate with age, culture, and personal responsibility".(2) Health has been defined by various authors, who have always emphasized its mental component.
In recent years, there has been a sharp increase in the number of older persons worldwide.(3) More old people are alive nowadays than at any time in history.(4) By the year 2025, it is expected that the world will host 1.2 billion people aged and rising to 1.9 billion in 2050.(5) In recent years, there has been an increasing international awareness of health issues relating to aging populations.(6)

Older people are often perceived as lonely, hopeless, and sad.(7) Although many elderly are facing mounting physical ailments, psychological stress, social losses, and increased dependency at the very end of life, most older people are well adjusted emotionally for the bulk of their later years.(8) Mood disorders in the elderly are common, adversely affect other medical conditions, and may lead to cognitive and functional decline.(9) Geriatric depression thus remains a fruitful area for clinical, translational and basic science research. (10)

Birrer et al. stated that depression is not a normal part of aging. The lack of connection between health care and mental health providers has created a fragmented system of care for depressed elderly patients, that is often inadequate. Elderly persons sometimes dismiss less severe depression as an acceptable response to life stress or a normal part of aging.(11)

Depressive symptoms and DSM-IV depressive disorders in elderly patients are associated with significantly higher health care costs, even after adjustment for chronic medical illness.(12) It is considered as a serious health concern leading to unnecessary suffering, impaired functional status and increased mortality. Late-life depression remains under diagnosed and inadequately treated.(13)

In Abha City, Kingdom of Saudi Arabia, Abolfotouh et al conducted a psychosocial assessment for elderly subjects (aged 65 or more). They reported a prevalence rate for depression as high as 17.5%, which was significantly more common among women than men (27.7% versus 12.7%, respectively, p<0.001). So, they concluded that depression is a problem among the geriatric population in the region, especially among women. They also emphasized the importance of screening of the elderly population for depression. (14)

Subjects and Methods

Study Design: This study followed a cross sectional design.

Study Setting: Abha City is the capital of Aseer Region. It lies in the southwestern part of the Kingdom of Saudi Arabia, about 3000 m above sea level. It has 6 primary health care centers (PHCCs), which provide both preventive and curative services to a total of 94,250 persons.(15) Since the elderly population (i.e., those aged above 65 years) constitute 4.3% of the population in Aseer Region, Kingdom of Saudi Arabia(16), so their expected number within each PHCC has been calculated (Table 1).

Population and Sampling: All registered patients at the above-mentioned PHCCs, who are 65 years of age or more(14) constitute the study population. Following a simple random sampling, three PHCCs were selected, i.e., Al-Numees, Al-Manhal and Shamasan PHCCs.

Sample Size Determination: The minimum sample size for this study has been decided according to Dell et al. (17). To fulfill the required sample size, the researcher followed a consecutive sample to interview 400 attendants (200 males and 200 females), who are 65 years of age or above, (130 elderly subjects from Al-Manhal, 130 elderly subjects from Shamasan and 140 elderly subjects from Al-Numees).

Study Tools (Appendix 1): The researcher designed a study questionnaire to collect personal data of elderly participants. This questionnaire includes the following: name, age, sex, nationality, last occupation, education, marital status, number of sons and daughters, smoking status and any current chronic diseases. The Geriatric Depression Scale: Short Form (GDS: SF) is a 15-question screening tool for depression in older adults that takes 5-7 minutes to complete and can be filled out by the patient or

Primary Health Care Center	Registered Persons	Expected No. of registered elderly
Al-Manhal	19406	834
Al-Qabel	13219	568
Shamasan	18574	799
Al-Numees	24238	1042
Al-Azeezeya	8500	366
Thera	10313	443

Table 1: PHCC Expected Registered Persons and Elderly

administered by a provider with minimal training in its use. It was developed in 1986 to screen for depression in older adults. (19) The GDS (SF) consists of 15 questions requiring "yes" or "no" answers. All questions relate to mood, rather than the physical symptoms frequently reported by older adults. One point is scored for each bolded answer. A score of 5 or more suggests depression (20), according to the following score range 0-4=no depression; 5-8=mild depression; 9-11=moderate depression; 12-15=severe depression. The GDS: SF has been translated into many languages, including Arabic. The GDS: SF may be used in any setting, acute care, primary care, home care, assisted living, or long-term care.(20) The discriminant validity of the GDS-15 is high (87% accuracy, 88% sensitivity, 85% specificity).(21) The Arabic version of GDS-15 has good psychometric properties, but the best properties were reported for the 7/8 cutoff. Cronbach's alpha, which is a measure of internal consistency reliability, was high (0.88) and kappa ranged from 0.57 to 0.75.(21)

Data Collection Technique: The researcher conducted the interviews at the General Practice Clinic in each of the three study PHCCs. The researcher spent one day at each PHCC performing the interviews and data collection.

Administrative and Ethical Considerations: All the necessary official permissions were obtained before data collection, from the Research Committee at the Joint Program of Family Medicine in Aseer. All elderly patients with depression were referred to a psychiatrist in order to receive the necessary management.

Statistical Analysis: Statistical Package for Social Sciences (SPSS) software version 18.0 was used for data entry and analysis. Descriptive statistics (e.g. number, percentage) and analytic statistics using Chi Square tests (X^2) to test for the association and/or the difference between two categorical variables were applied. P-value equal or less

Characteristics	No.	%
Age in years		
65-70	93	23.2
71-75	253	63.3
≥75	54	13.5
Range (years)	65-80	
Mean±SD (years)	71.9±4.2	
Gender		
Male	200	50.0
Female	200	50.0
Nationality		
Saudi	352	88.0
Non-Saudi	48	12.0
Social status		
Single	22	5.5
Married	326	81.5
Divorced	39	9.8
Widowed	13	3.2
Number of sons/daughters		
Zero	31	7.8
≤5	99	24.8
6-10	218	54.4
>10	52	13.0
Educational level		
Illiterate	62	15.5
Able to Read and	155	38.8
write	92	23.0
Primary school	36	9.0
Intermediate school	44	11.0
Secondary school	11	2.7
University		

Table 2: Socio-Demographic characteristics of elderly patients (n=400)

than 0.05 was considered statistically significant. Depression based on the Arabic version of the Geriatric Depression Scale-short form was treated as the dependent variable in multivariate logistic regression analysis. Age, gender, education, social status, number of sons/daughters, nationality, smoking, hypertension, DM, cancer, angina pectoris, hepatitis, end-stage renal disease, chronic renal disease, osteoarthritis, hemiplegia/paraplegia, visual impairment and hearing loss were treated as independent categorical variables. Multiple associations were evaluated in a multiple logistic regression model based on the backward stepwise selection, where significant variables from the univariate analysis were included. This procedure allowed the estimation of the strength of the association between each independent variable while taking into account the potential confounding effects of the other independent variables. The covariates were removed from the model if the likelihood ratio statistic based on the maximum likelihood estimates had a probability of > 0.10. Each category of the predictor variables was contrasted with the initial category (reference category). The adjusted measure of association between risk factors and depression was expressed as the Odds Ratio (OR) with 95% Confidence Interval (95% CI). Adjusted or crude ORs with

95% CI that did not include 1.0 were considered significant.

Budget: All costs of this study were fully carried out by the researcher.

Results

The study included 400 elderly patients who attended the selected PHCC in Abha throughout the study period. Their ages ranged between 65 and 80 years with a mean of 71.9 years and a standard deviation of 4.2 years. Exactly half of them were females. The majority of them were Saudi (88.0%) and married (82.8%). In more than half of them (55.3%), the number of sons and daughters ranged between 6 and 10. More than one-third of them (38.8%) were just able to read and write, while only 2.7% were university graduated. (Table 2)

Table 3 shows that slightly more than half of the participants had either hypertension or osteoarthritis (50.2%) while slightly less than half of them had Diabetes mellitus (46.2%). Slightly more than one-third of the participants have bronchial asthma (37.2%). End-stage renal disease (ESRD) and chronic renal disease (CRD) were reported among 18.7% and 24.5% of them respectively. Cancer, angina pectoris and hepatitis were reported among 16.5%, 10.2% and 19% respectively while hemiplegia/paraplegia, visual impairment and hearing loss were reported among 26.5%, 39.2% and 14% of them respectively.

In Figure 1, (next page) it is obvious that the prevalence of smoking among elderly patients was 17.3%. Sixty-three point seven percent reported depression, regardless of its severity. Mild and moderate depression was reported by 47.5% and 14.5% of elderly patients respectively while severe depression was reported by only 1.8% of them (Figure 2).

Table 4 shows that slightly more than half of patients aged between 65 and 70 years (51.6%) compared to approximately one-third of patients aged between 71 and 75 and over 75 years (31% and 31.5%, respectively) had no depression while 7.4% compared to 2.7% and 1.1% of elderly patients in the age groups >75, 71-75 and 65-70 years respectively had severe depression.

Forty-two percent of male elderly patients compared to 30.5% of female elderly patients had no depression while 3% of female elderly patients compared to only 0.5% of male elderly patients had severe depression.

Characteristics	No.	%
Hypertension		
No	199	49.8
Yes	201	50.2
Diabetes mellitus		
No	215	53.8
Yes	185	46.2
Bronchial asthma		
No	251	62.8
Yes	149	37.2
End-stage renal disease (ESRD)		
No	325	81.3
Yes	75	18.7
Cancer		
No	334	83.5
Yes	66	16.5
Osteoarthritis		
No	199	49.8
Yes	201	50.2
Angina pectoris		
No	359	89.8
Yes	41	10.2
Liver diseases		
No	324	81.0
Yes	76	19.0
Hemiplegia/paraplegia		
No	358	89.5
Yes	42	10.5
Chronic renal disease (CRD)	302	75.5
No	98	24.5
Yes		
Visual impairment		
No	243	60.8
Yes	157	39.2
Hearing Impairment		
No	344	86.0
Yes	56	14.0

Table 3: Medical characteristics of elderly patients (n=400)

This difference was statistically significant (P=0.001) (Table 4).

More than one-third of illiterate patients (37.1%) compared to 45.5% of those university graduated had no depression while 8.1% of illiterate elderly patients compared to none of those university graduated had severe depression. This

difference was statistically significant (P=0. 021). Also, more than one-third of married elderly patients (40.5%) compared to none of those either singles or widowed patients had no depression while 9.1% of single elderly patients and 7.7% of widowed patients compared to 0.6 of married elderly patients had severe depression.
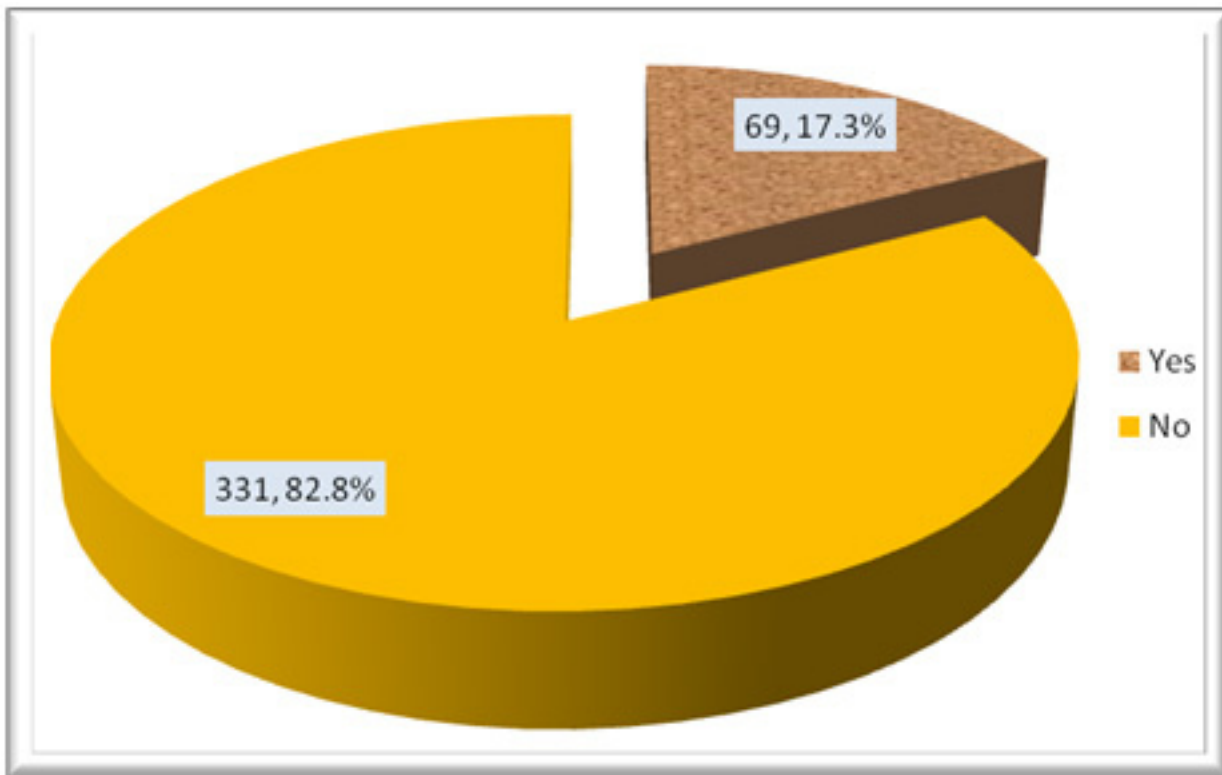
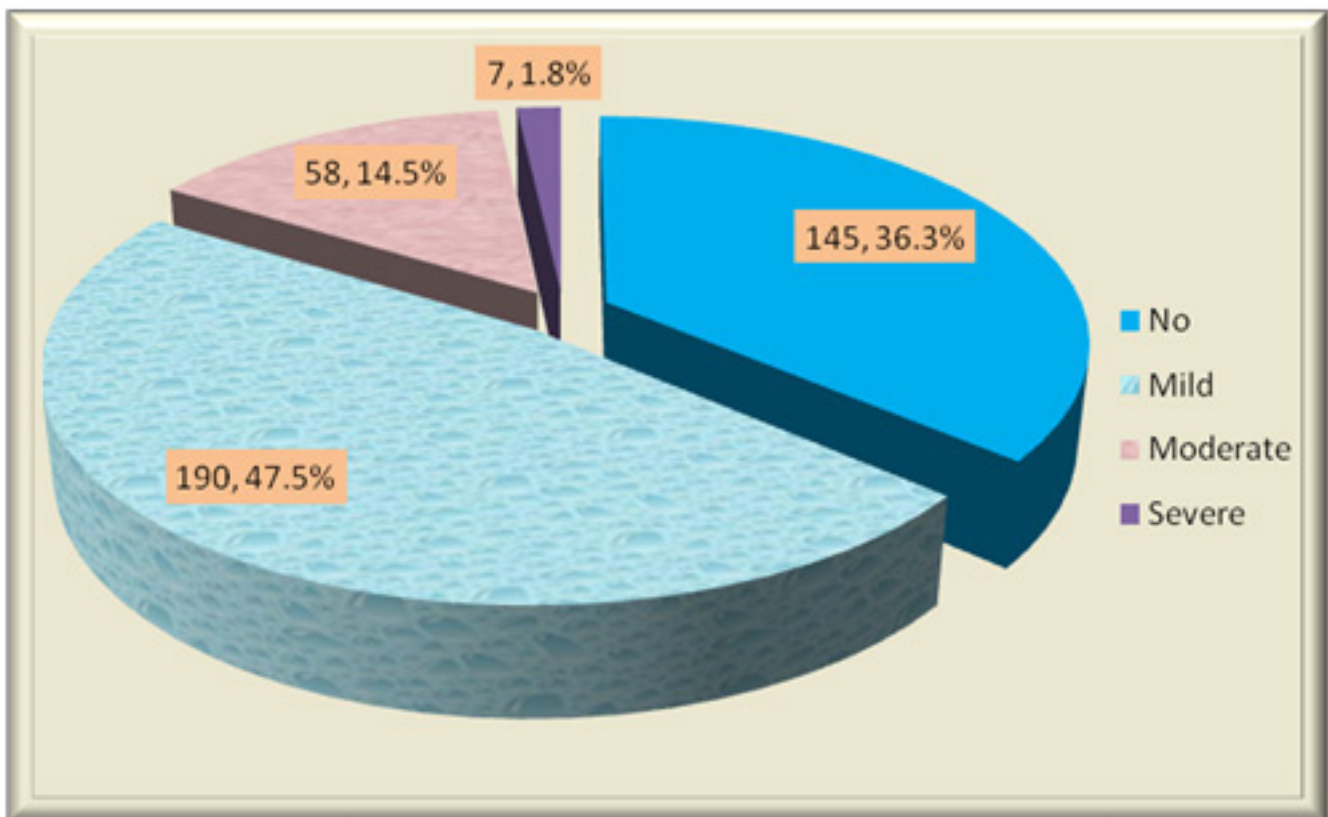**Figure 1: Prevalence of smoking among elderly patients, Abha, 2012**

Figure 2: Prevalence of depression among elderly patients, Abha, 2012.

