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The hope of new life

Editorial

This is the first issue this year for the journal. The issue is rich with papers from the region including Turkey, Pakistan, Saudi Arabia, Sultanate of Oman, Qatar, and Yemen with a rich content. I would like to wish our authors, readers, editorial board and production staff headed by our publishing manager a happy start of the year.

Basheikh et al., did a cross-sectional study looking at the Perception of Saudi Older Adults about Themselves and their Health in Makkah Region. The study included 328 Saudi participants aged 60 years and above who lived in the Makkah region from July 2019 to June 2020. For data collection, we used the Canadian Study of Health and Aging questionnaire (CSHA). Most of our participants (82.01%) perceived their health as "very or pretty good," which was statistically significant with income ($p = 0.01$), age ($p < 0.01$), and marital status ($p = 0.03$). In addition, 60.37% were happy with their life; however, this perception only positively correlated with health ($p < 0.001$) and income ($p = 0.001$). The authors concluded that Overall, most Saudi older adults, regardless of age, gender, marital status, income, and multiple comorbidities, had a positive perception of life because of socioeconomic factors and an efficient healthcare system.

El-Gamal et al., conducted a cross-sectional survey using google forms sent to residents in Jeddah to explore the burden of stress, anxiety, and depression in adult population and to explore its associated socioeconomic, and clinical determinants. Depression (62.9%), Anxiety (62.6%) and Stress (47.7%) were common among the studied subjects. The authors concluded that Despite achievements in education, health care, and economic development of Saudi population over the past 3 decades, the trend of these disorders has alarmingly been increased. Considering the findings, it is necessary to develop appropriate community-based primary and secondary mental health prevention programs. More researches, about this issue, in different regions of the Kingdom need to be conducted.

Alqahtani, et al., investigated the perceptions of mentees' and mentors' concerning their experience. 67% of students (mentees) benefitted from mentoring. One to one mentoring was preferred by most students (82.5%). Only 68.6% of students had satisfactory contact with their tutors. The authors concluded that Attendance is essential for both the mentoring relationship and the amplification of the program. Mentors are motivated in curriculum development and teaching due to students' involvement in the activity; thus, a virtuous circle is created, leading to benefit the whole undergraduate medical education.

Bajaber et al., used a case control study to assess the association and factors affecting the presence of osteoporosis among postmenopausal Saudi women. Participants with at least one interpregnancy interval < one year had a significantly higher percentage of those belonging to cases. Cases had a significant higher mean number of inter-pregnancy interval less < one-year, lower T-score and lower Z-score compared to controls. The authors concluded that females in reproductive age should be educated about the importance of long IPI and the relation between short IPI on PMOP.

There are two papers on Covid 19., Jaffar et al., did a descriptive cross sectional study to determine the knowledge, practices, availability of personal protective equipment to health care providers and hindrance to delivering health care facilities during the COVID-19 pandemic. The authors concluded that the study recorded lack of knowledge about newly emerged COVID-19 pandemic among health care workers. Shortage of ventilators, testing kits and personal protective equipment was noted in many hospitals and departments. Lack of personal protective equipment and insufficient training in infection control management may act as barriers in delivering health care during COVID-19. TOKTAMIŞ et al., consider the question whether measles immunization lead to immunization for COVID-19? Cases diagnosed with COVID-19 through reverse transcriptase polymerase chain reaction (RT-PCR) at Başkent University Alanya Research and Training Center. The Rubeola IgG and IgM levels of the patients and the rubeola IgG levels of the health staff carried out for screening and who had been admitted to the immunization outpatient clinic in December 2019 as the control group were compared. The Rubeola IgG levels were found to be significantly higher in the COVID-19 group compared to the control group.

El-Gamal, et al., explored the impact of age on the clinical aspects and management of patients with rheumatoid arthritis, among adults, in Saudi Arabia. A cross-sectional survey was conducted, online, using Google form which was sent to patients with Rheumatoid arthritis, in Jeddah, Saudi Arabia. Rheumatoid Arthritis occurred in 41.8% of the patients before the age of 20 years, in 28.7% by the age of 20 to < 30 years, in 20.5% by the age of 30 to < 40 years, and in 9% by the age of 40 years and older. The authors conclude that rheumatoid arthritis, did not appear to be an old age disorder; it was common before the age of 20 years. Clinical picture and lines of management differed among different age groups. This evaluation raised questions for future studies and improved care for RA. Extrapolation of these differences, and also lack of access to care, may help health care providers to implement a promotional strategy to address this health care issue.

Ibraheem et al., from Iraq had two papers on diabetes which is quite prevalent in the region. In the first paper they did a descriptive case control study to assess the effect of duration of type 2 diabetes mellitus on the serum electrolyte disturbances. HbA1c test and serum sodium were assessed in both diabetic patients and controls. Poor glycemic control was observed among 84% of diabetic patients with a highly significant difference in HbA1c level between diabetic patients and healthy controls ($p<0.001$). the authors concluded that hypernatraemia and hypocalcemia are frequent clinical entities of type2 diabetic patients. The second paper is a descriptive case control study aims at evaluation of the effect of body mass index (BMI) on serum electrolyte disturbances in diabetic patients. A convenient sample of 100 diabetic patient compared with 100 healthy controls. The authors concluded that hypocalcaemia is frequent clinical issue of type 2 DM patients. Serum calcium of type 2 DM patients is more likely to be inversely related with body mass index of the patients. No significant differences were observe between diabetic patients and healthy control regarding serum potassium level.

Saleh et al., attempt to determine the occurrence of Becker nevus among Yemeni patients and to define its clinical characteristics. During the study period, 84 patients were diagnosed with Becker nevus in our private clinic. The female to male ratio was 2:1 (F= 66.7% vs. M= 33.3%). The authors concluded that Becker nevus is a common condition among Yemeni patients in our series of 84 patients. Females were more commonly affected. The most common sites of involvement were the shoulders and chest. About a third of patients had associated hypertrichosis whereas breast

TOKTAMIŞ et al., did a systemic review to asses burnout among Turkish Physicians Introduction and objectives: By evaluating systematically and collectively of studies examining burnout and accompanying factors of physicians in Turkey. A total of 12598 physicians were evaluated in the surveys. The authors concluded that there is a low level of EE, DP and a highly decrease in the sense of PA in physicians working in Turkey. The overall burnout iis not very high, but also is not very low. Female physicians appear to be at higher risk for EE sub-dimension.

Alnaemi, et al., did a systematic review synthesizes the differences in the EMG activation during different hip position in order to better understand the role of specific hip position in recruiting and activating hip muscle. The authors found that several previous conducted studies show the association between hip muscles activity and lower limbs pathology by evaluating the EMG. Current review aims to evaluate the differences in electromyographic activation with different hip position activities. Limited evidence by an absence of control, low sample size and heterogeneity in methodological design. Further research evaluating the value of different hip position and to rank the best hip position in activating and targeting hip musculature is needed.

Alenazy et al did a cross sectional study looking at the Effect of obesity stigma on obese people, Saudi Arabia, 2020 . A pre-designed questionnaire was used to collect data about exposure to negative behavior by others because of obesity, ways and sources in which participants face discrimination and prejudice and were asked about their feelings and effect of obesity on their life and daily activities. in many times because of obesity 25.6% of the participants were exposed to negative behavior by others, 18.2% were exposed to bad comments from children, 25.2% were exposed to physical barriers and 25.4% exposed to bad comments from the family. The authors concluded that obese individuals should be health educated to accept themselves and in the national discourse on obesity, the weight stigma must be discussed.

Saleh et al. , did a descriptive cross-sectional study aimed to assess public awareness regarding antihistamines and its prescription in PHCCs in Abha City, Saudi Arabia. The study included 800 participants whose ages ranged from 18 to 55 years with mean age of 27.5 ± 10.9 years old. Majority of participants were females (73.5%; 588). As for known formulas of antihistamines, pills were the most reported formula (98.5%) followed by syrup (7.8%), nasal spray (3.8%), and eye drops (2.4%). Exactly 420 (52.5%) of the participants previously had antihistamines without prescription. The main cause of that was being available. (82.6%). The authors concluded that public awareness regarding antihistamines was very poor especially concerning its types, and clinical effects. Also, unprescribed utilization of antihistamines was very high due to its availability and easily achieved

Alammar et al., used a cross sectional approach to assess social media utilization and its impact on mental health among medical college students in Abha city. The study included 311 students whose ages ranged from 17 to 29 years old with mean age of 22.8 ± 2.1 years. Female figured 64.6% of the participants and 90.7% of the students were not married. About 28.6% of the students were in the pre-clinical grades and 14.5% were interns. The study revealed that medical college students used social media platform intensively with reported high insomnia rate and poor mental health for half of them.

Alzeer et al., conducted a cross-sectional community-based study to evaluate awareness of the effects of combining smoking and oral contraceptives on cardiovascular health among Saudi working women. The study population consisted of 301 women who responded and answered the questions, with an age range of 21–30 years. While 77 (25.6%) women were using OCs, only 13 (4.3%) were both smokers and users of OCs. Overall, 256 (85.0%) women believed that smoking increases CVH risk. The authors concluded that the majority of the respondents were not aware of the effects on CVH when combining smoking and the use of OCs. Public health awareness on this matter among Saudi women is therefore warranted.

Sumathipala S., reviewed the management of subclinical hypothyroidism in primary care. He stressed that subclinical hypothyroidism (SCH) is a relatively common condition, and it increases with age. A proportion of SCH patients will go on to develop overt hypothyroidism. Furthermore, there is concern that SCH increases the likelihood of extra thyroidal illness, such as cardiovascular disease. The diagnosis of SCH is a biochemical one, and given the frequent use of blood tests where thyroid function may be one component, the primary care clinician needs to understand what to do when a patient appears to have SCH. There are a variety of guidelines about the management of SCH for non-pregnant adults. The clinician needs to be aware that certain conditions can cause transient aberrations of thyroid blood test, and of those with persistent SCH, which patients might benefit from treatment and which ones would be better served with observation over time.

Al-Jadidi, S., reviewed Psychoanalysis from the Islamic religion point of view. Religion is an important constituent of a person's identity, whether it is an identity or an ethnicity. All religions share some common features that affect the analyst and the analysand's reactions (1). All major religions contain ideas about human motivation, interpersonal relations, and moral behavior that reflect a specific view of human nature (3). Many psychoanalysts have focused on religion's impact on therapy; both positive and negative. And some psychoanalysts and psychoanalytic thinkers have written more recently on Islam. They conclude that the outcome of the psychoanalysis of Muslim patients may go either very well or very poorly, and that Islam, per se, presents no major obstacle to psychoanalysis.

Ashfaq et al., conducted a cross sectional survey at family medicine clinics of Aga Khan University Hospital Karachi, Pakistan . The aim of this study is to assess the knowledge and practices of mothers regarding prevention of common accidents among preschool children in Karachi-Pakistan. Most of the mothers (79%) were between the ages of 31-40 years and were house wives. Children whose mothers were uneducated had a higher incidence of injuries. The most common types of accident among children were falls (88%) and approximately 90% of the mothers did not taught traffic rules to their children. The authors concluded that home-related injuries may lead to many health problem and their prediction and prevention are necessary to prevent from any major health hazards. This study concludes that majority of mothers have inadequate knowledge and improper practice on prevention of accidents among preschool children. There is a strong need to improve knowledge and awareness of mothers regarding home related injuries.

Issa et al., conduced a cross-sectional study on 150 medical interns using the WHO quality of life questionnaire. The aim is to assess the HQQOL of medicals interns in KSA and the relation between HRQOL and participants' characters. 39.3% and 24.7% of the participants were satisfied and very satisfied with their health respectively. Females had a significant higher score of Domain 1 (Physical health) compared to males, while married participants had a significant higher score of Domain 2 (Psychological health). The authors concluded that as the lowest scores in this study was for the Domain of social relationships and environmental health, there is a need to provide support of medical intern to cope with factors influencing their QOL through more assessment and training session done by specialists.

Perception of Saudi Older Adults about Themselves and their Health in Makkah Region

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Abstract

Background: The Saudi Arabian population increases as the world population increases. With the improvements in the healthcare system, the aging Saudi population, specifically at the age of 60 years and above, is increasing and is projected to reach 2 million in 2050. We aimed to address this issue by evaluating Saudi older adults (≥60 years old) perception of themselves and their subjective health compared with their current health status.

Method: This cross-sectional study included 328 Saudi participants aged 60 years and above, who lived in the Makkah region, from July 2019 to June 2020. For data collection, we used the Canadian Study of Health and Aging questionnaire (CSHA), which was sent to the participants or their caregivers if they could not answer it by themselves. Correlations between variables were assessed using bivariate analysis.

Result: Most of our participants (82.01%) perceived their health as "very or pretty good," which was statistically significant with income ($p = 0.01$), age ($p < 0.01$), and marital status ($p = 0.03$). In addition, 60.37% were happy with their life; however, this perception only positively correlated with health ($p < 0.001$) and income ($p = 0.001$). Most of them (89.94%) were also satisfied with their life; this outlook positively correlated with age ($p = 0.02$), income ($p = 0.019$), health ($p < 0.001$), and comorbidities ($p = 0.026$).

Conclusion: Overall, most Saudi older adults, regardless of age, gender, marital status, income, and multiple comorbidities, had a positive perception of life because of socioeconomic factors and an efficient healthcare system.

Key words: elderly, Saudi Arabia, self-perceived health

Introduction

The Saudi Arabian population continues to increase as the world population increases(1). In particular, the country's aging population has increased because of the tremendous improvement in the healthcare system(2). In 2010, the overall aging Saudi population over 60 years of age was 937,902, which is projected to reach 2 million in 2050(3).

Therefore, healthcare professionals need to implement practices necessary for proper geriatric care(2). Such practices must be in accordance with the older adults' needs and the expected growth in healthcare demand(2). To cater to the needs of older adult patients, the healthcare professionals must have knowledge of their patient's subjective health in addition to the observed health status (4). The World Health Organization (WHO) defines health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity(5). The concept of well-being is difficult to assess and may be interpreted in various ways because individuals assess their own lives differently (e.g., psychological, physical, and socioeconomic status)(6). However, considering the patients' well-being is crucial because it is related to their health. Both may potentially impact their quality of life (QoL)(6).

Negative attitude affects QoL, physical function, and health (7). Ounpuu et al. reported that people with negative attitude are less likely to seek preventive health care but more likely to require emergency treatment(8). An intervention study involving older people suggested that subliminal exposure to positive age stereotypes strengthens positive self-perceptions of aging, leading to improved health(9).

Perception of older adults about themselves and their own health is insufficiently investigated in Makkah region, Saudi Arabia. In addition, most studies focused on one center with a smaller sample size. Meanwhile, our research has a larger sample size and focuses on older adults' general perception of their own overall health. Our participants lived in Makkah region of Saudi Arabia.

This questionnaire-based study aimed to address this concern by assessing how the Saudi older adults (≥ 60 years of age) perceive themselves and their subjective health compared with their current health status.

Methods

This cross-sectional study, which was authorized by the institutional review board of King Abdulaziz University, was conducted among older adults aged ≥60 years living in Makkah region, Saudi Arabia, from July 2019 to June 2020. The Kingdom of Saudi Arabia defines geriatric age as 60 years old according to the regulation from the Ministry of Human Resources and Social Development. We used the Canadian Study of Health and Aging questionnaire (CSHA) as a reference and modified its questions to assess the quality of health among these participants. Data were collected by sending the questionnaire to the older adults or their caregivers if they could not answer the questionnaire by themselves. From 500 participants who answered the questionnaire, only 328 participants were recruited according to the following inclusion criteria: 1) Saudi nationality, 2) lives in Makkah region, and 3) ≥60 years of age. Those who did not meet the inclusion criteria were excluded.

The questionnaire included information about patients' demographic data (age, gender, marital status, and regional name). No names were obtained to maintain participants' confidentiality. It also included the general health status, psychological state, risk of fall, chronic disease(s) (hypertension [HTN], diabetes mellitus [DM], rheumatoid arthritis, and osteoarthritis), cardiovascular diseases (arteriosclerosis, heart failure, myocardial infarction [MI], etc.), neurological diseases (stroke, Parkinson's disease, etc.), respiratory diseases (pneumonia, tuberculosis [TB], asthma, etc.), gastrointestinal diseases, ear diseases, ophthalmological diseases, orthopedic problems (back pain and fractures), bladder and bowel control problem, and cancer.

The questionnaire was designed on Google Forms. Then, the data were exported to Microsoft Excel 2016. Statistical data were analyzed using SPSS software package version 21.0 (SPSS Inc., Chicago, IL, USA).

All categorical data (frequency and percentage) underwent descriptive statistical analysis. Meanwhile, bivariate analysis was performed between demographic data, health, happiness, life satisfaction, comorbidities, income, and life prediction.

Results

We recruited 328 participants (male, 50%; female, 50%), who were divided into three age groups: 60–69 (71.0%), 70–79 (20.4%), and >80 (8.5%) groups. Additionally, 74.7% of the participants were married (Table 1).

We asked how the participants perceive their health these days. Overall, 82.01% said "Very or pretty good," of which 86.7% were from the 60–69 group and 100.0% from the never married group. Participants who said "Not too good" accounted for 15.24%; most (39.3%) were from the ≥80 group, and 28.2% were divorced/separated/widowed. Participants who said "Very or pretty poor" accounted for 2.13%; most of them (4.5%) were from the 70–79 group, and 2.8% were divorced/separated/widowed. These results showed $p < 0.01$ and $p = 0.03$ for age and marital status, respectively (Table 2).

Both genders, mostly male (82.9%), agreed that their health these days was "Very or pretty good" (82.01%). Furthermore, 15.24% said "Not too good," and most of them were female (17.7%). Finally, participants who said "Very or pretty poor" accounted for 2.13%, and most of them were male (3.7%). These results were not significant ($p = 0.15$) (Table 2).

In terms of income, 82.01% of the participants perceived their health as "Very or pretty good," and most of them had "Very well" income (88.3%). Participants who said that their health was "Not too good" accounted for 15.24%, with the majority having "Inadequate" income (25.0%). Participants who said that their health was "Very or pretty poor" accounted for 2.13%; and most of them had "Inadequate" income (12.5%). These results were significant (p = 0.01) (Table 2).

Regarding the correlation of participants' happiness with age and marital status, 60.37% said "Yes"; most of them (61.8%) were from the 60–69 age group, and 61.6% were married. Participants who said "No" accounted for 39.63%; most of them (50.0%) were from the ≥80 group, and 43.7% were divorced/separated/widowed. These findings revealed no significance (p = 0.49 and p = 0.72 for age and marital status, respectively) (Table 3).

We compared the participants who said they were happy with their income and those who were not. Participants who said "Yes" accounted for 60.37%; in particular, most of them answered "Very well" (68.5%), followed by "Adequate" (63.2%), "With some difficulties" (42.1%), and "Inadequate" (33.3%). In contrast, participants who said "No" accounted for 39.63%; most of them said "Inadequate" (66.7%), followed by "With some difficulties" (57.9%), "Adequate" (36.8%), and "Very well" (31.5%). The results demonstrated to be significant (p = 0.001) (Table 3).
We also compared those participants who said they were happy with their health these days and those who were not. The overall participants who said "Yes" accounted for 60.37%; most of them said "Very or pretty good" (65.4%), followed by "Don't Know" (DK) (50.0%), "Not too good" (40%), and "Very or pretty poor" (14.3%). Meanwhile, those who said "No" accounted for only 39.63%; most of them said "Very or pretty poor" (85.7%), followed by "Not too good" (60.0%), "DK" 50.0%, and "Very or pretty good" (34.6%). The results were significant (p < 0.001) (Table 3).

Regarding the correlation of participants' life satisfaction with age and marital status, 89.94% said "Yes"; the majority (92.9%) belonged to the ≥80 age group, and 91.7% were never married. Conversely, 10.06% said "No"; the majority (19.4%) belonged to the 70–79 age group, and 11.3% were divorced/separated/widowed. The results were significant for age (p = 0.02) but not for marital status (p = 0.917) (Table 4).

Both genders agreed on life satisfaction and said "Yes," accounting for 89.94% (male, 89.0%; female: 90%), and only 10.06% said "No," demonstrating no significance (p = 0.582) (Table 4).

Moreover, we compared participants' satisfaction with their income. Participants who said "Yes" accounted for 89.94%; most of them answered "Very well" (94.6%), followed by "Adequate" (90.3%), "With some difficulties" (84.2%), and "Inadequate" 75.0%. Only 10.06% answered "No"; most of them said "Inadequate" (25.0%), followed by "With some difficulties" (15.8%), "Adequate" (9.7%), and "Very well" (5.4%). The results were significant (p = 0.019) (Table 4).

We compared the participants who said they were satisfied with their life or not with their health these days. Participants who said "Yes" accounted for 89.94%; most of them said "Very or pretty good" (94.1%), "Not too good" (80.0%), "DK" (50.0%), and "Very or pretty poor" (14.3%). Moreover, 10.06% responded "No"; most of them said "Very or pretty poor" (85.7%), followed by "DK" (50.0%), "Not too good" (20.0%), and "Very or pretty good" (5.9%). These results were significant (p < 0.001) (Table 4).

We divided the comorbidities into two groups according to the number of comorbidities (≤3 and >3) and compared the groups with what the participants said about their current life satisfaction. We found that 92.9% of the participants with ≤3 comorbidities said "Yes" and 7.1% said "No." Participants with >3 comorbidities who said "Yes" accounted for 85.4%, and "No" accounted for 14.6%, demonstrating significance (p = 0.026) (Table 4).

We compared participants with and without HTN as to if they were satisfied or not with their life today. Participants with HTN who were and were not satisfied accounted for 89.2% and 10.8%, respectively. Participants without HTN who were and were not satisfied accounted for 90.6% and 9.4%, respectively. No significance was found (p = 0.164) (Table 5).

We also compared participants with or without arthritis and if they were satisfied or not with their life today. Participants with arthritis who were and were not satisfied were 90.8% and 9.2%, respectively. Participants without arthritis who were and were not satisfied were 90.3% and 9.7%, respectively. No significance was noted (p = 0.615) (Table 5).

Furthermore, we compared participants with or without diabetes and if they were satisfied or not with their life today. Participants with diabetes who were and were not satisfied were 87.1% and 12.9%, respectively. Participants without diabetes who were and were not satisfied were 92.0% and 8.0%. The results were not significant (p = 0.146) (Table 5).

We asked the participants if things are getting worse as they get older and compared with age and marital status. Participants who said "Yes" accounted for 47.87%; most of them 64.3% were in the ≥80 age group, and 53.5% were divorced/separated/widowed. Participants who said "No" were 52.13%; the majority (55.8%) belonged to the 60–69 group, and 53.9% were married. No significance was found for age (p = 0.07) and marital status (p = 0.54) (Table 6).

According to gender, we asked the participants if things are getting worse as they get older. We found that 52.13% of them said "No" (male, 50%; female, 45.73%), whereas the remaining 47.87% said "Yes" (male, 50%; female, 45.27%). The results were not significant (p = 0.439) (Table 6).

We compared the participants who said that things are getting worse as they get older, or did not, with their income. Participants who said "Yes" accounted for 47.87%; most of them answered "With some difficulties" (71.1%), followed by "Inadequate" (70.8%), "Adequate" (44.5%), and "Very well" (39.6%). In contrast, participants who said "No" accounted for 52.13%; most of them answered "Very well" (60.4%), followed by "Adequate" (55.5%), "Inadequate" (29.2%), and "With some difficulties" (28.9%). These results were significant (p = 0.001) (Table 6).

We compared the participants who said that things are getting worse as they get older or not with their health these days. Participants who said "Yes" accounted for 47.87%; most of them said "Very or pretty poor" (100.0%), followed by "Not too good" (78.0%), "DK" (50.0%), "Very or pretty good" (40.9%). Those who said "No" accounted for 52.13%, and most of them said "Very or pretty good" (59.1%), "DK" (50.0%), and "Not too good" (22.0%). These results were significant (p < 0.001) (Table 6).

Table 1: Demographic data

		Count	Column N %
Age	(60–69)	233	71.0%
	(70–79)	67	20.4%
	=80	28	8.5%
Gender	M	164	50.0%
	F	164	50.0%
Marital status	Never married	12	3.7%
	divorced/separated/ widowed	71	21.6%
	married	245	74.7%

Table 2: Correlation between health and demographic data and income

		Health						
		very or pretty good		not too good		very or pretty poor		p value
		Count	Row N %	Count	Row N %	Count	Row N %	
Age	(60–69)	202	86.7%	26	11.2%	3	1.3%	
	(70–79)	51	76.1%	13	19.4%	3	4.5%	<0.01
	≥80	16	57.1%	11	39.3%	1	3.6%	
Marital	Never married	12	100.0%	0	0.0%	0	0.0%	
status	divorced/separated /widowed	49	69.0%	20	28.2%	2	2.8%	0.03
	Married	208	84.9%	30	12.2%	5	2.0%	
Gender	M	136	82.9%	21	12.8%	6	3.7%	0.15
	F	133	81.1%	29	17.7%	1	0.6%	
Income	Very well	98	88.3%	12	10.8%	1	0.9%	
	Adequate	128	82.6%	23	14.8%	3	1.9%	
	With some difficulties	28	73.7%	9	23.7%	0	0.0%	0.01
	Inadequate	15	62.5%	6	25.0%	3	12.5%	

Table 3: Correlation between demographic data, income, and health

		I am just as happy as when I was younger				
		Yes		No		p value
		Count	Row N %	Count	Row N %	(a = 0.05)
Age	(60–69)	144	61.8%	89	38.2%	
	(70–79)	40	59.7%	27	40.3%	0.49
	≥80	14	50.0%	14	50.0%	
Marital status	Never married	7	58.3%	5	41.7%	
	Divorced/separated/ widowed	40	56.3%	31	43.7%	0.72
	Married	151	61.6%	94	38.4%	
Income	Very well	76	68.5%	35	31.5%	
	Adequate	98	63.2%	57	36.8%	0.001
	With some difficulties	16	42.1%	22	57.9%	
	Inadequate	8	33.3%	16	66.7%	
Health	Very or pretty good	176	65.4%	93	34.6%	
	Not too good	20	40.0%	30	60.0%	
	Very or pretty poor	1	14.3%	6	85.7%	<0.001
	DK	1	50.0%	1	50.0%	

Table 4: Correlation between life satisfaction, demographic data, income, health, and comorbidities

		I am satisfied with my life today				
		Yes		No		p value
		Count	Row N %	Count	Row N %	a = 0.05
Age	(60–69)	215	92.3%	18	7.7%	
	(70–79)	54	80.6%	13	19.4%	0.02
	≥80	26	92.9%	2	7.1%	
Marital status	Never married	11	91.7%	1	8.3%	
	Divorced/separated/ widowed	63	88.7%	8	11.3%	0.917
	Married	221	90.2%	24	9.8%	
Gender	M	146	89.0%	18	11.0%	0.582
	F	149	90.0%	15	10.0%	
Income	Very well	105	94.6%	6	5.4%	
	Adequate	140	90.3%	15	9.7%	
	With some difficulties	32	84.2%	6	15.8%	0.019
	Inadequate	18	75.0%	6	25.0%	
Health	Very or pretty good	253	94.1%	16	5.9%	
	Not too good	40	80.0%	10	20.0%	<0.001
	Very or pretty poor	1	14.3%	6	85.7%	
	DK	1	50.0%	1	50.0%	
Comorbidities	≤3	184	92.9%	14	7.1%	0.026
	>3	111	85.4%	19	14.6%	

Table 5: Correlation between life satisfaction and high blood pressure, arthritis, or rheumatology and diabetes mellitus.

		I am satisfied with my life today				
		Yes		No		p value
		Count	Row N %	Count	Row N %	a = 0.05
High blood pressure	Yes	141	89.2%	17	10.8%	0.164
	No	154	90.6%	16	9.4%	
Arthritis	Yes	119	90.8%	12	9.2%	
	No	140	90.3%	15	9.7%	0.615
	DK	36	85.7%	6	14.3%	
Diabetes mellitus	Yes	122	87.1%	18	12.9%	
	No	173	92.0%	15	8.0%	0.146

Table 6: Correlation between life prediction and demographic data, income, and health.

		Things are getting worse as I get older				
		Yes		No		p value
		Count	Row N %	Count	Row N %	a = 0.05
Age	(60–69)	103	44.2%	130	55.8%	
	(70–79)	36	53.7%	31	46.3%	0.07
	≥80	18	64.3%	10	35.7%	
Marital status	Never married	6	50.0%	6	50.0%	
	Divorced/separated/ widowed	38	53.5%	33	46.5%	0.54
	Married	113	46.1%	132	53.9%	
Gender	M	82	50.0%	82	50.0%	0.439
	F	75	45.73%	89	54.27%	
Income	Very well	44	39.6%	67	60.4%	
	Adequate	69	44.5%	86	55.5%	
	With some difficulties	27	71.1%	11	28.9%	0.001
	Inadequate	17	70.8%	7	29.2%	
Health	Very or pretty good	110	40.9%	159	59.1%	
	Not too good	39	78.0%	11	22.0%	
	Very or pretty poor	7	100.0%	0	0.0%	<0.001
	DK	1	50.0%	1	50.0%	

Discussion

The older adult population is growing exponentially worldwide(10). In Saudi Arabia, this population is expected to reach 2 million by 2050(2). Therefore, we need to change from having a negative perspective of old age that is associated with chronic illnesses, weakness, and poor functions to having a positive health perspective, and to improve the QoL of this population.

This study included 328 older adults from the whole Makkah region. The quality of health among older adults can be assessed by many questionnaires, but in our study, we used the CSHA to understand how the Saudi older adults (≥60 years of age) perceive themselves and their subjective health compared with their current health status. Subsequently, the results are discussed through the five domains: health, happiness, life satisfaction, comorbidities, and prediction of life.

Health:
WHO defines health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity(11).

Health and age
We divided the Saudi older adults into three age groups (60–69, 70–79, and ≥80 years). We found that most of our participants said “Very or pretty good” (n = 269, 82.0%) and “Very or pretty poor” (n = 7, 2.13%), demonstrating significance (p < 0.01). In research conducted in Turkey, health did not significantly correlate with age (p = 0.17)(12). Hence, discrepancy exists between these two studies, probably because of the excessive number of factors, such as socioeconomic and advancement in health care.

Health and gender
Our research consisted of a female-to-male ratio of 1:1. Male participants who said “Very or pretty good” (82.9%) were slightly healthier than the female participants (81.1%).

Unexpectedly, the males (3.7%) who said "Very poor or pretty poor" were also healthier than the females (0.6%), with no significance (p = 0.15), consistent with the study results of Edimansyah Abdin et al(13).

Health and marital status
Our study found a significant finding (p = 0.03) in married couples who see themselves as healthier than those who never married or widowed. Multiple studies reported that marital status has a strong positive impact on the older adults(12,14).

Health and income
One of the most important factors that presume a healthier life is income, as evident in a previous study(15). Our study showed a significant correlation (p = 0.01) and is in compliance with this fact.

Happiness:
According to Harvard psychologist Daniel Gilbert, happiness is difficult to measure with a significant subjectivity that could be translated as "anything we please and enjoy." (14). The difference between happiness and life satisfaction is that happiness is a temporary emotion while life satisfaction is the general idea of life.

Happiness and age
We asked the participants about happiness by comparing it to when they were younger. Happiness had no significant (p = 0.49) correlation with age, but most of the age groups answered "yes" (60.37%), except for the ≥80 age group that acquired equal results. This finding is also evident in other studies that came up with the same conclusions(13,16,17). We believe that the similarities between these studies can be explained by the fact that happiness is subjective and depends on the individual's personal lifestyle and viewpoint.

Happiness and marital status
Happiness had no significant correlation (p = 0.72) with marital status. Most of the participants answered "yes" (60.37%) and were married. Compared with the Japanese study that disagrees with our study, we noticed that the difference between them was in the inclusion criteria (age group started from 65 years)(18).

Happiness and income
Individuals with lower income are less happy than those with "Adequate" or "Very well" income (p = 0.001). However, no recent studies can support this correlation.

Happiness and health
Happiness significantly correlated (p < 0.001) with health. Most of our participants responded "Very good" and "Pretty good." Unfortunately, no recent studies can prove this correlation.

Life satisfaction:

Life satisfaction and age
Saudi older adults were overall satisfied with their life, demonstrating significance (p = 0.02). However, a research in Nepal reported otherwise(19). We assume that this is a result of the difference in socioeconomics, poverty, and geriatric health care between these two countries.

Life satisfaction, gender, and marital status
Having a partner is one of the factors that influence life satisfaction, as shown in this research that had a positive correlation(19). In contrast, most of our married participants were more satisfied than nonmarried participants, but unfortunately, no statistical significance was found (p = 0.917).

Life satisfaction and income
Income has a higher influence on one's life satisfaction from many aspects, such as access to advanced health care, social well-being services, and exposure to stressful events. Life satisfaction significantly correlated with income (p = 0.019), consistent with a Taiwanese study (20). One of life's expectations is that a higher income will lead to better life satisfaction.

Life satisfaction and health
Most of our participants (89.94%) said that they were satisfied with their life despite self-rating health as "Not too good," with a significance value of (p < 0.001). A Brazilian study reported that the healthier the older adults, the more they are satisfied (p < 0.001)(21).

Comorbidities:
We divided the participants who had comorbidities into two groups (≤ 3 and >3 comorbidities), and correlated each group with life satisfaction. We found that 60.37% have ≤3 comorbidities and 39.63% have >3. As expected, participants with fewer comorbidities were more satisfied with their lives than those with many comorbidities, with significance (p = 0.026), as supported by a Spanish study (p = 0.02)(22). However, some studies investigated life satisfaction with major diseases such as HTN, DM, and arthritis or rheumatism, among the older adults(23-25).

Hypertension
HTN is a major medical issue in Saudi general health, with a prevalence of (1,332,234), and older adults comprised 49% of the HTN population(26). It is one of the leading causes of death and disability among older adults(23,25). We found that 48.17% of the participants had HTN, while 51.83% had no HTN. Most participants with HTN are satisfied with their life, but with no significance (p = 0.685). In contrast, Cao, W. and colleagues showed a significantly lower score in physical health, but not in psychological health in participants with HTN compared with those without HTN.(27). These studies have discrepancies, possibly because of the existing factors other than HTN which can affect life satisfaction like social support, income and other diseases that participants may have.

DM

The prevalence of DM in Saudi Arabia is (1,460,934), and the older adults compose 43%(26). DM is characterized by chronic hyperglycemia, leading to various complications, including microvascular (retinopathy, neuropathy, and nephropathy) and macrovascular complications. DM also has an increased risk factor in falls and hip fractures(20). We found that 42.68% of participants had DM, while 57.32% did not have. Most participants with or without DM were satisfied with their lives. However, our results were not significant (p = 0.146). A Japanese study disagrees with our result and showed a significant decrease in life satisfaction in participants with DM(24).

Arthritis

Most of the musculoskeletal pain felt by older adults results from osteoarthritis, which significantly reduces the QoL(28). In 2017, Saudi census reported that 160,979 older adults (≥65 years) had arthritis(29).

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Most of our participants with or without arthritis were satisfied with their lives, but unfortunately, no significant correlation was found (p = 0.615). However, a Japanese study disagrees with our result and showed a significant decrease in life satisfaction in participants with arthritis(24).

Prediction of life:

We asked our participants about their life predictions "if things are getting worse as they get older." All variables (age, gender, marital status, income, and health) were statistically significant, except for marital status, which correlated with the prediction of life. However, no recent studies have investigated this correlation.

Limitations

The present study has some limitations that should be acknowledged. This study was meant to be interview based, but considering the COVID-19 pandemic, we were forced to send the questionnaire via Google Form to the participants, which could have biased some responses.

Conclusion

Overall, most of the Saudi older adults, regardless of age, gender, marital status, income, and multiple comorbidities, had a positive rather than a negative perception in life because of socioeconomic factors and a good healthcare system. Therefore, considering the limited amount of research conducted on this topic in Saudi Arabia, we recommend for further studies in this field and to focus more toward older adults to improve the geriatric healthcare system.

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Depression, anxiety, stress and its determinant factors, among adult population in Jeddah, Saudi Arabia

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Abstract

Background: The burden of mental disorders continues to grow with significant impacts on health. It is one of the most important health indicators that causes considerable morbidity.

Objectives: This study aimed to explore the burden of stress, anxiety, and depression in the adult population and to explore its associated socioeconomic, and clinical determinants.

Methods: A cross-sectional survey was conducted online using Google forms sent to residents in Jeddah, Saudi Arabia. The total number enrolled was 329 subjects. Data was collected using a questionnaire which provided information on the socio-demographic characteristics, and medical history. The short version of Depression, Anxiety and Stress Scale (DASS)-21 Questionnaire was used to assess relevant depression, anxiety, and stress. SPSS version 23 was used to analyze the data; Chi Square and multi-linear regression tests of significance were used. The level of significance was 0.05.

Results: Depression (62.9%), Anxiety (62.6%) and Stress (47.7%) were common among the studied subjects. Depression score was significantly higher among the young subjects ($\beta = -0.077$; $p < 0.002$), those who smoke Hookah-Shisha ($\beta = -2.862$; $p < 0.000$), those who do not practice arts ($\beta = -0.968$; $p < 0.027$), among subjects with physical restrictions ($\beta = -5.683$; $p < 0.004$), and those with arthritis, ($\beta = -3.221$; $p < 0.000$). The anxiety score was significantly associated with smoking Hookah-Shisha ($\beta = -1.897$; $p < 0.004$), and among those with arthritis, ($\beta = -2.585$; $p < 0.000$). The stress score was significantly higher among the females, ($\beta = 1.552$; $p < 0.039$), those who smoke Hookah-Shisha, ($\beta = -2.079$; $p < 0.006$), those who use narcotic drugs, ($\beta = -1.941$; $p < 0.019$), those who use asthma medications, ($\beta = -2.464$; $p < 0.037$), and among those with chronic arthritis ($\beta = -2.222$; $p < 0.007$).