Characteristics	No Depression (n=145)	Yes Depression (n=255)			
		Mild (n=190) No. (%)	Moderate (n=58) No. (%)	Severe (n=7) No. (%)	
Age in years					
65-70 (93)	48 (51.6)	34 (36.6)	10 (10.7)	1 (1.1)	X^2=17.84, p=0.017
71-75 (253)	80 (31.0)	128 (49.6)	43 (16.7)	2 (2.7)	
>75 (54)	17 (31.5)	28 (51.9)	5 (9.2)	4 (7.4)	
Gender					
Male (200)	84 (42.0)	97 (48.5)	18 (9.0)	1 (0.5)	X^2=15.65, p=0.001
Female (200)	61 (30.5)	93 (46.5)	40 (20.0)	6 (3.0)	
Educational level					
Illiterate (62)	23 (37.1)	29 (46.7)	5 (8.1)	5 (8.1)	X^2=43.78, p=0.021
Read & write (155)	59 (38.1)	62 (40.0)	32 (20.6)	2 (1.3)	
Primary school (92)	38 (41.3)	44 (47.8)	10 (10.9)	0 (0.0)	
Intermediate school (36)	15 (41.7)	15 (41.7)	6 (16.7)	0 (0.0)	
Secondary school (44)	5 (11.4)	39 (88.6)	0 (0.0)	0 (0.0)	
University (11)	5 (45.5)	1 (9.0)	5 (45.5)	0 (0.0)	
Social status					
Single (22)	0 (0.0)	0 (0.0)	20 (90.9)	2 (9.1)	X^2=43.78, p=0.001
Married (326)	132 (40.5)	154 (47.2)	38 (11.7)	2 (0.6)	
Divorced (39)	13 (33.3)	24 (61.5)	0 (0.0)	2 (5.2)	
Widowed (13)	0 (0.0)	12 (92.3)	0 (0.0)	1 (7.7)	
Number of sons/daughters					
No (31)	0 (0.0)	15 (48.4)	15 (48.4)	1 (3.2)	X^2=33.18, p=0.011
≤5 (99)	38 (38.4)	44 (44.4)	15 (15.2)	2 (2.0)	
6-10 (218)	92 (42.2)	103 (47.3)	19 (8.7)	4 (1.8)	
>10 (52)	15 (28.8)	28 (53.9)	9 (17.3)	0 (0.0)	
Nationality					
Saudi (350)	135 (38.6)	171 (48.9)	39 (11.1)	5 (1.4)	X^2=28.66, p<0.001
Non-Saudi (50)	10 (20.0)	19 (38.0)	19 (38.0)	2 (4.0)	
Smoking history					
Smoker (69)	9 (13.0)	26 (37.7)	30 (43.5)	4 (5.8)	X^2=45.25, p<0.001
Non-smoker (331)	136 (41.1)	164 (49.5)	28 (8.5)	3 (0.9)	
Hypertension					
No (199)	86 (43.2)	87 (43.7)	24 (12.1)	2 (1.0)	X^2=9.38, p=0.025
Yes (201)	59 (29.4)	103 (51.2)	34 (16.9)	5 (2.5)	
Diabetes mellitus					
No (215)	82 (38.1)	99 (46.0)	34 (15.8)	0 (0.0)	X^2=9.35, p=0.025
Yes (185)	63 (34.1)	91 (49.2)	24 (13.0)	7 (100.0)	

Table 4: Depression among elderly patients by different characteristics (Part A)

Forty-two point two percent of elderly patients who have between 6 and 10 sons/daughters compared to none of those who have no sons/daughters had no depression while 3.2% of elderly patients who have no sons/daughters compared to none of those having more than 10 sons/daughters had severe depression.

Accounting for 38.6% of Saudi elderly patients when compared to 20.0% of non-Saudi elderly patients had no depression while 4.0% of non-Saudi elderly patients compared to only 1.4%\% of Saudi elderly patients had severe depression. Thirteen percent of smoker elderly patients compared to 41.1% of

non-smoker elderly patients had no depression while 5.8% of smoker elderly patients compared to only 0.9% of non-smoker elderly patients had severe depression. About 43.2% of non-hypertensive elderly patients compared to 29.4% of hypertensive elderly patients had no depression while 2.5% of hypertensive elderly

Characteristics	No Depression (n=145)	Yes Depression (n=255)			
		Mild (n=190) No. (%)	Moderate (n=58) No. (%)	Severe (n=7) No. (%)	
Bronchial asthma					X^2=4.66, p=0.198
No (251)	96 (38.2)	119 (47.5)	34 (13.5)	2 (0.8)	
Yes (149)	49 (32.9)	71 (47.7)	24 (16.1)	5 (3.3)	
ESRD					X^2=55.58, p<0.001
No (325)	131 (40.3)	159 (48.9)	35 (10.8)	0 (0.0)	
Yes (75)	14 (18.7)	31 (41.3)	23 (30.7)	7 (9.3)	
Cancer					X^2=26.96, p<0.001
No (334)	121 (36.2)	159 (47.6)	53 (15.9)	1 (0.3)	
Yes (66)	24 (36.4)	31 (47.0)	5 (7.5)	6 (9.1)	
Osteoarthritis					X^2=16.91, p=0.001
No (199)	85 (42.7)	94 (47.2)	20 (10.1)	0 (0.0)	
Yes (201)	60 (29.8)	96 (47.8)	38 (18.9)	7 (3.5)	
Angina pectoris					X^2=29.34, p<0.001
No (359)	130 (36.2)	174 (48.5)	53 (14.7)	2 (0.6)	
Yes (41)	15 (36.6)	16 (39.0)	5 (12.2)	5 (12.2)	
Liver diseases					X^2=23.47, p<0.001
No (324)	121 (37.3)	159 (49.1)	43 (13.3)	1 (0.3)	
Yes (76)	24 (31.6)	31 (40.8)	15 (19.7)	6 (7.9)	
Hemiplegia or paraplegia					X^2=16.88, p<0.001
No (358)	135 (37.7)	169 (47.2)	53 (14.8)	1 (0.3)	
Yes (42)	10 (23.8)	21 (50.0)	5 (11.9)	6 (14.3)	
CRD					X^2=12.99, p=0.004
No (302)	117 (38.7)	136 (45.0)	47 (15.6)	2 (0.7)	
Yes (98)	28 (28.6)	54 (55.1)	11 (11.2)	5 (5.1)	
Visual impairment					X^2=16.68, p=0.001
No (243)	87 (35.8)	112 (46.1)	44 (18.1)	0 (0.0)	
Yes (157)	58 (36.9)	78 (49.7)	14 (8.9)	7 (4.5)	
Hearing impairment					X^2=63.44, p<0.001
No (344)	140 (40.7)	161 (46.8)	43 (12.5)	0 (0.0)	
Yes (56)	5 (8.9)	29 (51.8)	15 (26.8)	7 (12.5)	

Table 4: Depression among elderly patients by different characteristics (Part B)

patients compared to only 1.0% of non-hypertensive elderly patients had severe depression. Accounting for 38.1% of non-diabetic elderly patients when compared to 34.1% of diabetic elderly patients had no depression while all cases of severe depression were reported among diabetic elderly patients (Table 4)

Table 4 shows 38.2% of non-asthmatic elderly compared to 32.9% of asthmatic elderly patients had no depression while 3.3% of asthmatic elderly patients compared to 0.8% of those without history of bronchial asthma had severe depression. This difference was not statistically significant (p=0.198).

While 40.3% of elderly patients without ESRD compared to 18.7% of elderly patients with ESRD had no depression, 9.3% of elderly patients with ESRD compared to none of those without history of ESRD had severe depression. While 36.2% of elderly patients without history of cancer compared to 36.4% of elderly patients with history of cancer had no depression 9.1% of cancer elderly patients compared to 0.3% of those without history of cancer had severe depression. While 42.7% of elderly patients without history of osteoarthritis compared to 29.8% of elderly patients with history of osteoarthritis had no depression 3.5% of osteoarthritis elderly

patients compared to none of those without history of osteoarthritis had severe depression. About 36.2% of elderly patients without history of angina compared to 36.6% of elderly patients with history of angina had no depression while 12.2% of elderly patients with history of angina compared to 0.6% of those without history of angina had severe depression. While 37.3% of elderly patients without history of liver diseases compared to 31.6% of elderly patients with history of liver diseases had no depression 7.9% of elderly patients with history of liver diseases compared to 0.3% of those without history of liver diseases had severe depression. (Table 4).

Variables	B	Standard error	Adjusted OR	95% Confidence interval
Gender				
Male†			1.0	
Female	1.435	0.910	1.95	1.31-4.69*
Social status				
Married†			1.0	
Single	1.359	0.736	1.96	1.16-6.15*
Divorced	1.106	1.637	2.93	1.06-3.61*
Widowed	1.596	1.267	2.06	0.85-6.23
Smoking				
Non-smoker			1.0	
Smoker	1.122	0.272	1.73	1.11-9.02*
DM				
No			1.0	
Yes	3.712	1.295	3.02	2.04-7.25*
Cancer				
No			1.0	
Yes	2.223	1.926	4.09	2.32-8.39*
ESRD				
No				
Yes	1.109	1.596	2.89	1.62-7.22*
Osteoarthritis				
No				
Yes	1.115	1.632	1.56	1.02-3.26*
Liver diseases				
No				
Yes	1.022	0.993	2.01	1.33-5.92*
Visual impairment				
No				
Yes	1.126	0.569	1.68	1.03-8.33*

Table 5: Risk factors for depression among elderly patients in Abha: Results of multivariate Logistic Regression Analyses

† Reference category   * $P < 0.05$

In Table 4, 37.7% of elderly patients without history of hemiplegia or paraplegia compared to 23.8% of elderly patients with history of hemiplegia or paraplegia had no depression while 14.3% of elderly patients with history of hemiplegia or paraplegia compared to 0.3% of those without history of hemiplegia or paraplegia had severe depression. 38.7% of elderly patients without history of CRD compared to 28.6% of elderly patients with history of CRD had no depression while 5.1% of elderly patients with history of CRD compared to 0.7% of those without history of CRD had severe depression. 35.8% of elderly patients without visual impairment compared to 36.9% of elderly patients with history of visual impairment had no depression while 4.5% of elderly patients with history of visual impairment compared to none

of those without history of visual impairment had severe depression. 40.7% of elderly patients without history of hearing impairment compared to only 8.9% of elderly patients with history of hearing impairment had no depression while 12.5% of elderly patients with history of hearing impairment compared to none of those without history of hearing impairment had severe depression. All of the variables in Table 4 were statistically significant except non-asthmatic elderly patients.

In the multivariate analysis, female elderly patients had almost double-folded risk to develop depression as opposed to male elderly patients (adjusted OR= 1.95, 95%CI= 1.31-4.69). Regarding social status, single patients and divorced patients were at 2-fold and 3-fold higher risk to

have depression, respectively, as compared to those married (adjusted OR= 1.96, 95%CI= 1.16-6.15 and adjusted OR= 3.93, 95%CI= 1.06-3.61, respectively). Smoker elderly patients were at higher significant risk for depression compared to non-smokers (adjusted OR= 1.73, 95%CI= 1.11-9.02). Patients with history of diabetes were at 3-fold risk for depression opposed to non-diabetics (adjusted OR= 3.02, 95%CI= 2.04-7.25). Patients with history of any form of cancer were at 4-fold risk for depression opposed to those without history of diagnosed cancer (adjusted OR= 4.09, 95%CI= 2.32-8.39). Patients with ESRD were at 3-fold risk of depression compared to those without history of renal diseases (adjusted OR= 2.89, 95%CI= 1.62-7.22). Patients with history of osteoarthritis were at a significant higher risk for depression

opposed to those without history of osteoarthritis (adjusted OR= 1.56, 95%CI= 1.02-3.26). Patients with history of liver diseases were at a double-fold higher risk for depression opposed to those without history of liver diseases (adjusted OR= 2.01, 95%CI= 1.33-5.92). Patients with history of visual impairment were at a significant higher risk for depression as opposed to those without history of visual impairment (adjusted OR= 1.68, 95%CI= 1.03-8.33). However, Age, nationality, number of sons/daughters, angina pectoris, hemiplegia/paraplegia, chronic renal disease and hearing impairment were removed from the final model. (Table 5).

Variables excluded from the model (not significant) were age, nationality, number of sons/daughters, angina pectoris, chronic renal disease and hearing impairment.

Discussion

Growth in the average life expectancy of people in the KSA is increasing with 5 percent of the population (1.2 million individuals) classified as being elderly.(22) This indicates that the elderly population in the country is increasing every year, with all the economic and social implications this has. This study assessed the prevalence and predictors of depression among geriatric subjects aged 65 years and over, who attended a PHCC in Abha City, Kingdom of Saudi Arabia.

Previous surveys of the elderly population in the Eastern Mediterranean Region have shown that females by far outnumber males.(24) In the present survey, depression was more frequent in women. The same has been reported by others.(25) The question of why elderly females have a higher prevalence of depression than males may be answered by the possibility that women have a higher frequency of independent risk factors for depression, i.e. single status, lack of education, poor functional capacity and poor perceived health status.(25)

The prevalence of depression in the current study was 63.7%,

regardless of its severity, which is higher than figures, reported by previous workers worldwide(26,27) and even in Saudi Arabia (Al-Shammari, 1999 who reported a figure of 39%).(26) However, most of our cases were mild cases. Moderate or severe depression was reported in 16.3% of our patients. Furthermore, the tool used in the current study (GDS-SF) is different from those used in the other studies, for example Al-Shammari used the Geriatric Depression Scale (GDS), a 30-item instrument, in his study. Moreover, a prevalence of 17.5% has been reported by Abolfotouh, et al in Abha, 2008.(14) The big difference between the prevalence of depression in the current study and others could be attributed to the fact that in the current study, we included elderly attendants of PHCC while in the Abolfotouh study and others they included elderly people in the catchment area of PHCC and not only patients.