Conclusions: Despite achievements in education, health care, and economic development of the Saudi population over the past 3 decades, the trend of these disorders has alarmingly increased. Considering the findings, it is necessary to develop appropriate community-based primary and secondary mental health prevention programs. More research, about this issue, in different regions of the Kingdom needs to be conducted.

Key words: Depression, Anxiety, and Stress Scale (DASS), Saudi Arabia.

Introduction

Mental illness is a serious medical condition that affects an individual's thoughts, feelings, mood, and behavior [1]. The World Health Organization (WHO) estimated that one in four people – about 25% of the world population – suffer from mental illness both in the developed and developing worlds. [2,3]. In major industrialized areas like the US, Canada, and Western Europe, mental illness accounts for almost 25% of all disabilities. It is also considered by the WHO to be the leading cause of disability across the world [2–4]. To improve mental health, WHO has developed an evidence-based mental health program for the years 2013-2020 [5]. Depression is a mood disorder that causes a persistent feeling of sadness and loss of interest [6]. Depression is a common psychiatric disorder in the world, affecting more than 300 million people worldwide [7, 8]. Anxiety is a psychological condition as well as an emotional and behavioral disorder characterized by extreme worrying, a sense of fear, agitation, excessively sensitive responses, and deleterious thinking [8]. In 2013, one out of every nine people in the world had at least one of the anxiety disorders [9, 10]. Stress is a feeling of emotional or physical tension. It can come from any event or thought that makes one feel frustrated, angry, or nervous. [11]. Nearly a quarter of adults in the United States have psychiatric disorders, and almost half of them experience at least one mental illness during their lives [12]. A systematic review and meta-analysis for global prevalence showed that the countries of Eastern Asia show an estimated one-year/lifetime prevalence less than other areas.

A recent study in Saudi Arabia revealed that 28.9% of respondents reported depressive symptoms, 16.4% reported anxiety symptoms and 17.8% reported stress symptoms. Moderate to severe features of depression, anxiety, and stress were experienced by 17.1%, 10.5%, and 12.3%, respectively [13]. Prevalence of mental disorders reported by international studies ranged between 10% and 30% [14-16].

This study aimed to explore the burden and correlates of depression, anxiety and stress among an adult population in Jeddah city, Saudi Arabia.

Subjects and Methods

It was a cross-sectional study; where an online survey using Google form questionnaire, was sent via email to the residents of Jeddah, Saudi Arabia. Sampling method was a non probability convenient one. Sample size for the present study was determined using G*power software [17] where, α = 0.05, Power = 0.95, effect size = 0.3 and degree of freedom = 5. The sample size required was 277. The total number of subjects who responded was 329. Data was collected using a questionnaire which included the following sections: Personal questionnaire which provided information on socio-demographic characteristics, and medical history. Psychological impact was assessed using the Arabic version of Depression, Anxiety, and Stress Scale (DASS-21), a reliable and valid measure in assessing mental health status in Arabic speakers [13, 18]. DASS-21 is a self-report questionnaire consisting of 21 items, seven items per subscale: depression, anxiety, and stress.

Tool reliability was assessed using the study's entire subjects, with a reliability coefficient (Cronbach's α) of 0.898. Patients were asked to score every item on a scale from 0 (did not apply to me at all) to 3 (applied to me very much). Sum scores were computed by adding up the items per (sub) scale and multiplying them by 2. Sum scores for the total DASS-total scale thus range between 0 and 120, and those for each of the subscales ranged between 0 and 42. Cut-off scores of 60 and 21 were used for the total DASS score and the depression subscale, respectively. These cut-off scores were derived from a set of severity ratings, proposed by Lovibond and Lovibond [19].

Data analysis and statistical tests: Statistical Package for Social Sciences (IBM SPSS, version 23, Armonk, NY: IBM Corp.) was used. Chi square and Multiple linear/correlation regression analysis was used. The level of significance for this study was 0.05.

Ethical considerations

Ethical clearance was obtained from the institutional review board (IRB). In order to keep confidentiality of any information provided by study participants, the data collection procedure was anonymous. Availability of the data: the row data is available at the research center of ISNC and all results of the data are included in the paper.

Results

Table 1 displays the occurrence of depression, anxiety and stress severity classes by gender.

Depression was encountered among 62.9% of the subjects; no significant differences were found between males and females ($p < 0.551$). Anxiety was encountered among 62.6% of the subjects; no significant differences were found between males and females ($p < 0.156$). Stress was encountered among 47.7% of the subjects; no significant differences were found between males and females ($p < 0.323$). Table 2 shows the regression correlation relationship between the depression score and the other independent variables. Depression score was significantly higher in the young subjects compared to the older ones ($\beta = -0.077$; $p < 0.002$). The mean depression score was significantly higher among Saudi subjects compared to non-Saudi ones ($\beta = -2.307$; $p < 0.025$). The mean depression score was significantly higher among those who smoke Hookah-Shisha compared to non-smokers ($\beta = -2.862$; $p < 0.000$). The mean depression score was significantly higher among those who do not practice arts, compared to those who do ($\beta = -0.968$; $p < 0.027$). The mean depression score was significantly higher among subjects with physical restrictions, compared to normal subjects ($\beta = -5.683$; $p < 0.004$). The mean depression score was significantly higher among those with arthritis, compared

to those without the disorder (β = -3.221; p < 0.000). Table 3 reveals the regression correlation relationship between the anxiety score and the other independent variables. The mean anxiety score was significantly higher among Saudi subjects compared to non-Saudis (β = -1.986; p < 0.049). The mean anxiety score was significantly higher among those who live in rented houses compared to those who live in owned houses (β = 1.592; p < 0.007). The mean anxiety score was significantly higher among those who smoke Hookah-Shisha compared to non-smokers (β = -1.897; p < 0.004). The mean anxiety score was significantly higher among those who suffer from chronic arthritis, compared to those without (β = -2.585; p < 0.000). Table 4 displays the regression correlation relationship between the stress score and the other independent variables. The mean stress score was significantly higher among females, compared to males (β = 1.552; p < 0.039). The mean stress score was significantly higher among those who smoke Hookah-Shisha, com Table 2: Regression correlation relationship between depression score and socio-demographic and clinical variables among studied subjects pared to those who do not (β = -2.079; p < 0.006). The mean stress score was significantly higher among those who use narcotic drugs, compared to those who do not (β = -1.941; p < 0.019). The mean stress score was significantly higher among those who use asthma medications, compared to those who do not (β = -2.464; p < 0.037). The mean stress score was significantly higher

Table 1: Distribution of studied subjects according to Gender and depression, anxiety and stress severity classes.

Variable	Category	score	Gender		Total	X2 (p)
			Male	Female		
Depression state	Normal	No	31	91	122	3.02 (0.551)
		%	34.1%	38.2%	37.1%	
	Mild	No	17	28	45	
		%	18.7%	11.8%	13.7%	
	Moderate	No	23	58	81	
		%	25.3%	24.4%	24.6%	
	Severe	No	11	35	46	
		%	12.1%	14.7%	14.0%	
	Extremely severe	No	9	26	35	
		%	9.9%	10.9%	10.6%	
Anxiety state	Normal	No	35	88	123	6.635 (0.156)
		%	38.5%	37.0%	37.4%	
	Mild	No	12	43	55	
		%	13.2%	18.1%	16.7%	
	Moderate	No	19	29	48	
		%	20.9%	12.2%	14.6%	
	Severe	No	11	23	34	
		%	12.1%	9.7%	10.3%	
	Extremely severe	No	14	55	69	
		%	15.4%	23.1%	21.0%	
Stress state	Normal	No	49	123	172	4.668 (0.323)
		%	53.8%	51.7%	52.3%	
	Mild	No	16	32	48	
		%	17.6%	13.4%	14.6%	
	Moderate	No	7	38	45	
		%	7.7%	16.0%	13.7%	
	Severe	No	12	32	44	
		%	13.2%	13.4%	13.4%	
	Extremely severe	No	7	13	20	
		%	7.7%	5.5%	6.1%	

Table 2: Regression correlation relationship between depression score and socio-demographic and clinical variables among studied subjects

Independent variables	Unstandardized Coefficients		Standardized Coefficients	t-test	p-Value
	B	Std Error	Beta		
Constant	35.100	6.037		5.814	0.000
Gender	0.634	0.668	0.059	0.949	0.343
Age	-0.077	0.024	-0.215	-3.198	0.002
Nationality	-2.307	1.021	-0.134	-2.260	0.025
Residence	1.009	0.604	0.096	1.670	0.096
Family	0.066	0.545	0.007	0.122	0.903
Recreation time	0.078	0.073	0.056	1.062	0.289
Smoke cigarettes	-0.170	0.871	-0.013	-0.195	0.846
Use hookah	-2.862	0.667	-0.248	-4.288	0.000
Use narcotic drugs	-0.424	0.736	-0.031	-0.576	0.565
Practice sport	-0.090	0.515	-0.010	-0.175	0.861
Practice social activities	-0.116	0.467	-0.014	-0.249	0.803
Practice arts	-0.968	0.435	-0.127	-2.224	0.027
Use internet	0.706	0.551	0.075	1.281	0.201
Physical restrictions	-5.683	1.952	-0.159	-2.912	0.004
Use Asthma medications	-1.085	1.048	-0.060	-1.035	0.301
Use anti-hypertensives	0.447	0.887	0.030	0.504	0.615
Use diabetes medications	-0.677	0.884	-0.045	-0.766	0.445
Have chronic pain	0.176	0.750	0.014	0.235	0.815
Have thyroid dysfunction	-0.321	0.694	-0.025	-0.462	0.645
Receive antiarrhythmic drugs	-0.193	1.873	-0.006	-0.103	0.918
Have any hematological disease	0.161	0.934	0.010	0.173	0.863
Suffer from arthritis	-3.221	0.727	-0.254	-4.432	0.000
Have immune diseases	0.464	1.445	0.020	0.321	0.748

Table 3: Regression correlation relationship between Anxiety score and socio-demographic and clinical variables among studied subjects

Independent variables	Unstandardized Coefficients		Standardized Coefficients	t-test	p-Value
	B	Std Error	Beta		
Constant	20.789	5.894		3.527	0.000
Gender	0.832	0.652	0.080	1.276	0.203
Age	-0.042	0.023	-0.122	-1.787	0.075
Nationality	-1.968	0.997	-0.119	-1.975	0.049
Residence	1.592	0.590	0.157	2.698	0.007
Family	-0.488	0.533	-0.050	-0.917	0.360
Recreation time	0.046	0.071	0.035	0.648	0.517
Smoke cigarettes	-0.563	0.850	-0.045	-0.662	0.508
Use hookah	-1.897	0.652	-0.171	-2.911	0.004
Use narcotic drugs	-1.096	0.719	-0.084	-1.525	0.128
Practice sport	0.919	0.503	0.102	1.827	0.069
Practice social activities	0.149	0.456	0.019	0.326	0.744
Practice arts	0.555	0.425	0.075	1.306	0.193
Use internet	0.490	0.538	0.054	0.910	0.363
Physical restrictions	-2.876	1.905	-0.083	-1.509	0.132
Use Asthma medications	-1.623	1.023	-0.093	-1.586	0.114
Use anti-hypertensives	1.521	0.866	0.108	1.756	0.080
Use diabetes medications	-1.154	0.863	-0.080	-1.338	0.182
Have chronic pain	-0.319	0.733	-0.025	-0.436	0.663
Have thyroid dysfunction	0.287	0.678	0.023	0.423	0.673
Receive antiarrhythmic drugs	-1.169	1.829	-0.039	-0.639	0.523
Have any hematological disease	0.824	0.911	0.053	0.904	0.367
Suffer from arthritis	-2.585	0.710	-0.212	-3.643	0.000
Have immune diseases	-0.393	1.411	-0.017	-0.278	0.781

Table 4: Regression correlation relationship between Stress score and socio-demographic and clinical variables among studied subjects

Independent variables	Unstandardized Coefficients		Standardized Coefficients	t-test	p-Value
	B	Std Error	Beta		
Constant	22.713	6.777		3.352	0.001
Gender	1.552	0.750	0.135	2.070	0.039
Age	-0.019	0.027	-0.050	-0.713	0.477
Nationality	-1.958	1.146	-0.106	-1.708	0.089
Residence	0.880	0.678	0.078	1.297	0.196
Family	-0.250	0.612	-0.023	-0.409	0.683
Recreation time	0.066	0.082	0.045	0.804	0.422
Smoke cigarettes	-0.715	0.977	-0.051	-0.731	0.465
Use hookah	-2.079	0.749	-0.167	-2.774	0.006
Use narcotic drugs	-1.941	0.826	-0.133	-2.348	0.019
Practice sport	0.683	0.579	0.068	1.181	0.239
Practice social activities	-0.163	0.525	-0.018	-0.311	0.756
Practice arts	-0.759	0.489	-0.092	-1.553	0.121
Use internet	0.763	0.619	0.075	1.233	0.219
Physical restrictions	-4.679	2.191	-0.121	-2.136	0.034
Use Asthma medications	-2.464	1.176	-0.126	-2.095	0.037
Use anti-hypertensives	1.667	0.996	0.106	1.674	0.095
Use diabetes medications	0.069	0.992	0.004	0.069	0.945
Have chronic pain	-0.070	0.842	-0.005	-0.083	0.934
Have thyroid dysfunction	-0.377	0.779	-0.027	-0.483	0.629
Receive antiarrhythmic drugs	0.688	2.103	0.021	0.327	0.744
Have any hematological disease	0.692	1.048	0.040	0.661	0.509
Suffer from arthritis	-2.222	0.816	-0.163	-2.724	0.007
Have immune diseases	1.787	1.622	0.070	1.102	0.271

Discussion

This study aimed to explore the burden of stress, anxiety, and depression and its determinant factors, among adult population in Jeddah city. The present study revealed that 62.9% of the respondents reported depressive symptoms, 62.6% reported anxiety symptoms, while 47.7% reported stress symptoms. Severe to extremely severe features of depression, anxiety and stress were found in 24.6%, 31.3% and 19.5% respectively. Our respondents were more likely to report experiencing depression, anxiety and stress compared to a previous study in Saudi Arabia, where the prevalence of these symptoms were 28.9%, 16.4% and 17.8% respectively [13]; it was also higher than other international studies such as those from Iran, where the prevalence of severe anxiety was 19.1% [20], and China where moderate to severe anxiety and stress were 28.8% and 29.6 %, respectively [21], and a study conducted in Spain [22].

The present study revealed that females were associated with increased symptoms of depression, anxiety, and stress, which is similar to a finding reported in previous studies [13,15], and similar to evidence in international literature demonstrating females tend to be more susceptible to stress and post-traumatic symptoms [16].

Our study found that young age was associated with increased stress, anxiety and depression. This is consistent with findings from most of the studies which have found that age constitutes a protective effect, and this trend may be explained by their greater life experience, or having to face fewer life responsibilities, and their experience [23]. Some researchers have suggested that higher anxiety amidst the younger population may be due to their greater access to information via social media, which can easily provoke stress [24]. Furthermore, it is speculated that the crisis of COVID-19 pandemic might be presenting a much greater range of difficulties for the working-age, rather than elder age groups. For example, in addition to financial worries, it is possible that COVID-19 may be currently inducing other stressors in younger age groups that similarly impacts mental health, such as the need for both parents to telework from home while also homeschooling their children.

The present study found an association between a history of chronic medical problems and increased depression, anxiety and stress. This is in agreement with other studies which demonstrated that chronic illness or a self-evaluation of poor health was associated with increased psychological distress [7, 25]. A possible interpretation for this finding is that persons with a history of chronic condition, or disability, who also perceive their health as weak might feel more vulnerable to contracting a new disease [26].

Use of Hookah-Shisha, and cigarette smoking were associated with a higher degree of depression, anxiety, and stress, which could be attributed to the awareness of smokers that they have a high chance of developing more medical complications e.g. cancer and COPD, and other health problems [27].

Conclusions

Depression, anxiety, and stress are prevalent among the general population in Saudi Arabia. We identified the specific subgroups of the general population at higher risk: females, those living in rented houses, and people with a history of smoking or chronic medical problems. Medical Authorities should focus on providing appropriate knowledge about the disease using appropriate methods, and specialized interventions to promote the mental well-being of the Saudi population, paying particular attention to high-risk groups. Moreover, community mental health care should be made accessible to people who are at increased risk.

Limitations

Several limitations to this study must be noted. As our sampling strategy was non-random, the results of this study cannot be considered representative of all Saudi population. Participants were recruited through online Google forms and are therefore likely to be more health connected, proactive in their health behavior, better informed about health issues and have greater exposure to prevention messages. Furthermore, participants use the internet, so results may not reflect the views of those unfamiliar with the internet, and living in very remote regions and living traditional/nomadic lifestyles. The survey provides only a snapshot of psychological responses at a particular point in time, and a longitudinal study is required to provide information on whether the observed impact will last for more extended periods. The psychological self-reported effects, anxiety, depression, and stress may not adequately represent the mental health status assessed in an interview; thus, for the outcome to be determined, prospective studies are necessary to provide more accurate data to support the need for focused public mental health strategies. Despite these limitations, our results have generated important information on Saudi views of mental disorders, in an otherwise unexplored area of health care.

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Awareness of the Effects of Combining Smoking and Oral Contraceptives on Cardiovascular Health among Saudi Working Women

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Abstract

Background: There is a paucity of information in the medical literature on the awareness of the harmful effect of the combination of smoking and using oral contraceptive pills (OCPs) on cardiovascular health (CVH).

Objective: To evaluate this awareness among Saudi working women.

Methodology: This is a cross-sectional community-based study conducted on Saudi women working in the private sector. An international standard questionnaire was distributed electronically. Apart from the records of the patients' demographics, their cigarette smoking habits and use of contraceptive pills were also noted. The participants' awareness of the risk of combining smoking and OCPs and its effects on CVH was assessed.

Results: The study population consisted of 301 women who responded and answered the questions, with an age range of 21–30 years. While 77 (25.6%) women were using OCPs, only 13 (4.3%) were both smokers and users of OCPs. Overall, 256 (85.0%) women believed that smoking increases CVH risk. Additionally, 39.3% and 34.7% were aware that combined smoking and use of OCPs will lead to heart disease or risk of stroke, respectively, more than smoking alone, and 18% and 16.3% were aware that using OCPs alone can lead to heart disease and increase risk of stroke. There was no significant difference between women who used OCPs and smoked and those who did not use OCPs and not smokers. Only 66 (21.9%) of the participants were willing to use other means of birth control when warned that combining smoking and the use of OCPs was harmful.

Conclusion: The majority of the respondents were not aware of the effects on CVH when combining smoking and the use of OCPs. Public health awareness on this matter among Saudi women is therefore warranted.

Key words: Smoking, Oral contraceptive pills, myocardial infarction (MI), Stroke, and venous thromboembolism (VTE).

Introduction

Cardiovascular diseases (CVDs) are the leading cause of death among females(1,2). Both smoking and the use of oral contraceptives (OCPs) have a negative effect on cardiovascular health (CVH). Women who use OCPs and smoke have a 13.6-fold increased risk of myocardial infarction (MI) (3). A cohort study of 17,032 women aged 25 to 39 years old who used OCPs found that those who smoked were more likely to die than the non-smokers(4). Women who smoked and used OCPs were also more likely to have an ischaemic stroke than non-smokers who used OCPs(5). Furthermore, it is well accepted that smoking combined with the use of OCPs increases the relative risk of arterial and venous thromboembolic events (VTE)(6). Despite this synergistic adverse effect, women still remain unaware of the risks associated with OCPs(7,8). In a study conducted on undergraduate students to assess the perception of synergistic risk of combining smoking and OCPs, the respondents were apparently unaware of the possible synergistic nature of the risks associated with smoking and OCPs use(8). As a matter of fact, the American College of Obstetrics and Gynaecology recommends that physicians prescribe combination OCPs with caution in women older than 35 years who smoke (9).

There is an increasing trend of smoking among Saudi females (10,11). The Saudi Ministry of Health started a national tobacco control programme in 2002 and increased and intensified its efforts after joining the World Health Organization (WHO). According to the WHO, increasing women's awareness and knowledge of the CVH risks of smoking changes their actual risk and can thus improve their chances of living free of CVD or at least delaying it till later in life (12).

In Saudi Arabia, the prevalence of current smokers among females ranges from 4.2% to 11%, (13–16) being higher among college students (11%) than among medical students (2.4%) (13–16). Conversely, the reported use of OCPs among Saudi women varies among different cohort studies and has been found to be in the range of 31.8–64.9% (17). There are no data yet in the literature on the perception of the harmful effects of combining smoking and the use of OCPs among Saudi women. Therefore, it is important to assess the population's knowledge of the deleterious effect of combining smoking and the use of OCPs in order to implement preventive measures to improve community health, and consequently, this is an open topic for further research. We hypothesized that most Saudi women are not aware of the CVH risk from combining smoking and the use of OCPs. To date, there has been little written on this subject worldwide. Therefore, the aim of this study was to explore the awareness of the CVH risks of combining smoking and the use of OCPs among a group of working Saudi women.

Methodology

Study design

This was a cross-sectional community-based study. The data were collected from Saudi women working in the private sector. The study population comprised working women of reproductive age who were employees of a bank in Riyadh, Saudi Arabia. For the actual survey, the questionnaire was electronically distributed for completion on 15 January 2019 and collected on 15 February 2019.

The sample size was computed based on the single proportion formula N=Za-1*P (1-P)/D2 at a confidence level of 95% (two-sided) and a precision of 5%, Z=1.96, with the original number increased by 10% to compensate for possible losses in the sample size (301).

Inclusion and exclusion criteria

For the present study, women of child-bearing age (18–50 years old), whether or not they used OCPs or smoked, were asked to participate. For the evaluation of women's awareness regarding the risks of smoking and using of OCPs leading to adverse CV events, in total 301 women were included in the study. But for the evaluation of the awareness of combined use of OCPs and smoking on the effect on CVH, we selected women who were smoking and using OCPs and women who were not smoking and not using OCPs.

Questionnaires

The questionnaire utilized for the data gathering consisted of knowledge and perception items adapted from a modified structured global adult tobacco survey questionnaire (18). The survey questionnaire comprises 14 questions that were validated by four experts in this field for content validity and language simplicity, including a cardiologist, internist, gynaecologist, and epidemiologist. The suggested corrections were initially made. A pilot study, including assessing the test–retest reliability of the questionnaire, was initially performed on eight women smokers to get their feedback about the clarity of the questionnaire before the actual survey was conducted. Research team members were available during the questionnaire filling-in process just to help in case they needed clarification on any of the questions. Participants were informed that their participation was entirely voluntary, that the obtained information would be used for research purposes only, and that their personal data would be kept strictly confidential. Furthermore, the study protocol was approved by the ethical committee of King Saud University Medical City.

The questionnaire was available in both English and Arabic versions. The questionnaire was categorized into three categories: The first category covered the demographic data, such as age, marital status, and level of education. The second category covered the respondent's smoking habits, including the number of cigarettes smoked daily and their duration of use of OCPs. The third category covered their awareness of the risk of smoking to CVH and the CVH risk of using OCPs alone or combined with smoking.

Statistical analysis

The chi-squared test and Fisher exact test were used for the categorical values, the t-test and one-way ANOVA were used for continuous variables. A p-value of <0.05 was considered significant.

Results

The survey population consisted of 301 women who answered the questions and completed the questionnaire. Table 1 shows the characteristics of the study population. Most of the participants were 21 to 30 years old and had bachelor's degrees (74% and 85.7%, respectively). Only 13 (4.3%) of the participants used OCPs and smoked cigarettes, and 77 (25.6%) of the participants use OCPs. Only 66 (21.9%) of the participants were willing to use other means of birth control when warned that combining smoking and the use of OCPs was harmful. The percentages who smoked cigarettes, shisha, and e-cigarettes were 16.3%, 14.3%, 5.3%, respectively. The percentages with a history of previous heart attack, stroke, and venous thromboembolism were 0.7%, 0.3%, and 2%, respectively.

Table 2 shows the percentage of correct answers to the six questions about the awareness of the CVH risk of combined smoking and use of OCPs among Saudi working women. For all participants, it is clear that the Saudi women had a higher level of awareness that smoking can lead to heart diseases, with 256 correct answers (85.7%). Also, they had a good level of awareness that smoking can increase the risk of stroke, with 62% correct answers. On the other hand, relatively few were aware that combined smoking and use of OCPs will lead to heart disease or risk of stroke more than smoking alone (39.3% and 34.7%, respectively) or that using OCPs alone can lead to heart disease and increase risk of stroke (18% and 16.3%, respectively). There was no significant difference in the awareness of the correct answers among the women who used OCPs and smoked and those who did not use OCPs and did not smoke.

Table 3 shows the mean of the total score of awareness of the CVH risk of combined cigarette smoking and use of OCPs among Saudi working women by participants' characteristics. The mean for the total score of awareness was low, at 2.56 out of 6. It is clear that the awareness increased with age, and there is a significant difference between different age groups ($p < 0.001$). There is no significant difference regarding the educational level ($p = 0.625$). The women who smoked cigarettes or shisha had significantly lower awareness than those who did not smoke ($p = 0.002, 0.040$, respectively), but the women who had used OCPs before had significantly higher awareness than those who did not use OCPs ($p = 0.002$). The women who had had a stroke or VTE had a significantly higher level of awareness.

Dicusssion

To the best of our knowledge, this is the first comprehensive study from the Middle East to assess women's awareness of the effects on CVH of combined smoking and use of OCPs. The present study reveals a major difference in the knowledge and opinions regarding the risk of CVD associated with smoking and the use of OCPs (Table 2). The majority of Saudi women who were questioned were aware of the CVD risk of smoking, but most of them were not aware of the risk of combining smoking and using OCPs, nor even of the risk to CVH of using OCPs alone (39.3% and 34.7%, respectively). Similarly, they were not aware of the deleterious effects on CVH of using OCPs. These results show that, while there is good general knowledge that CVD can be triggered by certain risk factors, there are differing levels of awareness of what those risk factors are. Our findings are consistent with the previous study that suggested a perception gap among undergraduate students on combining smoking and OCPs and the risks of circulatory diseases (8). The lack of awareness of the effect of combined smoking and use of OCPs on CVH in this study is a concern in the presence of growing evidence that smoking is increasing among Saudi women (10,11). Furthermore, a study on the knowledge and safety of OCPs in a group of Saudi women showed that although these women had read the package insert, they found it hard to comprehend (19). It is well known that knowledge by itself will not change behaviour (20). These findings highlight the need to increase awareness about the health risk of smoking, particularly in women using OCPs. This may not be the case in all participants. Notably, we observed some level of awareness of the risk of stroke and VTE among women who used OCPs and who had a previous history of stroke and VTE, but there was a lack of awareness among women smokers concerning the risk of smoking to CVH (Table 3). Our results are in keeping with self-reported CV risk from France, where smokers represented one quarter of the study group, and the knowledge of CV risks to blood pressure (BP), glucose, and cholesterol levels was lower among smokers than non-smokers. They also observed a low level of knowledge of BP level among both women using oestrogen-progestin combined contraception and those smokers using OCPs (21).

Remarkably, only 3.4% of our study group currently smoked and used OCPs. This is much lower than in previous reports from other countries (22,23). A study performed in the U.S. found that 21% of women aged 35 years old were taking OCPs and smoking, while a Danish study found that 20% of women aged 21 years old were taking OCPs and were currently smokers (22,23).

The overall low level of knowledge of the risk of combining smoking and the use of OCPs observed in this study is worrisome. This consistently occurs in the context of the self-reporting of deep venous thrombosis and stroke. This concept is important, as most of the interviewees in the present study had bachelor's degrees and so could be considered highly educated and might be expected to be

Table 1. Characteristics of the Study Population

		Number (n=301)	%
Age	21–30 years	223	74.1
	31–40 years	49	16.3
	41–50 years	16	5.3
	More than 50 years	13	4.3
Educational level	High school	38	12.6
	Bachelor's	258	85.7
	Higher education	5	1.7
Using OCPs while smoking		13	4.3
Smoking cigarettes		49	16.3
Number of cigarettes daily	I do not smoke	219	72.8
	Fewer than 5	47	15.6
	5–10	24	8.0
	11–20	11	3.7
Smoking shisha		43	14.3
Smoking e-cigarettes		16	5.3
Using OCPs		77	25.6
Duration of using OCPs	I do not use it	224	74.4
	<6 months	29	9.6
	6–12 months	19	6.3
	1–5 years	17	5.6
	More than 5 years	12	4.0
Using OCPs before/during the period of smoking cigarettes	Yes	6	2.0
	No	295	98.0
Having a heart stroke	Yes	2	0.7
	No	299	99.3
Having a history of a stroke	Yes	1	0.3
	No	300	99.7
Having a history of VTE	Yes	6	2.0
	No	295	98.0
Would you like to use other contraceptives if the combination of smoking and OCPs is dangerous for your health?	Yes	66	21.9
	No	137	45.5
	Do not know	98	32.6

Table 2: Awareness of the Combined Use of Cigarette Smoking and OCPs on Cardiovascular Risk among Saudi Working Women

Items	ALL		Using OCPs while smoking		Not using OCPs and not smoking		p-value
	Correct answer		Correct answer		Correct answer		
	Number (n=301)	%	Number (n=13)	%	Number (n=133)	%	
Do you know that smoking leads to heart diseases?	256	85.0	11	84.6	109	82.0	0.582
Do you think that OCPs lead to heart diseases?	54	17.9	4	30.8	26	19.5	0.236
Do you think that smoking alone can increase the risk of stroke?	186	61.8	11	84.6	78	58.6	0.058
Do you think that combining the use of OCPs and smoking is more harmful to the heart than smoking alone?	118	39.2	5	38.5	52	39.1	0.964
Do you think that using OCPs alone can increase your risk of stroke?	49	16.3	2	15.4	26	19.5	0.528
Do you think that combining the use of OCPs and smoking increases your risk of stroke?	104	34.6	4	30.8	51	38.3	0.414

aware of the risks, but this was not the case here. It seems to go against the common perception that it is usually women with less education who have low knowledge of the CVD risk factors and thus might carry a greater disease burden. This is in parallel with the observation from the recent French study (21). After all, this may be attributed to the perception that certain individuals tend to underestimate their susceptibility (24). Interestingly, the majority of the respondents were not willing to change their oral pills to another form of birth control. This could be because birth control pills are convenient and can be acquired over the counter. Previous studies in Saudi Arabia and the region suggested that birth control pills are the most popular mode of contraception (25,26). Nevertheless, this suggests the need for a public health campaign on the risk of smoking and the use of OCPs. Future work in this area could assess how medical practitioners, in particular gynaecologists and epidemiologists, could better educate their patients about the possible association of combining smoking and the use of OCPs with the risk of CVD.

Limitations and strengths of the present study

The study has several limitations. The study was conducted in a special population of working women and may not be an exact reflection of awareness of the topic in the general population. The information was self-reported, and baseline comorbidities like obesity, dyslipidaemia, and hypertension among the three groups of smokers, non-smokers, and smokers also taking OCPs were not compared at baseline. The types and components of the specific OCPs were not investigated. The key strength of the study is that it is the first study performed in the region to determine women's awareness of the effect of taking oral birth control pills while smoking on the risk of developing harmful cardiovascular events. Future studies on this subject should include a wider spectrum of the population as standard.

Conclusion

Although most of the respondents were aware of the risk of smoking and CVD, there was a high rate of unawareness of the effect of combining smoking and the use of OCPs in relation to CV risk, which represents an alarming health problem among these women and requires increased public health awareness to prevent further serious diseases. The present survey-based study highlights the need for a strategy to increase knowledge, health education, and awareness of the risks of combining smoking and the use of OCPs and the risk of CVD. This strategy should include classes, training, and educational materials. Further studies on this subject are warranted.

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Table 3: Mean of the Total Score of Awareness of the Combined Use of Cigarette Smoking and OCPs on Cardiovascular Risk among Saudi Working Women by Participants' Characteristics**

		Mean	SD	p-value
Overall		2.56	1.60	
	21–30 years	2.33	1.45	< 0.001*
	31–40 years	3.00	1.89	
	41–50 years	3.38	1.89	
	more than50 years	3.77	1.48	
Educational level	High school	2.37	1.32	0.625
	Bachelors	2.58	1.63	
	Higher education	3.00	2.45	
Smoking cigarettes	Yes	2.21	1.68	0.002**
	No	2.69	1.56	
Smoking shisha	Yes	2.09	1.74	0.040*
	No	2.63	1.57	
Smoking e-cigarettes	Yes	2.50	2.28	0.919
	No	2.56	1.56	
Using OCPs	Yes	3.05	1.56	0.002*
	No	2.39	1.58	
Using OCPs while smoking	Yes	2.85	1.72	0.506
	No	2.54	1.60	
Have you ever had a heart attack?	Yes	2.50	3.54	0.960
	No	2.56	1.59	
Have you ever had a stroke?	Yes	6.00		0.031*
	No	2.55	1.59	
Have you ever had VTE?	Yes	3.83	1.72	0.049*
	No	2.53	1.59	
Would you like to use other contraceptives if the combination of smoking and OCPs is dangerous for your health?	Yes	2.73	1.47	0.202
	No	2.43	1.61	

** out of 6 (the score includes 6 items, each of which is worth 1 point; correct answer = 1, wrong answer = 0)
* Significant p-value

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Public Awareness Regarding Antihistamines and their Prescription in Primary Health Care Centres in Abha City

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Abstract

Introduction: Antihistamines are the most used drugs in the treatment of allergies. Approximately a dozen drugs are available on the pharmaceutical market, and their generic forms are marketed widely as very efficient drugs for the treatment of allergic diseases. Usually, people receive antihistamines as an inexpensive, generic, over-the-counter drug that can deliver relief from nasal congestion, sneezing, or hives caused by pollen, dust mites, or animal allergy with minimal side effects.

Aim: The study aimed to assess public awareness regarding antihistamines and their prescription in PHCCs in Abha City, Saudi Arabia.

Methodology: A descriptive cross-sectional approach was used targeting all accessible population in Abha city, Aseer region, Southern of Saudi Arabia. All those with ages of 18 years or more living in Abha region and attending primary health care centres were invited to participate in the survey. Data were collected from participants using electronic pre-structured questionnaire. The tool covered the following data: participants' socio-demographic data like age, gender, residence, education, participants' history for receiving antihistamines, and participants practice regarding antihistamines, role of physician and pharmacists within PHCCs in providing health education (HE) sessions for antihistamines, participants' satisfaction regarding medical staff role and provided HE.

Results: The study included 800 participants whose ages ranged from 18 to 55 years with mean age of 27.5 ± 10.9 years old. The majority of participants were females (73.5%; 588). As for known formulas of antihistamines, pills were the most reported formula (98.5%) followed by syrup (7.8%), nasal spray (3.8%), and eye drops (2.4%). Exactly 420 (52.5%) of the participants previously had antihistamines without prescription. The main cause of that was being available and easily achieved (82.6%).

Conclusion: In conclusion, the study revealed that public awareness regarding antihistamines was very poor especially concerning their types and clinical effects. Also, unprescribed utilization of antihistamines was very high due to their availability and being easily achieved.

Key words: public awareness, antihistamines, practice, health education, primary health care centres.

Background

Allergic diseases are high frequent chronic conditions lasting throughout a patient's life. Besides, they cause considerable deterioration in the quality of life of patients and they also lead to significant absenteeism and decreased productivity, with high economic and psychological burden for society [1, 2]. Antihistamines are the most used drugs in the treatment of allergies. Approximately a dozen drugs are available on the pharmaceutical market, and their generic forms are marketed widely as very efficient drugs for the treatment of allergic diseases [3, 4]. Usually, people receive antihistamines as an inexpensive, generic, over-the-counter drug that can deliver relief from nasal congestion, sneezing, or hives caused by pollen, dust mites, or animal allergy with minimal side effects [5]. Antihistamines are usually prescribed for short-term treatment. Chronic allergies increase the risk of health problems where antihistamines may have no role, including asthma, sinusitis, and lower respiratory tract infection [6]. Consultation of medical health care staff is advised for those who intend to take antihistamines for longer-term use.

As the general population typically use the word "antihistamine" to describe drugs for treating allergies, physicians and pharmacists use the term to describe a group of drugs that contradict the activity of histamine receptors in the body [7]. In this sense of the word, antihistamines are divided according to the histamine receptor that they act upon. The two largest classes of antihistamines are H1-antihistamines and H2-antihistamines [8, 9].

Antihistamines are one of the over-the-counter (OTC) drugs which are dispensed without a prescription; they are perceived by the public as a safer medication in comparison to the prescribed ones [10-12]. This perception has led the population to make their own diagnoses for the health problem and use inappropriate self-medication [13]. Misuse or abuse of OTC products including antihistamines, by overusing a single agent or using too many different drugs to treat serious health conditions has led to many drug related health problems such as kidney, liver, or gastric damage, and other health problems [14-16].
The researchers after intensive literature search, found that no previous studies in Saudi Arabia have assessed public awareness regarding antihistamines and their use, besides the importance of being prescribed by health care professional. This motivated the researchers to conduct this study to assess public awareness regarding antihistamines and their prescription in PHCCs in Abha City, Saudi Arabia.