The Saudi culture and traditional social values dictate high respect for and care of the elderly by members of the extended family(27) and this may explain the small number of the Saudi elderly in this study, who were living alone compared to the elderly in other communities.(28) The association between more privacy and depression can be explained by the tendency of the elderly in the extended family system of Saudi Arabia to associate more privacy with alienation and neglect by other family members. The finding of more depression in the divorced and widowed is in keeping with numerous other studies. (26, 29)

In the present study, age was not a significant predictor for depression in multivariate analysis. This finding is supported by findings of some other studies reporting no effect of age on depressive symptomatology.(26, 30)

The rapid industrialization and modernization probably contribute to the dissatisfaction with housing standards in the elderly. Like social isolation and being dependent on others for fulfillment of personal needs were associated in this study with depressive feelings and

disorders (singles, divorced and widowed were at higher risk of depression as compared to married patients), as suggested by other researchers, who also found that loneliness and loss events were important contributing factors to the development of depression.(26) As reported by previous studies, poor physical health and limited activities of daily living were associated with more depression and depressive symptoms.(31) The current study reported more depression among those having chronic diseases especially osteoarthritis, that limited their activities.

Diabetes mellitus is a common health condition among geriatric patients. Comorbid depressive symptoms are prevalent among older adults with diabetes.(32) A study done by Sandra found that 31.1% of the older diabetic individuals reported high levels of depressive symptoms.(33) Bivariate and multivariate analysis showed that subjects with diabetes mellitus have a higher risk of depression in this study. This finding is in line with the longitudinal study done by Maraldi et al which found diabetes mellitus was associated with a depressed mood (OR 1.31).(34) Groot also reported that depression is twice as common in diabetic people than it is in non-diabetic people. As diabetes complications worsen, it will increase the chances of becoming depressed.(35) Elevated prevalence of depression among diabetic subjects was related to poor glycemic control, diabetes mellitus related complications, and obesity. (36-38) Subjects with diabetes mellitus also have a higher risk of physical disability and cognitive impairment which can also contribute to the development of depression.(34) Depression or impairment of mental status in elderly with diabetes mellitus will have a bad impact on treatment adherence such as diet and exercise which may lead to increasing severity and complications of the diseases. This will increase the use of health care services which will lead to higher health care costs.

In the present study, patients with a history of any type of confirmed cancer were at 4-fold risk for

depression. Despite the high prevalence of depressive disorders in cancer patients and elderly people, the topic of depression in elderly cancer patients still remains unexplored.(39) This emerges from a systematic review of the literature conducted to investigate issues of depression, diagnosis, pathogenesis, treatment and their complex neuroimmunobiological interactions. Indeed, it becomes apparent that depression in elderly patients with cancer may have a peculiar phenomenology. Immune dysfunction may represent a common pathogenic ground of depression, cancer and aging. This may have important implications for treatment. In the near future, there is a need to develop validated mood disorder diagnoses and verify antidepressant treatment efficacy for elderly cancer patients with depression in order to improve their clinical outcome and quality of life.(39)

The multivariate analysis in the current study confirms the association between osteoarthritis and depression. The same has been documented by Kim, et al, 2011 and Lin, 2008.(40, 41)

In the current research, ESRD was associated with depressive symptoms. This result is in line with a meta-analysis study which found that the presence of chronic disease, including renal diseases, was a risk factor for development of depression.(42) In addition, the same results have been obtained in another research study.(43) Depression in renal disease patients was associated with an increased risk of poor outcomes, such as hospitalization, higher kidney disease severity, and death.(44) Some medical aspects of diseases can be affected by depression in renal patients, such as limiting utilization of health care, adherence of treatment (dialysis regimen or compliance with prescribed medication), nutritional status (probably through eating disorders), changes in immune function or inflammatory responses. Survival of the renal disease patients could also be influenced by depression through the use of

medication or effect of underlying diseases.(45)

Sensory impairment and depression are common in old age and the relation between depression and vision as well as hearing impairment has been established. However, few studies have directly compared their effects and examined the impact of dual sensory loss. In the present study we compared the impacts of self-reported hearing and vision loss on depression. In multivariate analysis, visual impairment was a significant predictor of depression while hearing impairment was not. The same finding has been documented by others in China.(46)

In developing countries, the benefits of elderly depression treatment in primary-care units may more than offset its associated costs. Treatment may lower utilization rates and eventually free up resources that could be applied to improving the functional status of older adults, improve care for medical conditions that accompany depression, and may even extend life. In addition, offering treatment for depression may be instrumental in delaying the onset or slowing down the rate of cognitive decline(48). Therefore, the design and implementation of systematic training of primary-care physicians on the detection and management of elderly patients with depression should be granted high priority in developing countries. Primary care teams, including a depression care manager, primary care doctor, and psychiatrist, seem to have better results than the usual primary physician-centered care. Finally, it is also important to continue research in this area and to reinforce primary-level health care strategies to confront upcoming challenges.(47)

Conclusion
Depression constitutes a health problem among Saudi geriatrics in Abha, especially among women, those having history of chronic diseases and those having sensory impairment. These results provide insight to all physicians and nurses caring for the elderly, researchers in the field of Geriatrics, and health

educators into the particular care needs of elderly patients in Abha, KSA.

Recommendations
1. The design and implementation of systematic training of primary-care physicians in Saudi Arabia to recognize mental illness that could result in a better identification of cases and less use of laboratory investigation and prescription.
2. Elderly care services practitioners must take significant risk factors into consideration in their preventive intervention and treatment for psychological well-being.
3. Further research is recommended to study the independent impact of depression on health-related quality of life of the elderly population.
4. It is important for health care workers to screen geriatric patients routinely for depression in order to prevent the incidence of chronic disease complications. Screening alone does not improve outcomes, but screening in combination with monitoring of adherence to therapy of the chronic diseases may be useful. This study emphasizes the importance of maintaining chronic medical conditions and screening routinely for depression. Need for multidisciplinary care and the role of the geriatric team in geriatric patient care are apparent.
5. Periodic selective psychological and social screening of geriatric people via home visits with special emphasis on the most vulnerable groups, such as women and those who are uneducated, single or who live alone. This could be performed by the health teams of regional primary health care centers.
6. The social shift from extended to nuclear families should be discouraged so that geriatric people can continue to live with others.
7. A simple instrument such as the Geriatric Depression Scale is useful and easily administered.
8. Because depression among older people is viewed more and more as a public health problem, we suggest that partnerships of providers, patients, and policy makers be forged to overcome challenges related to funding, training, and implementing treatments for this condition.

Appendices

استمارة البيانات الشخصية للمريض

الاسم:

الجنس: ذكر

العمر: سنة

المستوى التعليمي:

غير متعلم يقرا ويكتب الابتدائية

المتوسطة الثانوية جامعي فأكثر

عدد الأبناء:

الحالة الاجتماعية: أعزب متزوج مطلق أرمل

مدخن غير مدخن

الجنسية: سعودي غير سعودي

وجود أمراض مزمنة: ارتفاع ضغط الدم

سكر

ربو شعبي

فشل كلوي

سرطان

التهاب مفاصل

قصور في الدورة التاجية

التهاب كبدي

شلل

التهاب كلوي مزمن أو فشل كلوي

إصابة الحواس: ضعف إبصار

ضعف سمع

Appendix 1: Patient's Personal Data Form

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Circle the answer that best describes how you felt over the past week:

1.	Are you basically satisfied with your life?	yes	**no**
2.	Have you dropped many of your activities and interests?	yes	no
3.	Do you feel that your life is empty?	yes	no
4.	Do you often get bored?	yes	no
5.	Are you in good spirits most of the time?	yes	**no**
6.	Are you afraid that something bad is going to happen to you?	yes	no
7.	Do you feel happy most of the time?	yes	**no**
8.	Do you often feel helpless?	yes	no
9.	Do you prefer to stay at home, rather than going out and doing things?	yes	no
10.	Do you feel that you have more problems with memory than most?	yes	no
11.	Do you think it is wonderful to be alive now?	yes	**no**
12.	Do you feel worthless the way you are now?	yes	no
13.	Do you feel full of energy?	yes	**no**
14.	Do you feel that your situation is hopeless?	yes	no
15.	Do you think that most people are better off than you are?	yes	no

Total Score:

Appendix 2: Geriatric Depression Scale (short form)

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An Arabic instrument to Measure Medication Adherence in Saudi Hypertensive Patients

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Abstract

Aim: To show the validity and reliability of the translated Hill-Bone scale on 110 hypertensive participants from an Arabic speaking country.

Background: With the wide spread availability of treatment, individuals with hypertension have reported various levels of adherence to their medications. Flexible and practical methods of measuring adherence are the use of surveys, scales and interviews. There is a scarcity in Arabic tools and scales that measure levels of adherence to antihypertensive treatments in the Arabic speaking context.

Design and Methods: A cross-sectional study was conducted among 110 individuals diagnosed with hypertension and from an Arabic speaking country. The Hill-Bone scale includes three subscales that measure salt intake, medication adherence and appointment keeping. Given the focus on the pharmacological management of hypertensive patients, only items related to medication adherence and appointment keeping subscales were used. The scale was translated by following a comprehensive and accepted method of translation.

Results: Instrument reliability was tested by identifying the Cronbach's alpha coefficient. The subscale for medication adherence in the Hill-Bone scale reported an acceptable level of reliability (Cronbach's alpha =0.76). Compared with other translated versions of the Hill-Bone scale, the scale also reported good reliability and validity.

Conclusion: Results indicate that the Arabic translated version of the Hill-Bone scale has an acceptable level of reliability and validity and therefore can be used in Arabic speaking populations.

Key Words: Medication, Adherence, Hypertension, Arabic

Background

There has been a rapid increase in cases of hypertension in both developed and developing countries. In the year 2000, the number of people aged 20 years and older with hypertension in the Middle Eastern crescent region was 34·5-37·3 million (Kearney et al., 2005). Complications related to hypertension such as ischemic heart disease, stroke and chronic kidney diseases are irreversible and augmenting around the world.

Ischaemic heart disease and stroke collectively killed 12·9 million people in 2010 around the world, or one in four deaths worldwide (Lozano et al., 2012). Ischemic heart diseases and stroke complications for people with hypertension has increased the number of deaths by 26-35% between 1990 to 2010 globally (Lozano et al., 2012). Deaths related to hypertensive heart diseases also increased by 47.8% from 1990 to 2010. Among the ranked 25 causes of death around the world, these complications are reported as the first and the third causes of deaths respectively (Lozano et al., 2012). Ischemic heart disease is the first cause of death in Middle East and North Africa. Globally, there is a massive increase in number of deaths from 1990 to 2010 by an amount of 91.5% for chronic kidney diseases due to hypertension (Lozano et al., 2012). Adherence to antihypertensive pharmacotherapy reduces the signs and symptoms of hypertension (Staessen et al., 2000), prevents complications that can lead to morbidities and mortalities, and decreases the cost of treating disease-related complications (whether that financial burden is on patients or the healthcare system) (Degli Esposti et al., 2004). However, individuals with hypertension have reported various levels of adherence to their medications due to the wide spread availability of treatment. Therefore, in order to evaluate the pharmacological management for hypertensive individuals assessing hypertensive patients' adherence to antihypertensive treatments is essential.

Literature Review:

Detecting medication non-adherence by researchers requires an adequate method. There are a number of methods that have been used to measure non-adherence which include physician estimates, pill count, pharmacy refill records, physiological measures, Medication Events Monitoring System (MEMS) and the self-report method. Physician estimations are one of the earliest used methods for testing non-adherence. Findings showed that this method is inadequate as it is no more accurate than random chance and therefore it was abandoned by researchers (Roter et al., 1998). Recent studies of pill counts have yielded useful information when done in patients' homes and without the purpose of assessment being emphasised beforehand (Svarstad et al., 1999). Pill counts can be difficult to interpret as patients can often combine medication from several containers into one container and also home visits are not always feasible (Haynes et al., 1980). Clinic based pill counts have also been criticised by researchers because when returning to the clinic many patients do not bring pill containers with them and when compared to more objective methods returned pill containers appear to seriously overestimate adherence (Myers & Calvert, 1984). Estimates of adherence over time in large populations can be sourced from pharmacy refill records which are relatively objective, inexpensive and unobtrusive (Sclar, Skaer, Robison, Legg, & Nemec, 1994). These records only provide information as a gross measure of adherence, and therefore this method is unable to provide data for measuring short-term regimens in individual patients. Blood pressure readings, laboratory tests and other physiological measures have also been used by researchers for detecting non-adherence (Craig, 1985; Gilbert, Evans, Haynes, & Tugwell, 1980). These methods are not always reliable or feasible and they reflect drug taking only within one or two days before the test. When using these methods the likelihood of receiving erroneous information is very high because patients will often increase their drug

intake within a few days of coming to the clinic; as such this method is seriously flawed for measuring adherence (Urquhart, 1994). The Medication Events Monitoring System (MEMS®) provides the most sophisticated method for measuring adherence (Cramer, Mattson, Prevey, Scheyer, & Ouellette, 1989). Developed by Aprex Corporation Fremont, California, USA, the MEMS dispense medication into a container that has a microprocessor in the lid. The microprocessor counts each container opening and records their date and time. Each opening is presumed to be an event where dosage has occurred, although there is no assurance that the patient has consumed their medication. However, in order to give misleading information the patient would have to open and close the container each day at the same time as their prescribed intervals in order to falsify the pattern of their adherence. The accuracy of MEMS has been shown in various studies (Cramer et al., 1989; Rudd, Ahmed, Zachary, Barton, & Bonduelle, 1990) as more reliable than other methods and for this reason it is widely regarded as the standard for comparison by other systems of adherence measurement. Although the MEMS has proven its effectiveness it has a high cost and there are other practical issues which have hindered widespread application in large studies and routine clinical practice (Rittenhouse, 1996). Flexible and practical methods of measuring adherence are the use of surveys, scales and interviews. There is a scarcity of Arabic tools and scales that measure levels of adherence to antihypertensive treatments in the Arabic speaking context. Therefore, we conducted a cross-sectional study in order to provide a validated Arabic scale for future research in an Arabic context. The use of the Hill-Bone scale (Kim, Hill, Bone, & Levine, 2000) was based on the reported high validity and reliability of this scale when used in a variety of research contexts (M. Karademir, I. H. Koseoglu, K. Vatansever, & M. Van Den Akker, 2009; Koschack, Marx, Schnakenberg, Kochen, & Himmel, 2010; Lambert et al., 2006; H.-J. Song et al., 2011).

Methods

Design
Cross sectional study design conducted with the use of convenient sampling method.