Methodology

A descriptive cross-sectional approach was used targeting all accessible population in Abha city, Aseer region, Southern Saudi Arabia. All those with ages of 18 years or more, living in Abha region and who attend primary health care centres were invited to participate in the survey. A total of 1,000 individuals received the study survey. Exactly 800 respondents completed the study questionnaire with response rate of 80%. After obtaining permission from the Institutional ethics committee, data collection commenced. Data were collected from participants using an electronic pre-structured questionnaire. The questionnaire was uploaded online using social media platforms by the researchers and their relatives during the period from 15th April till 30th of June 2020. All accessible and eligible population in the study setting were invited to fill out the attached tool. Based on literature review to detect public awareness regarding over the counter treatment and its prescription, the average awareness level was 55% [17, 18]. Based on this and using a precision of 5% at 95% confidence level and design effect of 2, a minimum sample size of 760 (rounded to 800) participants was required for the current study.

The researchers constructed the survey tool after intensive literature review and experts' consultation. The tool was reviewed using a panel of 5 experts for content validity. Tool reliability was assessed using a pilot study of 30 participants with reliability coefficient (α-Cronbach's) of 0.72. The tool covered the following data: participants' socio-demographic data like age, gender, residence, education, participants' history of receiving antihistamines, and participants' practice regarding antihistamines, role of physician and pharmacists within PHCCs in providing health education (HE) sessions for antihistamines, participants satisfaction regarding medical staff role and provided HE. Awareness was assessed using 4 questions with multiple allowed answers for 3 of them.

Data analysis
After data were extracted, it was revised, coded, and fed into statistical software IBM SPSS version 22(SPSS, Inc. Chicago, IL). All statistical analysis was done using two tailed tests. P value less than 0.05 was statistically significant. For awareness items, each correct answer was scored one point and total summation of the discrete scores of the different items was calculated. A participant with score less than 60% (8 points) of the maximum score was considered to have poor awareness while good awareness was considered if they had a score of 60% (8 points or more) of the maximum or more. Descriptive analysis based on frequency and percentage distribution was done for all variables including demographic data, awareness items and participants' practice. Cross tabulation was used to assess distribution of awareness according to participants' personal and medical data. Relations were tested using Pearson chi-square test.

Results

The study included 800 participants whose ages ranged from 18 to 55 years with mean age of 27.5 ± 10.9 years old. The majority of participants were females (73.5%; 588). Regarding work, 475 (59.4%) of the respondents were retired or not working at all while 261 (32.6%) worked at governmental jobs. Exactly 431 (53.9%) had monthly income less than 5000 SR and 117 (14.6%) had monthly income that exceeded 15000 SR. Regarding educational level, 650 (81.3%) of the respondents were university

graduated. Considering marital status, 463 (57.9%) of the participants were single and 190 (56.4%) of the married had 2-5 children. Exactly 437 (54.6%) of the respondents previously received prescribed antihistamines (Table 1).

Table 2 demonstrates public awareness regarding antihistamines. As for known formulas of antihistamines, pills were the most reported formula (98.5%) followed by syrup (7.8%), nasal spray (3.8%), and eye drops (2.4%). Considering pharmacological types, Histop was the most known by the participants (78.5%) followed by Cetirizine (21.9%), loratadine (18.8%), while 15.1% of the sample lacked oknowledge regarding this item. As for diseases treated with antihistamines, 73% of the participants reported they were for nasal allergy, followed by skin allergy (51.9%), eye allergy (44.1%), and drug allergy (25.9%). Totally, 73 (9.1%) of the participants had a good awareness level regarding antihistamines and their use.
As for participants' practice regarding antihistamines (Table 3), exactly 420 (52.5%) of the participants previously had antihistamines without prescription. The main cause of that was being available and easily achieved (82.6%), long waiting time for physicians (13.1%), and cheap (3.3%). Regarding side effects experienced by those who had antihistamines, 89.8% reported excessive sleeping, followed by drowsiness (53.5%), dry mouth (44.7%), and blurred vision (33.3%). Exactly 511 (63.9%) of the participants intend to use antihistamines in the future and only 5.1% intend to use unprescribed antihistamines for children below 2 years.

Table 4 illustrates role and participants' satisfaction with PHCCs staff regarding provided health education regarding antihistamines. Exactly 34.4% of the participants said that the Physician in PHCCs never provided explanations about antihistamines while 45.9% reported that it happened many times or usually. Regarding pharmacist role with drug dispensing, 16.6% said that pharmacists in PHCCs dispense the drug only, while 70% reported that they explain how to use and times of use; 41.1% reported that pharmacists write the instructional information on an antihistamine and 24% try to see if I understand the given information well. Regarding participants' satisfaction, 52.9% of the respondents were satisfied regarding physician provided HE regarding antihistamines compared to 57.4% satisfaction regarding pharmacist's role.

Table 5 shows distribution of public awareness regarding antihistamines by participants' personal data, practice, and source of information. Good awareness was reported among 15.6% of male participants compared to 6.8% of females with recorded statistical significance (P=.001). Also, 15.7% of those who work in governmental jobs had good awareness level compared to 5.9% of those who were not working (P=.001). Exactly 10.3% of university graduated participants had good awareness regarding antihistamines compared to none of those who had educational level below secondary school (P=.046). Also, 13% who had antihistamines had good awareness level compared to 4.5% of those who did not (P=.001) besides the same who had unprescribed antihistamines (13.3% vs. 4.5%, respectively; P=.001). Awareness was higher among dissatisfied participants regarding physician and pharmacists' roles (13.7% and 14.5%, respectively). As for source of information, there was no significant effect on participants' awareness level.

Discussion

Anticholinergic drugs include subtype of antihistamines named H1-antihistamines which act as reverse agonists instead of antagonists of histamine H1 receptors [19]. Besides their anti-allergic action, H1 antihistamines have extra anticonvulsant, hypnotic, tranquilizer, decongestant, and anti-parkinsonian effects [20]. According to their pharmacology and other effect properties, they are grouped into first-generation and second-generation drugs. Chemical properties of the two groups are markedly different with different clinical uses and side effects. The first-generation drugs are lipophilic which are able to cross the blood-brain barrier easily and meddle with neurotransmission by histamine at CNS H1 receptors. Therefore, this group has higher CNS side effects such as drowsiness, sedation, somnolence, fatigue, and headache. Additionally, they also affect cognitive function, memory, and psychomotor performance [21-23].

The current study aimed to assess public awareness regarding antihistamines and their side effects as one of the drugs that can be prescribed in primary health care centres. The study revealed that more than half of the respondents previously received prescribed antihistamines by the PHCCs physicians which means they may be exposed to the drug noisy side effects and should have some awareness. Regarding participants awareness, nearly all participants know that antihistamines are available in the form of pills and other forms such as syrup, spray, and eye drops were reported by very few numbers of participants. This was surprising as nearly 85% of the respondents had at least one child which means that they may be exposed to give their children any type of antihistamines for allergy or reactions but they were not informed about the drug and its clinical effect. Regarding types of antihistamines, Histop was the most reported (by about three quarters of the participants) while other types were less known and reported. The best detected area of awareness regarding antihistamines was diseases which need antihistamines in their treatment protocol. Allergy disorders (nasal, eye, and dermatological) were reported by more than half of the respondents. Only one quarter (25%) of the participants reported drug allergy which is not so correct. Totally, one out of each ten participants had good awareness level regarding antihistamines. This was inconsistent with that the most reported source of their information was medical staff (pharmacist and physician), as they were reported as the main source for information among more than half of the participants. This means they should have better awareness than what was found. This may be explained by that either participants were not understanding what was said to them (expressions may be difficult) or they don't care about given information. Another explanation may be that they may need antihistamines for long periods,

Table 1: Personal data of study participants, Abha, Saudi Arabia

Personal data		No	%
Age in years	< 25 years	383	47.9%
	25-35	217	27.1%
	36-45	106	13.3%
	> 45 years	94	11.8%
Gender	Male	212	26.5%
	Female	588	73.5%
Work	Not working/ retired	475	59.4%
	Governmental work	261	32.6%
	Private work	64	8.0%
Monthly income	< 5000 SR	431	53.9%
	5000-15000 SR	252	31.5%
	> 15000 SR	117	14.6%
Educational level	Below secondary	14	1.8%
	Secondary	136	17.0%
	University/ more	650	81.3%
Marital status	Single	463	57.9%
	Married	315	39.4%
	Divorced/ widow	22	2.8%
No. of children	No children	51	15.1%
	< 2 children	42	12.5%
	2-5 children	190	56.4%
	> 5 children	54	16.0%
Antihistamines was prescribed by PHC physicians	Yes	437	54.6%
	No	363	45.4%

Table 2.:Public awareness regarding antihistamines, Abha, Saudi Arabia

Awareness items	No	%
Known formulas antihistamine		
Pills	788	98.5%
Syrup	62	7.8%
Nasal spray	30	3.8%
Eye drops	19	2.4%
Know pharmacological types of antihistamines		
Don't know	121	15.1%
Histop	628	78.5%
Cetirizine	175	21.9%
loratadine	150	18.8%
Desloratadine	60	7.5%
Diseases treated with antihistamines		
Eye allergy	353	44.1%
Nasal allergy	584	73.0%
Skin allergy	415	51.9%
Drug allergy	207	25.9%
Overall awareness level		
Poor	727	90.9%
Good	73	9.1%

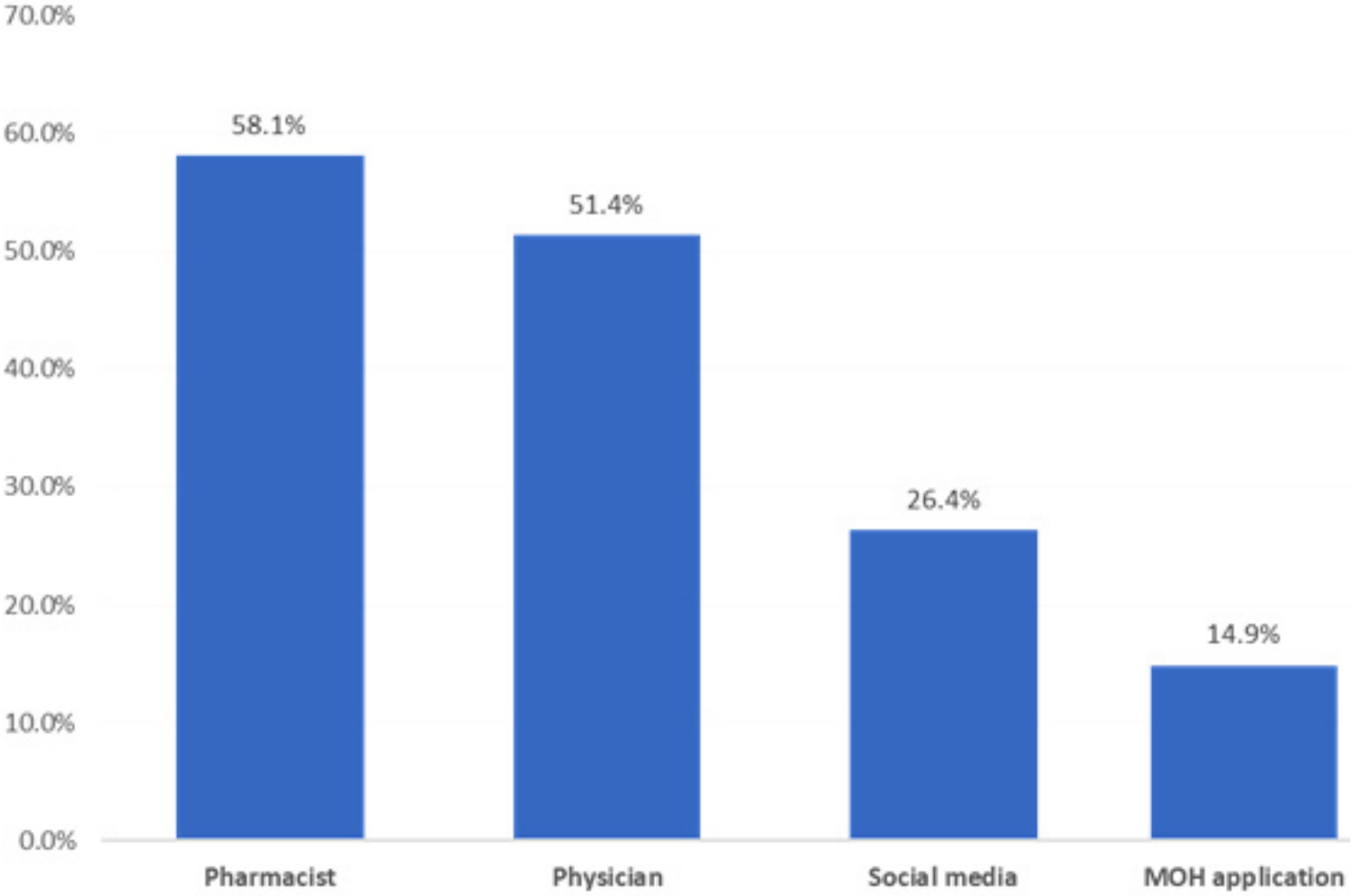
Table 3: Public practice regarding antihistamines, Abha, Saudi Arabia

Practice items	No	%
Had unprescribed antihistamines		
Yes	420	52.5%
No	380	47.5%
If yes, causes		
Available and easy achieved	347	82.6%
Cheap	14	3.3%
Fear to ask physician to prescribe	4	1.0%
Long waiting time for physician	55	13.1%
Previously had side effects for antihistamines		
Yes	271	33.9%
No	529	66.1%
If yes, mention		
Sleepiness	143	89.9%
Drowsiness	85	53.5%
Blurred vision	53	33.3%
Dry mouth	71	44.7%
Bad dreams	38	23.9%
Intend to use antihistamines in the future		
Yes	511	63.9%
No	289	36.1%
Intend to use unprescribed antihistamines for children below 2 years		
Yes	41	5.1%
No	759	94.9%

Table 4: Role and participants satisfaction of PHCCs staff regarding provided health education regarding antihistamines

Role of PHCCs staff in antihistamines HE	No	%
Physician in PHCCs explains about antihistamines		
Never	275	34.4%
Sometimes	158	19.8%
Many times,	259	32.4%
Usually	108	13.5%
Pharmacist role with drug dispensing		
Antihistamine dispensing only	133	16.6%
Write the instructional information on an antihistamine	329	41.1%
Explain how to use and times of use	560	70.0%
Tries to see if I understand the given information well	192	24.0%
Satisfaction regarding provided HE regarding antihistamines in PHCC clinic		
Completely dissatisfied	114	14.3%
Dissatisfied	263	32.9%
Satisfied	303	37.9%
Completely satisfied	120	15.0%
Satisfaction regarding provided HE regarding antihistamines in PHCC pharmacy		
Completely dissatisfied	99	12.4%
Dissatisfied	242	30.3%
Satisfied	290	36.3%
Completely satisfied	169	21.1%

Figure 1: Source of information regarding antihistamines among general population, Abha, Saudi Arabia



and they forget what medical staff explained. Awareness was higher among male participants who work, especially at governmental jobs, and among those who previously received antihistamines.

Regarding public practice of utilizing antihistamines, more than half of the participants received antihistamines without physician prescription which may be explained by that they are poorly knowledgeable regarding their side effects and clinical effects. The most reported cause of receiving unprescribed antihistamines was their availability and no need to have prescription and this motivates the need to include these group of drugs among those that need prescription due to side effects that may affect a person's life or cause CNS manifestation causing accidents or expose people's life to danger. The surprising thing was that these side effects were known for nearly 60% of the participants (on average), despite that, more than two thirds intend to use them in the future.

As for the physician and pharmacist role in providing health education regarding antihistamines, and patients' satisfaction regarding this role, two thirds of the participants reported that physicians told them about antihistamines and more than three quarters reported they had medical explanation by pharmacists. Pharmacists explained method of use, doses, time of use but none reported they were told about side effects, proper age to use and drugs' clinical contraindications. The study also revealed that nearly half of the participants were satisfied regarding role of physician or pharmacist in providing them with the clinical data.

Conclusions and Recommendation

In conclusion, the study revealed that public awareness regarding antihistamines was very poor especially concerning their types, and clinical effects. Also, unprescribed utilization of antihistamines was very high due to their availability and easily achieved without prescription. Physicians' and pharmacists' role in explaining drug reactions and uses is good but not fulfilling the expectation of the participants. More effort should be paid by the medical staff to cover this awareness deficit area in simple terms and by easy methods that can be remembered for a long duration. Also, antihistamines should be included with drugs that need a prescription to be given.

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Impact of Using Social Media on Mental Health among University Medical Students in Abha City, Southern Saudi Arabia

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Abstract

Background: During the past 10 years, the rapid development of social networking sites (SNSs) such as Facebook, Twitter, Snap chat, games and so on has caused several profound changes in the way people communicate and interact. SNSs are often defined as Web-based platforms that allow individuals to create their own personal profile and build a network of connections with other users. Today they have more than one billion active users, and, it is clear that during the past 10 years, online social networking has caused significant changes in the way people communicate and interact, affecting their mental and psychological health

Aim: to assess social media utilization and its impact on mental health among medical college students in Abha city.

Methodology: A cross sectional approach was used targeting college of medicine students in Abha city. Data were collected using structured questionnaire which was developed by the researchers after intensive literature review and expert consultation. The questionnaire was uploaded online using social media platforms by the researchers and their relatives and friends to be filled out by the medical student population in Abha city.

Results: The study included 311 students whose ages ranged from 17 to 29 years old with mean age of 22.8 ± 2.1 years. Females were 64.6% of the participants and 90.7% of the students were not married. About 28.6% of the students were in the preclinical grades and 14.5% were interns. Those who use social media platforms for less than one hour daily were 2.6% of the students while 50.5% use it for 6 hours daily. As for used social media platforms, Snap chat and Twitter were the most used. Poor mental health was detected among nearly half of the students.

Conclusions & recommendations: In conclusion, the study revealed that medical college students used social media platform intensively with reported high insomnia rate and poor mental health for half of them.

Key words: Social media, utilization, students, mental health, adults, addiction

Background

Social media has been defined as internet-based and networked communication platforms that allow both personal and public communication (1). This definition includes social media platforms such as Facebook, Twitter and Instagram. These platforms have become mainstays of popular culture (2). Based on the upward trend in social media utilization rates, it is estimated that by 2021, over 3 billion people will be using it (3).

Social media use in education implies using online social media platforms in academic settings. This ranges from elementary and secondary school to post-secondary education (4-6). Social media is becoming more accessible and easier to use, meaning that the age of students who are able to understand and use social media is getting younger and younger (7). Unfortunately, students mostly use social media for purposes other than learning and spend a very long time using the social media platforms daily (8). It was noticed that 94% of adults worldwide create a social account and used it at least once (9). Nearly 73% of adults use social media (10).

Mental health is defined as a state of well-being in which every individual realizes his or her own potential, ability to cope with the daily stresses of life, and productivity (11). "Facebook depression" is a term resulting from children's use of social media. A report by the American Academy of Paediatrics defines Facebook depression as "depression that develops when teens and preteens spend time on social media sites and then begin to exhibit classic symptoms of depression due to the intensity of the online world" (12). The pattern of social media platforms use is related to youth mental health. The current study was conducted to assess social media utilization in all forms and its impact on mental health among medical college students in Abha city.

Methodology

A cross sectional approach was used targeting college of medicine students in Abha city during the academic year 1441-1442 (1128 male students and 504 female students). Data were collected using structured questionnaire which was developed by the researchers after intensive literature review and expert consultation. The questionnaire data included student's personal data such as age, gender, and academic level. Students' social media utilization was assessed in the second section of the questionnaire including duration of use per day, availability and monthly cost of internet, and the most used social media platforms. Students' mental health was assessed using a developed tool consisting of 10 items covering students' concentration ability, self-confidence, ability to make decisions and useful actions besides enjoying doing missions (4 items). The other 6 items covered negative statements including being under pressure, anxious, unhappy, and feeling worthless. Students' attitude was measured using 10 questions with multiple answers format. All items were answered using 5 a point Likert scale ranging from strongly disagree (1 point) to strongly agree (5 points). The questionnaire was uploaded online using social media platforms by the researchers and their relatives and friends to be filled in by the medical student population in Abha city. A pilot study was conducted to assess tool applicability and reliability. The tool reliability coefficient (Alpha Cronbach's) was assessed and equalled 0.86.

Data analysis

After data were extracted, it was revised, coded and fed into statistical software IBM SPSS version 22(SPSS, Inc. Chicago, IL). All statistical analysis was done using two tailed test. P value less than 0.05 was considered to be statistically significant. For mental health items, the total summation of the discrete scores of the different items was calculated after reversing the scores of the negative statements. A student with a score less than 60% (30 points) of the maximum score (50 points) was considered to have poor mental health while good mental was considered if they had a score of 60% of the maximum or more. Descriptive analysis based on frequency and percent distribution was done for all variables including demographic data, Social media utilization data, and mental health assessment items. Crosstabulation was used to assess distribution of students' social media utilization by their personal data and to assess mental health according to social media utilization. Relations were tested using Pearson chi-square test.

Results

The study included 311 students whose ages ranged from 17 to 29 years old with mean age of 22.8 ± 2.1 years. Females were 64.6% of the participants and 90.7% of the students were not married. About 28.6% of the students were in the pre-clinical grades (1-6) and 14.5% were interns. GPA was 3.5-4.5 for 47.6% of the students.

Table 1 illustrates Social media use among University students in Abha city. Those who use social media platforms for less than one hour daily were 2.6% of the students, 13.5% use it for 2-3 hours while 33.4% use the platforms for 4-5 hours and 50.5% use it for 6 hours daily or more. Network was available all during the day among 86.5% of the students. About 49% of the students pay about 100-300 SR as internet cost monthly. As for used social media platforms, Snap chat and Twitter were the most used (64.3% for each) followed by WhatsApp (58.5%), and Instagram (47.3%).

On relating social media use with students personal data (Table 2), 49.5% of students aged less than 25 years used it for more than 6 hours daily compared to 52% of those aged above 25 years (P=.663). About 50% of both male and female students used social media for 6 hours or more daily. As for academic level, 53.3% of interns used the platforms for more than 6 hours daily while 42.7% of the students in the pre-clinical grades used it for the same duration. Exactly 60% of the students whose GPA was less than 2.5 spent more than 6 hours on social media compared to 41.3% of those whose GPA was 4.5-5 with recorded statistical significance (P=0.049).

Regarding students attitude, Table 3 illustrates that 87.8% of the students agreed that social media is a useful medium for them and 74% of them agreed that social media provides space for games while 70.4% reported that information from social media promotes self-awareness. Only 30.9% of the students documented no improvement in social life since they started using social media.

Mental health, depression is illustrated in Table 4 which indicates that 78.5% of the students reported that they feel able to make decisions, 75.6% said they can concentrate on what they do and 65.9% reported that they enjoy their daily activities. On the other hand, 51.1% of the students usually feel that they are under pressure and 28.6% reported that they feel unhappy or depressed. Exactly 25.7% of the students agreed that they feel that they cannot overcome their difficulties. In total, good mental health was detected among 168 (54%) of the students (Figure 1).

Table 5 demonstrates Distribution of students' mental health according to social media utilization. Exactly 58.4% of the students who use social media for less than 6 hours daily had good mental health compared to 49.7% of those who used it for more than 6 hours daily, with recorded statistical significance (P=.049). Good mental health was also insignificantly higher among those who use the internet for free than others who pay more than 500 SR monthly (52.3% vs. 37.5%, respectively; P=0.750). Good mental health was recorded among 54% of Snap Chat users compared to 44.4% of those who use YouTube (P=.643).

Table 1. Social media use among University students in Abha city

Social media use		No	%
Daily use of social media	< 1 hour	8	2.6%
	2-3 hours	42	13.5%
	4-5 hours	104	33.4%
	6 hours/ more	157	50.5%
Network availability over the day	Rare	8	2.6%
	Most of the day	34	10.9%
	All over the day	269	86.5%
Net cost per month	Free	44	14.1%
	< 100 SR	59	19.0%
	100-300 SR	153	49.2%
	300-500 SR	47	15.1%
	> 500 SR	8	2.6%
Used social media platform	Snap chat	200	64.3%
	Twitter	200	64.3%
	WhatsApp	182	58.5%
	Instagram	147	47.3%
	YouTube	9	2.9%

Table 2. Distribution of students social media use by their personal data

Personal data	Total (%)	Daily use of social media				P-value
		< 6 hours		> 6 hours		
		No	%	No	%	
Age in years						
< 25 years	184 (59.2%)	93	50.5%	91	49.5%	.663
> 25 years	127 (40.8%)	61	48.00%	66	52.0%	
Gender						
Male	110 (35.4%)	54	49.1%	56	50.9%	.911
Female	201 (64.6%)	100	49.8%	101	50.2%	
Marital status						
Non married	282 (90.7%)	142	50.4%	140	49.6%	.357
Married	29 (9.3%)	12	41.4%	17	58.6%	
Academic level						
Pre-clinical	89 (28.6%)	51	57.3%	38	42.7%	.220
Clinical	177 (56.9%)	82	46.3%	95	53.7%	
Intern	45 (14.5%)	21	46.7%	24	53.3%	
GPA						
<2.49	10 (3.2%)	4	40.0%	6	60.0%	
2.5-3.49	49 (15.8%)	26	53.1%	23	46.9%	.049*
3.5-4.49	148 (47.6%)	63	42.6%	85	57.4%	
4.5-5	104 (33.4%)	61	58.7%	43	41.3%	

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

Table 3. Distribution of students' attitude regarding social media platforms use in Abha city

Students attitude data	Agreement rate	
	No	%
Social media is a useful medium for university students	273	87.8%
I prefer spending more time on social media	161	51.8%
I prefer making friends on social media	111	35.7%
Information from social media promotes user self-awareness	219	70.4%
Information from social media enhances communication skills	191	61.4%
Social media provides space for games	230	74.0%
Social media affects my health (physical & psychological)	202	65.0%
Online social networks distract me from my real life	184	59.2%
I spend more time on social media than on real social relationships	184	59.2%
There has been no improvement in social life since I entered on social media	96	30.9%

Table 4. Description of mental health of university students in Abha city

Mental health items	Disagree		Neutral		Agree	
	No	%	No	%	No	%
I can concentrate on what I do	26	8.4%	50	16.1%	235	75.6%
I feel I am doing a useful job	49	15.8%	63	20.3%	199	64.0%
I feel able to make decisions	33	10.6%	34	10.9%	244	78.5%
Enjoy my daily activities	44	14.1%	62	19.9%	205	65.9%
I suffer from insomnia as a result of anxiety	132	42.4%	60	19.3%	119	38.3%
I always feel being under pressure	87	28.0%	65	20.9%	159	51.1%
I feel that I cannot overcome my difficulties	145	46.6%	86	27.7%	80	25.7%
I feel unhappy or depressed	148	47.6%	74	23.8%	89	28.6%
I lost self confidence	177	56.9%	65	20.9%	69	22.2%
I feel like a worthless person	222	71.4%	52	16.7%	37	11.9%

Figure 1. Overall mental health among university students in Abha city

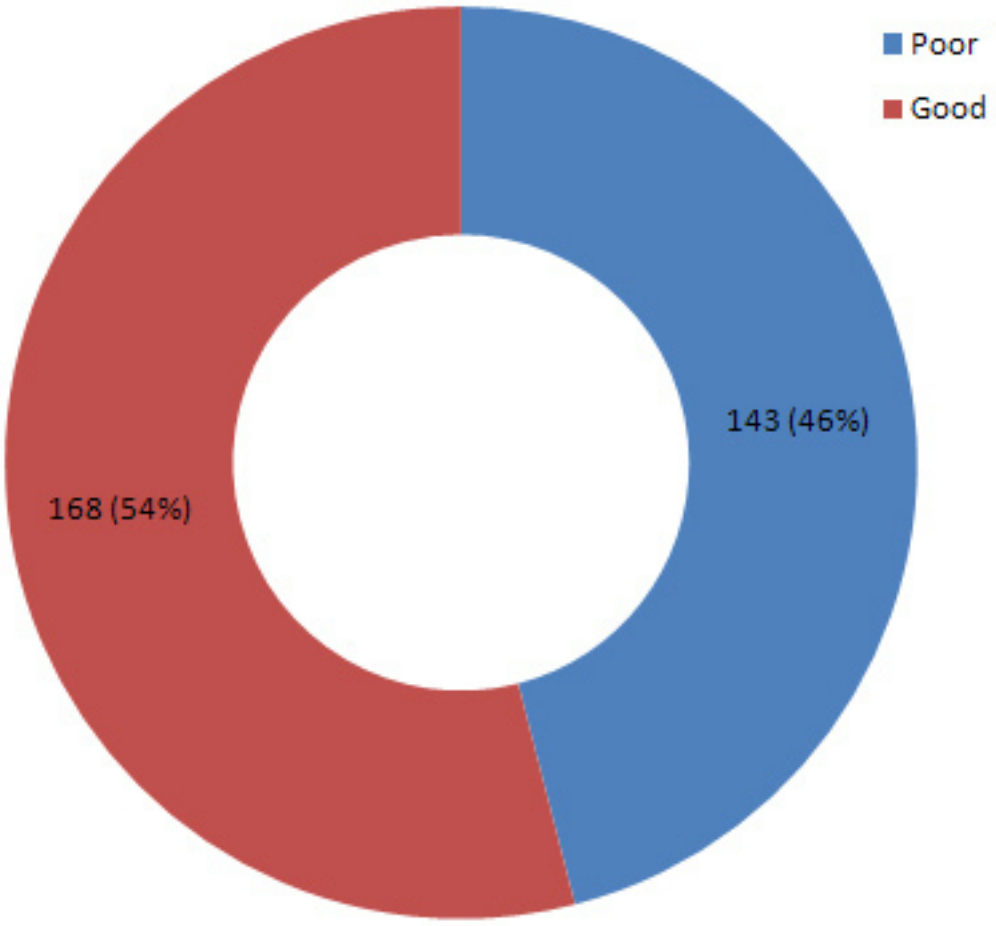

Table 5. Distribution of students' mental health according to social media utilization rate

Personal data		Mental health				P-value
		Poor		Good		
		No	%	No	%	
Daily use of social media	< 6 hours	64	41.6%	90	58.4%	.049*
	> 6 hours	79	50.3%	78	49.7%	
Net cost per month	Free	21	47.7%	23	52.3%	.750
	< 100 SR	27	45.8%	32	54.2%	
	100-300 SR	66	43.1%	87	56.9%	
	300-500 SR	24	51.1%	23	48.9%	
	> 500 SR	5	62.5%	3	37.5%	
Network availability over the day	Rare	4	50.0%	4	50.0%	.450
	Most of the day	19	55.9%	15	44.1%	
	All over the day	120	44.6%	149	55.4%	
Used social media platform	WhatsApp	87	47.8%	95	52.2%	.643
	Twitter	97	48.5%	103	51.5%	
	Instagram	72	49.0%	75	51.0%	
	Snap chat	92	46.0%	108	54.0%	
	YouTube	5	55.6%	4	44.4%	

Discussion

Regardless of the benefits of social media, it's important to know that social media can never be an alternative for real-world human relations. It requires in-person contact with others to set off the hormones that alleviate stress and make you feel happier, healthier, and more positive. Incongruously for a technology that's designed to bring people closer together, spending too much time using social media can actually make you feel more lonely and isolated and exacerbate mental health problems such as anxiety and depression (13, 14).

The current study aimed to assess the pattern of using social media among medical college students in Abha city, also, to assess the effect of social media utilization on the students' mental health. The study revealed that all included students use social media platforms in different intensity. More than half of the sample spent 6 hours or more daily using social media which is too big a time period irrespective of high monthly cost of the internet (more than 500 SR). The most commonly used sites were Snap Chat, WhatsApp, and Twitter. Social media use was nearly equal among male and female students, among different ages, and among all students regardless of their academic level. One of the most important findings was that GPA was significantly affected by the duration of using social media. It was significantly lower among those who used the platforms for more than 6 hours daily. Many researchers have studied the pattern of using social media platform among adults including students. A study was conducted to assess social media use among older adults by Bell C et al, 2013.(15). The study revealed that fifty-nine participants (42%) identified themselves as current Facebook users. Against what was expected, there was not a significant difference in loneliness between Facebook users and non-users for this sample. A second study was conducted in USA, 2016 to assess Social Media Use and Access to Digital Technology in US Young Adults (16). The researchers reported that in 2014, 89.42 of young adults regularly used at least one social media site. In 2016, this increased to 97.5%. Among regular users of social media sites in 2016, the top five sites were Tumblr (85.5%), Vine (84.7%), Snapchat (81.7%), Instagram (80.7%), and Linked In (78.9%).

Social media use may affect users' life style including sleep hygiene, loneliness feeling, social relations and their mental and social health. The current study revealed that 46% of the students had poor mental health which means nearly 1 out of each 2 students. About half of the students (42%) reported that they suffer from insomnia. More than half of the students feel loss of self confidence and nearly three quarters of them feel that they feel like a worthless person. Good mental health was significantly higher among those who used social media for a lesser time period (less than 6 hours daily) which means the more use of social media for a long time can affect users' mood and feelings. Also it may cause the user to objectify his/her real life situation due to the ideal world he engages in with social media which in turn affects mental health.

The Royal Society for Public Health (RSPH) conducted research and published a report looking at all aspects of social media and young people's mental health and wellbeing – both the positive and negative aspects (17). There was no doubt social media is playing a significant role in the rise of poor mental health that we are seeing in young people. The young people they surveyed in their research reported that four out of the five most popular social media platforms (Instagram, Snap chat, Facebook, Twitter) made their feelings of anxiety and depression worse. Users who reported spending more than two hours per day on platforms such as Facebook, Twitter and Instgram are more likely to report poor mental health, including psychological distress. In China, Brain imaging (MRI) studies, report that there are significant changes in the areas of the brain that regulate impulse control and decision making among individuals with an Internet gaming disorder. (18) In 2014, researchers in Austria found that participants in one of their studies reported a mood decline after using Facebook for 20 minutes, compared to people who only visited some websites in the same period of time. The study said people felt this low mood because they thought they had wasted their time using Facebook.(19). Locally, the majority of the Saudi population is under 30 years which makes them the biggest group using social media and games. Last year's social media statistics reveals that the number of internet users in Saudi Arabia rose swiftly to reach 30 million people by the beginning of 2018. The internet penetration in the country has now reached 91% (20). In 2016, a study was done in Al-Qassim region of Saudi Arabia aimed to assess the prevalence of addiction to video games and its correlation with mental health, among 276 high school students. They found addiction to video games was strongly associated with psychological distress (OR = 4.1, 95% CI = 1.80, 9.47) (21). Another study was conducted in Buraydah, Al Qassim city, Saudi Arabia to examine the relationship between use of social media and depression among 80 female teenagers who were selected randomly. About one third of the students have a diagnosis of depression and out of 48 participants who used social media more than 5 hours daily it was 20 (41.67%) who had depression. (21)

Conclusions and Recommendations

In conclusion, the study revealed that medical college students used social media platform intensively (more than 6 hours daily) with reported high insomnia rate and poor mental health for half of them. This in turn affected their education achievement due to loss of concentration during the daytime. More effort should be paid to improve the students' awareness regarding how to use social media and how to avoid being social media addicts. This can be achieved through periodic health education sessions, being included in their study courses and through national policy using all available media.

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Assessment of quality of life among medical interns in Saudi Arabia

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Abstract

Background: Internship is a long journey to explore many specialties. No study has been performed in Saudi Arabia to determine the health-related quality of life (HQQOL) of medical interns.

Objectives: to assess the HQQOL of medicals interns in KSA and the relation between HRQOL and participants' characteristics.

Methods: A cross-sectional study was done on 150 medical interns and the WHO quality of life questionnaire based on a brief version of the World Health Organization Quality of Life Instrument as the study tool. It contains 24 items of satisfaction that are divided into four domains: Physical health, psychological health, social relationships and environmental health.

Results: 39.3% and 24.7% of the participants were satisfied and very satisfied with their health respectively. Females had a significantly higher score of Domain 1 (Physical health) compared to males, while married participants had a significantly higher score of Domain 2 (Psychological health). Single participants had a significantly higher score of Domain 4 (Environmental health) and a non-significant relationship was found between domain 4 and domain 3 and other participants' characters. A significant negative correlation was found between overall WHOQOL-BREF instrument scores, Domain 2, Domain 3 and Domain 4 and participants' age. Females and married participants had a significantly higher score of satisfaction with their health.

Conclusion: As the lowest scores in this study were for the Domain of social relationships and environmental health, there is a need to provide support of medical interns to cope with factors influencing their QOL through more assessment and training sessions performed by specialists.

Key words: assessment, quality, life, WHOQOL-BREF, interns, Saudi Arabia

Introduction

During medical education, students are subjected to the pressure of their curriculum and having an expectation to gain a successful medical career and to cope with the future uncertainties regarding medical practice and its associated employment. After completing the course of medical education, medical students will spend an internship year which is 12 months of rotations between the major specialties (1).

Internship is a long journey to explore many specialties and to apply knowledge and skills which were taught in medical school to equip them for good practice. Moreover, it is an opportunity for new graduates to interpret their knowledge in the clinical field, making interns more familiar with the job description and to narrow the gap between medical school and real job practices (2).

The World Health Organization defines quality of life (QOL) as, ‘‘an individual’s perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns” (3).

Internship is a much more stressful year, with more commitments and responsibilities for medical interns, working long hours and on call duties which are similar to those experienced by senior doctors in the same rotation. This puts medical interns under mental stress and sleep deprivation which were not experienced by them at medical school (4). Many studies have shown that depression, sleep deprivation and mental overload decreases quality of life among medical interns which will impact the quality of care (1).

In the Kingdom of Saudi Arabia (KSA), a study was done in 2018 to assess the quality of life-based on WHO-QOL-BREF protocol among medical students studying in Riyadh, Saudi Arabia.

The study found that students staying with family had a higher overall QOL score than those living and scores according to different academic years were significantly different in the environmental health domain. The study concluded that the medical students were found to have a decreased quality of life (5). Another study was done in 2019 to assess the effect of gender, educational level, and academic performance on their QOL , where the WHOQOL-BREF instrument was used. The environmental domain had, and high achievers showed, lower psychological health, while poor academic performance was associated with better psychological health and social relationship QOL scores (6).

A careful literature search has found that no study has been done to assess the health-related quality of life (HQQOL) of medical interns during their medical training in Saudi Arabia. So, this study aimed to assess the health-related quality of life of medical interns in KSA and the relation between HRQOL and participants’ characteristics.

Methods

Study Setting and Population: Medical interns of Taif medical College, Taif University, from the year 2016 – 2020.
Study Design and time: a cross-sectional study was conducted to fulfill the objectives of the study. from February to March 2020.
Sample size estimation: The sample size formula used is as follows
n = Z2pq/d2
n = minimum sample size
Z = standard normal deviation set at 95% confidence limit = 1.96
p = number of medical student in internship year
q = 1p (complementary probability
D = margin of error = 5% =0.05

Prevalence of clinical procedures that required informed consent used in this study is 0.67 (67%), therefore P = 0.67
q = 10.5= 0.5
n = (1.96) 2 X 0.67 X 0.33/(0.05)2 X 0.2211/0.0025 3.8416 = 0.8493/0.0025 = 339.72.
So, the minimum sample size is 340 medical interns.

Sampling method: A simple random sampling was done until the required sample size was achieved.

The inclusion criteria were male and female medical interns of medical college of Taif University from the year 2016-2020. And the exclusion criteria were under graduated medical Students and medical interns outside the time (2016-2020).

Data collection tools: A predesigned questionnaire that included items on the participants’ characteristics was used. A version of the WHO quality of life questionnaire based on a brief version of the World Health Organization Quality of Life Instrument was the study tool (7). This instrument is derived from the WHOQOL 100. The WHOQOL BREF questionnaire and contains two items from the Overall QOL and General Health and 24 items of satisfaction divided into four domains: Physical health with 7 items (DOM1), psychological health with 6 items (DOM2), social relationships with 3 items (DOM3) and environmental health with 8 items (DOM4). Five hundred and thirty-five Neyshabur health care staff filled out the Iranian version of the WHOQOL BREF questionnaire. Each item is rated on a 5 point Likert scale. Each item of the WHOQOL BREF is scored from 1 to 5 on a response scale. Raw domain scores for the WHOQOL were transformed to a 4 20 score according to guidelines (8). Domain scores are scaled in a positive direction (i.e., higher scores denote higher QOL). The mean score of items within each domain is used to calculate the domain score. After the scores were computed, they were transformed linearly to a 0 100 scale (9,10,11).

Ethical considerations: This study was approved by the institutional ethical committee of Taif University, KSA.

All medical interns were informed about the purpose of the study and informed written and verbal consent was taken.

Statistical analysis: Data were analyzed using (SPSS) version 24. Qualitative data was expressed as numbers and percentages. Quantitative data was expressed as mean and standard deviation (Mean ± SD), where Mann-Whitney and Kruskal Wallis tests were applied for non-parametric variables. Correlation analysis using the Spearman's test was done, and a p-value of <0.05 was considered as statistically significant.

Results

Table 1 shows that the mean age of the participants was 24.43 ± 0.85 years, 60.7% were males, 90.7% were single, and 76.7% had an urban residence. Most of the participants (83.3%) graduated in 2020.

Figure 1 shows that 33.3% and 49.5% of the participants rate their quality of life as very good and good respectively. Figure 2 shows that 39.3% and 24.7% of the participants were satisfied and very satisfied with their health respectively.

Table 2 shows that the mean scores of Domain 1, 2, 3 and 4 were 62.69 ± 16.92, 68.69 ± 14.16, 42.24 ± 10.18 and 55.65 ± 20.24 respectively. And the mean scores of participants' rating of their quality of life and satisfaction with their health were 4.13 ± 0.76 and 3.73 ± 1.01 respectively.

Table 3 shows that females had a significantly higher score of Domain 1 (Physical health) compared to males (66.19 ± 15.91 vs 57.28 ± 17.13) (p-< 0.05). While married participants had a significantly higher score of Domain 2 (Psychological health) compared to participants with other marital status (p=< 0.05). On the other hand, a non-significant relationship was found between domain 1 and 2 according to other participants' characteristics (p=> 0.05).

Table 4 shows that single participants had a significantly higher score of Domain 4 (Environmental health) compared to participants with other marital status (p-< 0.05). A non-significant relationship was found between domain 4 and other participants' characteristics (p=> 0.05). A non-significant relationship was found between domain 3 and all participants' characters (p=> 0.05).

Figure 3 shows that a significant negative correlation was found between WHOQOL-BREF instrument scores and participants' age (r=-0.249, p-value=0.002). Table 5 shows that participants who graduated in 2019 had a significantly higher score when rating their quality of life (p=< 0.05) while female and married participants had a significantly higher score of satisfaction with their health (p=< 0.05).

Table 6 shows that a significant negative correlation was found between participants' age and Domain 2 (Psychological health), Domain 3 (Social relationships) and Domain 4 (Environmental health) of the WHOQOL-BREF instrument (p-value< 0.05). On the other hand, a non-significant correlation was found between the participants' age and score of Domain 1 (Physical health, rating of participants' quality of life score and satisfaction with their health score (p=> 0.05).

Table 1. Distribution of the participants according to their characteristics (No.=150)

Variable	No. (%)
Age (mean ±SD)	24.43 ± 0.85
Gender	
Female	59 (39.3)
Male	91 (60.7)
Marital status	
divorced	3 (2)
married	11 (7.3)
single	136 (90.7)
Year of graduation	
2018	1 (0.7)
2019	24 (16)
2020	125 (83.3)
Residence	
Rural	35 (23.3)
Urban	115 (76.7)

Figure 1. Percentage distribution of the participants according to their response to "How would you rate your quality of life?"

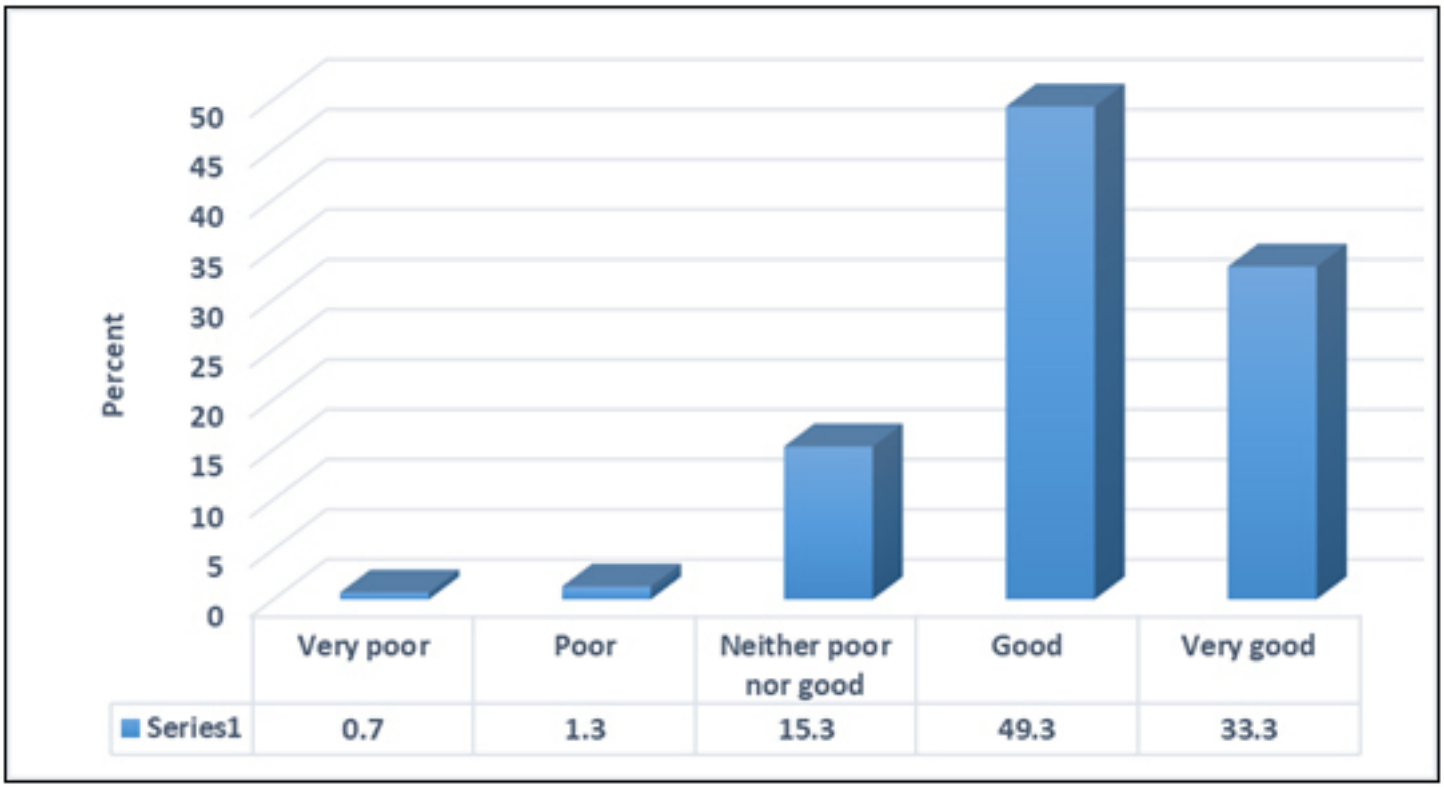


Figure 2. Percentage distribution of the participants according to their response to "How satisfied are you with your health?"

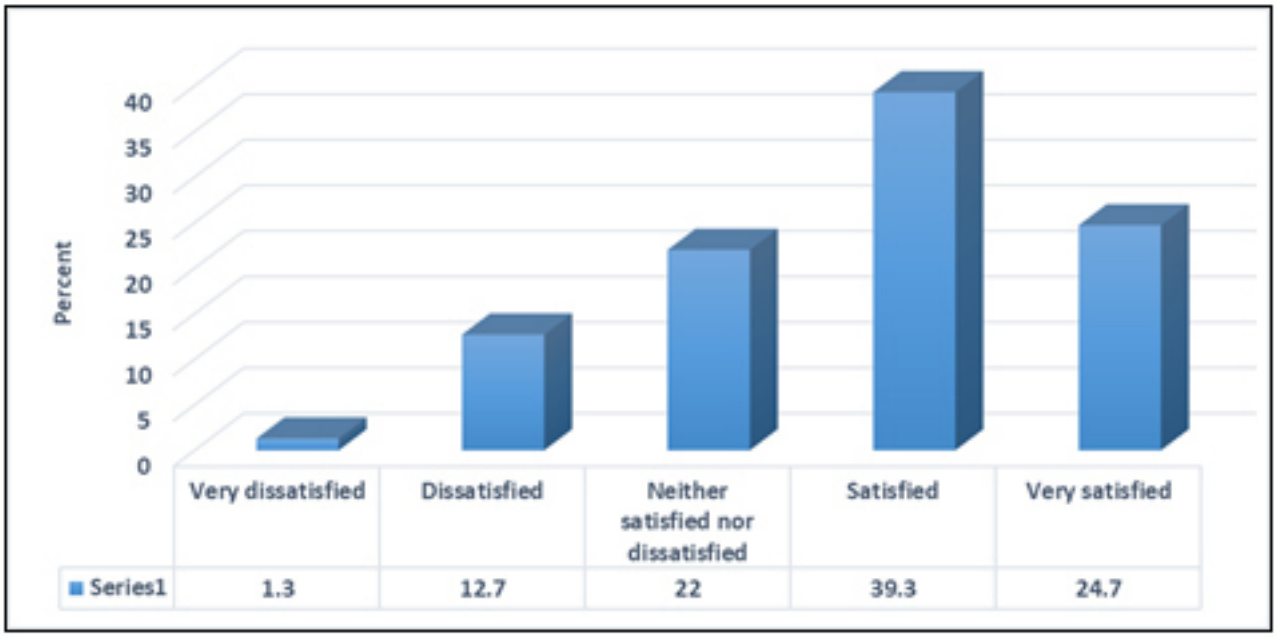


Table 2. Distribution of the participants according to the mean scores of the four domains of the WHOQOL-BREF instrument and mean score of participants' rating of their quality of life and satisfaction with their health

Variable	(mean ± SD)
Domain 1 (Physical health	62.69 ± 16.92
Domain 2 (Psychological health)	68.69 ± 14.16
Domain 3 (Social relationships)	42.24 ± 10.18
Domain 4 (Environmental health)	55.65 ± 20.24
Rating of participants' quality of life	4.13 ± 0.76
Satisfaction with their health	3.73 ± 1.01

Table 3. Relationship between mean scores of Domains 1 and 2 and participants' characteristics

Variable	Domain 1 (Physical health)	Test	p-value	Domain 2 (Psychological health)	Test	p-value
Gender						
Female	66.19 ± 15.91	3.17*	**0.001**	69.49 ± 15.05	1.11*	0.2631
Male	57.28 ± 17.13			67.45 ± 12.7		
Marital status						
divorced	52 ± 0.0001	2**	0.146	44 ± 0.0001	2**	**0.02**
married	56.36 ± 12.54			70.18 ± 9.18		
single	63.44 ± 17.26			69.11 ± 14.17		
year of graduation						
2018	48 ± 0.0001	2**	0.425	52 ± 0.0001	2**	0.319
2019	65.16 ± 15.8			66.33 ± 14.91		
2020	62.33 ± 17.16			69.28 ± 14.01		
Residence						
Rural	63.2 ± 17.24	0.1*	0.917	65.25 ± 16.16	1.17*	0.242
Urban	62.53 ± 16.89			69.73 ± 13.4		

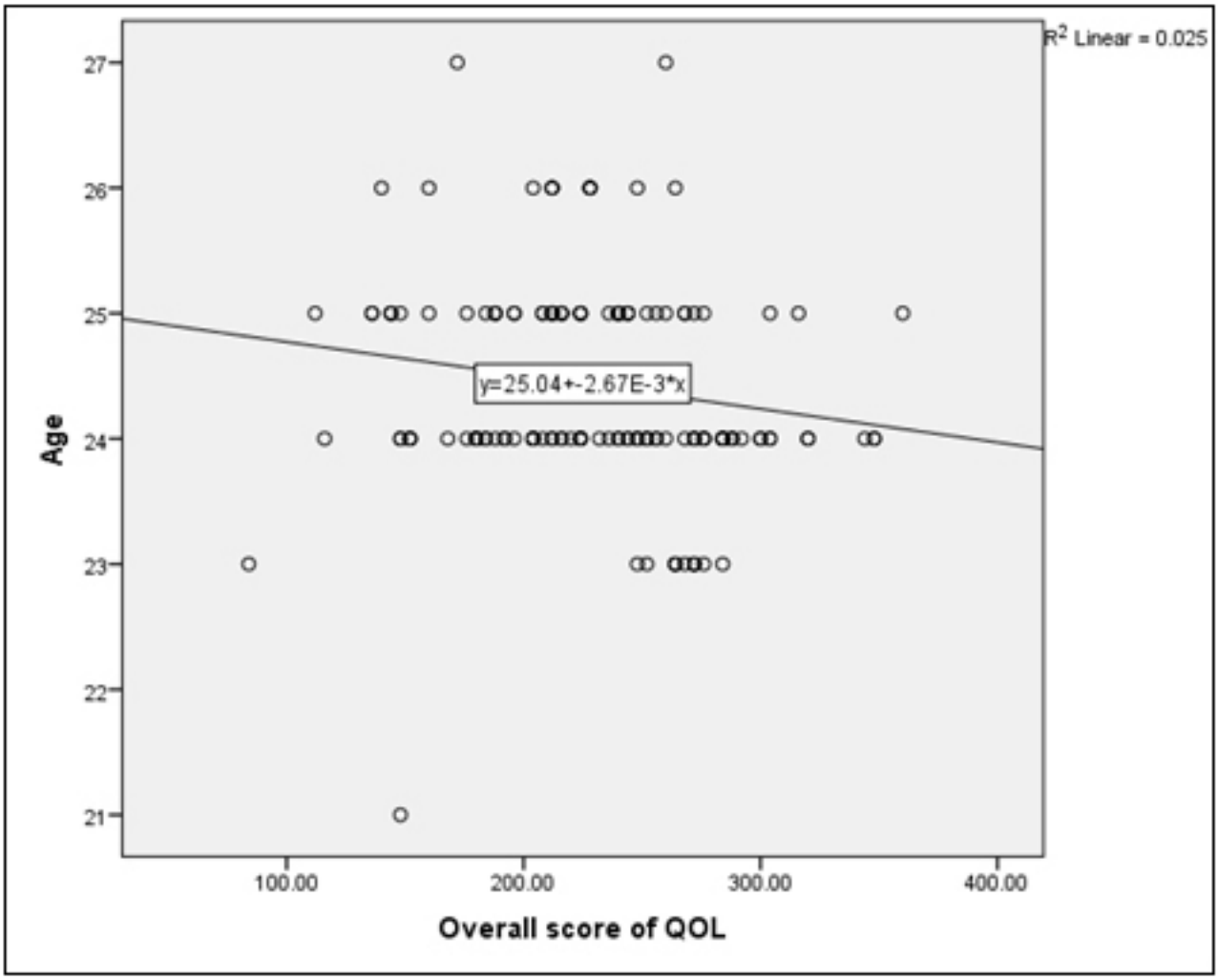
N.B.: *Mann-Whitney test **Kruskal Wallis test

Table 4. Relationship between mean scores of Domains 3 and 4 and participants' characteristics

Variable	Domain 3 (Social relationships)	Test	p-value	Domain 4 (Environmental health)	Test	p-value
Gender						
Female	42.94 ±10.71	1.33*	0.183	57.31 ±21.2	1.42*	0.153
Male	41.15 ±9.3			53.08 ±18.56		
Marital status						
divorced	28 ±0.0001	2**	0.041	20 ±0.0001	2**	**0.01**
married	40.72 ± 9.6			49.81±14.79		
single	42.67 ±11.14			56.91 ±20.09		
year of graduation						
2018	40 ±0.0001	2**	0.868	20 ±0.0001	2**	0.299
2019	41.33±10.12			54.83±21.86		
2020	42.43 ±10.27			56.09 ±19.83		
Residence						
Rural	41.82 ±11.28	0.17*	0.865	48.68 ±23.47	1.86*	0.063
Urban	42.36 ±9.88			57.77 ±18.76		

N.B.: *Mann-Whitney test **Kruskal Wallis test

Figure 3. Spearman's correlation analysis between WHOQOL-BREF instrument scores and participants' age



(r=-0.249, p-value=0.002)

Table 5. Relationship between mean scores of participants' rating of their quality of life and satisfaction with their health and their characteristics

Variable	Rating of participants' quality of life	Test	p-value	Satisfaction with their health	Test	p-value
Gender						
Female	4.21 ±0.76	1.61*	0.106	3.92 ±0.88	2.71*	**0.007**
Male	4.02 ±0.75			3.44 ±1.13		
Marital status						
divorced	5 ±0.0001	2**	0.063	2 ±0.0001	2**	**0.017**
married	4 ±0.44			3.55± 0.68		
single	4.13± 0.78			3.79 ±1.01		
Year of graduation						
2018	3 ±0.0001	2**	**0.046**	3 ±0.0001	2**	0.629
2019	4.42 ± 0.65			3.79±1.02		
2020	4.09 ±0.77			3.73 ±1.01		
Residence						
Rural	3.97 ±0.82	1.34*	0.178	3.86 ±1.08	1.02*	0.305
Urban	4.18 ±0.74			3.70 ±0.99		

N.B.: *Mann-Whitney test **Kruskal Wallis test

Table 6. Spearman's correlation analysis between participants' age and mean scores of the four domains of the WHOQOL-BREF instrument and mean score of participants' rating of their quality of life and satisfaction with their health

Variable	Age	
	r	p-value
Domain1 (Physical health)	-0.12	0.123
Domain2 (Psychological health)	-0.19	**0.017**
Domain3 (Social relationships)	-0.32	< **0.001**
Domain4 (Environmental health)	-0.19	**0.015**
Rating of participants' quality of life	-0.02	0.792
Satisfaction with their health	-0.15	0.064

Discussion

The main objective of this study was to assess the HRQOL of medical interns. The result from the survey of 150 medical intern doctors at Taif university, KSA did not support the expected hypothesis which is that the internship year affects negatively the QOL among medical intern doctors. The findings showed that 33.3% and 49.5% of the participants rate their QOL as very good and good respectively. Similarly, in another Saudi study conducted on medical students, 33.6% of the students described their QOL as "very good", 39.7% as "good", and only 2.1% felt it was "very poor" (6). Also, a study done on dental students found that students rated their QOL between very good and good (12).

The highest domain score was for Domain 2 (Psychological health) in this study. A previous study found that the environmental domain had the highest mean score, followed by the psychological health domain (12). Another study that included the medical profession found that the highest and the lowest mean scores of WHOQOL-BREF domains were found for physical and environmental health domains respectively (13).

A study done in Pakistan revealed the same different results where the highest reported mean score was that of the environmental domain and the psychological health domain had the lowest score (14). This disparity can be explained by several factors, such as Saudi Arabia's stable extrinsic climate, both politically and economically, and a well-balanced cohesive society promoting the psychological well-being of students compared to Pakistan's intermittently eruptive background.

In this study, the highest mean scores were found for psychological domain and the lowest was found for social relationships. Different results were found in a previously mentioned study done on dental students, where the mean scores were lowest for the psychological domain and were highest for the physical health domain (12). Previous studies suggested different results, where some

impairment of student's emotional stability occurs in the phase of medical training when students make their first contact with patients and may have intense emotional experiences involving feelings such as anxiety, insecurity, and guilt (15,16).

This work found a significant negative correlation between WHOQOL-BREF instrument scores and participants' age, and between participants' age and Domain 2 (Psychological health), Domain 3 (Social relationships) and Domain 4 (Environmental health) of the WHOQOL-BREF instrument. In contrast, a previous study done on medical students found that the psychological domain of the first-year participants was significantly better than that of fourth-year participants (12).

This work illustrated that single participants had a significant higher score of Domain 4 (Environmental health) compared to participants with other marital status. Different results were revealed from a previous Saudi study which stated that medical students living with their family had a better score of Domain 2 (psychological health (5)).

In this study females and married participants had a significantly higher score of physical health (Domain 1), while a non-significant relationship was found between Domains 2, 3 and 4 and other participants' characteristics.

In a previous Saudi study, no correlation was found between the gender of medical students and their QOL across all domains (6). In some studies, males had higher physical health scores compared to females (10, 14, 17, 18), while males showed better psychological health than females in other studies (10,14). In addition, one Brazilian study found that female students had lower scores in most of the Domains (19). This finding could show that there is no real qualitative difference in Saudi Arabia despite social and cultural norms that place variations on the ways of living of males and females.

Limitations

The limited application of the study on Taif university medical interns can affect the generalization of the findings. Also, most of the sample was taken from 2020 graduates. So, these limitations make it difficult to be representative of all other universities in Saudi Arabia.

Conclusion

This study found that 39.3% and 24.7% of the participants were satisfied and very satisfied with their health respectively. Females had a significantly higher score of Domain 1 (Physical health) compared to males, while married participants had a significantly higher score of Domain 2 (Psychological health) compared to participants with other marital status. A non-significant relationship was found between Domain 1 and 2 according to other participants' characteristics. Single participants had a significantly higher score of Domain 4 (Environmental health) and a non-significant relationship was found between Domain 4 and Domain 3 and other participants' characteristics. A significantly negative correlation was found between overall WHOQOL-BREF instrument scores, Domain 2 (Psychological health), Domain 3 (Social relationships) and Domain 4 (Environmental health) and participants' age. Participants who graduated in 2019 had a significantly higher score when rating their quality of life; females and married participants had a significantly higher score of satisfaction with their health. As the lowest scores in this study were for the Domain of social relationships and environmental health, there is a need to provide support to medical interns to cope with factors influencing their QOL through more assessment and training sessions done by specialists.

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Impact of age on the clinical aspects and management of patients with rheumatoid arthritis, among adults in Saudi Arabia

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Abstract

Background: Rheumatoid arthritis is a common chronic inflammatory disease; it is the most common inflammatory arthritis in Saudi Arabia.

Objectives: To explore the impact of age on the clinical aspects and management of patients with rheumatoid arthritis, among adults, in Saudi Arabia.

Methods: A cross-sectional survey was conducted, online, using Google form which was sent to patients with Rheumatoid arthritis, in Jeddah, Saudi Arabia. The total number enrolled was 122 patients. Data was collected using a predesigned questionnaire which provided information on the socio-demographic characteristics, age of onset of rheumatoid arthritis, comorbidities, symptoms and signs, and lines of management. Chi Square test of significance was used. The level of significance was 0.05.

Result: Rheumatoid Arthritis occurred in 41.8% of the patients before the age of 20 years, in 28.7% by the age of 20 to < 30 years, in 20.5% by the age of 30 to < 40 years, and in 9% by the age of 40 years and older. Autoimmune diseases, skin allergies, and intake of medication without doctor prescription, were significantly more common among those aged 36 to 46 years old ($p < 0.05$). Loss of appetite was common among those aged 16 to 25 years old ($p<0.5$). Cardiovascular diseases, burning in the mouth, neck pain, use of over the counter treatments, and use of biological treatment, were significantly more common among those aged 46 years or older ($p<0.05$). RF, anti-CCP, LFT, FRT, and CBC were the common investigations done, with no age differences. Although Cortisone, and methotrexate drugs were given more in those aged 46 years and over, no significant age differences were found. The majority of the patients did not visit the rheumatology clinics regularly.

Conclusion: Rheumatoid arthritis did not appear to be an old age disorder; it was common before the age of 20 years. Clinical picture and lines of management differed among different age groups. This evaluation raised questions for future studies and improved care for RA. Extrapolation of these differences, and also lack of access to care, may help health care providers to implement a promotional strategy to address this health care issue.

Key words: Rheumatoid arthritis, Age, clinical aspects, Saudi Arabia.

Introduction

Rheumatoid arthritis (RA) is a chronic progressive inflammatory disorder that causes disabling joint deformities. This can impose serious effects on a patient's overall wellbeing [1, 2].

The reported worldwide RA prevalence varies widely [3, 4]; the mean point-prevalence of RA was 0.56% (range 0.00% to 2.70%) between 1986 and 2014. The period-prevalence was 0.51% (range 0.05% to 1.9%) between 1955 and 2015. RA point- and period-prevalence was higher in urban settings than rural settings, (0.69% vs 0.48%) and (0.54% vs 0.25%), respectively [5]. There is a wide variability in the forms of presentation of RA. The age of onset of RA, and age of the patients seem to be critical factors in the clinical spectrum and lines of management; there are equivocal reports about it in several studies [6 - 13]. The prevalence of RA in the Saudi Arabian population was reported to be about 0.02% in a study in the Central region [14], which is comparable to the overall world figures [15, 16]. Yet, descriptive data on RA patients in Saudi Arabia, like the rest of the region, is scarce [17]. This study aimed toexplore the sociodemographic characteristics, as well as comorbidities, and clinical aspects of RA among adult Saudi patients, and study its variation among different age groups.

Subjects and Methods

It was a cross-sectional study; where an online survey using Google form questionnaire, was sent via email to the patients with RA, in Jeddah, Saudi Arabia. Sampling method was a non probability convenient one. Sample size for the present study was determined using G*power software (α = 0.05, Power = 0.95, effect size = 0.5 and degree of freedom = 12). The sample size required was 104 patients [18]. The total number of patients enrolled was 122. Data was collected using a questionnaire which provided information on socio-demographic characteristics, medical history of comorbidities, symptoms and signs, investigations done within last year, and lines of management, as well as history of visits to rheumatology clinics in the last year.

Data analysis and statistical tests: Statistical Package for Social Sciences (IBM SPSS, version 23, Armonk, NY: IBM Corp.) was used. Chi square test of significance was used. The level of significance for this study was 0.05.

Results

The present study comprised 122 patients with doctor diagnosed RA (5.7% males, and 94.3% females). The age distribution of the studied subjects was as follows: 17.2% were 16 to 21 years; 33.6% were 26 to 35 years; 27% were 36 to 45 years; and 22.1% were 46 years and older. Among the studied patients, RA was diagnosed in 41.8% before the age of 20 years; in 28.7% by the age of 20 to less than 30 years; in 20.5% by the age of 30 years to less than 40 years; and in 9% by the age of 40 years and older. Table 1 displays the distribution of patients with RA according to age groups and sociodemographic characteristics and medical history. The majority of the patients were bachelor degree holders (50.8%), particularly, among those aged 36 to 46 years old ($p < 0.005$). A minority of the patients were smokers (7.4%), particularly among those aged 46 years or older; however, this difference was not statistically significant ($p < 0.346$). About 38% consumed a diet rich in vegetable, fruits and high fibers. However, no significant differences were found between different age groups ($p < 0.061$). Chronic diseases of the lung, cardiovascular system, kidney and skin were very low among patients with PA, with no significant differences between different age groups, except for CVD which was more encountered among those aged 46 year or older ($p < 0.05$). On the other hand, autoimmune diseases and inflammatory bowel diseases were of higher magnitude among patients with RA (13.9% and 19.7% respectively); particularly among those aged 36 to 46 years old for auto immune disorders ($p<0.004$). Family history of RA was encountered among 32.8% of the patients, with no significant differences between different age groups ($p > 0.05$). About 61% of the patients with RA were found to have enough information about RA, and no significant differences were found between age groups. The majority of the patients (91.0%) were admitted 1 to 2 times to hospital in the previous year. This was similar among all age groups. Table 2 reveals the distribution of patients with RA according to age groups and symptoms and signs and clinical disorders. The majority of patients (70.5%) suffered from stiffness upon waking up. This was similar in all age groups ($p > 0.05$). About one fifth of the patients suffered from fever; this was also common in all age groups ($p > 0.05$). Only 4% suffered from weight gain, and none of the RA patient suffered from weight loss ($p > 0.05$). Loss of appetite was encountered among 31.1% of the patients; it was more prominent among those aged 16 years to 25 years; this difference was statistically significant ($p < 0.05$). Burning in the mouth was found in 36.9% of the patients; it was significantly more common in those 46 years and over ($p <0.05$). Difficulty swallowing and ulcer in the mouth were encountered among 15% of the patients; it was common in all age groups ($p> 0.05$). Psoriasis and petechial rash were encountered among 4.1%, and 9.8% of the RA patients respectively. Neck pain was found in 54.1% of the patients, particularly among those aged 46 and older ($p <0.05$). Back pain was a common disorder in all age groups, and was encountered among 57% of the cases. ($p> 0.05$). Numbness and swelling of the joints were encountered among the patients with RA (46.7%, and 57.4% respectively); no age differences were found ($p >0.05$). Difficulty hearing was encountered in 17% of the cases, history of thyroid dysfunction in 9.8% of the cases, and pain and weakness of the muscles was encountered in over half of the patients (55.7%); however, no significant differences were detected between different age groups ($p >0.05$). Table 3 reveals types of investigations done on patients with RA. RF, anti-CCP, LFT, FRT, and CBC were the common investigations done, with no age differences ($p > 0.05$). Table 4 displays the symptoms and signs and medical management of the RA patients by age groups.

The majority of the RA patients (49.2%) visited RA clinics 1 – 2 times last year, particularly those aged 46 years and older. However the differences between age groups was not statistically significant (p > 0.05). The majority of patients use medication for RA (77%). This was similar in all age groups (p> 0.05). About 37% of the subjects used corticosteroids, and 48.4% used methotrexate. These were similar in all age groups (p > 0.05). About 67% of the subjects used pain killers other than NSAIDs. Only 19% of the subjects used over the counter treatments, particularly those older than 46 years (p<0.05). About 42% of the patients used biological treatment, mainly those older than 46 years old (p<0.05). Only 16% of the subjects admitted that they took medication without doctor prescription, particularly among those aged 36 to 46 years old (p<0.05). Complications due to RA medications were encountered among 36% of the patients, with no age significant differences (p > 0.05).

Table 1: Distribution of patients with RA according to age groups and sociodemographic characteristics and medical history.

Variable / category	Age groups in years					X2
	16 – No (%)	26 – No (%)	36 – No (%)	46 + No (%)	Total No (%)	(p)
How many times have you visited rheumatoid clinics in the last year?						
1-2 times	14 (66.7%)	20(48%)	15 (45.5%)	11(40.7%)	60(49.2%)	9.7 (0.370)
3-4 times	3(14.3%)	5(12.2%)	11 (33.3%)	8(29.6%)	27(22.1%)	
5-6 times	1(4.8%)	5(12.2%)	2(6.1%)	2(7.4%)	10(8.2%)	
More than 6	3(14.3%)	11 (26.8%)	5(15.2%)	6(22.2%)	25(20.5%)	
Do you use any medication?						
No	9(42.9%)	10 (24.4%)	6(18.2%)	11(40.7%)	28(23.0%)	7.3 (0.062)
Yes	12 (57.1%)	31 (75.6%)	27 (81.8%)	24(88.9%)	94(77.0%)	
Do you use cortisone?						
No	13 (61.9%)	29 (70.7%)	19 (57.6%)	16 (59.3%)	77 (63.1%)	1.6 (0.650)
Yes	8 (38.1%)	12 (29.3%)	14 (42.4%)	11 (40.7%)	45 (36.9%)	
Do you use methotrexate?						
No	14 (66.7%)	21 (51.2%)	17 (51.5%)	11(40.7%)	63 (51.6%)	3.1 (0.364)
Yes	7(33.3%)	20 (48.8%)	16 (48.5%)	16(59.3%)	59(48.4%)	
Do you use any pain killer other than NSAID?						
No	10 (47.6%)	12 (29.3%)	9(27.3%)	10 (37.0%)	41 (33.6%)	2.9 (0. .403)
Yes	11 (52.4%)	29 (70.7%)	24 (72.7%)	17 (63.0%)	81 (66.4%)	
Do you use any over the counter medication?						
No	20 (95.2%)	36 (87.8%)	23 (69.7%)	20(74.1%)	99(81.1%)	7.6 (0. .054).
Yes	1(4.8%)	5(12.2%)	10 (30.3%)	7(25.9%)	23(18.9%)	
Do you use any biological treatment?						
No	17 (81.0%)	21 (51.2%)	22 (66.7%)	11(40.7%)	71(58.2%)	9.6 (0. .022)
Yes	4(19.0%)	20 (48.8%)	11 (33.3%)	11(59.3%)	51(41.8%)	
Do you use any medication without Doctor prescription?						
No	16 (76.2%)	35 (85.4%)	25 (75.8%)	27 (100.0%)	103 (84.4%)	7.9 (0. .046)
Yes	5(23.8%)	6(14.6%)	8(24.2%)	0(0.0%)	19(15.6%)	
Do you have complication from the medication you use?						
No	14 (66.7%)	23 (56.1%)	24 (72.7%)	17 (63.0%)	78 (63.9%)	2.2 (0.517)
Yes	7 (33.3%)	18 (43.9%)	9 (27.3%)	10 (37.0%)	44 (36.1%)	

Table 2: Distribution of patients with RA according to age groups and symptoms and signs and clinical disorders.