Population and Sample Recruitment: The King Abdulaziz University Hospital is one of the main government hospitals in Jeddah City, located in the western region of Saudi Arabia. The hospital has thirteen outpatient clinics. Specialities in the outpatient clinics include orthopaedics, ophthalmology, ENT, OB Gyne, cardiology/medicine, GIT, renal, paediatrics, oncology, respiratory, haematology, dermatology and neurology. The hospital provides support for patients who visit the outpatient clinics. This includes booking appointments with physicians for initial diagnosis and/or follow up, arranging admission when required, organising education sessions through the patient education clinic, diet counselling and prescribing of medications. Participants in this study were recruited based on the following selection criteria: (1) being adult patients aged 18 years and older, (2) have been diagnosed with hypertension and (3) receive antihypertensive therapy. A convenient sample was employed for this study. Participants were selected from the outpatient departments at the time they were coming for a follow up. Participants were approached through the treating physicians in the outpatient clinics who identified potential participants who met the eligibility criteria. Eligible patients were then invited to participate. Those who agreed completed the survey in the waiting room of the outpatient department. A member of the research team was available to respond to questions from participants.

Data Collection Tool
The Hill-Bone scale has been used to measure treatment adherence in hypertensive patients in this study. The Hill-Bone scale has 14 items; nine items measure the frequency of behaviour related medication taking, two items are related to appointment keeping and three items for salt intake. In this study, 11 items were

used because they are specifically related to medication adherence behaviour and appointment keeping. The three items that are related to salt intake were excluded from the scale as they are non-pharmacological management. The work that has been presented by Song et al., for the Korean translated version of the Hill-Bone scale has excluded the salt intake subscale and the appointment keeping subscale because those subscales have presented low validity and internal reliability in previous studies (M. Karademir, I. Koseoglu, H., K. Vatansever, & M. Van Den Akker, 2009; Krousel-Wood, Muntner, Jannu, DeSalvo, & Re, 2005; Lambert et al., 2006) and they included only the medication adherence behaviour subscale in their validity study (H. Song et al., 2011). Our argument for excluding the salt intake subscale is that it is not related to the pharmacological management of hypertension. Responses for this scale are in Likert scale and each item has four response categories. For example for the first item "how often do you forget to take your high blood pressure medication?" the responses are: all of the time = 4, most of the time = 3, some of the time = 2 and none of the time= 1. Scores range from 9 (minimum) to 36 (maximum) for the nine items that are related to medication adherence behaviour, with a higher score reflecting poorer adherence to antihypertensive medication. This method of dichotomising the scale responses to minimum and maximum levels of adherence has been mentioned in the study by Song et al. (H. Song et al., 2011). Therefore, responses related to other subscales, such as appointment keeping and salt intake in the Hill-Bone scale will be dichotomised if the scale has been used with its three subscales. In this paper the focus of using the Hill-Bone scale is to find the reliability and validity of the Arabic translated version that measures the medication adherence behaviour and appointment keeping. Participants' demographic information, including age, gender, marital status and employment status were collected as a numerical value for age and

categorical values for the other variables.

Translation Process:
Linguistic variations between English and Arabic make the process of translation problematic. Therefore, a comprehensive and accepted method of translation is important in order to ensure the equivalence of meaning between the original language and the translated version (W. Wang, H. Lee, & S. Fetzer, 2006). The back translation technique, developed by Brislin (Brislin, 1970), is a widely used method of translating research instruments in cross-cultural research, where the language of the target population is different from the original language of the instrument (Mason, 2005; Reichenheim & Moraes, 2007; W. Wang et al., 2006). The process of back translation involves a forward translation of the original instrument language into the targeted language, so that the meanings and concepts between the two languages can be compared (Brislin, 1970). This is important because the process of translating a research instrument is prone to errors in meaning (W.-L. Wang, H.-L. Lee, & S. J. Fetzer, 2006). Accordingly, selecting translators, employing a panel of experts and pre-testing the instruments, via a pilot study, are effective strategies to minimise the chance of error and decrease the chance of collecting meaningless data (Gjersing, Caplehorn, & Clausen, 2010). In this study, the translation process for the questionnaire included five steps, as described below.

Step 1: Forward Translation
In the forward translation step, it is important to recruit a translator who is bilingual and knowledgeable of the intended meaning of the research instrument (Streiner & Norman, 2008). In this study, a bilingual accredited translator translated the English language meanings, items and concepts into Arabic. In this step, the translator had no medical experience in order to ensure that the translator focused only on the meanings and concepts of the language.

Step 2: Expert Panel
This step involved a panel of five native Arabic speaking experts who were bilingual (Arabic and English) and who have previously worked on translating health research instruments between the two languages. This team of experts also had medical experience, which helped to ensure the accuracy of the intended medical meaning of the instrument.

Step 3: Back Translation
A back translator is required to translate the instrument again into the original language; however, this translator should not be familiar with the original instrument (Gjersing et al., 2010). This step is important in order to confirm that the Arabic questionnaire has not been changed through the modification process and is not giving a different meaning from the original English questionnaire. In this study, a translator who had both medical experience and language experience was recruited to back translate the Arabic questionnaire.

Step 4: Editing
After reaching consensus meaning, the instrument was adjusted and edited to a final version by the research team.

Step 5: Pre-testing
The translated research instrument should be tested on participants in order to provide suggestions and alternatives for the questionnaire and in order to assess the understanding of the instrument contents (Gjersing et al., 2010). The purpose of this process is to identify words, sentences or items that are unfamiliar in the translated instrument, and also to assess the reliability of the scale. This study describes the pre-testing of the questionnaire in a group of Arabic-speaking hypertensive patients.

Data Analysis
Data from the collected surveys was entered into the Statistical Packages for Social Science (SPSS) program for quantitative data analysis. All data was double checked and cleaned. Descriptive analysis was conducted to find the means and standard deviation for the demographic variables (age, gender, marital status and employment status). Internal consistency of the scale items was assessed by the scale reliability analysis, Cronbach's alpha.

Ethics Approval:
The ethical approval for conducting this study was obtained from the Queensland University of Technology ethics committee (Brisbane, Australia) and King Abdulaziz University Hospital, the Unit of the Biomedical Ethics (Jeddah City, Saudi Arabia). Participants were approached through the treating physicians in the outpatient clinics who identified potential participants who met the eligibility criteria.

Results
General Characteristics of the participants:
A total of 120 questionnaires were distributed; 110 were completed and form the basis for the present analysis. Over the sample of 110 participants in this study, there were 56 (50.9%) hypertensive patients aged more than 55 years. Among those participants the majority were male patients 84 (76.4%), married 76 (69.1%) and non-employed 57 (51.8%). Demographic and health characteristics of the study participants' (n=110) are shown in Table 1.

Instrument reliability:
Cronbach's alpha is an index of the degree to which a measuring instrument is internally reliable. A reliability coefficient of 0.70 or above is accepted as evidence of internal consistency for a new instrument (Gliem & Gliem, 2003). Cronbach's alpha for the 11-item scale reported 0.633. Results for scale reliability that are in Table 2 show that by excluding item 3, the Cronbach's alpha coefficient would increase to 0.756. Since items 3 and 4 measure appointment keeping, these two items were excluded to focus on medication taking behaviour (9 items). The Cronbach's alpha for this 9-item scale was 0.760.

Discussion
In order to measure hypertensive patients' adherence, there are several scales including the Morisky Medication Adherence Scale (Morisky, Ang, Krousel-Wood, & Ward, 2008), the Brief Medication Questionnaire (Svarstad et al., 1999), and the Hill-Bone Scale (Kim et al.,

Descriptive Characteristics	Mean +/- SD/ n (%)
Age (years)	53.6 +/- 11.88
Age (range)	
Group 1 (<35)	2 (1.8)
Group 2 (35-55)	52 (47.3)
Group 3 (>55)	56 (50.9)
Gender: n (%)	
Male	84 (76.4)
Female	26 (23.6)
Marital Status: n (%)	
Married	76 (69.1)
Non married	34 (30.9)
Employment Status: n (%)	
Employed	53 (48.2)
Unemployed	57 (51.8)

Table 1: Demographic and Health Characteristics of the Study Population (N=110)

Item	Mean	SD	Item total correlation	Cronbach's Alpha if Item Deleted
1- How often do you forget to take your HBP medicine?	1.4953	.60460	.306	.608
2- How often do you decide not to take your HBP medicine?	1.3925	.54525	.291	.612
3- How often do you make the next appointment before you leave the doctor's office?	2.6262	.97636	-.278	.756
4- How often do you miss scheduled appointments?	1.8318	.66568	.237	.620
5- How often do you forget to get your prescription filled?	1.5981	.75059	.446	.575
6- How often do you run out of HBP pills?	1.9252	.88702	.285	.615
7- How often do you skip your HBP medicine before you go to the doctor?	1.4766	.63463	.460	.578
8- How often do you miss taking your HBP pills when you feel better?	1.5234	.69154	.428	.582
9- How often do you miss taking your HBP pills when you feel sick?	1.4486	.63296	.512	.568
10- How often do you take someone else's HBP pills?	1.1963	.44381	.549	.581
11- How often do you miss taking your HBP pills when you are careless?	1.3178	.55962	.506	.575

Table 2: Items Internal Consistency

2000), all of which have been tested in a variety of studies. The Morisky Medication Adherence scale includes 4 items which require a dichotomous response (yes or no). However, this scale has previously been shown to be unreliable, resulting in a skewed distribution for the total scores (Morisky et al., 2008). The other scale, known as the Brief Medication Questionnaire, also has some shortcomings since the original validation for the scale only included 20 participants. This has hindered the ability to effectively assess the psychometric properties of the tool (Svarstad et al., 1999). The Hill-Bone Scale is another scale, which has been developed for hypertensive patients (Kim et al., 2000). This is a 14-item scale and has been validated by patients of various nationalities,

including African-Americans, Turks and Germans (Melek Karademir et al., 2009; Koschack et al., 2010; Lambert et al., 2006).

The report presented by the original author for the Hill-Bone scale found that the three subscales reported a Cronbach's alpha value of 0.84 (Kim et al., 2000). The findings of this study for the nine items of the medication adherence subscale was (Cronbach's alpha = 0.76) and are similar to the findings of the study carried out by Krousel-Wood et al., (2005), which reported 0.68 reliability for the medication adherence subscale. Noting the difference between the original report for the scale and the modified version is important; however this version does not reflect all the items from the

original scale. Similarly, Shea et al., (1992) had used a modified version and reported an acceptable level of reliability for the scale (Cronbach's alpha =0.71) (Shea, Misra, Ehrlich, Field, & Francis, 1992). The reliability results for this study were comparable with those of other studies that have used the same scale. The modified Arabic version of the Hill-Bone scale, using nine items which measure adherence, demonstrated an acceptable level of reliability and validity.

Conclusion
Overall, this study has found acceptable reliability of a modified version (nine items) of the Hill-Bone scale for antihypertensive medication adherence when translated into

Arabic. The study used a back-translation technique and included 110 hypertensive patients attending the outpatient clinic at the King Abdulaziz University Hospital in Jeddah City, Saudi Arabia.

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Lipid levels and association with disease activity in Rheumatoid Arthritis and Systemic Lupus Erythematosus patients in Saudi Arabia

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Abstract

Background: Rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE) are systemic inflammatory diseases that are associated with increased risk of cardiovascular disease. Systemic inflammation in RA and SLE may contribute to accelerated atherogenesis through alteration of the plasma lipid profile. The aim of this study was to assess the relationship between disease activity and lipid levels in patients diagnosed with RA and SLE.

Methods: This was a retrospective cohort analysis of patients diagnosed with SLE or RA at the King Abdul Aziz University Hospital, Saudi Arabia from August 2010 to August 2011. Demographic and biochemical data was extracted from medical records. Differences in the levels of total cholesterol (TC), high density lipoprotein (HDL)-cholesterol, low density lipoprotein (LDL)-cholesterol and triglycerides (TG) between RA and SLE patients were analysed using chi square tests. Associations between lipid levels and disease activity were analysed using partial correlations.

Results: 250 patients met the inclusion criteria and were included in the study population. 155 patients had been diagnosed with SLE and 135 with RA, of whom 41 had been diagnosed with both diseases. Patients diagnosed with both SLE and RA had lower mean ANA and RF titres compared to those diagnosed with a single disease (p<0.001 and p=0.040 respectively). CRP and ESR levels were similar in the three groups. Patients with an RA-only diagnosis had higher TG levels and lower HDL levels, whilst SLE patients had a significantly higher TC/HDL ratio. TC was negatively correlated with ANA (r=-0.161, p=0.046) and CRP (r=-0.176, p=0.01) and positively correlated with RF (r=0.191, p=0.028); TG was positively correlated with ESR (r=0.215, p=0.001) and CRP (r=0.139, p=0.043); LDL-C was negatively correlated with ESR (r=-0.199, p=0.026) and HDL-C was negatively correlated with ANA (r=-0.223, p=0.046 (Table 3).

Conclusion: Higher concentrations of markers and mediators of inflammation and disease activity in patients with SLE and RA are associated with changes in lipid levels which may infer greater cardiovascular risk.

Key words: Rheumatoid arthritis; systemic lupus erythematosus; cardiovascular disease, lipid

Abbreviations:
ANA - Anti-nuclear antibody;
CRP - C-reactive Protein;
ESR - erythrocyte sedimentation rate;
HDL-C - high density lipoprotein cholesterol;
LDL-C - low density lipoprotein cholesterol;
RA - Rheumatoid arthritis;
RF - Rheumatoid Factor;
SLE - systemic lupus erythematosus;
TC - total cholesterol;
TG - triglyceride

Introduction

Rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE) are systemic inflammatory diseases that are associated with increased risk of cardiovascular disease (Watson et al., 2003, Solomon et al., 2004, Asanuma et al., 2003, Roman et al., 2003). Epidemiological studies suggest that the cardiovascular risk of a young woman with SLE is several times higher than that of an age-matched disease-free control (Manzi et al., 1997) whilst the relative risk of cardiovascular disease in RA is estimated at 2-3 times that of age- and sex-matched controls (Solomon et al., 2003). Cardiovascular disease has been attributed as a major cause of premature mortality in patients with RA, with the majority of cardiovascular deaths resulting from accelerated atherosclerosis (Gabriel et al., 2003, Goodson and Symmons, 2002, Goodson, 2002, Van Doornum et al., 2002). Similarly, studies in SLE patients have demonstrated significantly increased rates of atherosclerosis and hospitalisation due to myocardial infarction compared to age-matched controls (Ward, 1999, Abu-Shakra et al., 1995b, Abu-Shakra et al., 1995a).

Within the general population numerous factors have been associated with increased cardiovascular disease risk including age, gender, physical inactivity, obesity, smoking, hypertension and abnormal plasma lipid levels. Increased low density lipoprotein cholesterol (LDL-C) and total cholesterol (TC) levels and decreased high density lipoprotein

cholesterol (HDL-C) concentrations have been shown to be independent cardiovascular risk factors (Grundy et al., 1997) whilst high TG concentrations have been associated with increased cardiovascular disease risk, particularly in women (Lerner and Kannel, 1986). The reduction of HDL-C and increased TC levels has the effect of increasing the TC/HDL ratio; this atherogenic index is an important prognostic marker of cardiovascular disease; a ratio higher than 5 indicates a significantly increased risk of cardiovascular disease (Boers et al., 2003, Situnayake and Kitas, 1997). General risk factors associated with cardiovascular disease are more prevalent in RA and SLE, contributing to the accelerated atherosclerosis observed in these diseases. In addition, disease-related factors have been implicated including side effects of medication, chronic inflammation and under treatment of conventional cardiovascular risk factors (Soubrier et al., 2006, Park et al., 1999, Choi and Seeger, 2005).

Increased inflammatory markers are commonly associated with a reduction in total and LDL-cholesterol (Khovidhunkit et al., 2004). Systemic inflammation in RA and SLE may therefore contribute to cardiovascular disease risk through both direct mechanisms, for example through effects on endothelial function, and indirect mechanisms, which may include alteration of the lipid profile. RA patients have consistently been shown to have reduced HDL-C levels (Choi and Seeger, 2005, Park et al., 1999, Dursunoglu et al., 2005, Georgiadis et al., 2006). However, the picture is considerably more complex for TC and LDL-C. Some studies have shown significantly increased serum concentrations of TC and LDL-C in RA patients compared to controls (Boers et al., 2003, Georgiadis et al., 2006, Situnayake and Kitas, 1997, Lorber et al., 1985, Frati et al., 1984, Lazarevic et al., 1992) and often increased TC/HDL ratios (Stampfer et al., 1991), whilst others have reported reduced total and LDL-cholesterol levels in patients with RA (Choi and Seeger, 2005,

Dursunoglu et al., 2005, Park et al., 1999, Situnayake and Kitas, 1997). Similarly, SLE patients have been shown to have lower concentrations of HDL-C and increased TG levels compared to control subjects (Ettinger et al., 1987, Borba and Bonfa, 1997, Chung et al., 2006). A few studies have looked to examine the interplay between inflammation and disease activity with lipid levels, suggesting inverse relationships between HDL-C, LDL-C and TC and inflammation (Choi and Seeger, 2005, Svenson et al., 1987, London et al., 1963).

Very little information is available on lipid levels and their relationship to disease activity in patients with RA and SLE in Saudi Arabia. This study aimed to address this by conducting a retrospective analysis of RA and SLE patients in a busy outpatient department in Saudi Arabia, to assess the influence of disease activity on lipid levels in RA and SLE.

Methods

Patients and data extraction
This was a retrospective study of patients diagnosed with rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE) in Saudi Arabia. Data was extracted from the medical notes of all patients meeting the inclusion/exclusion criteria who attended the medical outpatient department of King Abdul Aziz University Hospital, Saudi Arabia from August 2010 to August 2011. To be included in the study, patients had either been diagnosed with RA according to the 1987 American College of Rheumatology (ACR) classification for RA (Arnett et al., 1988) or SLE measured using the SLE Disease Activity Index (SLEDAI) or both. The following data was extracted from the medical notes: age, sex, nationality. In addition the following biochemical data was extracted from the medical notes: rheumatoid factor (RF) titre (as a measure of RA disease activity), anti-nuclear antibody (ANA) titre (as a measure of SLE disease activity), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) TC, TG, LDL-C, and HDL-C.

Statistical methods

Data was entered in Excel and analysed using SPSSv19.0 for Windows (SPSS, Chicago, IL, USA). Demographic characteristics are presented for continuous variables as means and standard deviations and categorical variables as frequencies and percentages. The three groups (RA only, SLE only and RA/SLE) were compared using the chi-square test for categorical variables and Kruskal-Wallis test for binomial variables. Non-normal lipid variables were analysed by logarithmic transformation and are expressed as antilogarithmic transformation to facilitate understanding. Differences in the levels of total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides between RA and SLE patients were analysed using chi square tests. Associations between lipid levels and disease activity were analysed using partial correlations. Significance was set at the 0.05 level.

Results

Patient demographics

250 patients met the inclusion criteria and were included in the study population. 155 patients had been diagnosed with SLE and 135 with RA, of whom 41 had been diagnosed with both diseases. The demographic characteristics of the study population are presented in Table 1. More of the SLE patients were of non-Saudi nationality, whilst RA patients were more likely to be of Saudi nationality. Older patients were more likely to have been diagnosed with RA or both RA and SLE than with SLE alone (p<0.001). Patients diagnosed with both SLE and RA had lower mean ANA and RF titres compared to those diagnosed with a single disease (p<0.001 and p=0.040 respectively). CRP and ESR levels were similar in the three groups.

Lipid levels in RA and SLE patients

Comparison of TC, TG, LDL-C and HDL-C found significantly higher levels of TG (p=0.020) and significantly lower levels of HDL-C in the group of patients diagnosed with RA or SLE compared to those diagnosed with both (Table 2). There were also non-significant increases in LDL-C and TC in these two groups,

compared to the group with both diagnoses. The atherogenic index (total cholesterol/HDL cholesterol ratio) was significantly higher in SLE patients (p=0.042) and slightly raised in the RA patients.

Relationship between disease activity and lipid levels

The association of disease activity with lipid measures was analysed in all patients and in the three separate disease groups. For the overall study population, TC was negatively correlated with ANA (r=-0.161, p=0.046) and CRP (r=-0.176, p=0.01) and positively correlated with RF (r=0.191, p=0.028); TG was positively correlated with ESR (r=0.215, p=0.001) and CRP (r=0.139, p=0.043); LDL-C was negatively correlated with ESR (r=-0.199, p=0.026) and HDL-C was negatively correlated with ANA (r=-0.223, p=0.046 (Table 3 - page 28). In addition, there were positive correlations between ESR and CRP (r=0.333, p<0.001), ESR and ANA (r=0.312, p<0.001), ESR and RA titre (r=0.174, p=0.049), CRP and ANA (r=0.219, p=0.015), TC and TG (r=-.261, p<0.001), TC and LDL (r=0.292, p<0.001) and a negative correlation between TG and HDL-C (r=-0.199, p=0.022).

When analysed within the three subgroups many of the correlations were lost. Within the SLE group ESR was positively correlated with TG (r=0.250, p=0.012) and negatively correlated with LDL-C (r=-0.307, p=0.19). Within the RA group HDL-C was negatively correlated with ESR (r=-0.339, p=0.012). There were no significant correlations within the group of patients meeting the diagnostic criteria for both diseases.

Discussion

There is a paucity of published data about SLE and RA in Saudi Arabia. This study reports the association of inflammatory markers and disease activity with lipid profiles in RA and SLE patients. Using a retrospective cohort study design, we have found that patients diagnosed with RA and SLE have reduced levels of HDL-cholesterol, and raised levels of total cholesterol, triglycerides and

LDL-cholesterol. In addition, raised TC/HDL levels were observed, particularly in the SLE group, suggesting that these patients are at a higher risk of atherosclerosis. Our findings are in accordance with those of other studies that have evaluated lipid profiles in RA and SLE patients (Choi and Seeger, 2005, Dursunoglu et al., 2005, Georgiadis et al., 2006, Park et al., 1999, Boers et al., 2003, Borba and Bonfa, 1997, Chung et al., 2006, Ettinger et al., 1987, Frati et al., 1984, Lazarevic et al., 1992, Lorber et al., 1985, Situnayake and Kitas, 1997, Stampfer et al., 1991). However, there is a notable contrast of results in the literature with a number of studies reporting an overall reduction in all lipid sub-fractions in active disease (Choi and Seeger, 2005, Dursunoglu et al., 2005, Park et al., 1999, Situnayake and Kitas, 1997). Such conflicting results may be attributed to a number of causes including sample size, study design, differences in the stage of disease or level of disease activity. One study comparing lipid levels in patients with remission or active disease found increased HDL-C levels and reduced TC/HDL-C ratios in patients in remission (Boers et al., 2003) indicating the substantial differences observed in subsets of patients with the same disease. Systemic inflammation may be an important driver of atherosclerosis in patients with RA and SLE both directly and through indirect effects on lipid profiles. In this study we have found significant correlation between disease activity and inflammatory measures and lipid profile levels in RA and SLE patients, in agreement with other studies that have demonstrated relationships between inflammatory markers and lipid profiles (Choi and Seeger, 2005, Svenson et al., 1987, London et al., 1963).

It must be noted that most patients within the study were taking disease modifying and/or steroid therapies at the time of their visit and these therapies may have impacted on the recorded lipid levels. A number of studies have analysed the effects of conventional disease modifying, glucocorticoid and biologic therapies

	All	SLE	RA	RA and SLE	p
		N (%)*	N (%)*	N (%)*	
Total	250	113	95	42	
Female	233	108	85	40	0.172
Male	17	5	10	2	
Age, mean ± s.d.	46.88 ± 14.44	40.50 ±14.46	53.69 ± 12.44	48.83 ± 10.78	<0.001
Nationality					0.040
Saudi	127	66	41	20	
Non Saudi	122	46	54	22	
ANA, mean ± s.d.	750 ± 497	855 ± 482	-	467 ± 428	<0.001
RF, mean ± s.d.	220 ± 311	-	256 ± 330	141 ± 250	0.047
CRP, mean ± s.d.	23 ± 33	24 ± 37	25 ± 33	13 ± 11	0.148
ESR, mean ± s.d.	45 ±26	46 ± 30	45 ± 24	42 ± 23	0.755

*Unless stated. ANA - Anti-nuclear antibody; RF - Rheumatoid Factor; CRP - C-reactive Protein; ESR - erythrocyte sedimentation rate

Table 1: Patient characteristics

	All	SLE	RA	RA and SLE	p
	mean ± s.d.	mean ± s.d.	mean ± s.d.	mean ± s.d.	
TC, mmol/L	4.70 ± 1.2	4.65 ± 1.30	4.8 ±1.37	4.54 ± 1.13	0.642
TG, mmol/L	1.28 ± 0.73	1.28 ±0.63	1.42 ± 0.89	1.01 ±0.50	0.020
HDL-C, mmol/L	1.41 ± 0.43	1.31 ± 0.45	1.48 ± 0.37	1.71 ± 0.43	0.005
LDL-C, mmol/L	2.99 ± 0.96	3.03 ± 0.95	2.96 ± 1.01	2.91 ± 0.99	0.257
TC/HDL-C	3.80 ± 1.75	4.16 ± 2.14	3.46 ± 1.11	3.25 ± 1.28	0.042

TC - total cholesterol; TG - triglyceride; HDL-C - high density lipoprotein cholesterol; LDL-C - low density lipoprotein cholesterol

Table 2: Lipid levels in RA and SLE patients

	CRP	ESR	RF	ANA
TG	+ve	+ve		
TC	+ve		+ve	-ve
HDL				-ve
LDL		-ve		
TC/HDL				

ANA - Anti-nuclear antibody; RF - Rheumatoid Factor; CRP - C-reactive Protein; ESR - erythrocyte sedimentation rate

Table 3: Correlations between disease activity and lipid levels in the total population

on serum lipid levels in RA patients. The small number of studies examining DMARDs have found either beneficial (Boers et al., 2003, Georgiadis et al., 2006, Park et al., 1999) or neutral effects (Dessein et al., 2002) on lipid levels whilst research into the effects of TNF-α blockers on lipid levels have in general observed an increase in total cholesterol which is mostly attributed to increased HDL-C (Peters et al., 2007, Vis et al., 2005, Allanore et al., 2006). Notably, a number of these studies demonstrated that the degree of disease-modifying effect was correlated with the degree of change to the lipid profile. In other words, the better suppression of inflammation achieved by a particular treatment the greater the change to the lipid profile. These studies lend strong weight to the importance of chronic inflammation in driving the lipid changes which are, at least in part, responsible for the increased cardiovascular risk observed in RA patients. There is a paucity of data on the effect of SLE treatments on lipid levels and this is a notable area for future research.

There are a number of limitations of this study. Due to the retrospective nature of the study we are unable to draw any causal relationships between lipid levels and inflammation, and prospective studies with long-term follow-up are needed to examine effects on outcome. The study only included patients diagnosed with active disease and it would be useful to include a control population of non-disease patients in future studies. Inflammatory and lipid levels were not available for all patients on the same date. Fluctuations in disease activity and lipid levels during the disease course may therefore affect correlation analysis. As in any retrospective analysis, we were only able to use data contained in medical notes to determine disease diagnosis. There are discrepancies within the correlative data and this may be a result of our relatively small sample size and missing data for individual lipid measurements for some patients.

In conclusion, our study demonstrates that lipid levels are altered in patients with RA and SLE and that these changes in lipid levels are associated with disease activity. Further work is needed to fully elucidate the relationship between inflammation and atherosclerosis in RA, and the mechanism through which lipoprotein profiles are altered. There is at least preliminary evidence to suggest that beneficial effects on inflammation and lipid profiles may be gained from the use of lipid-lowering therapies in RA. However,

before such therapies can become a mainstay of RA and SLE treatment much more research is required to understand the potential relationship between reduced lipid levels and improvement in cardiovascular risk in these patients.

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Tropical Public Health: Malaria Education

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Abstract

Essential elements in the design of a brochure to educate travellers about Malaria.

Key words: travellers, education, malaria

Part 1: Chosen Media Material

1. Introduction

Malaria is a tropical, infectious disease that is spread through a mosquito vector. This disease is generally prevalent in tropical countries, specifically, in sub-Saharan Africa where more than 80% of fatal cases occur, Southeast Asia, India, some areas of the Middle-east, South America and Central America (AJBR 2006). The specific area where malaria occurs infers that people living in other parts of the globe would not be familiar with malaria, such as the people living in the UK. The primary reason is that the vector mosquitoes do not breed outside the tropical regions of the world, meaning that cases of malaria in other countries are rare (Lawlor 2008). As a result, people living in countries where malaria is almost non-existent would have limited knowledge about the disease, including its symptoms, how it is spread, and its treatment because most of the time, they have no practical use for it (Lawlor 2008; Njobvu and Koopman 2008). However, there are cases where people should become aware and be knowledgeable about malaria, specifically, when there is a need to travel to countries where malaria is endemic.

In response to this learning need, a brochure that aims to educate people living outside of malaria endemic regions is suitable. Below is a discussion about the structure of the proposed brochure, its content, and how information about malaria is presented to facilitate the education of the people about the disease.

2. Structure of the Brochure

The proposed brochure is targeted towards people who are planning to travel to foreign countries. Generally, there are three steps that people going to other countries take when planning their trip. The first step is research about the intended destination, the second step is logistics planning, while the last step is the formation of the itinerary (Ballantyne, Packer, and Axelsen 2009; Banyai and Glover 2012). The proposed brochure should therefore be structured for people who want to do research about their travel destinations. Information discussing malaria should be comprehensive, yet easy to understand and recall for the traveller to remember during their visit. A brochure is suitable for this purpose because it is easy to carry, and can be brought for the trip with no hassles on the part of the traveller. A brochure can easily be made available in bookstores, travel agencies, newspaper stands, airport coffee shops and souvenir stores where people can get a copy, especially if their destination is a malaria endemic area.

The proposed brochure should be short and concise in providing information to travellers. The title, layout and design of the brochure should be appealing and should be able to attract the attention of travellers going to places where malaria is prevalent so they will become interested and take one for their reading.