Variable / category	Age groups in years					X2
	16 – No (%)	26 – No (%)	36 – No (%)	46 + No (%)	Total No (%)	(p)
Did you feel stiffness upon waking up in the last month?						
No	8 (38.1%)	11 (26.8%)	9 (27.3%)	8 (29.6%)	36 (29.5%)	.96 (0.810)
Yes	13 (61.9%)	30 (73.2%)	24 (72.7%)	19 (70.4%)	86 (70.5%)	
Fever						
No	15 (71.4%)	35 (85.4%)	27 (81.8%)	21 (77.8%)	98 (80.3%)	1.8 (0.600)
Yes	6 (28.6%)	6 (14.6%)	6 (18.2%)	6 (22.2%)	24 (19.7%)	
Weight gain (more than 5 Kg)						
No	21 (100.0%)	41 (100.0%)	30 (90.9%)	25 (92.6%)	117 (95.9%)	5.4 (0.139)
Yes	0 (0.0%)	0 (0.0%)	3 (9.1%)	2 (7.4%)	5 (4.1%)	
Loss of appetite						
No	7 (33.3%)	29 (70.7%)	23 (69.7%)	25 (92.6%)	84 (68.9%)	19.5 (0.00)
Yes	14 (66.7%)	12 (29.3%)	10 (30.3%)	2 (7.4%)	38 (31.1%)	
Burning in mouth						
No	16 (76.2%)	30 (73.2%)	19 (57.6%)	12 (44.4%)	77 (63.1%)	7.8 (0.050)
Yes	5 (23.8%)	11 (26.8%)	14 (42.4%)	15 (55.6%)	45 (36.9%)	
Sore throat/ difficulty in swallowing						
No	17 (81.0%)	33 (80.5%)	29 (87.9%)	24 (88.9%)	103 (84.4%)	1.3 (0.709)
Yes	4 (19.0%)	8 (19.5%)	4 (12.1%)	3 (11.1%)	19 (15.6%)	
Ulcers/bleeding or infection in mouth						
No	19 (90.5%)	32 (78.0%)	27 (81.8%)	25 (92.6%)	103 (84.4%)	3.3 (0.335)
Yes	2 (9.5%)	9 (22.0%)	6 (18.2%)	2 (7.4%)	19 (15.6%)	
Psoriasis						
No	21 (100.0%)	38 (92.7%)	32 (97.0%)	26 (96.3%)	117 (95.9%)	2.0 (0.555)
Yes	0 (0.0%)	3 (7.3%)	1 (3.0%)	1 (3.7%)	5 (4.1%)	
Ecchymosis, petechial rash						
No	20 (95.2%)	37 (90.2%)	29 (87.9%)	24 (88.9%)	110 (90.2%)	0.845 (0.835)
Yes	1 (4.8%)	4 (9.8%)	4 (12.1%)	3 (11.1%)	12 (9.8%)	
Neck pain						
No	11 (52.4%)	24 (58.5%)	14 (42.4%)	7 (25.9%)	56 (45.9%)	7.4 (0.058)
Yes	10 (47.6%)	17 (41.5%)	19 (57.6%)	20 (74.1%)	66 (54.1%)	
Numbness						
No	12 (57.1%)	22 (53.7%)	16 (48.5%)	15 (55.6%)	56 (53.3%)	.48 (0.921)
Yes	9 (42.9%)	19 (46.3%)	17 (51.5%)	12 (44.4%)	57 (46.7%)	
Swelling in Joints.						
No	8 (38.1%)	15 (36.6%)	12 (36.4%)	17 (63.0%)	52 (42.6%)	5.8 (0.117)
Yes	13 (61.9%)	26 (63.4%)	21 (63.6%)	10 (37.0%)	70 (57.4%)	
Hearing loss/ tinnitus						
No	19 (90.5%)	36 (87.8%)	26 (78.8%)	20 (74.1%)	101 (82.8%)	3.4 (0.333)
Yes	2 (9.5%)	5 (12.2%)	7 (21.2%)	7 (25.9%)	21 (17.2%)	
History of Thyroid disease						
No	20 (95.2%)	38 (92.7%)	30 (90.9%)	22 (81.5%)	110 (90.2%)	3.2 (0.359)
Yes	1 (4.8%)	3 (7.3%)	3 (9.1%)	5 (18.5%)	12 (9.8%)	
Pain/ weakness in muscles						
No	13 (61.9%)	13 (31.7%)	14 (42.4%)	14 (51.9%)	54 (44.3%)	5.9 (0.114)
Yes	8 (38.1%)	28 (68.3%)	19 (57.6%)	13 (48.1%)	68 (55.7%)	
Back pain						
No	14(66.7%)	22(53.7%)	16 (48.5%)	9 (33.3%)	61(50.0%)	5.958 (0.134)
Yes	7 (33.3%)	19(46.3%)	17 (51.5%)	18 (66.7%)	61(50.0%)	

Table 3: Distribution of patients with RA according to age groups and Investigation done

Variable / category	Age groups in years					X2
	16 – No (%)	26 – No (%)	36 – No (%)	46 + No (%)	Total No (%)	(p)
what investigation did you have in the last year						
X RAY						
No	13 (61.9%)	29 (70.7%)	20 (60.6%)	15 (55.6%)	77 (63.1%)	1.787 (0.618)
Yes	8 (38.1%)	12 (29.3%)	13 (39.4%)	12 (44.4%)	45 (36.9%)	
CT						
No	18 (85.7%)	32 (78.0%)	24 (72.7%)	18 (66.7%)	92 (75.4%)	2.598 (0.458)
Yes	3 (14.3%)	9 (22.0%)	9 (27.3%)	9 (33.3%)	30 (24.6%)	
rheumatoid factor						
No	14 (66.7%)	17 (41.5%)	17 (51.5%)	11 (40.7%)	59 (48.4%)	4.358 (0.225)
Yes	7 (33.3%)	41 (100.0%)	16 (48.5%)	16 (59.3%)	63 (51.6%)	
Anti-CCP						
No	10 (47.6%)	19 (46.3%)	12 (36.4%)	4 (14.8%)	45 (36.9%)	0.854 (0.836)
Yes	11 (52.4%)	22 (53.7%)	21 (63.6%)	23 (85.2%)	77 (63.1%)	
CBC						
No	10 (47.6%)	19 (46.3%)	12 (36.4%)	4 (14.8%)	45 (36.9%)	8.267 (0.041)
Yes	11 (52.4%)	22 (53.7%)	21 (63.6%)	23 (85.2%)	77 (63.1%)	
CPR						
No	17 (81.0%)	29 (70.7%)	22 (66.7%)	15 (55.6%)	83 (68.0%)	3.71 (0.295)
Yes	4 (19.05)	12 (29.3%)	11 (33.3%)	12 (44.4%)	39 (32.0%)	
LFT						
No	11 (52.4%)	16 (39.0%)	12 (36.4%)	6 (22.2%)	45 (39.9%)	4.744 (0.192)
Yes	10 (47.6%)	25 (61.0%)	21 (63.6%)	21 (77.8%)	21 (77.8%)	
FRT						
No	11 (52.4%)	15 (36.6%)	12 (36.4%)	5 (18.5%)	43 (35.2%)	6.062 (0.192)
Yes	10 (47.6%)	26 (63.4%)	21 (63.6%)	22 (81.5%)	79 (64.8%)	

Table 4: Distribution of patients with RA according to age groups and clinical management

Variable / category	Age groups in years					X2
	16 – No (%)	26 – No (%)	36 – No (%)	46 + No (%)	Total No (%)	(p)
How many times have you visited rheumatoid clinics in the last year?						
1-2 times	14 (66.7%)	20(48%)	15 (45.5%)	11(40.7%)	60(49.2%)	9.7 (0.370)
3-4 times	3(14.3%)	5(12.2%)	11 (33.3%)	8(29.6%)	27(22.1%)	
5-6 times	1(4.8%)	5(12.2%)	2(6.1%)	2(7.4%)	10(8.2%)	
More than 6	3(14.3%)	11 (26.8%)	5(15.2%)	6(22.2%)	25(20.5%)	
Do you use any medication?						
No	9(42.9%)	10 (24.4%)	6(18.2%)	11(40.7%)	28(23.0%)	7.3 (0.062)
Yes	12 (57.1%)	31 (75.6%)	27 (81.8%)	24(88.9%)	94(77.0%)	
Do you use cortisone?						
No	13 (61.9%)	29 (70.7%)	19 (57.6%)	16 (59.3%)	77 (63.1%)	1.6 (0.650)
Yes	8 (38.1%)	12 (29.3%)	14 (42.4%)	11 (40.7%)	45 (36.9%)	
Do you use methotrexate?						
No	14 (66.7%)	21 (51.2%)	17 (51.5%)	11(40.7%)	63 (51.6%)	3.1 (0.364)
Yes	7(33.3%)	20 (48.8%)	16 (48.5%)	16(59.3%)	59(48.4%)	
Do you use any pain killer other than NSAID?						
No	10 (47.6%)	12 (29.3%)	9(27.3%)	10 (37.0%)	41 (33.6%)	2.9 (0. .403)
Yes	11 (52.4%)	29 (70.7%)	24 (72.7%)	17 (63.0%)	81 (66.4%)	
Do you use any over the counter medication?						
No	20 (95.2%)	36 (87.8%)	23 (69.7%)	20(74.1%)	99(81.1%)	7.6 (0. .054).
Yes	1(4.8%)	5(12.2%)	10 (30.3%)	7(25.9%)	23(18.9%)	
Do you use any biological treatment?						
No	17 (81.0%)	21 (51.2%)	22 (66.7%)	11(40.7%)	71(58.2%)	9.6 (0. .022)
Yes	4(19.0%)	20 (48.8%)	11 (33.3%)	11(59.3%)	51(41.8%)	
Do you use any medication without Doctor prescription?						
No	16 (76.2%)	35 (85.4%)	25 (75.8%)	27 (100.0%)	103 (84.4%)	7.9 (0. .046)
Yes	5(23.8%)	6(14.6%)	8(24.2%)	0(0.0%)	19(15.6%)	
Do you have complication from the medication you use?						
No	14 (66.7%)	23 (56.1%)	24 (72.7%)	17 (63.0%)	78 (63.9%)	2.2 (0.517)
Yes	7 (33.3%)	18 (43.9%)	9 (27.3%)	10 (37.0%)	44 (36.1%)	

Discussion

The aim of the present study was to compare RA characteristics in the young and old patients. RA and other autoimmune diseases have a well-known female preponderance. Approximately 78% of patients affected by autoimmune diseases such as multiple sclerosis, scleroderma, systemic lupus erythematosus, Sjogren's syndrome, and RA are women [19]. RA is twice as common in women, with a peak incidence between the ages of 45 and 55 years, and the incidence of RA in women appears to be increasing [19-21]. This is consistent with the findings of the present study as 93% of the respondents were females. Smoking is linked to the development of rheumatoid arthritis, particularly for people who have smoked 20 years or longer. Smokers also have an increased risk of more severe rheumatoid arthritis. In addition, they may be less likely to experience remission. [22] In the present study a very low percentage of patients with RA were smokers (7.4%), compared to other studies [22, 23]. This can be explained by the high percentage of females in our study, and smoking is not prevalent among females in our countries. Diets rich in vegetables, fruits, and fiber are associated with lower BMI, have anti-inflammatory properties and help reduce pain and inflammation in patients with RA [24, 25]. However, in the present study the majority of the patients with RA (63%), particularly those younger than 36 years old, did not consume high fiber based diet. This could be due to the tradition of eating in Saudi Arabia, and the use of fast food by young patients; thus health care providers should put in more effort to educate the patients about proper diet for patients with RA. Family history of rheumatoid arthritis (RA) is one of the strongest known risk factors for developing RA, conferring twofold to fourfold increased risk in first-degree relatives. The heritability of RA seems to be around 40%, and is higher for seropositive than for seronegative RA [26].]. In agreement with that, family history of RA was encountered among 32.8% of the patients, with no significant differences between different age groups. Current management of RA may result in a decrease in disease activity and improvement of overall

function of the patient. Nonetheless, comorbidities such as cardiovascular, kidney, lung and gastrointestinal diseases, infections, malignancies, osteoporosis and depression remain an important issue. These comorbidities are more frequently observed in patients with RA compared to the general population [27]. In the present study, chronic diseases of the lung, cardiovascular system, kidney and skin were very low among patients with PA, with no significant differences between different age groups, except for CVD. On the other hand, autoimmune diseases (13.9%), and inflammatory bowel diseases (19.7%) were of higher magnitude among patients with RA, particularly among those aged 36 to 46 years old for auto immune disorders. This is in agreement with another study [28].
It is considered that a patient suffers elderly onset rheumatoid arthritis (EORA) when the disease began at the age of ≥ 60 years [6, 7]. This form of RA occurred in 10–33% of cases of disease [8]. The prevalence of RA increases with age and is estimated to occur in up to 2.2% of the population >55 years [9]. Contrary to that, in the present study 41.8% had the disease diagnosed before the age of 20 years; and 91% had it diagnosed before the age of 41 years old.

In contrast to the disease beginning in young individuals (young onset rheumatoid arthritis, or YORA), EORA seem to follow a more acute course, in association with systemic phenomena such as fever, fatigue and weight loss, as well as with the involvement of larger joints and higher prevalence of atypical forms of onset as remitting seronegative symmetrical synovitis with pitting edema, and polymyalgia rheumatica-like forms [6]. However, the statement that, with increasing age, the prognosis becomes more severe or even that there are differences in the course of the disease for young and elderly people, as some authors claim [6, 9-11], is a controversial matter, since the literature is not unanimous on this point. [10-12]. A previous study could not detect differences in prognosis for both groups [13]. In the present study musculoskeletal manifestations such as stiffness upon waking up (70.5%), back pain (57%), swelling of the joints (57.4%), numbness (46.7%,), and pain and weakness of the muscles (55.7%) were common, and all of them were similar in all age groups. On the other hand, neck pain (54.1%), was significantly more encountered among those aged 46 and older. Fever was reported by about 20% of the patients and it was similar in all age groups. Loss of appetite was encountered among 31.1% of the patients; it was more prominent among those aged 16 years to 25 years, while, burning in the mouth was found in 36.9% of the patients; and was significantly more common in those 46 years and over ($p < 0.05$). Thyroid deficiency (9.8%), difficulty hearing (17%), and difficulty of swallowing and ulcers of the mouth (15%), and psoriasis (4.1%) were encountered in all age groups with no significant differences in occurrence. The treatment of EORA patients pursues the same goals as those of YORA patients, i.e. to control the clinical manifestations, prevent structural damage, preserve function and autonomy of the individual, and also prevent excess mortality caused by the disease [6]. Methotrexate is usually the first medicine given for rheumatoid arthritis, often with another Disease-modifying anti-rheumatic drugs (DMARD), and a short course of steroids (corticosteroids) to relieve any pain [29]. But some authors have observed that the treatment of elderly patients is carried out differently, with less aggressiveness opposed to that for YORA patients [7, 9]. This finding is justified for the fear of prescribing modifying disease drugs in more vulnerable people, with greater possibility of drug interaction due to multiple co-morbidities to which the elderly individual is usually subject [7, 8]. In the present study 23% of the subjects received no treatment for RA, and 67% used painkillers other than NSAIDs. RA treatment was similar in all age groups, except for biological treatment (42%), which was mainly prescribed for those aged 46 years or older. Methotrexate was prescribed for 48.4%, while corticosteroids were prescribed for 37% of the patients with RA. Although about 61% of the patients with RA were found to have enough information about RA, and no significant differences were found between age groups, their visit to rheumatology clinics was very deficient.

Conclusion

Rheumatoid arthritis did not appear to be an old age disorder; it was common before the age of 20 years. Clinical picture and lines of management differed among different age groups. This evaluation raised questions for future studies and improved care for RA. Extrapolation of these differences, and also lack of access to care, may help health care providers to implement a promotional strategy to address this health care issue.

Limitations

Several limitations to this study must be noted. As our sampling strategy was non-random, the results of this study cannot be considered representative of all Saudi population. Participants were recruited through online Google forms and are therefore likely to be more health connected, proactive in their health behavior, and better informed about health issues. Furthermore, participants use the internet, so results may not reflect the views of those unfamiliar with the internet, and living in very remote regions and living traditional/nomadic lifestyles. The majority of respondents were females, and this might reflect changes mainly in females rather than females and males. The survey provides only a snapshot of clinical responses at a particular point in time, and a longitudinal study is required to provide information on whether the observed impact will last for more extended periods. The self-reported medical history may not adequately represent the health status assessed in an interview; thus, for the outcome to be determined, prospective studies are necessary to provide more accurate data to support the need for focused public rheumatology health strategies. Despite these limitations, our results have generated important information on Saudi views of RA, in an otherwise unexplored area of health care.

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The Effect of obesity stigma on obese people, Saudi Arabia, 2020

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Abstract

Background: Weight stigma contributes to the present epidemic of obesity, and obese people with stigmatization are at risk of acquiring adverse physical, behavioral and psychological health outcomes

Objectives: to identify the source of obesity stigma and to examine the effect of obesity stigma on adults with overweight/obesity in Saudi Arabia.

Methods: A cross sectional study was done on a sample of the Saudi population from different regions. A pre-designed questionnaire was used to collect data about exposure to negative behavior by others because of obesity, ways and sources in which participants face discrimination and prejudice and participants were asked about their feelings and effect of obesity on their life and daily activities.

Results: Often, because of obesity, 25.6% of the participants were exposed to negative behavior by others, 18.2% were exposed to bad comments from children, 25.2% were exposed to physical barriers and 25.4% were exposed to bad comments from the family. The most important sources of discrimination against obese people were by family members (42.4%) and (27.9%) face this discrimination by self-love, and self-acceptance. Participants with an age ranging from 21-29 years had a significant higher frequency of those who reported exposure to negative behavior by others, bad comments from children, family and others, and encountered more physical barriers and obstacles compared to other age groups.

Conclusion: Obese individuals should be health educated to accept themselves and in the national discourse on obesity, weight stigma must be discussed.

Key words: effect, obesity, stigma, obese, people, Saudi Arabia

Introduction

Obesity bias is defined as negative attitudes towards, and beliefs about, others because of their body size and shape (1). These are manifested by stereotypes and/or prejudice towards people with overweight and obesity (1). Internalized weight bias is defined as holding a bad perception about oneself due to body size (2). Social signs or labels are affixed to an individual who is the victim of prejudice. Obesity stigma involves actions against people with obesity that can cause discrimination and lead to inequities in many settings like health care and places of education (3). Almost no cultures do not associate obesity as a sign of personal failure (1).

Weight stigma contributes to the present epidemic of obesity, and obese people who are stigmatized are at risk of acquiring adverse physical, behavioral and psychological health outcomes (4). Weight stigma can also lead to the internalization of such experiences that reduce the overall quality of life (4). Stigma can come from colleagues, family, educators, media and healthcare professionals (5).

Data from the Rudd Center for Food Policy and Obesity indicate that school-aged children with obesity experience a 63 % higher chance of being bullied; 54 % of adults with obesity report being stigmatized by co-workers; 69% of adults with obesity report experiences with healthcare professionals stigmatization (6).

Weight stigma was indirectly linked to higher frequency of depressive symptoms, lower psychological well-being, self-esteem and physical health by adversely affecting them (7). Obesity stigma was strangely linked to an increased risk of DM, high cortisol level, high oxidative stress level, high C-reactive protein level, eating disorders, depression, anxiety, dissatisfaction with body image and negative self-esteem among overweight and obese adults (8).

There is extensive evidence of unfair treatment of people living with obesity in employment, education, healthcare, interpersonal relationships, and maternity care (9).

A pilot study in 15 countries of online newspapers showed that images in the media may contribute to stigmatization attitude toward obese people. A total of 195 images were analyzed and the majority of images scored negatively (i.e. were likely to be stigmatizing). Media in Hong Kong, South Africa, Italy and Morocco had the highest prevalence of stigmatizing imagery, whereas Japan and New Zealand displayed the lowest. Public media in all the countries surveyed show stigmatizing imagery associated with obesity, but there was variability between countries (10). The anti-obesity campaign images promote the feeling of stigma among the obese people (11). The least stigmatizing terms used by health care providers like 'unhealthy body weight' and 'unhealthy lifestyle' strongly promote treatment and lifestyle modifications more than the stigmatizing and blaming terms like Fat/obese (12).

Females were found to more frequently experience stigma than males (13). Obesity is not an individual problem; all society must be involved to solve this problem. Overall, future reports, campaigns, and policies should not focus on weight as a proxy for health nor utilize stigmatizing images or terminology (14). Based on the current evidence, obesity stigma poses the same burden of other forms of stigma eg: race, class, ability, gender, sexual orientation, etc.., and has many implications on individual health (1).

Saudi Arabia now has one of the highest obesity and overweight prevalence rates with 44% of the female population and 28% of the male population obese (15). A study done in 2014 found that among Saudi women, obesity attracts stigma and moral failure, and the traditional clothing, foods, hospitality norms and limited outdoor female activities were regarded as barriers to weight loss (16). So it is very useful to address weight stigma and coping in the context of weight management and obesity treatment programs, to help protect individuals from negative health effects of experiencing obesity stigma (7). Based on many studies conducted in western countries Weight stigma contributes to the present epidemic of obesity and according to our knowledge there is no published study in our region despite the significant magnitude of this problems.

As studies addressing the issue of obesity stigma among obese people in Saudi Arabia are limited this study aimed to recognize the perception of obese people about their body shape, to identify the source of obesity stigma and to examine the affect of obesity stigma on adults with overweight/obesity in Saudi Arabia.

Subjects and Methods

A Cross sectional study was done through interviewing 850 people attending MOH hospitals in different regions in KSA (central, northern, southern, eastern and western) from November 2019 to February 2020. We also used 609 online questionnaires. We collected data from different cities in the Kingdom such as Riyadh, Al-Qaseem, Hail, North border districts, Makkah, Jeddah, Al-Medina, and Aseer. The ethical approval was obtained from the administration of health affairs in each region before distribution of the questionnaire. The inclusion criteria were all age groups of both genders and the exclusion were all who refused sharing in the study.

A pre-designed questionnaire was used to collect data about participants' demographic characters. They were asked about exposure to negative behavior by others, bad comments from children or family, physical barriers and obstacles, inappropriate comments from doctors, being embarrassed from close people, because of obesity, if they were being ignored and excluded, if staring was done improperly when entering a place, job discrimination, being attacked or exposed to bullying when being a child because of obesity. Participants were asked about the most important ways and sources in which participants face discrimination and prejudice and were asked about

their feelings and the effect of obesity on their life and daily activities.

Data were analyzed using (SPSS) version 24 where qualitative data was expressed as numbers and percentages, and Chi-squared test ($\chi 2$) was applied to test the relationship between variables. Quantitative data was expressed as mean and standard deviation (Mean ± SD) and a p-value of <0.05 was considered as statistically significant.

Results

Table 1 shows that of the 1,459 participants, 67% are females, 35.4% aged between 21 - 29 years, 62.5% were married, 89.7% were Saudis, and 33.6% were from the central region. The mean weight of the participants was 90.57 ± 23.30 kg, and 27.78% had a BMI ranging from 31-34 kg/m2.

Table 2 shows that many times because of obesity: 25.6% were exposed to negative behavior by others, 18.2% were exposed to bad comments from children, 25.2% were exposed to physical barriers and obstacles, 8.7% were exposed to inappropriate comments from doctors, and 25.4% exposed to bad comments from the family. Also many times because of obesity: 23.1% were exposed to bad comments from others, 12.5% were embarrassed by those close to them, 5.8% were exposed to, ignored or excluded, 8.2% were exposed to and stared at inappropriately, 4.8% were exposed to job discrimination, 4.5% were attacked because of the obesity and 15.8% were exposed to being bullied when they were children.

Figure 1 shows the most important defecnces: ignore the situation (26.4%), avoid negative statements (26%), seeing that this is the view and problem of others (25.4%), positive to talk with self (21.6%), and eating (20.6%).

Figure 2 shows the most important sources of discrimination and prejudice against obese people were: family members 42.4%, community members in general 33.4%, friends 24%, classmates 21.1%, co-workers 18.9%.

Table 3 shows that 40% don't suffer from extreme sadness and not enjoying daily activities, 30.8% sometimes suffer from this, while 29.3% already suffer from extreme sadness and not enjoying daily activities. According to whether they feel that discrimination and prejudice against them contributed to their weight gain, we note that 50.5% don't suffer from this, 23.6% sometimes suffer from this, while 25.9% feel that discrimination and prejudice against them contributed to their weight gain. According to the feeling that being overweight changes the way they deal with them, 43.7% don't suffer from this, 22.7% sometimes suffer from this, while 33.7% feel that being overweight changes the way people deal with them. As for their preference to describe their body size, 62.3% prefer to describe it as "increased weight", 18.3% prefer to describe "ghee", while 14.2% prefer to describe "obesity". On asking them whether discrimination and prejudice prevents them from visiting the doctor, 66.8% reported that discrimination and prejudice does not prevent them from visiting the doctor, 20.5% reported that discrimination and prejudice prevents them from visiting the doctor, while 12.7% reported that discrimination and prejudice comes from visiting the doctor. We note that 61.2% of them said the discrimination and prejudice does not prevent them from going to the club.

Participants with an age ranging from 21-29 years had a significantly higher frequency of those who reported exposure to negative behavior by others, bad comments from children family and others, physical barriers and obstacles compared to other age groups (p=<0.05) (Table 4).

Discussion

We set out in this cross-sectional study to assess the effect of obesity stigma on obese adults in Saudi Arabia. The results of the current study showed that almost 64.6% of the respondents were obese (BMI> 30kg/m2), and almost two thirds of them have been exposed to negative behavior by others because of the weight gain. Family members were the main source of discrimination and prejudice according to the current study, and obese subjects try to face this mainly by ignoring, and through self-love and self-acceptance. The highest percentage of the participants reported suffering from extreme sadness and not enjoying daily activities, being overweight changes the way they deal with things, and half of them feel that discrimination and prejudice against them contributed to their weight gain.

Stigma and discrimination toward obese persons are prevalent and pose numerous consequences for their psychological as well as physical health, and this was also highlighted in our study (1). Many studies have documented harmful weight-based stigma, prejudice, and discrimination against obese people in multiple living domains, including the workplace, health care facilities, educational institutions, and even in close interpersonal relationships (5,6,7).

In line with the current study findings, previous studies [1,17] reported negative attitudes and stereotypes toward obese persons. This has been frequently reported by coworkers, physicians, nurses, dietitians, psychologists, friends, family members and even among children (1,17). This might be attributed to the fact that weight stigma remains a socially acceptable form of bias (5,6,7,10).

Obesity is highly prevalent in the whole Gulf Cooperation Council (GCC) countries including Saudi Arabia (18). In 2011, Alhyas et al (12) estimated that, in the GCC countries, the prevalence of overweight ranges between 25%-50% and the prevalence of obesity ranges between 10%-50% and is found to be relatively higher in women showing an increase with age. The current study results revealed great rises in obesity prevalence over the past decade, which indicate that a large a high percentage of the Saudi population might be at risk of stigma and discrimination because of obesity (12).

Table 1. Participants distribution according to personal data

		No.	%
Age	17 or less	66	4.5
	18 to 20	121	8.3
	21 to 29	516	35.4
	30 to 39	444	30.4
	40 to 49	221	15.1
	50 to 58	74	5.1
	60 and more	17	1.2
Gender	Male	481	33.0
	Female	978	67.0
Marital status	Married	531	62.5
	Single	293	34.5
	Other	26	3.1
Nationality	Saudi	1308	89.7
	Non-Saudi	151	10.3
Region	Central Region	490	33.6
	Northern region	379	26.0
	Southern region	150	10.3
	Eastern region	263	18.0
	Western Region	177	12.1
Weight	Mean ±Std. D	90.57 ±23.307	
Height		161.66 ±10.599	
BMI	less than 25	155	10.6
	25 to 30	361	24.7
	31 to 34	406	27.8
	35 to 40	300	20.6
	More than 40	237	16.2

Table 2. Participants' distribution according to their exposure to discrimination and prejudice attitudes because of the obesity

Variable	Never		Once in your life		More than once in your life		Many times	
	N	%	N	%	N	%	N	%
1. Exposure to negative behavior by others (Implicit: as mocking looks or publidy as comments or sarcastic smiles) because of the weight gain	516	35.4	172	11.8	397	27.2	374	25.6
2. Bad comments from children.	419	28.7	122	8.4	168	11.5	265	18.2
3. Physical barriers and obstades	368	25.2	124	8.5	185	12.7	311	21.3
4. Inappropriate comments from doctors.	533	36.5	120	8.2	127	8.7	119	8.2
5. Bad comments from the family.	322	22.1	83	5.7	256	17.5	370	25.4
6. Bad comments from others	306	21.0	89	6.1	256	17.5	337	23.1
7. Those close to you embarrass you because of obesity.	341	23.4	94	6.4	230	15.8	183	12.5
8. You are ignored and excluded	524	35.9	88	6.0	154	10.6	84	5.8
9. Staring is done improperly when entering a place	473	32.4	78	5.3	178	12.2	120	8.2
10. Job discrimination.	568	38.9	85	5.8	125	8.6	70	4.8
11. They attack you.	595	40.8	94	6.4	96	6.6	65	4.5
12. Bullying you when you were a child	532	36.5	86	5.9	117	8.0	230	15.8

Figure 1. Most important ways in which participants face discrimination and prejudice

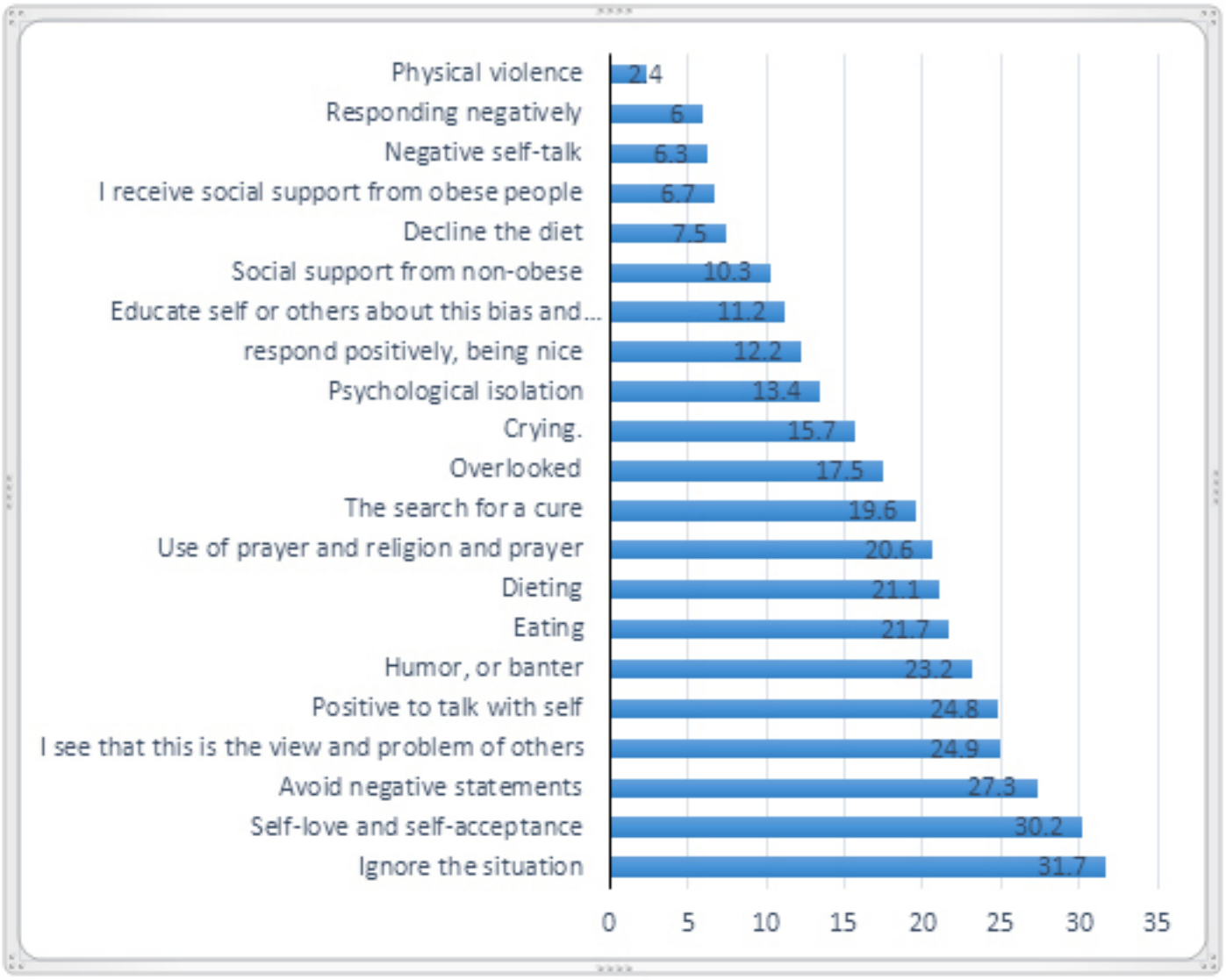

Figure 2. Most important sources of discrimination and prejudice against obese people

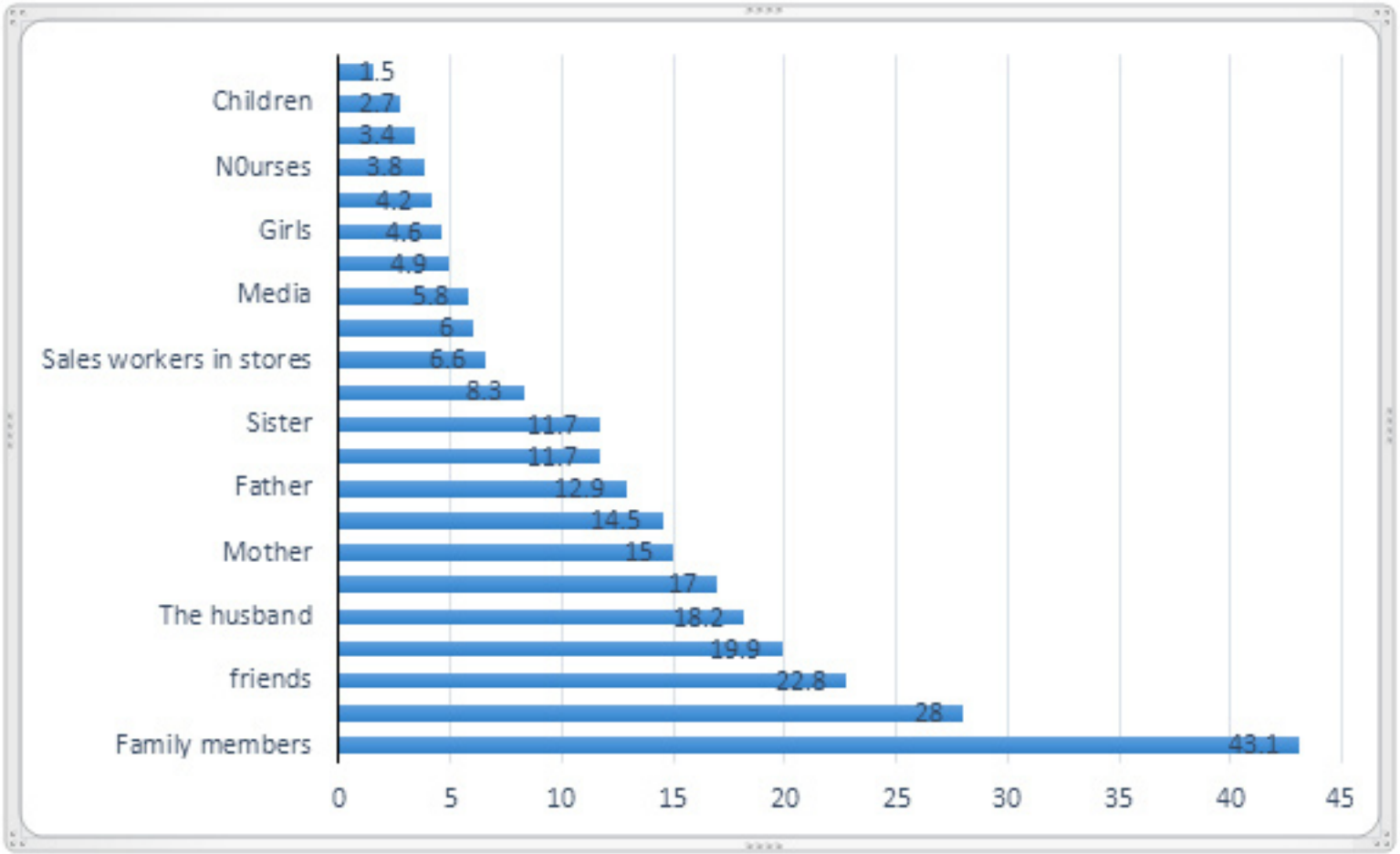

Table 3. Participants distribution according to their feelings and effect of obesity on their life and daily activities

Variable	No.	%
suffering from extreme sadness and not enjoying daily activities.		
Yes	427	29.3
No	583	40.0
Sometimes	449	30.8
feeling that discrimination and prejudice against them contributed to their weight gain		
Yes	378	25.9
No	737	50.5
Sometimes	344	23.6
feeling that being overweight changes the way others deal with them.		
Yes	491	33.7
No	637	43.7
Sometimes	331	22.7
preference to describe the body size		
increase weight	909	62.3
ghee	267	18.3
obesity	207	14.2
Other	76	5.2
discrimination and prejudice prevent them from visiting the doctor		
Yes	186	12.7
No	974	66.8
Sometimes	299	20.5
discrimination and prejudice prevent them from going to the club		
Yes	270	18.5
No	893	61.2
Sometimes	296	20.3

Table 4. The relationship between exposure and age

		AGE							Chi-square	P-value	The comment
		17 or less	18 to 20	21 to 29	30 to 39	40 to 49	50 to 58	60 and more			
Exposure to negative behavior by others (Implicit: as mocking looks or publicly as comments or sarcastic smiles) because of the weight gain.	Never	19	29	172	173	72	41	10	42.63	.001	There is a relationship
	Once in your life	7	21	70	35	33	5	1			
	More than once in your life	17	36	144	123	57	15	5			
	Many times	23	35	130	113	59	13	1			
Bad comments from children.	Never	13	28	128	129	67	42	12	57.06	.000	There is a relationship
	Once in your life	6	11	60	21	16	6	2			
	More than once in your life	17	15	49	38	36	11	2			
	Many times	18	32	86	80	38	10	1			
Physical barriers and obstacles.	Never	24	27	111	115	53	27	11	49.47	.000	There is a relationship
	Once in your life	3	19	47	22	23	10	0			
	More than once in your life	13	13	64	39	31	20	5			
	Many times	12	29	102	104	52	12	0			
Inappropriate comments from doctors.	Never	23	48	179	145	84	42	12	12.86	.800	No relationship
	Once in your life	7	9	43	29	21	9	2			
	More than once in your life	11	11	39	29	24	11	2			
	Many times	9	12	39	37	16	6	0			
Bad comments from the family.	Never	14	23	91	99	54	30	11	39.88	.002	There is a relationship
	Once in your life	4	10	27	19	16	6	1			
	More than once in your life	16	21	98	57	42	18	4			
	Many times	21	41	137	111	45	15	0			
Bad comments from others.	Never	8	16	101	93	50	29	9	39.90	.002	There is a relationship
	Once in your life	6	12	35	17	16	3	0			
	More than once in your life	24	24	83	68	34	18	5			

It has been previously reported in the literature that 78% of severely obese patients awaiting bariatric surgery have permanently or frequently been treated insolently by the medical profession due to their weight (19), whereas more than 70% feel that most doctors do not understand how difficult it is to be overweight (20).

Carr D, and Friedman MA reported that in the workplace, stereotypes see 26% of people with moderate obesity (BMI 30-35) and 31% of those with severe obesity (BMI ≥ 35) being discriminated against because of their weight or appearance.[21]. In the current study, most (>60%) of the obese subjects have been exposed at least once to negative behavior by others; a percentage which is almost more than double that of the previously mentioned study (21).

Family members being the main source of stigma and discrimination in the current study is more or less in line with a previous similar study in which participants' worst stigma experiences occurred most frequently at home from parents, spouses, other family members and health professionals (1,22,23).

Such findings highlight the importance of investigating weight stigma in the context of close interpersonal relationships and recognizing the nature, extent and consequences of bias when it comes from familial sources (23). However, this finding may be counterintuitive and have different explanations including that weight bias may become so normative that even family members are not immune to negative attitudes toward obesity, and increased exposure to these interactions in home settings where more time may be spent compared with other settings where bias could occur (1). Additionally, some comments, though hurtful, may reflect desperate efforts to motivate weight loss efforts among obese relatives, and push them harder to lose weight (24). Moreover, there is a suggestion that family members may express criticism or negative attitudes as a result of stress induced in their own lives from living with an overweight person (1,25).

Irrespective of which explanation is correct, it is critical to identify intervention strategies that reduce the contribution of families of overweight individuals to the experience of weight bias (8). Puhl RM, and Heuer CA (1) reported that the available evidence challenges the assumption that weight stigma is a useful tool for changing health behaviors. Instead, and similar to our findings, research shows that weight stigma reinforces unhealthy lifestyle behaviors which contribute to obesity and is an unlikely method of inducing successful weight loss.

Muennig P (26) claimed that obese subjects experience a high degree of psychological stress due to weight stigma, and this contributes to the pathophysiology associated with obesity. Additionally, he mentioned that, many of the adverse biochemical changes that are associated with adiposity can also be caused by the psychological stress that accompanies the experience of frequent weight-based discrimination. This finding was augmented also by many other previous studies (27,28).

Major B et al (29), and Schvey NL et al (30) in their laboratory experiments, found that when participants were manipulated to experience weight stigma, their eating increases, their self-regulation decreases, and their cortisol (an obesogenic hormone) levels are higher relative to controls. Moreover, weight stigma was correlated with exercise avoidance in a survey study (31). Therefore, it is likely that weight stigma drives weight gain and poor health and thus should be got rid of. This can be achieved through training concerned and knowledgeable healthcare providers who will deliver better care and eventually lessen the negative effects of weight stigma (31).

The current study showed a statistically significant association between age and exposure to negative behaviors from others. This is in contrast with an Australian study that reported no association between weight stigma and age (32). On the other hand, the relationships between weight discrimination and age in our study were consistent with Puhl et al's study in which age was a significant predictor of weight discrimination (33).

As per the literature (33), it is notable that females reported a significantly higher frequency of stigma experiences than males. Even though both men and women experience obesity stigma, women experience more eating-related psychopathology, and report experiencing more obesity stigmatization, and internalized weight bias more than men (34). In the US, people with greater BMI report higher rates of discrimination because of their weight (33). Additionally, male patients with higher BMI report that physicians spend less time with them compared to the time they spend with lower BMI patients (35). Moreover, physicians engage in less health education with higher BMI patients (36). Obesity degree was significantly correlated with negative behaviors in the current study.
In accordance with the current study which showed a significant association between bad comments from family with age, it was reported that weight teasing during adolescence predicted hurtful weight-related comments in young adulthood (37).

In a national multilevel study among school children in the US, it reported disproportionate risks of being verbally bullied for obese/overweight second graders. The risk of being verbally bullied was significantly higher for obese/overweight white children vs. obese/overweight Hispanic children (38). This is more or less in line with our findings that showed a relation between nationality and region and being bullied during childhood. However, such interpretation should be taken with caution due to the difference between the two studies' populations. In a previous study that included only men, it was found that men reporting weight stigma were: younger, had higher BMIs, and less likely to be married (39). Such results are considered consistent with ours that showed a significant association of obesity stigma with age, BMI, and marital status.

In line with our findings, a body of evidences has consistently demonstrated that experiencing weight stigma increases the probability of engaging in unhealthy

eating behaviors and lower physical activity levels, both of which exacerbate obesity and weight gain. In addition, weight-based victimization among overweight youths has been linked to lower physical activity level, negative attitudes about sports, and lower participation in physical activity (40).

In a population-based study among English middle-aged and older adults that aimed to assess the association between perceived weight discrimination and physical activity, it was reported that independent of BMI, participants who perceive biased treatment based on their weight are less physically active than those who do not perceive discrimination (41).

The current study results revealed that 12.7% of the participants reported that discrimination and prejudice prevent them from visiting the doctor, while 20.5% reported that this happens sometimes. In this regard, an article published in obesity reviews in 2015 [4] showed that many healthcare providers hold strong negative attitudes and stereotypes towards obese people. Poor treatment experiences or expectations may cause mistrust of doctors, stress and avoidance of care, and poor adherence among obese patients.

It is important to address the widespread health and social disparities faced by obese people. We must move past the victim-blaming approach and instead advocate a comprehensive obesity prevention strategy that includes efforts to reduce weight-based stigma and discrimination. Puhl RM and Heuer CA (1) provided suggestions to achieve this including: weight stigma should be addressed in obesity interventions and incorporate anti-stigma messages into obesity prevention campaigns. Obesity prevention efforts need to focus on individual behaviors toward larger-scale, coordinated policies that initiate social changes to help reverse the societal and environmental conditions that create obesity (1). Additionally, they mentioned that efforts for improving obese individuals' health will be facilitated by legislation to prohibit weight-based discrimination.
Obesity stigma is inescapable, damaging, and threatens main public health values (1). Overweight and obesity rates are alarming in Saudi Arabia, (15,16) and ignoring weight stigma means that the public health community ignores substantial suffering of a large proportion of the population (1,4).

Limitation
A limitation of this study is having a cross sectional design that may determine the association between variable without assessing the causal relationship.

Conclusion

This study found that many times, because of obesity, 25.6% of the participants were exposed to negative behavior by others; 18.2% were exposed to bad comments from children, 25.2% were exposed to physical barriers and obstacles, 8.7% were exposed to inappropriate comments from doctors, and 25.4% exposed to bad comments from the family. The most important sources of discrimination against obese people were: family members (42.4%) and (27.9%) face this discrimination by self-love, self-acceptance. 30.8% sometimes suffer from extreme sadness and not enjoying daily activities while 25.9% feel that discrimination and prejudice against them contributed to their weight gain. Participants with an age ranging from 21-29 years had a significant higher frequency of those who reported exposure to negative behavior by others, bad comments from children, family and others, and physical barriers and obstacles compared to other age groups. This study calls for encountering common societal assumptions that perpetuate weight stigma and prioritize discussions of weight stigma in the national discourse on obesity.

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The Association between Short Inter-Pregnancy Interval and Postmenopausal Osteoporosis, Saudi Arabia, Taif City, 2019: A case-control study

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Abstract

Background: Previous studies confirmed the relation between postmenopausal osteoporosis (PMOP) and short inter-pregnancy interval (IPI). Studies assessing this association in KSA are limited.

Objectives: This study aimed to assess the association and factors affecting the presence of osteoporosis among postmenopausal Saudi women.

Methods: A case-control study was done on cases diagnosed with PMOP who had DEXA scan report and cases of postmenopausal females without osteoporosis. Through a personal interview, a questionnaire was used to collect demographic data, height, weight, sports practice, previous bone fracture, smoking, medications used, breast-feeding numbers, interpregnancy intervals, age at menarche, age at menopause, age at first baby, number of deliveries, number of breastfeeding, and T-score and Z- score.

Results: Participants with at least one interpregnancy interval < one year had a significantly higher percentage of those belonging to cases. Cases had a significant higher mean number of inter-pregnancy interval less < one-year, lower T-score and lower Z-score compared to controls. A non-significant relationship was found between the cases and controls according to sports practice, BMI categories, previous bone fracture and smoking and family history of osteoporosis, age at menarche, age at menopause, age at first baby, number of deliveries, number of breastfeeding, and number of medications used.

Conclusion: Females in reproductive age should be educated about the importance of long IPI and the relation between short IPI on PMOP.

Key words: Association, inter-pregnancy, interval, postmenopausal, osteoporosis, Saudi Arabia.

Introduction

Osteoporosis is defined by the World Health Organization (WHO) as a bone mineral density (BMD) T-score less than -2.5 as measured by dual-emission x-ray absorptiometry (DXA).(1). Osteoporosis affects 30% of women and 12% of men at some point in their lifetimes.(2). In nine industrialized countries, in North America, Europe, Japan, and Australia, osteoporosis affects up to 49 million individuals and its prevalence at the total hip, or hip/spine ranged from 9 to 38 % for women and 1 to 8 % for men (3).

Many factors affect bone mineralsdensity; one of the most important factors is age; the risk gets higher at an age of more than 45 years or advanced age of menopause (4). A previous study confirmed the relation between osteoporosis, postmenopause and white women with previous smoking habit and lower schooling level (5,6). In addition, body fat is considered a protective factor as it has a role in raising the estrogen level in the blood, which can activate the osteoblasts. Thus those of low body weight have a higher risk of osteoporosis (7).

Prolonged breastfeeding is known to be associated with decreased bone mineral density and can affect bone metabolism and calcium hemostasis (8). Other studies have found that glucocorticoid therapy, rheumatoid arthritis, being nondiabetic or pre-diabetic, having a family history of osteoporosis, physical inactivity, and inadequate sun exposure increased the risk of having osteoporosis (9, 10). The risk of osteoporosis was also found to increase by 10% for each 1 year delay in the age of menarche (11). Women who had five or more abortions were found to have significantly lower spine BMD values compared to women who had no abortions or women who had one or two abortions (12).

In postmenopausal women, osteoporosis and osteopenia may be diagnosed based on BMD T scores measured by DXA, with or without the presence of a fragility fracture. Low BMD T scores predict future fractures in postmenopausal women (13). Young women with BMD Z scores below −2.0 should be categorized as having BMD that is “below expected range for age”, and those with Z scores above −2.0 should be categorized as having BMD that is “within the expected range for age” (14).

In the Kingdom of Saudi Arabia (KSA), a study was done in 2007 to determine the prevalence of osteoporosis among Saudi men and found a prevalence of osteopenia for the lumbar spine in the whole group of 35.7% (15). And among Saudi women, osteoporosis is considered as a physiologic process with a prevalence of 23% among Saudi women aged 50–70 years (16,17). A study done in 2019 assessed the association between systemic osteoporosis and periodontal diseases in Saudi postmenopausal women. The study found that osteoporosis was a risk factor for periodontal disease and seems to play a vital role in disease progression (18).

As studies assessing the association between short inter-pregnancy interval and postmenopausal osteoporosis in KSA are limited, this study aimed to assess the association and factors affecting the presence of osteoporosis among a sample of postmenopausal Saudi women, Taif city.

Methods

Study design and time frame: a case-control study was done between June 2019 to June 2020.

Study setting and participants: The inclusion criteria were Saudi and non-Saudi postmenopausal females living in the Taif city who came to ortho clinics already diagnosed with PMOP or who had DEXA scan report, and the excluding criteria were pre-menopausal females, nullipara postmenopausal women, males, not diagnosed PMOP, patients who are non-residents of the western region, and those who did not do DEXA scan. Data collection: the study was based on a pre-designed survey, then the questions were asked in an interview with postmenopausal females who visited ortho clinics. The questionnaire included a first part with items tomcollect demographic data; height, weight, education level, sports practice, previous bone fracture, and smoking. The second part included items on medications used, breastfeeding, interpregnancy intervals, age at menarche, age at menopause, age at first baby, number of deliveries, number of breastfeeding, T-score and Z- score. According to the participants’ responses to the questionnaire, they were classified into two groups, according to the presence of osteoporosis, as cases and controls.

Ethical consideration: Ethical approval was obtained from the deanship of Saudi females’ affairs before starting the work. During the research activities, each studied subject was informed about the study objectives stressing on the confidentiality of collected data and getting verbal and written consent from the subject to participate in the study.

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

Results

Sixty-two (62) postmenopausal women involved in our study, (96.8%) of the participants, were of Saudi nationality, 88.9% were from Taif city, 55.6% were illiterate, and 57.1% were satisfied with housework without practicing any exercises. Of the participants, 47.6% were obese, 22.2% had a previous bone fracture, and 3.2% were current smokers smoking one packet of cigarettes daily [Table 1].

Table 2 shows that 28.6% of the participants were taking Vitamin D and calcium, 93.7% had previous breastfeeding, and 50.8% had an inter-pregnancy interval of less than one year. The mean age, BMI, age at menarche, age at menopause, age at first baby, number of deliveries, number of breastfeeding, T-score and Z- score were 59.17 ± 8.1 years, 30.27 ± 4.82kg/m2, 13.11± 1.73 years, 50.17 ± 4.47 years, 20.85 ± 4.93 years, 7.42 ± 3.34 times, 1.67 ± 0.51 times, - 1.67 ± 172 and -0.94 ± 1.2 respectively. Figure 1 shows that 63.5% of the participants (cases) were diagnosed with osteoporosis, and 22% had a family history of it (Figure 2).

Table 3 illustrates that a non-significant relationship was found between the cases and controls according to their characteristics, sports practice, BMI categories, previous bone fracture and smoking and family history of osteoporosis (P> 0.05). In contrast, participants who had at least one interpregnancy interval of less than one year had a significant higher percentage of those belonging to cases (P<0.05) Figure 3.

Table 4 illustrates that cases had a significantly higher mean number of inter-pregnancy interval less than one-year, lower T-score and lower Z- score compared to controls (P=<0.05). On the other hand, a non-significant relationship was found between cases and controls according to their age, BMI, age at menarche, age at menopause, age at first baby, number of deliveries, number of breastfeeding, and number of medications used (P> 0.05).

Discussion

The present study found that postmenopausal females with osteoporosis (cases) had a significantly higher mean number of inter-pregnancy intervals (IPI) less than one year compared to the postmenopausal females without osteoporosis (controls). The association of IPI and postmenopausal osteoporosis has been observed before in two studies. One of those was done in 2015 and showed that IPI was lower in cases with osteoporosis in comparison to the controls group,(19) remarking that women who had 0–12 months interpregnancy interval have the highest risk for osteoporosis. The other study was done in 2019 and showed that increased IPI decreases the risk of osteoporosis (20). The previous study (20) also found that frequent births throughout the whole reproductive age and having more than one child in adolescence has an adverse effect on postmenopausal bone mineral densities.

Previous studies showed a decrease in bone mineral density and trabecular thickness due to pregnancy and lactation (21,22). A study was done in 2014 and showed an association between long periods of breastfeeding and vertebral fractures, supporting a role for lengthy lactation as a risk factor for osteoporotic fractures after menopause (23). Another one was done in 2016 and showed that prolonged breastfeeding was significantly associated with low BMD in the lumbar spine (24).

Bone mass loss associated with pregnancy and lactation is usually regained in the postpartum period. However, it is unknown whether the bone loss is completely recovered in women with shortened interpregnancy interval (IPI) (19).

In our study, a non-significant relationship was found between the cases and controls according to their BMI categories and smoking. This finding is in agreement with that revealed from a study done in Jorden (25). In contrast, other studies found that smoking was considered a significant factor (26,27). In addition, other studies revealed that women with low BMI are at increased risk of osteoporosis (28). Another study done in Brazil found that obese women had a lower prevalence of osteoporosis compared with those having normal weight and overweight women (29).

In our study, a non-significant relationship was found between the cases and controls according to the presence of a family history of osteoporosis. Many studies showed the opposite where a positive family history of osteoporosis in close relatives was significantly an independent risk factor for osteoporosis development (30,31).

In the present work, the same non-significant relationship was found between the cases and controls according to the age at menarche, age at menopause. Previous studies have found that osteoporosis was more prevalent among women having their menarche after the age of 13 years (30). This was explained by the fact that some women may forget or did not accurately recall the exact date of their menarche. (25,26). Other studies found that early loss of the menstrual cycle before 50 years was not a significant factor for osteoporosis in postmenopausal women (25).

Our study also revealed a non-significant relationship between the cases and controls according to the number of breastfeeding. The same result was observed in a study conducted on Chinese women in 2019 (32). This study found that breastfeeding and its duration was not associated with postmenopausal osteoporosis (32).

Also, a non-significant relationship was found between cases and controls according to sports practice, previous bone fracture, age at first baby, number of deliveries, and number of medications used. Previous studies found different results, where breastfeeding was significantly associated with low bone mineral density (BDM) and high risk of postmenopausal osteoporosis (PMOP) (24,33,34). Furthermore, an Italian study found that long periods of breastfeeding significantly increased the risk of osteoporotic fracture after menopause (23).

A strength of the present study is that research assessing the association between short IPI and postmenopausal osteoporosis in KSA is scarce and this study will help to understand this association that was proved in international studies with different populations.

Table 1. Distribution of the participants according to their characters, sports practice, BMI categories, previous bone fracture and smoking

Variable	
Nationality	
Saudi	61 (96.8)
Non-Saudi	2(3.2)
City	
Taif	56 (88.9)
Makkah	7 (11.1)
Education	
Illiterate	35 (55.6)
Educated	28 (44.4)
Number of practicing walking or any sport/ week	
Bed ridden	6 (9.5)
I am satisfied with housework	36 (57.1)
< 3 times	14 (22.2)
≥ 3 times	7 (11.1)
BMI categories	
Underweight	1 (1.6)
Normal weight	9 (14.3)
Overweight	23 (36.5)
Obese	30 (47.6)
Previous bone fracture	
Yes	14 (22.2)
No	49 (77.8)
If yes, what was its site?	
hand	5 (7.9)
hip	4 (6.3)
leg	5 (7.9)
Current smoking	
Yes	2 (3.2)
No	61 (96.8)
Number of daily cigarette packets	
A packet/ day	2 (3.2)
Smoking duration	
10 years	1 (1.6)
20 years	1 (1.6)
Smoking duration (years)	15 ± 7

Table 2. Distribution of the participants according to medications used, breast feedings, interpregnancy intervals, age, BMI, age at menarche, age at menopause, age at first baby, number of deliveries, number of breast feedings, T-score and Z- score

Variable	No. (%)
Medication used	
DM medications	3(4.8)
NSAID and medication for HTN	1 (1.6)
Chemotherapy	1 (1.6)
Thyroid medications	1 (1.6)
Vitamin D	6 (9.5)
Vitamin D and calcium	18 (28.6)
Corticosteroid	2 (3.2)
Corticosteroid and Vitamin D	3 (4.8)
Corticosteroid and Vitamin D and calcium	4 (6.3)
Corticosteroid and DM medications	3 (4.8)
Heparin and DM medications	2 (3.2)
Heparin and Thyroid medications	1 (1.6)
Heparin and HTN medications	7 (11.1)
No medication taken	11 (17.5)
Number of medications used	1.67 ± 0.51
Previous breast feeding	
Yes	59 (93.7)
No	4 (6.3)
Number of breast feedings	6.22 ± 3.05
Inter-pregnancy interval less than one year	
Yes	32 (50.8)
No	31 (49.2)
Number of inter-pregnancy interval less than one year	3.25 ± 2.09
(Mean ±SD)	
Age	59.17 ± 8.1
BMI	30.27 ± 4.82
Age at menarche	13.11± 1.73
age at menopause	50.17 ± 4.47
Age at first baby	20.85 ± 4.93
Number of deliveries	7.42 ± 3.34
Number of breast feedings	1.67 ± 0.51
T-score	- 1.67 ± 172
Z- score	-0.94 ± 1.2

Figure 1. Percentage distribution of the participants according to being diagnosed with osteoporosis

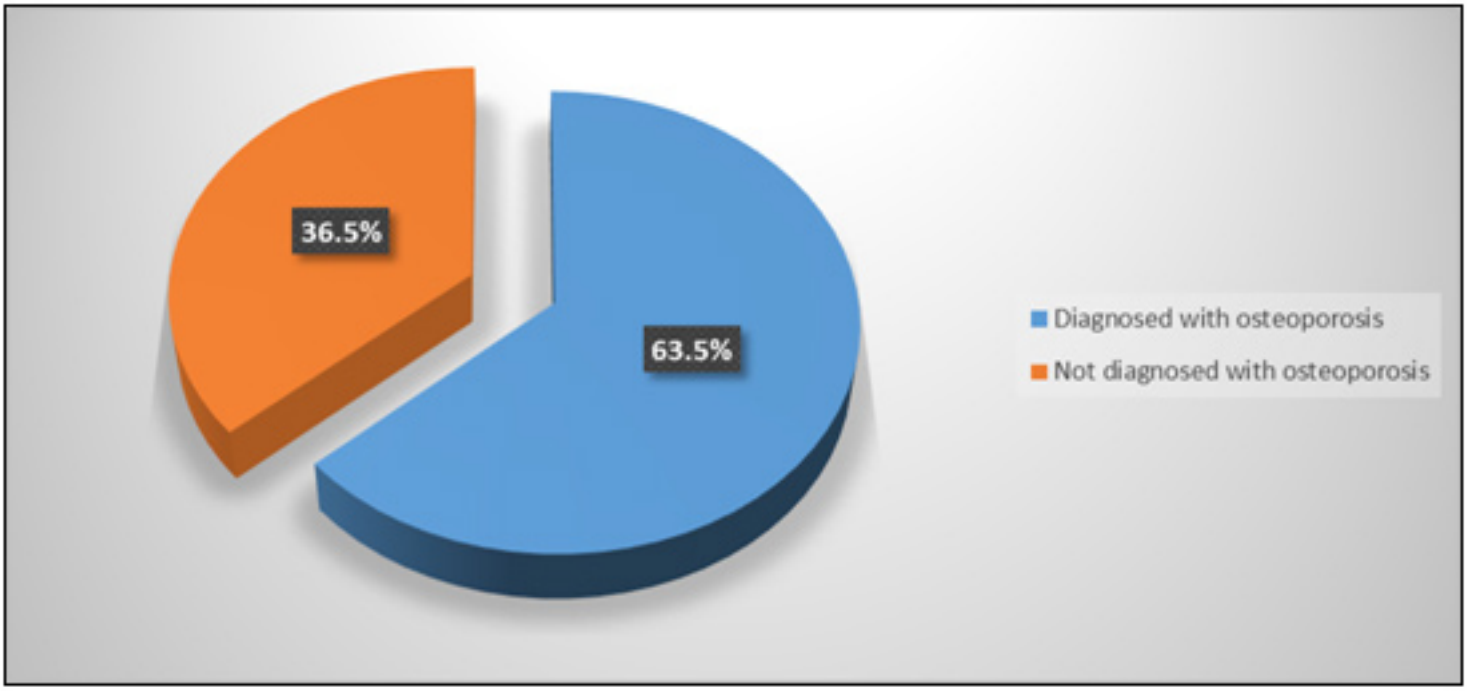


Figure 2. Percentage distribution of the participants according to family history of osteoporosis

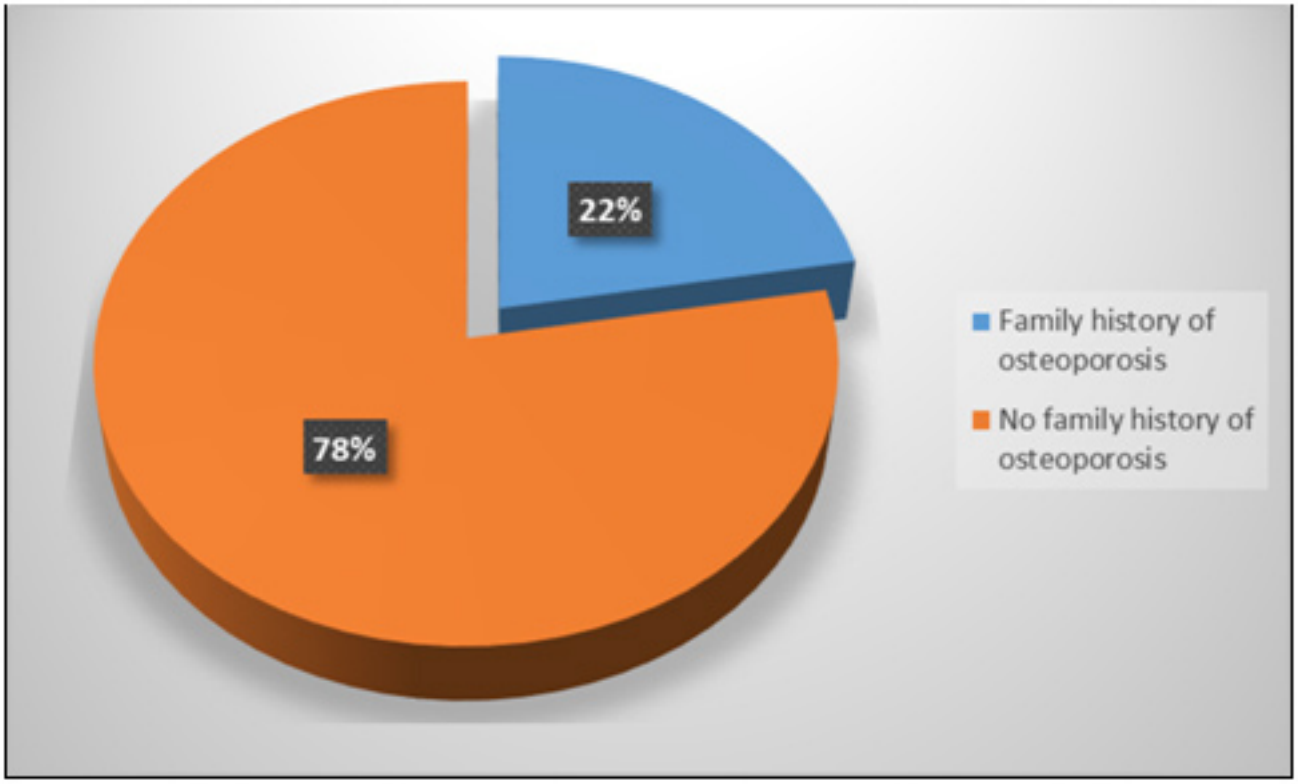
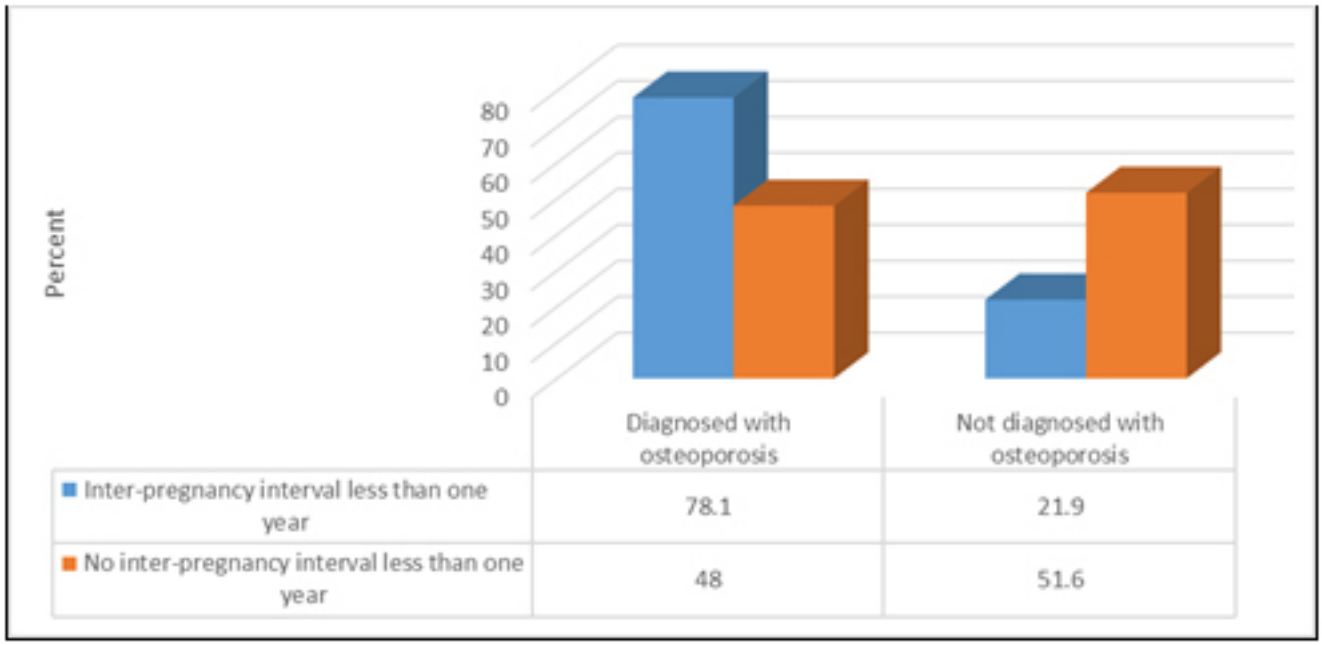


Table 3. Relationship between tosteoporosis and participants' characteristics, sports practice, BMI categories, previous bone fracture and smoking and family history of osteoporosis

Variable	Cases No. (%)	controls No. (%)	χ2	p-value
Nationality				
Saudi	69 (63.9)	22 (36.1)	0.16	0.68
Non-Saudi	1 (50)	1 (50)		
City				
Taif	35 (62.5)	21 (37.5)	0.21	0.64
Makkah	5 (71.4)	2 (26.6)		
Education				
Illiterate	19 (54.3)	16 (75.7)	2.99	0.09
educated	21 (75)	7 (25)		
Number of practicing walking or any sport/ week				
Bed ridden	4 (66.7)	2 (33.3)	0.46	0.92
I am satisfied with housework	23 (63.9)	13 (36.1)		
< 3 times	8 (57.1)	6 (42.9)		
≥ 3 times	5 (71.4)	2 (28.6)		
BMI categories				
Underweight	1 (100)	0 (0.0)	2	0.57
Normal weight	7 (77.8)	2 (22.2)		
Overweight	15 (65.2)	8 (34.8)		
obese	17 (56.7)	13 (43.3)		
Previous bone fracture				
Yes	9 (64.3)	5 (35.7)	0.005	0.94
No	31 (63.3)	18 (36.7)		
Current smoking				
Yes	1 (50)	1 (50)	0.16	0.68
No	39 (63.9)	22 (36.1)		
Previous breast feeding				
Yes	37 (62.7)	22 (37.3)	0.24	0.62
No	3 (75)	1 (25)		
Family history of osteoporosis				
Yes	9 (64.3)	5 (35.7)	0.005	0.94
No	31 (63.3)	18 (36.7)		

Figure 3. Relationship between the cases and controls and the presence of interpregnancy interval less than one year



N.B.: ($\chi 2=6$, p-value=0.01)

Table 4. Relationship between osteoporosis and participants' age, BMI, age at menarche, age at menopause, age at first baby, number of deliveries, number of interpregnancy intervals less than one year, number of breast feedings, number of medications used, T-score and Z- score

Variable	Cases	controls	Test	P-value
	No. (%)	No. (%)		
Age	58.35 ±6.7	58.87 ±10.26	0.86*	0.381
BMI	29.5 ±4.86	31.62 ±4.54	1.7**	0.09
Age at menarche	13 ±1.3	13.3±2.32	0.19*	0.48
Age at menopause	50.93±3.6	48.87 ±5.53	1.65*	0.09
Age at first baby	21.37 ±4.77	19.95 ±5.19	1.15*	0.24
Number of deliveries	7.3 ±3.49	7.65 ±3.12	0.5*	0.61
Number of inter-pregnancy interval less than one year	3.65 ±1.49	2 ±0.53	2.71*	**0.007**
Number of breast feedings	6.08 ±3.26	6.45 ±2.72	0.47*	0.631
Number of medications used	1.6 ±0.55	1.78 ±0.41	1.34*	0.17
T-score	-2.26 ±1.65	-1.36 ±1.71	2.31*	**0.02**
Z- score	-1.56 ±0.67	-0.6 ±1.27	2.39*	**0.01**

N.B.: *Mann-Whitney test **Independent sample t-test

Limitations

The main limitation of this study is the national lockdown due to COVID-19 pandemic that affect the data collection and the sample size.

Conclusions

Participants with at least one interpregnancy interval less than one year had a significantly higher percentage of those belonging to cases. In addition, cases had a significant higher mean number of inter-pregnancy intervals less < one-year, lower T-score and lower Z- score compared to controls. A non-significant relationship was found between the cases and controls according to sports practice, BMI categories, previous bone fracture and smoking and family history of osteoporosis, age at menarche, age at menopause, age at first baby, number of deliveries, number of breast feedings, and number of medications used. Based on the results of the present study, health education campaigns should be done to educate all women in the reproductive age about the relationship between short IPI on PMOP.

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The effect of BMI and glycemic control on S. potassium and S. calcium Disturbances among Diabetic Patients in Salah Al-Deen General Hospital

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Abstract

Background: Diabetes is endemic in Iraq with changeable prevalence in the last three decades and the sedentary lifestyle and westernization of dietary habits are also potentiating mortality and disability adjusted life years of diabetes mellitus in Iraq. The electrolyte disturbances among Iraqi Type 2 DM patients were frequent and correlated with poor glycemic control and abnormal lipid profile. Type 2 DM as a rule coincides with different parts of metabolic disorder, for example, high body mass index (BMI). High BMI is an indicator of a beginning of Type 2 DM in elderly age adult's 65–96 years. This study aims at evaluation of the effect of body mass index (BMI) on serum electrolyte disturbances in diabetic patients.

Patients and Methods: This study is a descriptive case control study conducted in Consultancy Clinics of Salah Al-Deen General hospital in Tikrit city through the period from 1st October 2017 to end of 2018. A convenient sample of 100 diabetic patients was compared with 100 healthy controls. The researcher measured the body weight for both groups using Seca scale instrument; the Body Mass Index was calculated for each subject. A sample of 5 ml of venous blood was collected by non-tourniquet method from diabetics and controls, and then 1 ml of blood was taken for EDTA tube for HbA1c. Four ml of blood was centrifuged for 10 minutes to take 1 ml of serum from the sample and taken to incubator for 20 minutes after adding some reagents to serum and reading results by spectrophotometer.

Results: Mean BMI of diabetic patients was 28.1±4.4 Kg/m2. Mean HbA1c level was significantly higher among diabetic patients (8.1±1.7) than the controls (4.4±0.5). Studying the serum electrolytes of diabetic patients showed that Mean serum potassium of diabetic patients was 3.9±0.5 mmol/L; 17% of patients had low serum potassium level. Mean serum calcium of diabetic patients was 9.1±0.6 mg/dl; 78% of them had low serum calcium level.

Conclusions: Concerning the result of this study, the following conclusions are obtained: hypocalcaemia is a frequent clinical issue of type 2 DM patients. Serum calcium of type 2 DM patients is more likely to be inversely related with body mass index of the patients. No significant differences were observed between diabetic patients and healthy controls regarding serum potassium level.

Key words: S. potassium, S. Calcium, DM, BMI

Introduction

Diabetes mellitus is a chronic illness that either happens when there is insufficient insulin or if the body can't use the insulin effectively. The global prevalence of diabetes was expected to be 8.3% in 2013 and expected to increase to 10.1% by 2035 among those aged 20-70 years[1].

Type-2 diabetes mellitus (DM) is a disorder presenting as hyperglycemia and abnormal metabolism, as a result of deficient insulin which may be associated with insulin resistance[2].

Derangement and imbalances of water and electrolytes are often the main presentation of many metabolic diseases in emergency departments of hospitals with different etiologies that need urgent medical intervention to prevent morbidity and mortality sequel [3]. The most common public associated disease correlated with electrolyte disturbances is diabetes mellitus, especially when uncontrolled, failure of multi-drugs, and complicated with ketoacidosis and kidney diseases [3]

Among type I diabetic patients, low or absence of insulin is regarded as an interesting facilitator of potassium withdrawal from cells [4]. Escape of potassium from intracellular to extracellular fields leads to high plasma tonicity and hyperkalemia [5]. Movement of water to extracellular fields caused by osmolarity changes is the main cause of potassium movement from cells toward extracellular field and is attributed to intracellular dehydration [6]. For that, treating hyperkalemia patients with dextrose in water alone and not accompanied by insulin administration is dangerous as the insulin endogenous secretion might be low or absent and lead to high plasma tonicity [7].

Hyperkalemia was confirmed among many patients with diabetic ketoacidosis, despite the fact that potassium level is lowered. This condition is caused by the extravagance of potassium, which arises from the extended transfer of sodium into the distal nephron in combination with the enhanced mineralocorticoid activity [8,9]. Hyperkalemia is caused by redistribution of potassium, which is a consequence of hypertonic and insulin deficiency rather than by metabolic acidosis. Potassium shifts caused by metabolic acidosis are more pronounced in hyperchloremic, non-anionic acidosis than in acidosis, which is available in diabetic ketoacidosis [10]. Anion gap= Na-(Cl+HCO3) Normal value=6-12meq/L, increase in DKA, lactic acidosis, ethinyl glycol poisoning, uremia and aspirin poisoning, while it decreases in hypoalbuminemia, plasma cell dyscrasia and bromide intoxication, and normal values occur in diarrhea, recovery from DKA, renal tubular acidosis and as a normal variant[10].