3. Brochure Content

Information presented in the brochure includes a description of malaria that includes its cause, signs and symptoms, treatment and preventive measures that travellers can take to lower their risk of contracting malaria during their visit. Information about existing services in their country's health services should also be posted so that the readers of the brochure will become informed on what they should do if they feel that they have malaria. The following sections would be the exact information displayed in the brochure.

3.1 Overview of Malaria

Malaria is an infectious disease spread by mosquitoes in tropical countries. The disease is transmitted through the bite of a female mosquito, which introduces the disease carrying microorganism into the circulation of the infected individual (CDC. 2010; WHO 2012).

This disease is endemic only to tropical countries that lie near the equator. The area with the most number of fatal malaria cases is in sub-Saharan Africa. Other areas where malaria is present include the Indian subcontinent and other adjacent countries like Pakistan and Cambodia, the Southeast Asian region, and the northern areas of South America near the equator that include Ecuador, Colombia and Venezuela (CDC. 2010; WHO 2012; Greenwood, et.al 2008).

3.2 Signs and Symptoms

An individual can remain asymptomatic for up to ten days after being bitten. This means that a person visiting a malaria endemic area for a short time can be bitten and remain oblivious to his/her condition until symptoms appear when the person returns home (Cox-Singh, et.al 2008; Das and Ravindran 2011).

The initial signs and symptoms are similar to a generalized infection that includes the onset of fever and headache. These two symptoms are then followed by joint pain, nausea and vomiting, anaemia, liver and retinal eye damage and convulsions (Hay, et.al 2009; Teklehaimanot, Teklehaimanot, Kiszewski, Rampao, and Sachs 2009). The primary defining symptom of malaria is paroxysm. Paroxysm is a condition where symptoms intensify for alternating time periods (WHO 2010; WHO 2012; Cox-Singh, et al 2008; Das and Ravindran 2011). It is common for malaria patients to suddenly experience chills and experience debilitating stiffness of the body within a two or three day interval. Recurrent fever is also another hallmark sign that appears every 36-48 hours depending on the condition of the patient (WHO 2010; WHO 2012; Cox-Singh, et.al 2008; Das and Ravindran 2011).

3.3 Cause and diagnosis

Malaria is caused by microorganisms that are spread by mosquitoes. Specific mosquito species that spread these microorganisms come from the Anopheles species and are known to spread the common parasites that cause malaria that include P. falciparum, P. malariae, P. vivax and P.ovale. If malaria is suspected, the disease is diagnosed through blood examinations using antigen based test kits that can rapidly determine if the person has malaria (Lawlor, 2008; Cox-Singh, et.al 2008; Freedman, 2008; Chandler, Whitty, and Ansah 2010).

3.4 Treatment

It is always advisable for individuals who have travelled abroad to seek immediate treatment when they feel sick or experience fever after they get home. For malaria, treatment is dependent on the severity of the malaria.

General cases are treated with oral medications known as artemisinis. Various types of anti-malaria medications are given to reduce the risk of developing resistance to these drugs and to ensure that the proper type of drug is prescribed to a given case. For more severe cases, these drugs are given through parenteral administration. The current drug of choice for severe malaria in both adults and children is artesunate. In most cases, severe malaria is characterized by convulsions and seizures, requiring the affected patient to be admitted in an intensive care unit for further observations for complications that include extremely high fever, respiratory depression, electrolyte abnormalities and hypoglycaemia (Chandler, Whitty, and Ansah 2010; Dondorp, Nosten, Yi, Das, Phyo, and Tarning 2009).

3.5 Precautions

Travellers to malaria endemic regions are advised to take precautions to lower their risk of getting malaria. It should be emphasized that malaria is a serious threat that travellers and tourists should be prepared for. The most common protection against malaria is to avoid areas where the female mosquitoes live (Chandler, Whitty, and Ansah 2010; Dondorp, Nosten, Yi, Das, Phyo, and Tarning 2009; AJBR 2006; Freedman 2008). Riverbanks, streams and ponds are likely to contain a large number of mosquitoes and should be avoided. Travel during dusk and early hours of the evening should also be avoided. This is because the feeding habits of female mosquitoes are dependent on their breeding patterns. The Female Anopheles mosquitoes feed during night time and lay their eggs in the early hours of dawn (Nosten, Yi, Das, Phyo, and Tarning 2009). Female Anopheles Mosquitoes are more active during the late hours of the afternoon and during night time because these are the parts of the day when they lay their eggs. During these times, it is advisable to stay within their chosen accommodation and put on insect repellents to ward of these insects (Chandler, Whitty, and Ansah 2010; Dondorp, Nosten, Yi, Das, Phyo, and Tarning 2009; AJBR 2006; Freedman 2008).

The attire chosen for the trip should also be considered. It is advised that travellers to malaria endemic places should bring light, long sleeved shirts and pants to lessen the area of exposed skin that can be bitten. The pants should ideally grip the ankle, and shirts should also cover most of the neck when possible (Freedman 2008). An insecticide spray can also be used to spray rooms to ensure that no mosquitoes can stay in places such as wardrobes, trash bins and below desks and tables. Prophylactic medications against malaria can also be administered (CDC 2010; WHO 2010; Dondorp, Nosten, Yi, Das, Phyo, and Tarning 2009). Currently, Malarone is the most popular drug given to individuals travelling to malaria endemic areas. Other medications that can be prescribed are doxycycline, Chloroquine and Mefloquine. It is advised that travelers should seek the advice of their country's health care services for more advice on what precautions should be taken before the trip. Finally, pregnant women and children are discouraged from visiting places where malaria is prevalent (CDC 2010; WHO 2010; Dondorp, Nosten, Yi, Das, Phyo, and Tarning 2009).

Part 2: Discussion about the information presented in the educational material

1. Introduction

Tropical diseases are some of the most neglected and least known diseases because they only occur in selected countries around the world. People living outside of these areas are not familiar with these diseases and may not even be aware of their existence. As a result, there is a need to educate people living in other parts of the globe about the threat of tropical diseases. Factual information from evidenced based research should be presented in this media and should be organized or structured in a way that can be useful to readers.

2. Criteria used for the Evaluation of Presented Information in the chosen Media

There are five general criteria used in evaluating information published in educational materials such as brochures. These are currency of information, relevance, authority, accuracy and purpose.

Currency of information refers to the timelines on how the information in a brochure is published. These include the date of publication of the sources of information used in writing the brochure and when the brochure itself was published. The most critical area of evaluating currency is that if the posted information is still accurate. Countless research about various topics is being conducted daily, and it is likely that more recent research would be a better source of information than the original source used in the brochure. In this regard, a brochure must only be made available for a specific time period to ensure that its contents are up-to date with current research about the disease (Sharma and Romas 2008; Smith 2011; Wiley, Goldman, Graesser, Sanchez, Ash and Hemmerich 2009; Anderson and Klemm 2008).

Relevance refers to significance and scope of the presented information regarding a specific topic. Basically, relevance would refer to a brochure's capacity to give meaningful answers to the questions of the readers. This would mean that the brochure should cover broad information about the subject matter and should contain information about scholarly discussions on the topic within its short pages (Anderson and Klemm 2008).

Authority refers to the source of information used for educational material. The source of information should be stated in the brochure to allow the readers to know that the information posted is derived from actual extensive research about the topic. In the field of health care, a credible source is said to come from peer reviewed journals, meaning that the author has allowed his/her colleagues to study and critique the given study about a topic

(Sharma and Romas 2008). The organizations the author is affiliated to is also important, as well as if the source of information has gained the credibility of providing quality works through consistent research about a given topic (Sharma and Romas 2008; Smith 2011; Wiley, Goldman, Graesser, Sanchez, Ash and Hemmerich 2009; Anderson and Klemm 2008).

Accuracy refers to the truthfulness of published content. The makers of the brochure must ensure that what is written is correct and that it should not be modified or altered to meet the needs of its makers. Information published on the brochure should be verified from other sources. For instance, when a tourist decides to read more about malaria online, he/she must find the same information written in the brochure on the internet. For scientific sources, a source obtained from a peer reviewed journal is ideal because these studies have proven to be correct and accurate by the members of the scientific community (Wiley, Goldman, Graesser, Sanchez, Ash and Hemmerich 2009; Sharma and Romas 2008).

Finally, purpose refers to how the information from obtained sources is used to meet a specific objective. The primary goal of a brochure is to spread information about a topic to a large number of people in a short amount of time, however, the agenda of the brochure's makers should be established clearly for the readers (Wiley, Goldman, Graesser, Sanchez, Ash and Hemmerich 2009; Sharma and Romas 2008).

3. Application of the Evaluation Criteria to the Proposed Media

The discussed criteria provide a detailed guide on how to evaluate the information posted on the brochure. For the currency criteria, it can be seen that sources used for the brochure contain the latest information about malaria since most of the selected sources were published within the last four years (Sharma and Romas 2008; Smith 2011; Wiley, Goldman, Graesser, Sanchez, Ash and Hemmerich

2009; Anderson and Klemm 2008). Protocols for malaria management and diagnosis are discussed based on current research and from the latest guidelines published by the World Health Organization, a reputable organization that is responsible for publishing the latest updates about tropical diseases around the world. Readers who want to read more on discussions made by the World Health Organization about malaria can easily do so by checking the links included in the brochure online.

The scope of the information in the brochure, regarding malaria, needs to be sufficient based on the needs of travellers (Banyai and Glover 2012). The information in the brochure can answer reader's questions about the symptoms of malaria, how it is treated and preventive measures that can be used to decrease their risk from getting malaria when they are in a country where malaria is prevalent (Freedman 2008.) Because of this, additional information about the disease is excluded, such as the pathophysiology of the disease, the life cycles of the vector mosquitoes, its epidemiology and the mode of transmission. Information about these topics is excluded because these areas are not what travellers are immediately looking for when they travel to other countries (Banyai and Glover 2012; Freedman 2008; Lawlor 2008). What the brochure has done is to consolidate the most important information relevant to travel and to present this information to the readers.

The proposed brochure also meets the authority criteria of evaluation guideline, given that all sources used in making the brochure are from peer-reviewed journals. These sources have produced their results through extensive research that follows current guidelines and methods for reputable research in the field of medicine (Banyai and Glover 2012; Freedman 2008; Lawlor 2008). Readers who want to check the credentials of these authors would find that they have done extensive research in the past, and have produced similar research materials.

From these valid points, the sources used for the brochure have the authority to discuss malaria and can serve as good sources of educational materials to readers (Banyai and Glover 2012; Freedman 2008; Lawlor 2008; Smith 2011).

The information in the brochure needs to also be accurate. The accuracy of the information is derived from the credibility of the chosen sources (Sharma and Romas 2008; Smith 2011). The information presented in the brochure can also be confirmed from other sources like the World Health Organization's advisory panel for tropical diseases. All of the chosen sources have presented their evidence regarding effectiveness of the management of malaria, as well as the preventive measures that can be used to lower the risk of travellers from being bitten by mosquitoes. All of the information used in the brochure has come from scientific methods and research, ensuring that the information posted is accurate.

Finally, the purpose of the brochure is made clear to the readers. The goal of the brochure is to increase awareness about malaria and to provide readers with information that they can use if they are going on a trip to malaria endemic areas.

Conclusion
The information posted on the brochure is obtained from peer-reviewed sources that are presented in an organized manner that is easier for travellers to read and understand. The goal of the brochure is to provide information about the symptoms of malaria, its cause and diagnosis, treatment and preventive measures. Information about these topics is considered to be relevant to the needs of travellers, and can be used successfully, to educate the people about malaria.

Appendices

Appendix 1: Brochure

References
AJBR. (2006). Malaria prevention: knowledge, attitude and practice in a Southwestern Nigerian community. African Journal of Biomedical Research: Ibadan, Nigeria. Anderson, A., & Klemm. 2008., The Internet: Friend or Foe When Providing Patient Education?. Clinical Journal of Oncology Nursing, 107,pp. 55-63.

Ballantyne, R., Packer, J., & Axelsen, M. 2009., Trends in Tourism Research. Annals of Tourism Research, 36(1), 149-152.

Banyai, M., & Glover, T. 2012., Evaluating Research Methods on Travel Blogs. Journal of Travel Research, 51(3), 267-277.

Malaria is an infectious disease spread by mosquitoes in tropical countries. The disease is transmitted through the bite of a female mosquito, which introduces the disease carrying microorganism into the circulation of the infected individual (CDC. 2010; WHO 2012).

This disease is endemic only to tropical countries that lie near the equator. The area with the most number of fatal malaria cases is in sub-Saharan Africa. Other areas where malaria is present include the Indian subcontinent and other adjacent countries like Pakistan and Cambodia, the Southeast Asian region, and the northern areas of South America near the equator that include Ecuador, Colombia and Venezuela (CDC. 2010; WHO 2012; Greenwood, et.al 2008).

An individual can remain asymptomatic for up to ten days after being bitten. This means that a person visiting a malaria endemic area for a short time can be bitten and remain oblivious to his/her condition until symptoms appear when the person returns home (Cox-Singh, et.al 2008; Das and Ravindran 2011).
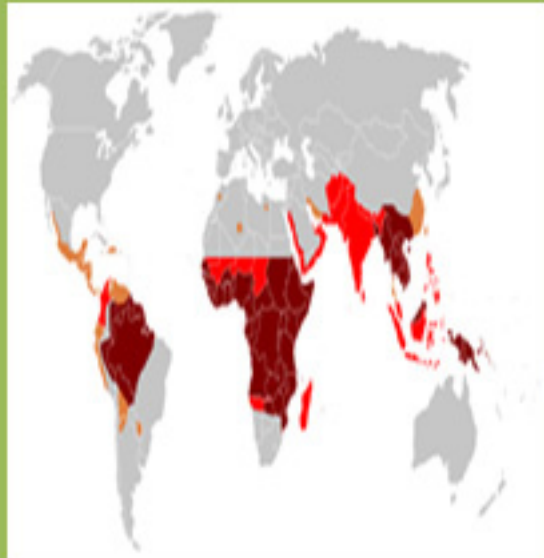
The image above shows Malaria endemic areas around the world. Check the map to see if your destination is included.

The initial signs and symptoms are similar to a generalized infection that includes the onset of fever and headache. These two symptoms are then followed by joint pain, nausea, vomiting, anaemia, liver, Retinal eye damage and convulsions (Hay, et.al 2009; Teklehaimanot, Kiszewski, Rampao, and Sachs 2009).

Brochure pages (continues pages 53-55)

CDC. 2010., CDC's malaria research., Center for Global Health, Division of Parasitic Diseases and Malaria: Atlanta, Ga.

Chandler, C., Whitty, C., & Ansah, E. 2010, How can malaria rapid diagnostic tests achieve their potential? A qualitative study of a trial at health facilities in Ghana. Malaria Journal, 9(95), 16-24.

Cox-Singh, J., Davis, T., Lee, K., Shamsul, S., Matusop, A., & Ratnam,

S & Singh, B., 2008, Plasmodium knowlesi Malaria in Humans Is Widely Distributed and Potentially Life Threatening. Clinical Infectious Diseases, 46(2), pp. 165-171.

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Freedman, D. 2008 Malaria Prevention in Short-Term Travelers. The New England Journal of Medicine, 359, pp. 603-612.

Greenwood, B., Fidock, D., Kyle, D., Kappe, S., & Alonso, P. & Duffy,

Causes and spread of Malaria

Malaria is caused by microorganisms that are spread by mosquitoes. Specific mosquito species that spread these from the *Anopheles* species and are known to spread the common parasites that cause malaria include *P. falciparum, P. malariae, P. vivax* and *P. ovale*. These mosquitoes bite their victims starting from late afternoon up to the evening. If malaria is suspected, the disease is diagnosed through blood examinations using antigen based test kits that can rapidly determine if the person has malaria (Lawlor, 2008; Cox-Singh, et.al 2008; Freedman, 2008; Chandler, Whitty, and Ansah 2010).

Treatment

It is always advisable for individuals who have travelled abroad to seek immediate treatment when they feel sick or experience fever after they get home. For malaria, treatment is dependent on the severity of the malaria. Those that suspect they have malaria should go to the nearest hospital for immediate treatment.

Important Numbers and websites to remember:
CDC Malaria Hotline: (770-488-7788)
http://www.cdc.gov/malaria/diagnosis_treatment/index.html
London Malaria Help line: +44 (0) 20 7927 2325,
http://malaria.lshtm.ac.uk/
Canada Malaria Hotline: 1-800-418 1111.
www.redcross.ca/malaria
Travel Clinics Australia: 1900 969 359
http://www.travelclinic.com.au/

General cases are treated with oral medications known as artemisinis. Various types of anti-malaria medications are given to reduce the risk of developing resistance to these drugs and to ensure that the proper type of drug is prescribed to a given case. The current drug of choice for severe malaria in both adults and children is artesunate for the majority of countries that include the United States, UK, and Canada (Chandler, Whitty, and Ansah 2010; Dondorp, Nosten, Yi, Das, Phyo, and Tarning 2009).

P.2008, Malaria: progress, perils, and prospects for eradication. The Journal of Clinical Investigation, 118(4), pp. 1266-1276.

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Njobvu, B., & Koopman, S. M. (2008). Libraries and information services towards the attainment of the UN millennium development goals.: K. G. Saur: Munchen

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Smith, A. (2011). Testing the Surf: Criteria for Evaluating Internet Information Resources. Public Access-Computer Systems Review, 8(3), 1-10.

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WHO.,2012., WHO-Malaria Advisory. Retrieved September 28, 2012, from www.who.int/topics/malaria/en/

How to prevent Malaria Abroad

Travellers to malaria endemic regions are advised to take precautions to lower their risk of getting malaria. It should be emphasized that malaria is a serious threat that travellers and tourists should be prepared for. The most common protection against malaria is to avoid areas where the female mosquitoes live (Chandler, Whitty, and Ansah 2010; Dondorp, Nosten, Yi, Das, Phyo, and Tarning 2009; AJBR 2006; Freedman 2008).

Riverbanks, streams and ponds are likely to contain a large number of mosquitoes and should be avoided. Travel during dusk and early hours of the evening should also be avoided. This is because the feeding habits of female mosquitoes are dependent on their breeding patterns. The Female *Anopheles* mosquitoes feed during night time and lay their eggs in the early hours of dawn (Nosten, Yi, Das, Phyo, and Tarning 2009).

Female *Anopheles* Mosquitoes are more active during the late hours of the afternoon and during night time because these are the parts of the day where they lay their eggs.

During these times, it is advisable to stay within their chosen accommodation and put on insect repellents to ward of these insects (Chandler, Whitty, and Ansah 2010; Dondorp, Nosten, Yi, Das, Phyo, and Tarning 2009; AJBR 2006; Freedman 2008).

The attire chosen for the trip should also be considered. It is advised that travellers to malaria endemic places should bring light, long sleeved shirts and pants to lessen the area of exposed skin that can be bitten. The pants should ideally grip the ankle, and shirts should also cover most of the neck when possible (Freedman 2008). An insecticide spray can also be used to spray rooms to ensure that no mosquitoes can stay in places such as wardrobes, trash bins and below desks and tables. Prophylactic medications against malaria can also be administered (CDC 2010; WHO 2010; Dondorp, Nosten, Yi, Das, Phyo, and Tarning 2009)

Reminder: If malaria is prevalent in your country of destination, take the necessary precautions. Avoid being bitten by mosquitoes, and immediately consult the nearest hospital when symptoms appear.

Have a nice trip!

The frequency of scabies among patients attending the dermatology department in Erbil, Iraq

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Abstract

Background: Scabies is a severely itchy parasitic infestation of the skin affecting all social classes and is endemic in resource-poor communities. Data about its prevalence in Iraq are limited.

Objective: The aim of this study is to determine the frequency of scabies infestation among patients attending the department of dermatology and venereology at Rizgary teaching hospital in Erbil city, Iraq.

Methods: This study is a hospital-based cross sectional descriptive study conducted over a six month period. Patients with scabies were identified, a complete history and physical examination was done and diagnosis was confirmed by microscopic examination of skin scraping.

Results: The frequency of scabies was 4.48%. Out of this 56.2% were female and 43.8% were male. The highest frequency of scabies was among patients aged 21-50 years (55.8%) and the lowest was among infants (1.6%). The duration of the condition varied from one week to more than 16 weeks. Family history was positive in 82.1%.

Conclusion: Scabies is a common dermatologic problem and public health measures should be undertaken to control the infestation.

Key words: Scabies, frequency, Erbil, Iraq.

Introduction

Scabies is an intensely itchy dermatosis caused by the mite Sarcoptes scabiei. The infestation occurs at all ages, but particularly in children. It is a common public health problem in poor communities and is widespread in many underdeveloped countries(1).

The hallmark of scabies is intractable pruritus, characteristically more severe at night. The itching, often disproportionately severe, is associated with lesions that initially appear on the web spaces, then the sides of the fingers, the flexor surfaces of the wrists, elbows and anterior axillary folds. Other common sites of lesions are the penis and scrotum, the areolae in women, the buttocks, and the sacral and periumbilical areas. Lesions may be eczematous and often are excoriated, but the pathognomonic lesion is the burrow, a short, wavy dark line (2). In adults, the scalp and face are usually spared, but in infants lesions are commonly present over the entire cutaneous surface(3). The typical history of pruritus with nocturnal exacerbations, and the distribution of the eruption of inflammatory papules, should suggest the diagnosis. Absolute confirmation can only be made by the discovery of burrows and microscopical examination. Dermatoscopy is useful for detecting burrows and visualizing their contents (4). In the past, scabies was attributed to poor hygiene. Most contemporary cases, however, appear in individuals with adequate hygiene who are in close contact with numbers of individuals, such as school children(5). Scabies affects all races and social classes worldwide, but accurate figures of its prevalence are difficult to obtain(4). The increasing incidence of scabies among our department patients and the increased burden of this disease among the population have prompted me to conduct this study. The aim of

this study is to determine the frequency of scabies among patients attending the department of dermatology and venereology at Rizgary teaching hospital in Erbil city.

Erbil is located in the northern part of Iraq; it is the fourth largest city in Iraq with a population of approximately 1.3 million and is the capital of Iraqi Kurdistan.

Patients and Methods

A hospital-based cross sectional descriptive study was conducted in the department of dermatology and venereology at Rizgary teaching hospital in Erbil city over a six month period from the third of March to the third of September 2012.

All patients who presented to the dermatology department were included in the study. Patients with a presumptive diagnosis of scabies were identified. Scabies was suspected if a patient showed a suspicious skin lesion accompanied by itching for at least one week. Data were collected by direct interview with the patients through a questionnaire and a thorough history was taken from all patients including the age, gender, duration of infestation, diurnal variation of the itching and exacerbation at night, family history of the same condition and the number of family members having itching at the time of diagnosis, previous treatments, history of recurrence of the condition and any associated diseases. Scabies is a pleomorphic eruption with different types of lesions. Lesions include papules, scales, vesicles, bullae, crusts, pustules, nodules and excoriations. The most characteristic lesion is the burrow, a wavy thread like or linear papule up to a centimeter in length with a small vesicle containing a black dot at the leading end (6). Patients were examined in a well-lighted room. Examination of the whole skin surface was done for the sites of predilection which include the finger webs, flexor surface of the wrists, extensor surface of the elbows, axillary folds, abdomen, particularly around the umbilicus, inframammary folds, lower part of the

buttocks, areola and nipples, penis and scrotum. Confirmation of the diagnosis was done by skin scraping which was performed by placing a drop of microscope immersion oil over the lesion and scraping off the epidermis over the suspected site of scabies infestation. The specimen was then placed on a microscope slide and examined by light microscopy for the demonstration of mites or eggs.

Statistical Analysis

All data gathered were entered into the Statistical Package for the Social Sciences (SPSS) database. Data analysis was conducted using version 20 SPSS, Chi square test was used to test the significance of association between variables and a P- value equal or less than 0.05 was considered statistically significant.

Ethical Considerations

The study was approved by the Research Ethics Committee of the College of Medicine, Hawler Medical University, Erbil, Iraq.

Informed verbal consent was obtained from each patient after an explanation of the objectives of the study. In the case of minors, parents or guardians were asked for the consent.

Results

During the six month period of the study the total number of patients attending the department of dermatology and venereology at Rizgary teaching hospital was 13,686; out of this number scabies was diagnosed in 614 (4.48%) patients. Of this total, 345 (56.2%) were female and 269 (43.8%) were male. Their age ranged from 3 month old infants up to 95 years. The lowest frequency of scabies was among infants; 1.6% while the frequency among children one to twelve years of age was 29.5% and patients aged 13-20 years had a frequency of 10.3%. The highest frequency of scabies was among patients aged 21-50 years; 53.5% and it was 5.5% in patients above 50 years of age. Table 1 (next page) shows the clinical characteristics of patients. The duration of the symptomatic

condition varied. Three hundred and thirty six (54.7%) patients had pruritus of less than 4 weeks duration and 149 (24.3%) patients had pruritus for 4-7 weeks. In 60 (9.8%) patients the duration of the pruritus was 8-12 weeks while 23 (3.7%) patients had pruritus for 13-16 weeks and pruritus of more than 16 weeks was present in 46 (7.5%) patients (Table 2). Family history was positive in 505 (82.1%) patients. The infestation was recurrent in 99 (16.1%) patients. Secondary bacterial skin infection was found in 32 (5.2%) patients. No significant association between patients age and duration was found (p= 0.500). A significant association was found between family history and duration as shown in Table 3 (p= 0.002).

Discussion

Despite being readily treatable, scabies remains a common dermatologic problem. This is because sometimes it is difficult both to diagnose and to ensure adequate treatment of patients and their contacts especially in a poor resource country like Iraq with deficiency in medical facilities and lack of patient follow up. The worldwide prevalence of scabies has been estimated to be about 300 million cases per year (7). Scabies remains a significant source of morbidity in nursing home residents and workers because of its highly contagious nature. It is also a problem in hospitals that care for the elderly, the debilitated, and the immunocompromised. New outbreaks continue to occur, despite controlling the recurrent epidemics (8).

Rizgary teaching hospital is the main governmental hospital in Erbil city and the majority of patients with dermatological problems are referred from primary health care centres to the dermatology and venereology department of this hospital. Epidemiologic studies have been conducted in our country. Although the prevalence rate found in our study (4.48%) was concordant with some of these results, it showed considerable differences from other studies. The prevalence of the

Characteristic	No. of patients (%)
Sex	
Male	269 (43.8)
Female	345 (56.2)
Age group	
< one year	10 (1.6)
1-12 years	182 (29.5)
13-20 years	63 (10.3)
21-50 years	327 (53.5)
>50 years	32 (5.5)

Table 1: Clinical Characteristics of Patients

Duration	No. of patients (%)
<4wk	336 (54.7)
4-7wk	149 (24.3)
8-12wk	60 (9.8)
13-16wk	23 (3.7)
>16wk	46 (7.5)

Table 2: The duration of scabies infestation

		Duration						
		<4 wk	4-7 wk	8-12 wk	13-16 wk	>16wk	Total	P-value
Family history	Negative	79	24	3	1	2	109	
	Positive	257	125	57	22	44	505	
Total		336	149	60	23	46	614	0.002

*Data are given as number of patients
Table 3: The relation between family history and duration*.

disease was reported as 3.3% in Basrah (9) (a large city located in the southern part of the country). In a survey done in a dermatology clinic in Tikrit (a small city located to the north of Baghdad), the frequency of scabies was 11.1% (10) which is high compared to ours but this study was conducted on a small number of patients (1,194) so it might not reflect the true prevalence of the disease in that area.

During the Iraq-Iran war scabies was the most common arthropod born disease among Iranian solders affecting 30% of them. According to evidence in documentary sources, scabies also was prevalent among Iraqi soldiers 11. The prevalence varies among different countries. In a Turkish study the prevalence rate of scabies was 0.4% (12). Very high figures were found in Pakistan (70.2%) (13). Scabies is known to affect people from all socioeconomic levels, including affluent populations,

if exposure occurs. Poverty and overcrowding, however, are often concomitant, and overcrowding is believed to have a significant effect on the spread of scabies, reflecting the fundamental role of physical contact in person-to-person transmission. Poverty also leads to other associated problems, such as poor nutritional status, which may in turn contribute to the immune status of the individual and the levels of disease within the community(14).

The disease was more common in female (56.2%) than male (43.8%) patients.

Similar results were found in other studies (10, 15) while different results were found by other investigators (16). No significant gender difference was found in other studies (17).

Scabies is most common in children and young adults, but may occur at any age(4). Fifty six percent of our patients were in the age group 21-50 years followed by children 1-12 years (29.5%). Our results were concordant with other investigators(18). In another Iraqi study the highest prevalence was in children followed by the age group 30 to 44 years (10).

The disease begins insidiously. Symptoms are minor at first and are attributed to a bite or dry skin. Scratching destroys burrows and removes mites, providing initial relief. The patient remains comfortable during the day but itches at night. Nocturnal pruritus is highly characteristic of scabies. Scratching spreads mites to other areas and after 6 to 8 weeks the once localized area of minor irritation has become a widespread, intensely pruritic eruption (5). Consequently in 54.7% of our patients the duration of the symptoms before seeking medical care was less than 4 weeks and in 7.5% the duration was for more than 16 weeks. This long duration could be due to misdiagnosis and to steroid application by patients, which is a common practice among our patients. If left untreated, scabies can continue for many months. Recurrence of symptoms after attempted treatment does not exclude the diagnosis of scabies because patients may not have treated themselves correctly or may have been reinfested by an untreated contact (1).

The relationship between scabies and relative levels of poverty, crowding, and hygiene within a household and a community is complex. Individual and population susceptibilities must also be considered, as must levels of exposure. In this study we found a positive family history in 82.1%

of patients. The high incidence of scabies in individual family groups indicates that transmission is likely mediated by close personal contact, such as sharing a bed. Sexual contact is a likely important means of transmission between adults (19). Other investigators found no evidence that household crowding or household scabies burden were associated with likelihood of acquiring scabies among these individuals (20). In this study 16.1% of the scabies contaminations were for the second time after treatment. In an Iranian study there was recurrence in 1.7% (18). With reinfestation, sensitization develops rapidly, and the associated lesions and pruritus are evident within 24 to 48 h (14). Most recurrences are likely to be due to reinfection from untreated contacts (19).