The hypocalcemia is frequently reported for cases of renal complications of diabetes like nephrotic disorder, as this disorder developed condition of high urine loss of 25-hydroxyvitamin D3 in addition to carrier proteins. Changes in parathyroid hormone levels detected in diabetic patients also have a significant role in lowering serum calcium levels [11]. Low magnesium levels among diabetes mellitus patients played a role in decreasing serum calcium level by impairment release of parathyroid hormones and lowering skeletal resistance to these hormones which in turn lower the serum calcium level [12]. Essential hyperparathyroidism is thought to be considered in patients with diabetes who have hypercalcemia, since in such people essential hyperparathyroidism happens at a rate that is a few times as high as that in the normal population. Hypercalcemia additionally occurs in patients with volume exhaustion, which leads to the expanded reabsorption of renal calcium [11,12].

The Iraqi population has faced in the last 3 decades an increased prevalence of DM, changed dietary habits, sedentary lifestyle as well as potentiating mortality and disability adjusted life years of diabetes mellitus in Iraq [13]. Usually the Iraqi DM patients were poorly controlled and presented in emergency units as poor glycemic control and abnormal lipid profile of patients, the figure with increased burden on Iraqi health services [14]. The interaction of low levels of some minerals with abnormal glucose metabolization in humans was not studied sufficiently especially in Iraq and did not differentiate between insulin-resistance associations and type 2 diabetes with macrominerals which provide the reasons for conducting the current study. This study aims at evaluation of the effect of body mass index (BMI) on serum electrolyte disturbances in diabetic patients.

Patients and Methods

This study is a descriptive case control study conducted in Consultancy Clinics of Salah Al-Deen General hospital in Tikrit city from 1st Oct. 2017 – end of April, 2018. A convenient sample of 100 type 2 DM patients and 100 healthy controls were randomly selected. The data collection was carried out through direct interview by a questionnaire sheet. The patients were assessed by full history and clinical examination, confirmation of diagnosis, DM history, and duration. The results of each patient were taken in the same day and recorded in the questionnaire. The calcium kit used was Bio Lab kits, while Spectrum kits were used for potassium (France). Normal limits of investigations; Serum potassium (3.5-5 mmol/L), Serum calcium (8.7-10.3 mg/dl)[15]. Ethical approval was obtained from Salah Al-Deen General Hospital Directorate. A written oral informed consent was taken from the patients and controls.

The body weight and height of the patients and controls were measured by researcher using Seca scale instrument; then body mass index was calculated by the researcher according to equation: BMI=weight/(height in meters) [16]. A sample of 5 ml of venous blood was collected by non-tourniquet method from diabetics and controls, and then 1 ml of blood was taken for EDTA tube for HbA1c. Four mls of blood was centrifuged for 10 minutes to take 1 ml of serum from the sample and taken to incubator for 20 minutes after adding some reagents to serum and

reading results by spectrophotometer. BMI according to Asian population; (17.5-23 is normal, 23-28 is overweight, >28 is obese) [17].

Results

Mean HbA1c level of diabetic patients was 8.15±1.7 %. There was a highly significant difference in HbA1c level between diabetic patients and healthy controls ($p<0.001$); mean HbA1c level was significantly higher among diabetic patients (8.1±1.7) than the controls (4.4±0.5). All these findings are shown in Figure 1.

No significant differences were observed between diabetic patients and healthy controls regarding the body mass index, the mean BMI was (28.1±4.4) among diabetic patients, versus (28±4.3) among healthy persons, as shown in Table 1.

No significant differences were observed between diabetic patients and healthy controls regarding serum potassium level ($p=0.5$). A highly significant association was observed between low serum calcium level and diabetic patients ($p<0.001$). All these findings are shown in Table 2.

Moreover, there was no significant correlation between serum potassium level of diabetic patients and each of patients' age, gender, BMI, HbA1c level, DM duration, smoking, HT history, anti-hypertensive drugs, anti-diabetic drugs, family history of DM and regular checking of RBS. All these findings are shown in Table 4. Furthermore, no significant correlation was observed between low serum calcium level of diabetic patients and each of patients' age, gender, HbA1c level, DM duration, smoking, HT history, anti-hypertensive drugs, anti-diabetic drugs, family history of DM and regular checking of RBS. A significant negative correlation was observed between serum calcium level of diabetic patients and BMI ($p=0.02$, $r=0.22$). All these findings were shown in Table 3.

Figure 1: Distribution of HbA1c mean according to diabetics and controls.

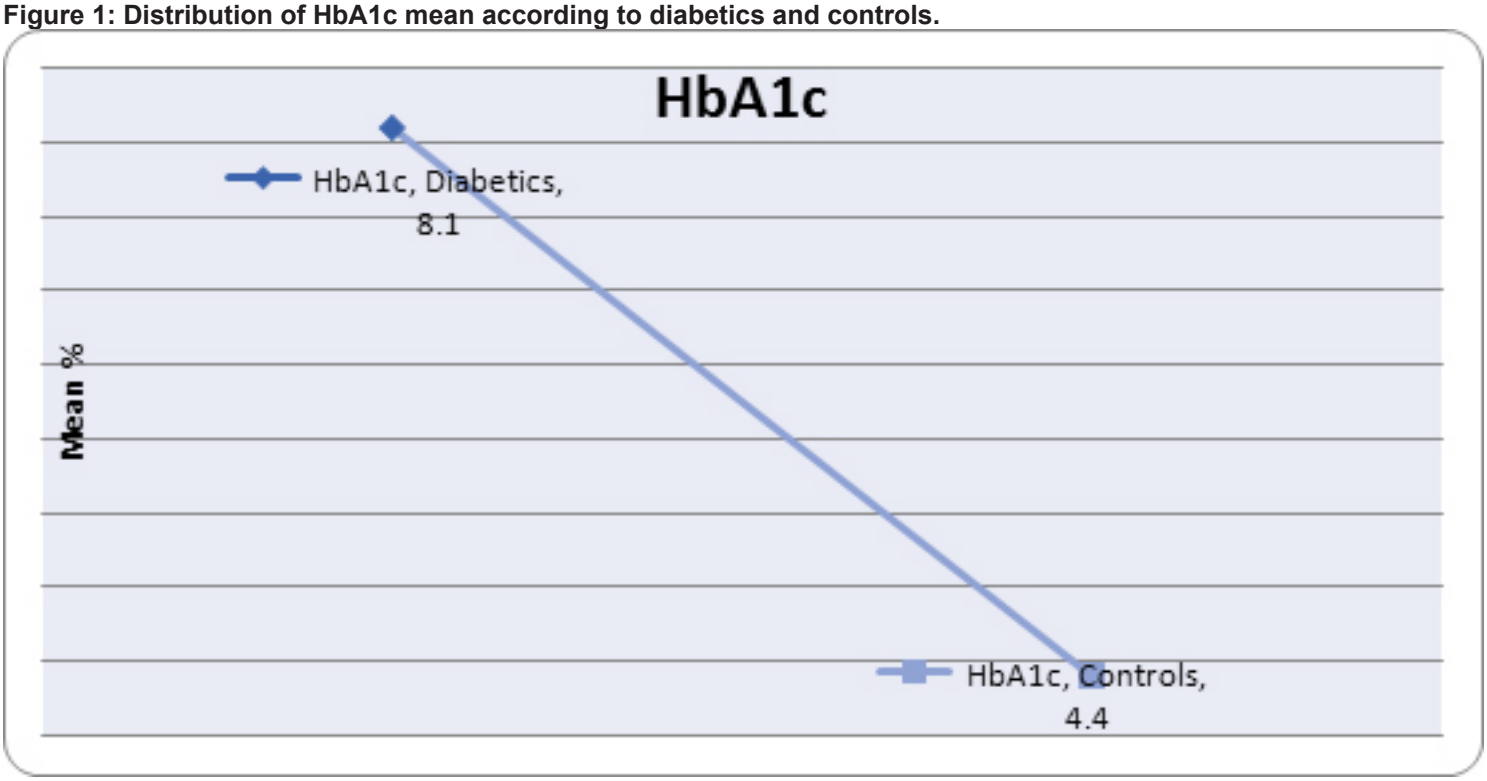

Table 1: Distribution of BMI according to Diabetics and Controls.

Variable	Diabetics	Controls	P
	Mean±SD	Mean±SD	
Mean±SD (Kg/m²)	28.1±4.4	28±4.3	0.8** NS

Table 2: Distribution of serum electrolyte levels according to diabetics and controls

Variable	Diabetics		Controls		P
	No.	%	No.	%	
Serum potassium					0.5*** NS
Low	17	17.0	20	20.0	
Normal	83	83.0	80	80.0	
Total	100	100	100	100	
Mean±SD (mmol/L)	3.9±0.5		3.8±0.3		0.1** NS
Serum calcium					<0.001* S
Low	78	78.0	21	21.0	
Normal	22	22.0	75	75.0	
High	0	-	4	4.0	
Total	100	100	100	100	
Mean±SD (mg/dl)	8±0.7		9.1±0.6		<0.001** S

* Fishers exact test, ** Independent sample t-test, *** Chi-square test, NS=Not significant, S=Significant.

Table 3: Correlations between study variables and serum potassium and calcium among diabetic patients.

Variable	Serum potassium		Serum calcium	
	r	P value	r	P value
Age	-0.07	0.04 NS	0.1	0.1 NS
Gender	0.1	0.2 NS	0.02	0.8 NS
BMI	-0.06	0.5 NS	-0.22	0.02 S
HbA1c	0.005	0.9 NS	-0.008	0.9 NS
DM duration	-0.01	0.8 NS	-0.01	0.8 NS
Smoking	0.02	0.8 NS	-0.05	0.5 NS
HT history	-0.1	0.3 NS	-0.1	0.1 NS
Anti-hypertensive drugs	-0.02	0.8 NS	0.02	0.7 NS
Anti-diabetic drugs	-0.04	0.6 NS	-0.1	0.2 NS
Family history of DM	0.05	0.5 NS	0.001	0.9 NS
Regular checking of RBS	0.1	0.1 NS	0.1	0.1 NS

NS Not significant. Ssignificant

Discussion

The electrolyte imbalance among diabetic patients is a frequent entity in hospitals. These disturbances are aggravated in hyperosmolarity status caused by hyperglycemia and diabetic ketoacidosis metabolic emergencies; as both of them cause osmotic diuresis [18].

In the current study, mean BMI of type 2 diabetic patients was 28.1±4.4 Kg/m2. This finding is similar to results of a previous Iraqi study that reported BMI mean of type 2 diabetic patients as 27.9±5.9 Kg/m2 [19].

The current study showed that 17% of diabetic patients had low serum potassium level while 20% of controls had low serum potassium level with no significant difference in mean serum potassium level between diabetic patients and controls (p=0.1). This finding coincides with results of Talabani's study in Iraq [20] which studied the electrolyte and lipid profile of non-insulin dependent diabetic patients in comparison to healthy controls and revealed no significant changes in serum potassium levels between study groups. This finding is inconsistent with results of Foo et al's [21] study in UK which recruited 2,482 patients with acute coronary syndrome (ACS) and found that diabetes mellitus among ACS patients is regarded as a significant predictor for high potassium level.

On other hand, Chatterjee et al's [22] study in USA reported that low serum potassium level is considered as a risk factor for development of diabetes mellitus due to a decreased B-cell sensitivity in pancreas to hyperglycemia leading to lower insulin release. Liamis et al (3) study in Greece stated that both hypokalemia and hyperkalemia may occur in diabetes mellitus; hypokalemia might be caused by shifting of K+ from extracellular to intracellular fluids due to insulin effect or loss of K+ from gastrointestinal lumen due to malabsorption or by excessive renal loss; while hyperkalemia might be attributed to shift of K+ from intracellular to extracellular fluids due to acidosis effect, hypertonicity, lack of insulin, drugs effect and lysis of cells or chronic hyperkalemia might be due to decrease the renal tubular secretion of K+ by hyporeninemic hypoaldosteronism syndrome [3].

In the present study, 78% of diabetic patients had low serum calcium level while 21% of healthy controls had low serum calcium level, with highly significant difference between the two study groups (p<0.001). This finding is similar to results of Al-Yassin et al's [23] study in Iraq which selected 70 type 2 diabetic patients in comparison to 70 healthy controls and found that serum calcium level was significantly lower than serum calcium level of controls. However, another study in Iraq conducted by Al-Selevany found that the DM type 2 had no effect on serum calcium level [24]. This difference might be attributed to fact that the Al-Selevany study included early onset type 2 DM patients and the effect of DM on calcium level observed later in the disease [25]. Many authors stated that hyperphosphatemia and hypomagnesemia caused by renal failure and volume depletion are the main causes of low serum calcium level among diabetic patients in addition to effects of vitamin D deficiency and parathyroid hormones [3, 25, 26]. Ahn et al's [27] study in South Korea documented that supplementation of population with vitamin D and calcium reduces the risk of type 2 DM development as the insulin sensitivity increased after calcium and vitamin D intake. In a national large population study carried out in Finland by Saltivo et al [28], it was found that serum calcium level is involved directly with all components of metabolic syndrome and specifically affected hyperglycemia.

In the current study, serum calcium of type 2 diabetic patients was significantly correlated with body mass index of patients (p=0.02). This finding coincides with results of Babikr et al's [29] study in Saudi Arabia which found a significant negative correlation between each of serum magnesium and calcium with BMI of type 2 diabetic patients. The serum calcium is found to be important for insulin activity intracellularly specifically in skeletal muscle and adipose tissue [30]. Alterations in calcium levels are affecting sensitivity of insulin [31]. Major et al's study in Canada revealed that calcium and vitamin D intake stimulated weight loss among obese women [32].

Conclusion

Hypocalcaemia is a frequent clinical issue of type 2 DM patients. Serum calcium of type 2 DM patients is more likely to be inversely related with body mass index of the patients. No significant differences were observed between diabetic patients and healthy controls regarding serum potassium level. Further studies are needed to explore the subject, as it is an important issue in the diabetic patient management.

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The effect of diabetic control on serum sodium disturbances in Salah Al-Deen general hospital

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Abstract

Background: Diabetes mellitus is regarded as a common disease that is highly accompanied with higher incidence of electrolyte disturbances. The aim of this study was to assess the effect of duration of type 2diabetes mellitus on the serum electrolyte disturbances in Salah Al-Deen General Hospital.

Patients and methods: This study is a descriptive case control study conducted in Consultancy Clinics of Salahaldin General hospital in Tikrit city through the period from 1st of October, 2017 to 28 of April 2018 on a convenient sample of 100 patients with type 2 diabetes mellitus and sample of 100 healthy controls. HbA1c test and serum sodium were assessed in both diabetic patients and controls.

Results: Poor glycemic control was observed among 84% of diabetic patients with a highly significant difference in HbA1c level between diabetic patients and healthy controls ($p<0.001$). There was a significant association between hypernatraemia and diabetic patients ($p<0.001$).

Conclusions: Hypernatraemia and hypocalcaemia are frequent clinical entities of type 2 diabetic patients.

Key words: DM, HbA1C, S. Sodium, s. electrolyte

Introduction

Hyperglycemia is the early complication of diabetes and the prominent risk factor for slow destruction of many body organs, mainly heart, eyes, blood vessels, nerves and kidneys. Raised blood glucose, a common effect of uncontrolled diabetes, may, over time, lead to serious damage to the heart, blood vessels, eyes, kidneys and nerves [1]. The demographic patterns of type 2 diabetic patients in Arab countries is obviously different from other developed and developing countries with a predominance of diabetes population in less than 60 years age group with decline in incidence curve toward younger age group. This higher prevalence is the outcome of accelerated increase in obesity prevalence with sedentary lifestyle of these populations [2]. The acquired disorders of electrolyte balance had poor prognosis although some of them are classified as mild [3]. The etiology of electrolyte distorted balances is commonly of a multi-factorial nature, many risk factors involved in the pathophysiology picture of electrolyte imbalances [4,5].

In Iraq, DM is an endemic disease with increasing incidence because of illiteracy, poor health educational, westernization of the dietary habits, sedentary lifestyle and economic transition, are all potentiating mortality and disability adjusted life years of diabetes mellitus in Iraq [6]. The electrolyte disturbances among Iraqi type 2 diabetic patients were frequent in emergency care centers and always correlated with poor glycemic control and abnormal lipid profile of patients [7]. Increased diabetes type 2 prevalence among the population with poor glycemic control represented a big burden on the national health system in Iraq[8]. This study aimed at assessing the effect of the type 2 diabetic control on the serum sodium disturbances in Salah Al-Deen General Hospital.

Patients and Methods

This study is a descriptive case control study conducted in Consultancy Clinics of Salah Al-Deen General hospital in Tikrit city from 1st October 2017 to 28th April, 2018. A convenient sample of 100 type 2 DM patients and 100 healthy controls were randomly selected. The data collection was carried out through direct interview by a questionnaire sheet. The patients were assessed by full history and clinical examination, confirmation of diagnosis, DM history, and duration. The results of each patient were taken on the same day and recorded in the questionnaire. The Spectrum kits were used for sodium (France). The kits used for HbA1c test were Stan Bio kits (USA). Normal limits of investigations; Serum sodium (135-145 mmol/L) [4]. Ethical approval was obtained from Salah Al-Deen General Hospital Directorate. A written oral informed consent was taken from the patients and controls.

Results

The present study included 100 diabetic patients with mean age of 53.1±11.6 years; (range 25-85 years); Female diabetic patients were more than male patients with female to male ratio as 1.4:1. No significant differences were observed between diabetic patients and healthy controls regarding age and gender. All these findings are shown in Table 1.

There was a highly significant difference in HbA1c level between diabetic patients and healthy controls ($p<0.001$), about 84(84%) of the diabetic patients had poor glycemic control versus none of the control group. All these findings are shown in Table 2.

Studying the serum electrolytes of diabetic patients showed that mean serum sodium was 143.1±5.4 mmol/L for diabetic patients in comparison to the controls (142.7±3.2). About 2% of patients had low serum sodium level while 33% of patients had high serum sodium level. All these findings are shown in Table 3 and Figure 1. There was a significant association between high serum sodium level among diabetic patients 33(33%) versus control 16(16%), ($p<0.001$). All these findings are shown in Table 3.

There was no significant correlation observed between normal or high serum sodium level of diabetic patients and each of patients' age, gender, BMI, HbA1c level, DM duration, smoking, HT history, anti-hypertensive drugs, anti-diabetic drugs, family history of DM and regular checking of RBS. All these findings are shown in Table 4.

Table 1: Distribution of diabetic patients and controls according to age and gender

Variable	Diabetics		Controls		P
	No.	%	No.	%	
Age					
Mean±SD (years)	53.1±11.6		54.3±7.3		0.4**
Gender					0.1*
Male	41	41	32	32	
Female	59	59	68	68	
Total	100	100	100	100	

*Chi-square test, ** Independent sample t-test.

Table 2: Distribution of BMI and HbA1c level according to Diabetics and Controls

Variable	Diabetics		Controls		P
	No.	%	No.	%	
HbA1c level					<0.001* S
Good glycemic control	16	16.0	100	100.0	
Poor glycemic control	84	84.0	0	-	
Total	100	100	100	100	

Table 3: Distribution of serum electrolyte levels according to diabetics and controls

Variable	Diabetics		Controls		P
	No.	%	No.	%	
Serum sodium					
Low	2	2	0	-	
Normal	65	65	84	84	0.006*S
High	33	33	16	16	
Total	100	100	100	100	
Mean±SD (mmol/L)	143.1±5.4		142.7±3.2		0.5** NS

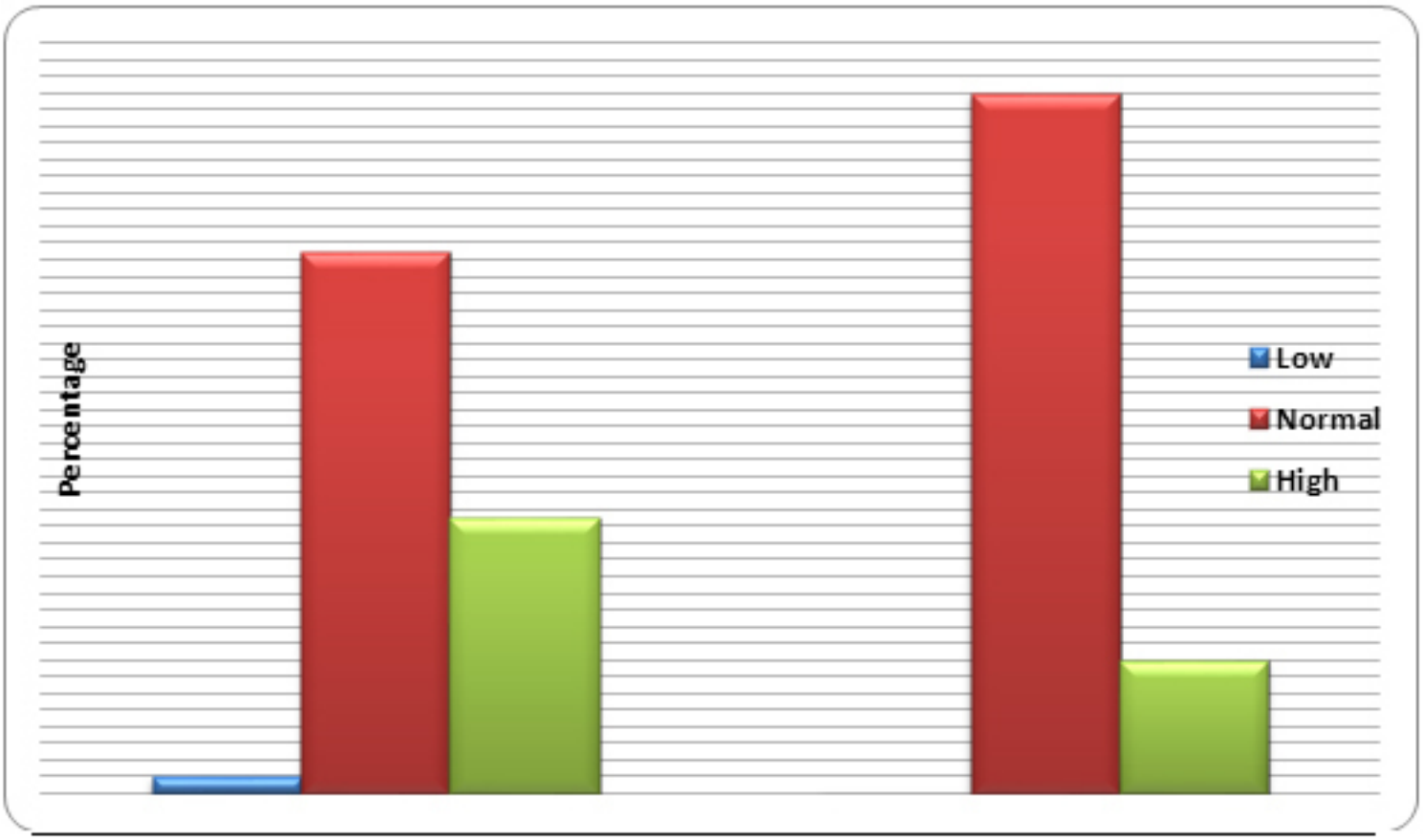
* Fishers exact test, ** Independent sample t-test, *** Chi-square test, NS=Not significant, S=Significant.

Table 4: Correlations between study variables and serum sodium of diabetic patients.

Variable	Serum sodium	
	r	P value
Age	0.002	0.9 NS
Gender	0.07	0.4 NS
BMI	0.1	0.06 NS
HbA1c	-0.03	0.7 NS
DM duration	-0.1	0.2 NS
Smoking	0.08	0.3 NS
HT history	-0.08	0.4 NS
Anti-hypertensive drugs	0.01	0.8 NS

NS Not significant.

Figure 1: Distribution of serum sodium according to diabetics and controls



Discussion

The studied type 2 diabetic patients had mean age of 53.1±11.6 years with predominance of female gender. This finding is close to results of Nassar et al's [9] study in Iraq which included 336 type 2 diabetic patients in Al-Faiha Specialized Diabetes, Endocrine and Metabolism center in Basrah city and found that mean age of them was 54.4 years with predominance of female gender. In the current study, mean BMI of type2 diabetic patients was 28.1±4.4 Kg/m2; 79% of them were overweight and obese.

The HbA1c level of diabetic patients in the present study was significantly higher than HbA1c level of controls ($p<0.001$), with 84% of diabetic patients having poor glycemic control. This poor glycemic control proportion is higher than that reported by Mansour's study in Iraq as 76.7% of diabetic patients who presented to diabetes center in Basrah city had poor glycemic control (≥7% HbA1c) [10].

The current study finding is also higher than results of Al-Rowais' study [11] in Saudi Arabia which measured the glycemic control among type 2 diabetic patients who attended the diabetic center of a tertiary hospital and found that 60% of them had poor glycemic control. This higher proportion of poor glycemic control in the present study might be due to different reasons like high prevalence of obesity, irregular monitoring and treatment of diabetes in addition to bad security and political situations in Salahaldin province which made disconnection and inappropriate follow up of diabetic patients. McBrien et al's study in Canada found that absence of patients' confidence and poor social support by health care staff are the main barriers of good glycemic control [12]. In Iraq, the common barriers of good glycemic control were long DM duration, lack of self-monitoring of blood glucose and obesity of diabetic patients [6].

The present study showed that 33% of diabetic patients had high serum sodium level while 16% of controls had high serum sodium level with a significant difference ($p=0.006$). This finding is consistent with results of Liamis et al's study in Greece which included 113 patients with diabetes and found that 34.5% of them have hypernatremia [13]. This hypernatremia is caused by osmotic diuresis in which the water loss is insufficiently replaced [13]. Inconsistently, Wang et al's [14] study in China found a significant decrease in both serum levels of sodium and magnesium among diabetic patients in comparison to normal healthy controls. The hypernatremia is proved to be the prevalent electrolyte disturbance with high incidence rate of 1-3% and high death rates of 40-60% all over the world [15]. Many authors documented that Hypernatremia had higher prevalence rates among older populations and among patients with metabolic diseases complications like DM [15,16].

Although the present study findings reported the hypernatraemia, Palmer et al's [17] study in USA stated that the common presentation of sodium level abnormalities among diabetes mellitus patients were as hypernatremia due to high osmotic flow of water and higher dilution effect. They also reported that in some cases (like in this study) with poor replacement of water loss, the osmotic diuresis leads to hypernatremia [17].

Conclusions

Concerning the result of this study, it indicates hypernatremia are frequent clinical entities of type 2 diabetic patients. Poor glycemic control prevalence among type2 diabetic patients in Salahaldeen is high, affecting the S. Sodium and may lead to further metabolic complications, therefore Salahaldeen is in urgent need for implementation of a diabetic clinic program.

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Are Pakistani mothers aware of the Child Safety Measures? A Cross sectional study

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Abstract

Introduction: Accidental injury and trauma is one of the most important causes of mortality among children <3 years. Parent's especially mother's knowledge has a vital influential role in care and safety of their children (2). The most common reasons for injury includesdrinking hot drinks while holding a baby, leaving children alone in the bath, allowing children to play with toys small enough to go into their mouths and not wearing cycle helmets etc(3). The aim of this study was to assess the knowledge and practices of mothers regarding prevention of common accidents among preschool children in Karachi, Pakistan.

Methodology: This was a cross sectional survey conducted at family medicine clinics of Aga Khan University Hospital Karachi, Pakistan. The study participants included mothers of pre-school children (aged 3-5 years) identified through convenience sampling after taking informed verbal and written consent. The questionnaire included descriptive characteristics of the study participants along with questions related to knowledge and practices regarding the common accidents among pre-school children and strategies to prevent them. The data was entered on epi data version 3.1 and analysis was performed on SPSS version 16.

Results: Most of the mothers (79%) were between the ages of 31-40 years and were housewives. Children whose mothers were uneducated had a higher incidence of injuries. The most common types of accident among children were falls (88%) and approximately 90% of the mothers did not teach traffic rules to their children. The majority of mothers reported that continuous supervision is the best precaution to avoid injuries among pre-school children.

Conclusion: Home-related injuries may lead to many health problems and their prediction and prevention are necessary to prevent major health hazards. This study concludes that the majority of mothers have inadequate knowledge and improper practice on prevention of accidents among preschool children. There is a strong need to improve knowledge and awareness of mothers regarding home related injuries to prevent accidents in preschool children.

Key Words: Awareness, Mother, Injuries, young children

Introduction

Injury among children is a major health issue globally. Around 830,000 children die every year and nearly 2,300 die each day due to injury worldwide (1). Road traffic crashes, drowning, burns, falls and poisoning are the leading causes of deaths due to injury. Every day 480 children die due to drowning, 260 die from burns, 130 die from falls and 125 die from poisoning worldwide (1). Previous studies have reported that across all age brackets; the highest incidence of unintentional injuries occurs in the preschool group (2-4). A study conducted among children (aged <15 years) showed that nearly half of the total number of children who visited the Emergency Center due to unintentional injury were less than 5 years of age (2). Similarly a study from Pakistan showed that during the second year of life; children had the highest number of injuries (3). Zhang et al also reported that among children of different age brackets; preschool age was significantly associated with unintentional injuries (4). A study from China reported that incidence of injury was 16 per 1000 children aged less than 5 years of age (5).

Injuries are the most important cause of mortality, morbidity and disability among children. Systematic review by Rivara reported that head injuries and burns have a marked impact on emotional and behavioral development (6). Preschool age is the most crucial period in life as 90% of the brain development occurs during this age (7). Hence, any traumatic injury occurring during this age can lead to lifelong physical and mental consequences. Disability-Adjusted Life Years (DALYs) lost due to road-traffic injuries and falls rank among the top 15 causes of global burden of disease (8). A national study from India reported unintentional injuries to be the sixth leading cause of death among children less than 5 years of age (9). Worldwide, injuries like drowning, road-traffic injuries and burns are among the top 12 leading causes of deaths among preschool children (10).

However this burden of injury among children is distributed unequally; with more than 95% of all child injury deaths occurring in middle- and low- income countries (11). It highlights the poor interventional practices in these countries to prevent injury among children. Furthermore, the World Health Organization reports that around 90% of injuries to children are “accidental”, hence mostly preventable (1). Therefore, the prevention strategies can play a pivotal role in curtailing the rates of injury among children. Previous studies reported that most of the injuries to children take place at home due to household hazards (2-3, 5, 12). A study from Pakistan reported that 61% of injuries to children occurred at home with the highest number occurring in the courtyard, followed by stairs, kitchen and bedroom (3). This is particularly relevant for preschool children who spend most of their time at home. Therefore, prevention strategies taken by mothers to reduce the risk of household hazards can significantly suppress the incidence of injury among preschool children.

Pakistan is one of the five countries where about 50% of under-five age deaths are clustered (13). The Mortality rate under-5 (per 1000) in Pakistan was reported at 87 in 2009 (14). Among different causes of deaths in children less than 5 years; studies have reported high incidence of injury among children in Pakistan (3, 12). A study from Pakistan showed incidence rate of injuries that required care outside home was 19.7 per 100 children (3). However there is a lack of literature regarding mothers’ knowledge about injury among preschool children. Therefore the aim of this study was to assess the knowledge of mothers regarding common injuries, their prevention and emergency management among preschool children. This would help to frame interventional strategies targeted toward curtailing the risk of injuries among preschool children and improving its emergency management by mothers.

Methods

We conducted a cross sectional study at the Community Health Clinics (CHC) at the Aga Khan University Hospital Karachi, Pakistan. The Aga Khan University is a not-for-profit, private institution in Pakistan.

Sample size calculation:
We required a sample size of 302 participants to achieve our study objective. The following assumptions were used to calculate it; prevalence of 50% was used to achieve maximum variance due to lack of studies of the same from Pakistan, at 95% confidence interval and 7% bound on error of estimation. The sample size was also inflated by 10% for the non-responders resulting in a total of 320 study participants.

Data collection:
The study participants were recruited from the waiting area of CHC clinics during September to November 2019. CHC clinics were chosen as these clinics offer immunization and circumcision services and a large number of parents visit these clinics and hence easy recruitment of study participants is possible from here. Secondly, people from diverse socio economic backgrounds avail services from CHC so as to ensure representation of various socio economic strata in our sample. Those mothers who had one or more children of age 3-5 years were invited to participate in the study. However, those mothers who had acute problems like chest pain, acute abdominal pain etc. at the time of data collection were excluded.

The study sample was drawn in a convenience manner from CHC during the study period.

Development of Questionnaire:
The questionnaire was initially developed in English language and then translated to Urdu for the convenience of the study participants and it took about 20-40 minutes to complete the questionnaire. The questionnaire was formulated after thorough literature search and was comprised of two sections. Section A, dealt with the descriptive characteristics of the study participants. The

subsequent section consisted of various categories of injuries such as burns, poisoning, foreign body aspiration etc.; different strategies were listed for these categories and the respondents were asked in a multiple response manner to pick the strategies which need to be used in order to avoid that particular type of injury. The data collectors hired were specifically trained for the task to identify eligible participants and for administering the questionnaire.

Ethical consideration:
Written informed consent was obtained from all the study participants after explaining to them the research protocol. The data was collected by ensuring strict confidentiality to the participants and they were interviewed in an environment where their privacy was ensured. The study was reviewed and approved by the Ethical Review Committee .

Statistical Analysis:
The data was double entered on epi data version 3.1 and analysis was performed on Statistical Package for Social Sciences (SPSS) version 19. Baseline information on demographics was analyzed using descriptive statistics and proportions were calculated for categorical variables such as age, occupation and education of mother, number of children etc. The outcome was to identify the common strategies used by mothers to avoid unintentional injuries among preschool children. Multiple responses were obtained for each category of interventions and percentages were reported for them.

Results

A total of 320 mothers were recruited in the study. Out of these 18 (6%) were non responder and information of 302 participants was included in the final analysis The socio-demographic characteristic of our study population is given in Table 1. Out of the total 302 participants, around half (49%) were between 21-30 years of age; followed by participants (34.8%) aged 31 to 40 years. On inquiring about educational status, the majority of the mothers had completed their high school education (44%) and about one quarter of the participants were graduate and above. Only a small number of participants did not have any formal education (6.6%). On questioning about family system, the majority of the mothers were living in an extended family system (70.2%). Regarding number of children nearly half of the mothers (48%) had 1 to 2 children, closely followed by 44% of mothers who had 2 to 3 children. Furthermore, almost 53.6 % of the mothers had less than 2 children of 5 years and less. It was interesting to note that more than half (54.3) of the study mothers (participants) were employed (private and government) and less than half 45.7% of the participants were housewives.

Graph 1 depicts mothers' perception of the most common injury among pre-school children less than 0 years. About 19% of the mothers responded that falls are the most common injury followed by cuts, lacerations (15%) and poisoning (15%). While 10% of the mothers believed that electrocution can be the most common cause of injury among pre-school children.

Table 2 presents the knowledge of mothers of pre-school children to avoid unintentional injuries. To avoid cuts and lacerations 76% of the mothers believed that sharp objects should be kept out of the reach of children and 20% assumed that using unbreakable utensils can solve the problem. To prevent falls about 64.2% of the mothers responded that children should not be left unattended on roof tops and stairs to avoid falls and 37% said that children should not be left alone on high chair or bed. In order to prevent burn injury the majority of the mothers (67.9%) were of the opinion that children should not be left alone in the bathroom and kitchen while 63.9% of them stated to switch off the electrical appliance when they were not in use while only half 45% and 47% said that the stove should be kept in a high place and hot fluids should be out of reach of children. As far as injuries from drowning is concerned mothers (81.8%) responded to supervise children closely when they were near any source of water and advised to teach them swimming by a professional swimmer (46.4%). On asking about prevention from poisonous substances the majority of the mothers (74.2%) responded that all poisonous substances should be at a height which is out of child reach in a locker (47.7%). When asked about prevention of motor injury nearly all (98%) of the participants emphasize on the fact that children should not be left unattended when playing outside the house. Moreover, 43% of mothers believed that children should be taught not to run after balls and kites on the road.

To prevent children from electrical injuries 91.4% of the mothers stated that children should not be allowed to play with electrical appliances and 73% said that open wires should not be used followed by the opinion that the electrical sockets not in use should be covered (69.2%). When asked about prevention from animal bite approximately 94% of the mothers thought that children should be taught to avoid stray animals, 87% said children should be taught to avoid abusing animals (84%) followed by 72% of mothers who think children should not be allowed to sit on uncovered grass. When asked about the prevention of foreign body aspiration among preschoolers the majority of the mothers replied; that children should not be allowed to play with small objects (coin, button) etc. (78.1%) and do not permit them to play with toys with small parts (46%). Moreover, remove all small objects from the floor before a child picks them up (88%).