Bacterial superinfection of scabies occurs commonly, and, according to the context and geographical area, varies from 16% to 67% of the cases(21). Secondary bacterial infection was the initial presentation in 5.2% of our patients. This relatively low frequency could be due to the easy access of our patients to antibiotics. A significant association was found between family history and duration of pruritus (p= 0.002). The longest duration of itching was found among patients with a positive family history; 7.16% of them had pruritus for more than 16 weeks duration while 0.32% of patients with a negative family history had pruritus for more than 16 weeks. Early treatment of the first affected family member will limit the disease transmission and a lower likelihood of scabies acquisition will be expected when all close contacts receive treatment whether symptomatic or not while delayed treatment and absence of contact tracing will increase the chance of transmission among family members.

The limitation of this study is that it might not give the true incidence of the disease. Being a hospital-based study it might overestimate or underestimate the incidence. However, this relatively high frequency of the disease among

our department patients may reflect the impact of the problem on the community and the need for the formulation of public health control policies including educational programs, the provision of scabicidal drugs and contact tracing.

Conclusion

Scabies is a common dermatologic problem in our clinic; further studies are indicated to further assess the epidemiology of the disease in the community and to establish appropriate preventive health measures.

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Body mass index or body weight alone

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Abstract

Background: Excess weight and smoking may be the major underlying causes of metabolic syndrome.

Methods: Consecutive patients with coronary heart disease (CHD) were studied.

Results: Study included 1,620 females and 1,240 males. Prevalences of CHD were similar in both sexes (3.8% versus 4.4%, respectively, p>0.05). Smoking and chronic obstructive pulmonary disease (COPD) were higher in males with CHD (p<0.001 and p<0.05, respectively). Low density lipoprotein cholesterol (LDL-C) and triglyceride (TG) were higher in females (p= 0.008 and p= 0.002, respectively). Hypertension (HT) and diabetes mellitus (DM) were higher in females, too (p<0.001 and p<0.05, respectively). WCH was also higher in females, but the difference was nonsignificant probably due to the small sample sizes (p>0.05). Although body weight of males with CHD was significantly higher (79.1 versus 74.4 kg, p= 0.027), females had a higher BMI value (29.7 versus 28.3kg/m2, p>0.05), but the difference was nonsignificant probably due to the above reason again.

Conclusion: Metabolic syndrome is a systemic atherosclerotic process mainly caused by aging, excess weight, and smoking. Smoking and excess weight come with a similar degree of clinical severity. CHD, as a major consequence of the syndrome, is seen with similar prevalences in both sexes with the higher prevalence of smoking in males against the higher prevalences of BMI and its consequences including LDL-C, TG, WCH, HT, and DM in females. Although body weight is higher in males, BMI and its consequences are higher in females, thus BMI should be preferred to determine excess weight rather than weight alone.

Key words: Body mass index, body weight, atherosclerosis, metabolic syndrome

Introduction

A causative relationship between systemic atherosclerosis and excess weight, smoking, and aging has been known for many years under the title of metabolic syndrome (1-4). The syndrome is characterized by a low-grade chronic inflammatory process, probably initiated in early life (5), and it can probably be slowed down during the early phases with appropriate nonpharmaceutical approaches including lifestyle changes, diet, and exercise (6). But probably the syndrome cannot be prevented completely, since aging alone may be one of the significant facilitator factors of the systemic atherosclerosis. The metabolic syndrome may contain early reversible indicators including white coat hypertension (WCH), impaired fasting glucose (IFG), impaired glucose tolerance (IGT), hypertriglyceridemia, hyperbetalipoproteinemia, dyslipidemia, overweight, and smoking for the development of irreversible diseases including obesity, hypertension (HT), diabetes mellitus (DM), chronic obstructive pulmonary disease (COPD), peripheric artery disease (PAD), coronary heart disease (CHD), and stroke (7-9). In another view, the syndrome may be the most common and complex disease of human life, decreasing its quality and duration. The metabolic syndrome has become increasingly common all over the world, and the syndrome induced symptomatic atherosclerosis is probably the leading cause of death for both sexes. For example, CHD is the leading cause of death in developed countries. During the average life span, males and females probably have the same risk of mortality from CHD (8). Although CHD may be equally seen in both sexes, there may be some gender differences in the underlying risk factors of the CHD. We tried to understand significance of the body weight alone or BMI in determination of excess weight in the metabolic syndrome on male and female CHD cases in the present study.

Material and Methods

The study was performed in the Internal Medicine Polyclinic of the Dumlupinar University between August 2005 and March 2007. We took consecutive patients applying for any reason at and above the age of 15 years. Their medical histories including smoking habit were learnt, and a routine check up procedure including fasting plasma glucose (FPG), low density lipoprotein cholesterol (LDL-C), triglyceride (TG), and an electrocardiography was performed. Current smokers with six pack-months and cases with a history of five pack-years were accepted as smokers. COPD was diagnosed via the pulmonary function tests in suspected cases in which the ratio of forced expiratory volume in the first second of expiration to forced vital capacity is lower than 70%. Body mass index (BMI) of each case was calculated by the measurements of the same physician instead of verbal expressions. Weight in kilograms is divided by height in meters squared (10). Cases with an overnight FPG level of 126 mg/dL or greater on two occasions or already using antidiabetic medications were defined as diabetics. An oral glucose tolerance test with 75-gram glucose was performed in cases with a FPG level between 110 and 125 mg/dL, and diagnosis of cases with a two-hour plasma glucose level of 200 mg/dL or higher is DM. An office blood pressure (OBP) was checked after a 5-minute rest in seated position with a mercury sphygmomanometer on three visits, and no smoking was permitted during the previous two hours. A 10-day twice daily measurement of blood pressure at home (HBP) was obtained in all cases, even in normotensives in the office due to the risk of masked HT after education about proper BP measurement techniques (11). A 24-hour ambulatory blood pressure (ABP) monitoring was not required due to its equal effectiveness with HBP measurements (12). Eventually, HT is defined as a mean HBP value of 135/85 mmHg or greater, and WCH as an OBP of 140/90 mmHg or greater, but a mean HBP value of lower than 135/85 mmHg (11). A stress electrocardiography was

performed in cases with an abnormal electrocardiography and/or history of angina pectoris. A coronary angiography was obtained just for the stress electrocardiography positive cases. So CHD was diagnosed either angiographically or with a history of coronary artery stenting and/or coronary artery bypass graft surgery. Eventually, all cases with CHD were divided into two groups according to gender distribution, and the mean age, weight, BMI, LDL-C, and TG values and prevalence of smokers, COPD, WCH, HT, and DM were compared. Mann-Whitney U test, Independent-Samples T test, and comparison of proportions were used as the methods of statistical analyses.

Results

The study included 1,620 females and 1,240 males, totally. Mean ages were 41.7 and 40.8 years, respectively (p>0.05). Prevalence of CHD was similar in both sexes (3.8% versus 4.4%, respectively, p>0.05) (Table 1). Mean ages of the CHD cases were 61.5 versus 63.5 years in females and males, respectively (p>0.05). Prevalence of smoking was significantly higher in males with CHD (54.5% versus 9.6%, p<0.001). Prevalence of COPD was also higher in males (18.1% versus 6.4%, p<0.05). On the other hand, the mean LDL-C and TG values were significantly higher in the females (132.6 versus 115.6 mg/dL, p= 0.008 and 250.3 versus 150.1 mg/dL, p= 0.002, respectively). Similarly, prevalence of HT and DM were significantly higher in females, too (58.0% versus 30.9%, p<0.001 and 51.6% versus 38.1%, p<0.05, respectively). Prevalence of WCH was also higher in females, but the difference was nonsignificant probably due to the small sample sizes (30.6% versus 23.6%, p>0.05). As the most surprising result, although the mean weight of males with CHD was significantly higher (79.1 versus 74.4 kg, p= 0.027), the females with CHD had a higher mean value of BMI (29.7 versus 28.3 kg/m2, p>0.05), but the difference was statistically nonsignificant probably due to the small sample sizes of the groups again.

Variables	Males with CHD*	Females with CHD	p-value
Prevalence	4.4% (55/1,240)	3.8% (62/1,620)	ns†
Mean age (year)	63.5 ± 10.8 (43-82)	61.5 ± 11.2 (42-88)	ns
Prevalence of smokers	*54.5% (30)*	*9.6% (6)*	*<0.001*
Prevalence of COPD‡	*18.1% (10)*	*6.4% (4)*	*<0.05*
Mean weight (kg)	*79.1 ± 12.9 (58-116)*	*74.4 ± 18.7 (42-129)*	*0.027*
Mean BMI§ (kg/m²)	28.3 ± 4.7 (20.6-46.9)	29.7 ± 6.7 (19.0-48.6)	ns
Mean LDL-C‖ (mg/dL)	*115.6 ± 38.5 (43-192)*	*132.6 ± 47.3 (10-232)*	*0.008*
Mean TG¶ (mg/dL)	*150.1 ± 113.4 (53-594)*	*250.3 ± 233.9 (81-1380)*	*0.002*
Prevalence of WCH**	23.6% (13)	30.6% (19)	ns
Prevalence of HT***	*30.9% (17)*	*58.0% (36)*	*<0.001*
Prevalence of DM****	*38.1% (21)*	*51.6% (32)*	*<0.05*

*Coronary heart disease †Nonsignificant (p>0.05) ‡Chronic obstructive pulmonary disease §Body mass index ?Low density lipoprotein cholesterol Triglyceride **White coat hypertension ***Hypertension ****Diabetes mellitus
Table 1: Characteristic features of the study cases

Discussion

Probably aging, excess weight, and smoking are the main underlying causes of the metabolic syndrome (13). Actually the syndrome is a collection of risk factors for the development of systemic atherosclerosis, and symptomatic atherosclerosis is probably the leading cause of death for human beings. So definition of the syndrome includes both reversible signs including overweight, smoking, WCH, IFG, IGT, hypertriglyceridemia, hyperbetalipoproteinemia, and dyslipidemia and terminal diseases including aging, obesity, HT, DM, CHD, PAD, COPD, and stroke (14,15). For example in a previous study (16), prevalence of hypertriglyceridemia, hyperbetalipoproteinemia, dyslipidemia, IGT, and WCH showed a parallel fashion to excess weight by increasing until the seventh decade of life and decreasing afterwards (p<0.05 nearly in all steps). On the other hand, prevalence of HT, DM, and CHD always continued to increase by aging without any decrease (p<0.05 nearly in all steps) indicating their irreversible properties (16). After development of one of the terminal diseases, nonpharmaceutical approaches will provide little benefit to prevent development of the others probably due to cumulative effects of the risk factors on systems for a long period of time (14,15). According to our opinion, obesity should be included among the irreversible final diseases since after development of obesity, pharmaceutical and nonpharmaceutical approaches will provide little benefit either to heal obesity or to prevent its complications.

Excess weight probably leads to a chronic and low-grade inflammatory process in many systems, especially the endothelial system as the largest system of the body, and risk of death from all causes, including cardiovascular diseases and cancers, increases parallel to the range of moderate to severe weight excess in all age groups (17). The effects of weight on BP were also shown previously that the prevalence of sustained normotension (NT) was significantly higher in the underweight (80.3%) than the normal weight (64.0%) and overweight cases (31.5%, p<0.05 for both) in a study (18), and 55.1% of cases with HT had obesity against 26.6% of cases with NT (p<0.001) in another study (19). So the dominant underlying risk factor of the metabolic syndrome appears as an already existing weight or a trend towards excess weight, which is probably the main cause of insulin resistance, dyslipidemia, IFG, IGT, and WCH (6). Even prevention of the accelerating trend of weight with diet or exercise, even in the absence of a prominent weight loss, will probably result with resolution of many parameters of the metabolic syndrome (20-21). But in our opinion, limitation of excess weight as an excessive fat tissue in and around abdomen under the heading of abdominal obesity is meaningless, instead it

should be defined as overweight or obesity via BMI, since adipocytes function as an endocrine organ that produces a variety of cytokines and hormones anywhere in the body (6). The resulting hyperactivity of sympathetic nervous system and renin-angiotensin-aldosterone system is probably associated with chronic endothelial inflammation, elevated BP, and insulin resistance. Similarly, the Adult Treatment Panel III reported (10) that although some people classified as overweight have a large muscular mass, most of them also have excess fat tissue, and excess weight does not only predispose to CHD, stroke, and numerous other conditions, it also has a high burden of other CHD risk factors including type 2 DM, HT, and dyslipidemia. As the most surprising result of the present study, excess weight should be defined as a higher BMI rather than a higher body weight alone, since although the higher body weight of the males with CHD, the BMI and its terminal consequences including higher LDL-C, TG, WCH, HT, and DM were observed in females with CHD.

As also observed in the present study, smoking alone may be one of the major underlying causes of the systemic atherosclerotic process. Smoking-related diseases kill one in every ten adults globally, and it will kill one in every six by 2030 (22). It is a major risk factor for the development of cardiovascular diseases especially CHD (23). Although the known strong atherosclerotic effect of smoking, some studies reported that smoking in humans and nicotine administration in animals are associated with a decreased body weight (24). Evidence revealed an increased energy expenditure while smoking both on rest and light physical activity (25), and nicotine supplied by patch after smoking cessation decreased caloric intake in a dose-related manner (26). According to an animal study, nicotine may lengthen intermeal time and simultaneously decrease amount of meal eaten (27). Additionally, body weight seems to be the highest in former, the lowest in current and

medium in never smokers (28). Smoking may be associated with postcessation weight gain, but evidence suggests that risk of weight gain is the highest during the first year after quitting and declines over the years (29). Similarly, although CHD was detected with similar prevalences in both sexes in the present study, prevalences of smoking and COPD were higher in males against the higher prevalences of BMI and its complications including WCH, LDL-C, TG, HT and DM in females. This result may indicate both the weight decreasing and strong atherosclerotic effects of smoking. Similarly, the incidence of a myocardial infarction is increased sixfold in women and threefold in men who smoke at least 20 cigarettes per day compared to the never smoked cases (30). In other words, smoking is more harmful for women about CHD probably due to the associated higher BMI and its consequences in women. Similar to our results, the proportion of smokers is consistently higher in men in the literature (23). So smoking is probably a powerful athersclerotic risk factor with some suppressor effects on appetite. But smoking, as a pleasure in life, may also show the weakness of volition of the individuals to control eating in the metabolic syndrome, so it may indicate additional risk of excess weight and its complications although there are some inhibitory effects on appetite. Similarly, prevalences of HT, DM, and smoking were the highest in the highest TG having group as a significant indicator of the metabolic syndrome in a previous study (15).

As a conclusion, metabolic syndrome is a systemic atherosclerotic process mainly caused by aging, excess weight, and smoking. Smoking and excess weight come with a similar degree of clinical severity. CHD, as one of the major consequences of the syndrome, is seen with a similar prevalence in both sexes with the higher prevalence of smoking in males against the higher prevalence of BMI and its consequences including LDL-C, TG, WCH, HT, and DM in females. Although the body

weight is higher in males, BMI and its consequences are higher in females, thus BMI should be preferred to determine excess weight rather than the body weight alone.

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