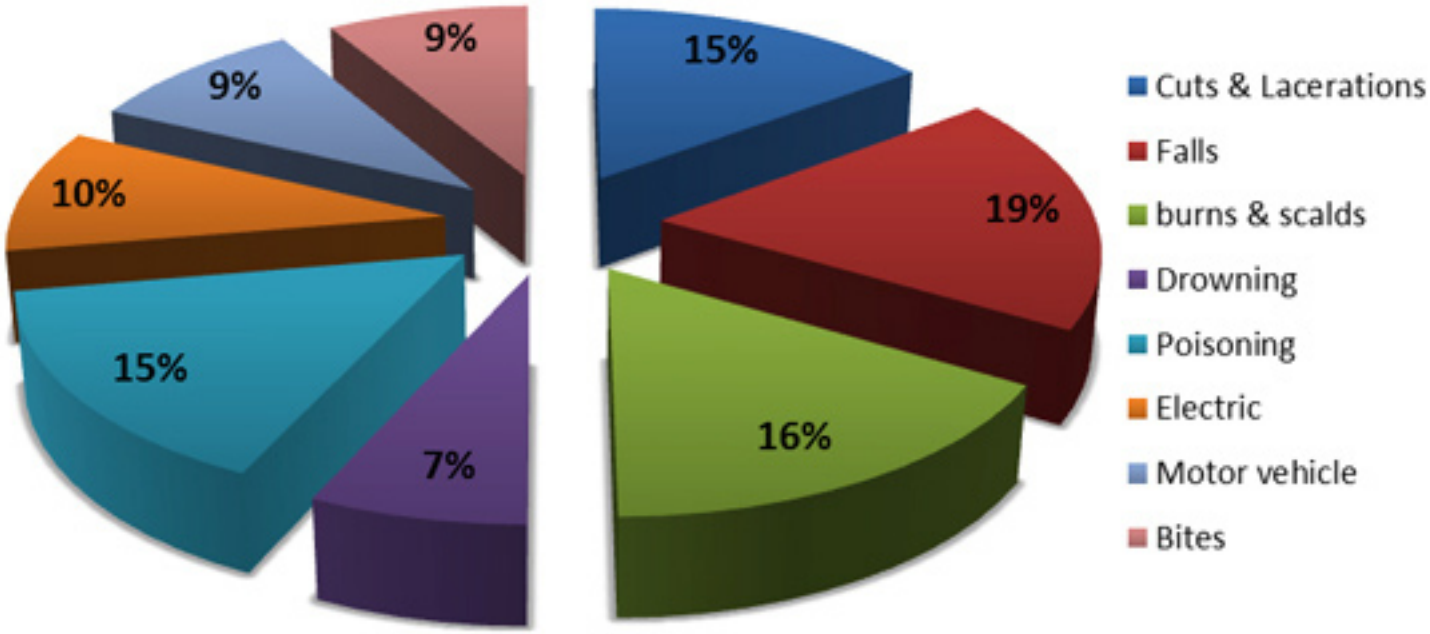
Table 1: Sociodemographic Characteristics of the study participants

Socio-demographic Characteristics of Study Participants		
Characteristics	**Number (n)**	**Percentage (%)**
Age of mother		
<20 years	37	12.3
21-30 years	149	49.3
31-40 years	105	34.8
41-50 years	11	3.6
Literacy Status		
Literate but no schooling	20	6.6
Primary Education	31	10.3
Secondary Education	45	14.9
High School	133	44
Graduate & above	73	24.2
Type of Family		
Nuclear	90	29.8
Extended	212	70.2
Number of Children		
1-2 Children	145	48
2-3 Children	135	44.7
> 3 Children	22	7.3
Number of children < 5 years		
less than 2 children	162	53.6
More than 2 children	140	46.4
Occupation of Mother		
Government Employee	34	11.3
Private employee	130	43
House wife	138	45.7

Table 2: Preventive strategies adopted by Mothers for child safety

Statements	Number	Percentage
Cuts and lacerations		
Supervise the child by not touching sharp objects	145	48.0
Sharp objects out of children's reach	230	76.2
Use non-breakable utensils	61	20.2
Avoiding Falls		
Never leave child unattended on high chair/bed	112	37.1
Not allow child to climb stairs/roof unatteneded	194	64.2
Burns		
Keep stove at a high place in kitchen	136	45.0
Keep hot fluids/food out of child reach	144	47.6
Siwtch off iron/heaters when not in use	193	63.9
Check temperature of child bath water	34	11.3
Never leave child unattended in kitchen or bathroom	204	67.5
Drowning		
Keep bathroom doors closed when not in use	89	29.4
Supervise children closely when near any source of water	247	81.8
Teach children swimming under adult/professional swimmer	140	46.4
Poisoning		
Never store toxic substances in food containers	122	40.4
Never remove labels from toxic substances	77	25.4
Keep all toxic substances at a height out of child reach	224	74.2
Keep all toxic substances in lock	144	47.7
Motor Injury		
Don't allow child to play behind parked cars	60	19.9
Teach child not to run after ball/kites etc	130	43.0
Supervise the children when playing outside home	296	98.0
Electric Hazards		
Electrical switches, wires, fuse, gas outlets out of children reach	132	43.7
Cover electrical sockets not in use	209	69.2
Avoid use of open wires	223	73.8
Teach electrical safety to children	161	53.3
Electrical wires hidden and out of reach of children	199	65.9
Don't allow child to play with electrical appliances	276	91.4
Bites from animals/insects		
Teaching the child to avoid abusing animals	263	87.1
Do not allow child to sit on uncovered grass	218	72.2
Applying insect repellent when exposure is anticipated	77	25.5
Teach the child to avoid stray animals	285	94.4
Foreign Body Aspiration		
Prevent the child playing with small objects (coin, button)	236	78.1
Do not permit child to play with damaged balloons	116	38.4
Remove all small objects from floor before child picks them up	267	88.4
Toys should be inspected for small removable parts	139	46

Graph 1: Mothers' perception of the most common injury among pre-school children less than 0 years



Discussion

This was a cross sectional study in which we tried to explore how well our mothers know about the risk factors of injuries in children and what measures do they think can prevent child injury.

Most of the mothers who participated in this study were between age group 21-30 years highly educated and were living in a joint family system. There were four common types of home injury i.e., falls, burn injury followed by wounds by sharp objects and foreign body aspiration poison etc. This pattern of injuries was similar to that reported by CDC.(1)

Regarding type of injuries, the majority were of the opinion that falls were the most common type of injury followed by burns among children of preschool age groups. These results are similar to studies done by Rezapur-Shahkolai F et al (15) and Zia N et al (12) emphasizing that children need to be kept in a safe environment to prevent falls.
When inquired about mothers attitude about safety measures on injury prevention, 76% of the mothers were of the correct belief on how to prevent sharps related injuries in their young ones. These results were similar to those presented by Black from New York which found that 74% of mothers knew how to protect their children from cuts/ lacerations/ sharps related injuries (17). To prevent falls, about 64.2% of the mothers responded that children should not be left unattended on roof tops and stairs to avoid falls and 37% said that children should not be left alone on a high chair or bed. In order to prevent burn injury the majority of the mothers (67.9%) were of the opinion that children should not be left alone in bathroom and kitchen. Other precautions against burn injuries reported by mothers were switching off the electrical appliance when they were not in use in 63.9%.

Approximately half of the mothers, around 45%, said that the stove should be kept at high place and hot fluids should be out of reach of children. This contrasts with the results reported by Carlsson A which showed that about 70% of the mothers were of the belief that warm fluids/water should not be kept within a child's reach 18. As far as injuries from drowning is concerned mothers (81.8%) responded to supervise children closely when they were near any source of water. Similar results have been reported by Silva etal from Brazil (19) and advised to teach them swimming by a professional swimmer (46.4%) (19). In our study only 40% of the mothers were of the view that toxic substances should not be kept in food containers. Bilgen Sivri et al from Turkey reported better preventive knowledge i.e 89.8% on keeping poisonous/ toxic substances in their original containers rather than putting them in food containers (20). Educating parents, especially mothers, regarding proper storage of poisonous substances, use of childproof containers, putting warning labels on containers of toxic/poisonous substances might significantly decrease the number of poisonings in children.

Motor vehicle related injuries account for 1.3 million deaths worldwide (21). Young people especially children are the vulnerable group (21). Mortality related to motor vehicle related injuries among children is three times higher in low income countries as compared to high-income countries (22). Since Pakistan is a low income country it becomes more relevant for us.

When asked about prevention from motor injury nearly all (98%) of the participants emphasize on the fact that children should not be left unattended when playing outside the house. Moreover, 43% of mothers believed that children should be taught not to run after balls and kites on the road.

Children are more vulnerable to motor vehicle injuries because they have small stature which makes it difficult for children to see and assess surrounding traffic and in addition to it drivers also cannot see them. Children may also find it difficult to interpret the various visual and aural stimuli, which may impair their judgement regarding the speed and proximity of moving vehicles. Therefore the responsibility of their safety lies mainly on their parents and according to our societal norms, on mothers. Hence education of mothers regarding safety measures becomes important.

To prevent children from electrical burns 91.4% of the mothers stated that children should not be allowed to play with electrical appliances and 73% said that open wires should not be used followed by the opinion that the electrical sockets not in use should be covered (69.2%). Carlsson A conducted a similar study in Sweden and found that 60% of the mothers believed that cords of electrical appliances and heating devices should be kept out of reach of children (18). According to the World Health Organization, animal bites account for significant morbidity and mortality all around the world with the highest risk among children (23). Animal bites especially secondary to snakes, dogs and cat bites can easily be prevented. When asked about prevention from animal bite la arge number of mothers correctly identified the preventive measures. Approximately 94% of the mothers thought that children should be taught to avoid stray animals, 87% said children should be taught to avoid abusing animals (84%) followed by 72% of mothers who think children should not be allowed to sit on uncovered grass.

More than half of the mothers in our study were unaware of the fact that children, when given toys with small fragments can increase their chances of foreign body aspirations. These results are similar to those reported by Ozdogan S et al (24). Around two-third of the mothers identified that playing with small objects such as coins and batteries increases the risk of foreign body aspiration This emphasizes the need of educating parents especially mothers with children younger than 12 months about the risk factors of foreign body aspiration.

In our study we observed an overall low level of awareness regarding preventive strategies. Therefore it becomes essential to improve mothers' awareness of child safety measures and make them fully aware of the consequences of the problem as well as the morbidity and mortality associated with it. One of the strategies that WHO and UNICEF have recommended to improve child safety at home is that home visits should be made in the first week of a baby's life (25). Several studies have proven that educational home visits encourage parents to take measures against potential risk factors thus reducing the risk of injuries in the home (26, 28). Social networks are also important in raising awareness and adherence to child safety advice. Unintentional home injury may result in temporary or permanent disability and requires medical attention and continuous care in millions of children. The findings suggest that timely childhood injury-related risk messages should be delivered during pregnancy and in line with developmental milestones of the child, through a range of sources including social networks, mass media, face-to-face advice from health professionals and other suitably trained mothers.

Conclusion

Home-related injuries may lead to many health problems and their prediction and prevention are necessary to prevent major health hazards. Enhancement of mothers' knowledge through awareness sessions and through media can be helpful to improve child injury prevention.

Strengths and Limitations:
Since the objective of the study was to assess the awareness of mothers related to preventive measures against different modes of childhood injuries therefore no association /comparisons with other groups could be made. The strength of this study is that limited data on this topic is available from Pakistan therefore its results can be used as a baseline to devise interventions to improve parents', especially mothers' knowledge on child safety measures.

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Becker nevi among patients in Aden, Yemen

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Abstract

Background: Becker nevus typically presents as a hyperpigmented patch with irregular borders that gradually enlarges for a few years and then remains stable.

Objective: The objective of the study is to determine the occurrence of Becker nevus among Yemeni patients and to define its clinical characteristics.

Materials and method: This was a retrospective study of all patients with Becker nevus seen at two private clinics in Aden over a two years period, from January 2017 to December 2018.

Results: During the study period, 84 patients were diagnosed with Becker nevus in our private clinic. The female to male ratio was 2:1 (F= 66.7% vs. M= 33.3%). The mean age was 17.7 years (standard deviation = 3.9) (range: 10–25 years).

Most of the patients were from urban areas (92.9%). The most commonly involved site was the shoulder (32.1%), followed by chest (16.7%), arm (11.9%) and back (11.9%). Hypertrichosis was found in 32.1% of patients. Breast hypoplasia was noted in 2 patients (2.4%).

We concluded that Becker nevus is a common condition among Yemeni patients in our series of 84 patients. Females were more commonly affected. The most common sites of involvement were the shoulders and chest. About a third of patients had associated hypertrichosis whereas breast hypoplasia was less frequent.

Key words: Occurrence, Becker nevus, clinical characteristics

Introduction

Becker nevus (BN), also called Becker melanosis and Becker pigmentary hamartoma, was first described in 1949 by William Becker, who reported the presence of unilateral hyperchromic skin lesions with hair in two young male patients [1]. It typically presents as a hyperpigmented patch with irregular borders that gradually enlarges for few years and then remains stable [1].

Becker nevus commonly manifests in the peri-pubertal age as a unilateral, solitary, acquired localized hyperpigmented patch composed of coalescing brownish macules. Hyperpigmentation usually increases for the first 2-3 years while hypertrichosis can appear after the pigmentation. However, the non-hypertrichotic variant is more common. “Progressive cribriform and zosteriform hyperpigmentation” may represent the non-hypertrichotic variant of Becker nevus. Although typically a unilateral condition, a few documented cases have been reported with multiple symmetrical and multiple unilateral Becker nevi [2,3,4].

Onset of Becker nevi is usually around puberty, with a prevalence of 0.25% to 0.5% in adolescent boys and young men [5,6,7]. The condition is rarely congenital, and the male-to-female ratio is approximately 5 to 1 [5,8].

Becker nevi occur in all races but are more common in nonwhites than whites [6]. The majority of cases are sporadic, but familial cases have also been reported [9,10].

We have not found in the published articles evidence of studies conducted in Yemen on this health problem. The aim of this study is to determine the occurrence of Becker nevus among Yemeni patients and to define its clinical characteristics.

Materials and Method

A retrospective study was done of all patients who suffer from Becker nevus and who were seen in our private clinic in Al-Mansoura, Aden over a two-years-period, from January 2017 to December 2018. The patients’ files were reviewed to obtain information about sex, age, residency, location of nevus, size of nevus, hypertrichosis and associated features.

The data was entered into a computer and analyzed using SPSS version 17, statistical package. For variables difference, chi-square tests, and P values were calculated

Results

During the study period, 84 patients were diagnosed with Becker nevus skin disease in our private clinic. They were 56 females (66.7%) and 28 males (33.3%) with a female to male ratio 2:1 (Table 1).

The 84 patients had a mean age of 17.7 (standard deviation = 3.9) (range: 10–25 years). The mean age of male patients was 18.8 ± 3.7 years (range: 12 – 25 years) and the mean age of female patients was 17.2 ± 3.9 years (range 10 – 25 years).

There was no statistical relation between mean values ($p > 0.05$). Most of the patients (n= 78; 92.9%) were from urban areas.

The most commonly involved site was the shoulder (n= 27; 32.1%), followed by chest (n=14; 16.7%), arm and back at equal involvement (n=10; 11.9%), abdomen and scapula at equal involvement (n=6; 7.1%), thigh (n= 5; 6.0%), face (n=4; 4.8%), and shoulder with scapula (n=2; 2.4%) (Table 2). Hypertrichosis was found in only 27 cases (32.1%) distributed as follows: 17 (20.2%) in males and 10 (11.9%) in females. Ipsilateral breast hypoplasia was noted in 2 cases (2.4%). Nevus size ranged between 6 to 40 cm and mean size was 14.7 ± SD 6.4 cm.

Discussion

In the present study 84 patients diagnosed with Becker nevus were identified with a female to male ratio 2:1. Literature search showed variations in the incidence between females and males. Some studies have reported that males are 4-6 times more commonly affected [11,12,13].

On the contrary, a published study by Danarti et al [14] reported that it is more common in females (F : M ratio = 1.5:1).

The variations can be explained by absence of hypertrichosis and easily noticeable breast hypoplasia in females [14,15,16].

In the current study the 84 patients had a mean age of 17.7 ± 3.9 years (range: 10–25 years). The mean age of male patients was 18.8 ± 3.7 years (range: 12 – 25 years) and the mean age of female patients was 17.2 ± 3.9 years (range 10 – 25 years). There was no statistical relation between mean values ($p > 0.05$).

Rasi et al [17] reported in their study that the 47 Becker nevus patients had a mean age of 17.1 years (range: 12–42 years). The mean age of male patients was 17 years (range: 12–42 years) and the mean age of female patients was 22.85 years (range: 15–29 years). Our results were consistent with these results.

Table 1: Demographic characteristics of the study patients (n=84)

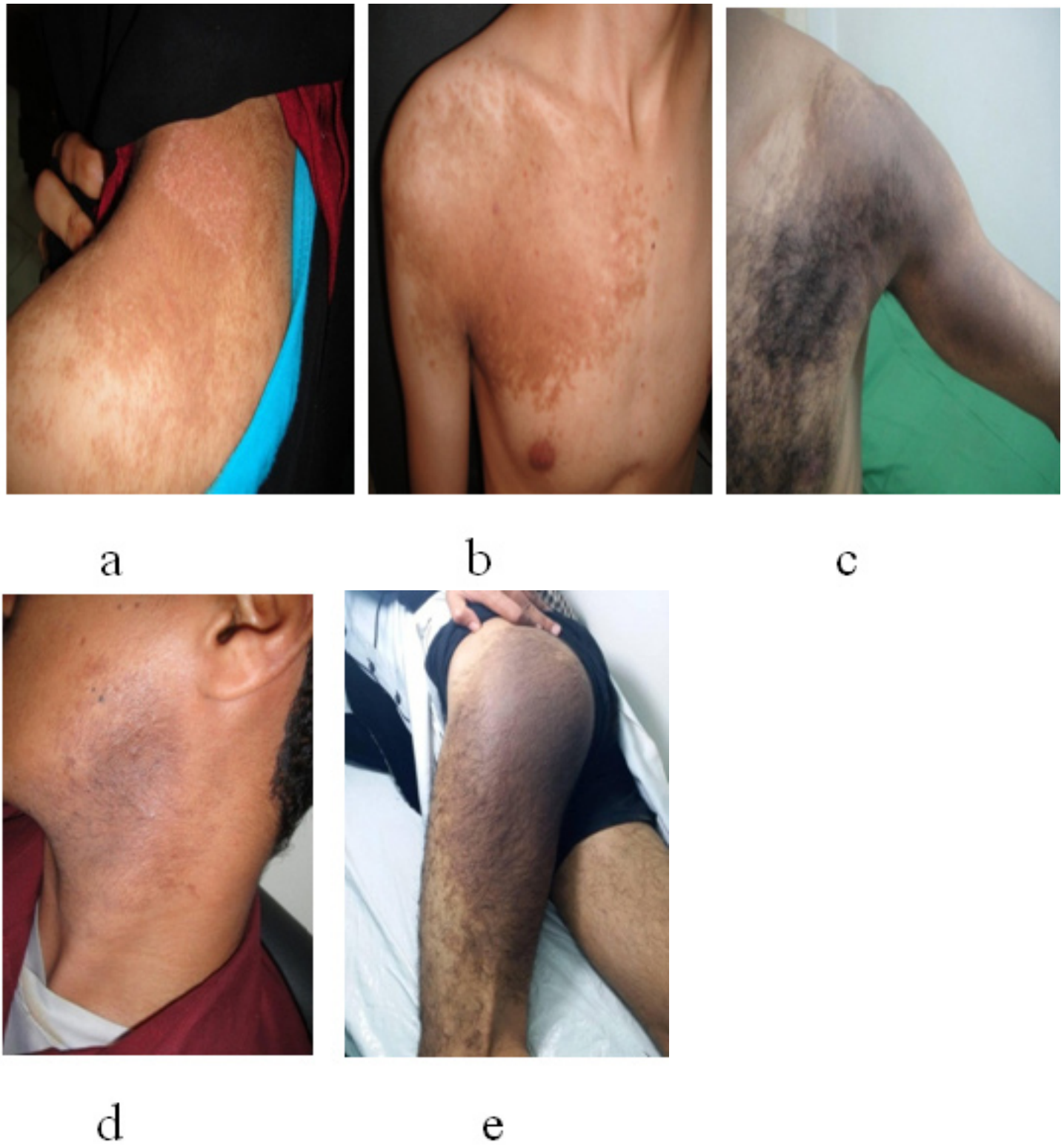
Variables	Ratio	Means ± SD	No	%
Sex:				
Females			56	66.7
Males			28	33.3
Ratio female : male	2 : 1			
Age group (years):			30	35.7
10 – 15			34	40.5
16 – 20			20	23.8
21 – 25				
Age range (years):				
Total mean age ±SD		17.7 ± 3.9		
Male mean age ±SD		18.8 ± 3.7		
Age range (years)		12 – 25		
Female mean age ±SD		17.2 ± 3.9		
Age range (years)		10 - 25		
P-value		> 0.05		
Residency:				
Urban			78	92.9
Rural			6	7.1

SD = Standard Deviation

Table 2: Distribution of affected body site by BN among the study patients

Localization	No	%
Body site:		
Shoulder	27	32.1
Chest	14	16.7
Arm	10	11.9
Back	10	11.9
Abdomen	6	7.1
Scapula	6	7.1
Thigh	5	6.0
Face	4	4.8
Shoulder & scapula	2	2.4
Hypertrichosis:		
Exist:		
Males	17	20.2
Females	10	11.9
Not Exist:	57	67.9
Associated features:		
Left breast hypoplasia	1	1.2
Right breast hypoplasia	1	1.2
No	82	97.6
Nevus size (cm):		
Range	6 – 40 cm	
Mean ± standard deviation	14.7 ± 6.4 cm	

Figure 1: Some Becker nevi with their localization:
a) Scapula classic site of Becker nevus in young female
b) Right side of chest extending to shoulder
c) Left arm extending to chest with hypertrichosis
d) Lower face extending to neck
e) Buttock with left thigh associated with hypertrichosis



In our study result (n= 78; 92.9%) were from urban areas. We do not expect the incidence to be lower in rural areas but we assume that most patients were from urban sites because the healthcare service is more accessible and the data was only from two private clinics

In the present study we found the most commonly involved site was the shoulder (32.1%), followed by chest (16.7%), arm (11.9%) & back (11.9%), abdomen and scapula each one with (7.1%), thigh (6 .0%), face (4.8%), and shoulder with scapula (2.4%).

Kumar et al [18] reported in their study that the usual site of Becker nevi is described as shoulder, anterior chest, or scapular region; it can occur over unusual sites such as face, neck, abdomen, and thighs. Reports of it occurring over legs are very few. Kumar et al [18] added Becker's nevi presents as a unilateral irregular area of hyperpigmentation with geographic contour which usually occurs over shoulder and anterior chest.

There are various reports of Becker's nevus occurring over atypical sites such as face, neck, and limbs [18].

In a case series, Becker nevus was reported to occur at various atypical sites such as flank, pubic area, right arm, upper leg [19]. Becker nevus rarely occurs in the lower limb. In a Jordanian survey done among males, they reported a prevalence of 6.5% of which only 1.1% of males showed localization of Becker's nevus over legs [20]. Manoj et al [21] reported a male patient with Becker's nevus occurring over knee joint. Turan et al [22] reported it occurring on ankle in a male patient.

In the current study we observed hypertrichosis was found in only 27(32.1%) of the 84 patients. The hypertrichosis typically develops after the hyperpigmentation and the hairs become progressively coarse with time. Some recent studies have suggested that hypertrichosis may not be associated with a majority of the cases of BM [5,12,23,24].

Tawran et al [20] reported in their study in Jordan that significant hypertrichosis was observed in 284 patients (75.4%), which is a high incidence compared to our study.

Hypertrichosis with terminal hairs was observed on the BN of 70% of young Italian men [25] and in 56% of young French males [26] but only in 23.1% of Brazilian teenager males [6]. In a very recent study of BN in children, hypertrichosis was seen in 31.3% of 118 patients; the majority of patients with hairless BN were younger than 10 and more than 50% had mild hypertrichosis which was located only on the center of the lesions [27].

Also we found 1(1.2%) as left breast hypoplasia and 1(1.2%) of right breast hypoplasia. Previous studies reported that hypoplasia may involve the entire breast or only the nipple and areola. In female patients, this is the most frequently reported anomaly to be associated with Becker nevus [28,29]. Rasi et al [17] mentioned that in their study they found only 2 (2.4%) female patients had ipsilateral breast hypoplasia.

Conclusion

It was difficult to obtain published studies on Becker nevi from Yemen. Therefore, this study can be considered as the first work which reported on this health problem in Yemen. Most of the patients were from urban areas (92.9%) and the most commonly involved site was the shoulder (32.1%), followed by chest (16.7%), arm (11.9%) & back (11.9%). Hypertrichosis was found in (32.1%) of the patients. Further studies on the incidence, prevalence and treatment procedures for Becker nevi are needed.

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Novel COVID-19 Pandemic: A Cross-Sectional Survey among Global Health Care Providers

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Abstract

Background: Covid-19, a highly infectious disease was first reported in Wuhan, China on 31 December, 2019. It was declared a pandemic by World Health Organization on 11 March, 2020 when 118,326 cases were reported globally.

The present study was designed to determine the knowledge, practices, availability of personal protective equipment to health care providers and hindrance to delivering health care facilities during the COVID-19 pandemic.

Methods: A descriptive cross sectional study was conducted with 217 health care workers serving in different hospitals/departments across the globe. Sample size was calculated by using Open EPI software and data was analysed by using SPSS version 22.0.

Results: Knowledge of many 152(73.4%) participants regarding guidelines for isolation of suspected cases and recommendations for wearing a mask in a community setting was not satisfactory. About 51(24.63%) did not receive any personal protective equipment. Inadequate provision of personal protective equipment was reported by 78(37.7%) participants as the most common factor that might impede their willingness to work during the COVID-19 pandemic. About half, 98(47.3%) of the participants admitted that they are not well prepared/trained in handling COVID-19 cases. PCR was correctly reported as diagnostic test for SARS CoV-2 by 136(65.7%) respondents.

Conclusions: Our study recorded lack of knowledge about newly emerged COVID-19 pandemic among health care workers. Shortage of ventilators, testing kits and personal protective equipment was noted in many hospitals and departments. Lack of personal protective equipment and insufficient training in infection control management may act as barriers in delivering health care during COVID-19.

Key words: COVID-19, Healthcare personnel, practice, knowledge, barriers, pandemic, global.

Introduction

Corona virus infectious disease is caused by severe acute respiratory syndrome corona virus type-2 (SARS CoV-2), which belongs to the family coronaviridae [1-3]. The disease was first reported in Wuhan, Hubei province of China in December 2019 which then spread rapidly throughout the country in merely 30 days [4, 5].

It is a highly infectious disease with an incubation period ranging from 2-14 days [6]. It is estimated that the number of individuals infected with the virus doubles every 6-7 days [7].

It is suspected that bats serve as the main animal reservoir of SARS CoV-2 [8]. Old age, male gender, and underlying co-morbidities such as hypertension, diabetes mellitus, chronic obstructive pulmonary diseases, liver diseases and renal diseases serve as important risk factors [3].

Patients infected with SARS CoV-2 commonly present with fever, cough, myalgia, fatigue and shortness of breath. Anorexia, sore throat, sputum production, headache, diarrhoea and haemoptysis are reported as less commonly occurring symptoms [9]. Frequent hand washing with soap and water, use of alcohol based sanitizers, avoiding public gatherings and maintaining good respiratory hygiene are some important preventive measures. People with respiratory symptoms (coughing sneezing shortness of breath) and travel history should wear a mask also [10-11].

Adequate supply of ventilators and testing kits is required for the diagnosis and treatment of the patients. However, hospitals around the world are already reporting shortage of personal protective equipment and ventilators [12]. Lack of provision of protective gear will cause deteriorating effects on our health care providers who are playing an important role in prevention and management of COVID-19 pandemic. Up to date knowledge regarding the disease, adequate provision of personal protective equipment and sufficient training in infection control management thus serve as an important factor in identifying the cases and treating them. Hence, the present study was aimed to determine the knowledge and practices of health care workers, availability of personal protective equipment and hindrance to delivering health care during the COVID-19 pandemic.

Materials and Methods

A descriptive cross sectional study was conducted during March, 2020 with a total of 217 health care workers working across the globe. Ethical approval was obtained from the institutional review board of Jinnah Sindh Medical University (JSMU/IRB/2020/-359) and informed consent was acquired before data collection. All the consenting doctors, house officers, residents, physicians, surgeons, paramedics, nurses, medical students, pathologists, virologists, and laboratory technicians practicing across the globe were included in our study. Dentists, physiotherapists, psychologists and those who were not practicing medicine were excluded. Data was collected through a self-administered online questionnaire designed by using software online google forms [13] as it was difficult to approach all health care providers physically due to lockdown. Participants were selected by using non-probability convenient sampling technique. The questionnaire was prepared after extensive literature review from Google Scholar and consisted of three parts. The first section included socio-demographic data, location and workplace information. The second segment enquired about the knowledge and practices of the participants regarding coronavirus infection and the third section investigated the experience of health care workers related to patient exposure and protective equipment. Doctors, nurses, paramedics, laboratory personnel, general physicians, surgeons, consultants and technicians were invited to participate in a survey via posting an online questionnaire on different social media platforms including Facebook, email and Whatsapp. Sample size was obtained by using Open EPI software (www.openepi.com/Menu/OE_Menu.htm). Keeping confidence interval of 95% (Z score=1.96) 83% [14] as prevalence from previous study and 5% allowable error of known prevalence, sample size obtained was n=217

Data was analysed by using SPSS version 22.0. Descriptive statistics were used to determine mean and standard deviation for numerical variables. Categorical variables were expressed in frequency and percentages.

Results

A total of 217 health care workers working across the globe were included in the current study. More than one-half of the participants were females. The age range was 20-30 years. Mean age with standard deviation was 2.48±0.78. More than half of the participants belonged to different provinces of Pakistan. About 137 (63.1%) participants were Doctors, house officers and residents practicing in government hospitals 155 (71.4%) for 1-5 years. (Table 1)

Only 74 (34.1%) correctly identified the name of virus causing COVID-19 whereas bat was reported as animal reservoir of the SARS CoV-2 by most 167 (76.9%) of the respondents. Fever, cough, dyspnoea and myalgia were reported as the most common symptoms by 108 (49.7%) participants. Knowledge of most 162(74.6%) of the respondents regarding patient isolation and recommendations for wearing surgical mask was not satisfactory according to WHO guidelines (Table 2).

Gloves and surgical masks were reported as the most common protective equipment supplied to health care providers (Figure 1). Visitors' restriction in hospitals was the most common infection control measure taken in 46(22.2%) hospitals. More than half 131(60.3%) of the participants reported that their hospital/department is not well prepared for the COVID-19 pandemic and inadequate provision of personal protective equipment might impede their willingness to serve during the pandemic (Table 3).

Table 1: Distribution of socio-demographic data and workplace information:

Variables:			N (%):	Mean ± STD deviation:
City/country/state/country:	National:	Pakistan:	29(14)	
	Provincial:	Sindh:	53(25.6)	
		Punjab:	95(43.7))	
		Khyber Pakhtunkhwa::	18(8.7)	
		Baluchistan:	3(1.4)	
		Azad Jammu and Kashmir:	3(1.4)	
	Global::	United states of America	2(0.9)	
		United Kingdom	3(1.44)	
		Hong Kong:	1(0.48)	
		Algeria:	1(0.48)	
		Saudi Arabia:	3(1.44)	
		India:	2(0.9)	
		Malaysia:	1(0.48)	
		Dubai	1(0.48)	
		Srilanka:	1(0.48)	
		Bangladesh	1(0.48)	
Gender:	Male:		96(46.4)	
	Female:		121(58.4)	
Age in Years:	<20		2(1.0)	(2.48±0.78)
	20-30		144(66.3)	
	31-40		44(21.3)	
	41-50		23(11.1)	
	>50		4(1.9)	
Profession/ Health care work category:	Doctor/house officer/resident:		137(63.1)	
	General physician/surgeon/consultant:		33(15.9)	
	Pathologist/virologist/laboratory director/:		5(2.4)	
	Nurse:		12(5.8)	
	Paramedic:		11(5.3)	
	Laboratory personnel/technologist:		6(2.9)	
	Medical student:		5(2.4)	
	Other:		8(3.9)	
Workplace:	Government hospital/public sector hospital:		155(71.4)	
	Private hospital/tertiary care unit:		30(14.5)	
	University hospital/laboratory:		10(4.8)	
	Private hospital (small scale)		7(3.4)	
	Temporary build isolation centre/field hospital:		4(1.9)	
	Private clinic:		7(3.4)	
	Paediatric unit:		3(1.4)	
	Diagnostic lab:		1(0.5)	
Professional experience in years:	<1		47(22.7)	
	1-5		100(46.0)	
	>5		70(33.8)	

Table 1: Distribution of socio-demographic data and workplace information: (continued)

Approximate number of suspected corona virus infected cases brought to your setup on daily basis:	>100	6(2.9)	
	76-100	3(1.4)	
	51-75	5(2.4)	
	26-50	17(8.2)	
	1-25	186(85.7)	
Facility of ventilator at hospital:		142(65.4)	
Number of patients currently on a ventilator due to coronavirus infection at your workplace?	>10	10(4.8)	
	6-10	7(3.4)	
	1-5	24(11.6)	
	None	126(58.0)	
	Not applicable	50(24.2)	

Figure 1: Basic personal protective equipment supplied to the participants by department or hospital N (%)

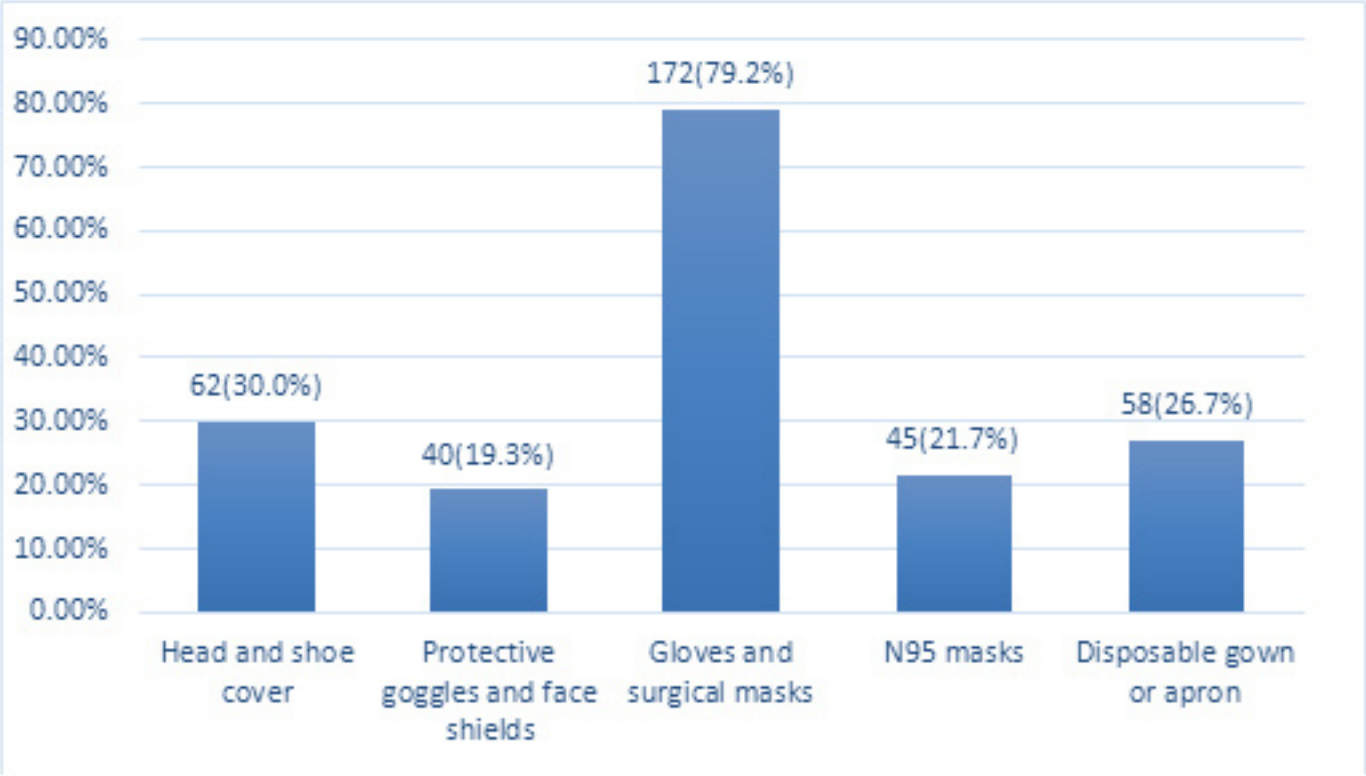

Table 2 Knowledge of participants related to COVID-19:

Variables:		N (%)
All suspected cases can be placed together in the same ward when single well-ventilated rooms are not available	Strongly agree	4(1.9)
	Agree	51(24.6)
	Disagree	162(74.6)
Wearing a surgical mask is not mandatory in community settings if one does not have respiratory symptoms	Strongly agree	13(6.3)
	Agree	51(24.6)
	Disagree	153(70.5)
Screening of airline passengers on exit from an affected area and upon arrival can miss 50% cases of COVID-19	Strongly agree	68(32.9)
	Agree	128(58.9)
	Disagree	20(9.7)
Main reservoir of COVID-19 causing virus	Camels	7(3.4)
	Bats	167(76.9)
	Sheep	2(1.0)
	All of them	25(12.1)
	None of them	16(7.7)
Incubation period of SARS CoV-2	1-5 days	6(2.9)
	1-14 days	130(59.9)
	2-21 days	79(38.2)
Mode of transmission of SARS CoV-2	Aerosol droplets	16(7.7)
	Person to person contact	9(4.3)
	Air borne transmission	8(3.9)
	Both aerosol and person to person transmission	83(38.2)
	All of them	101(48.79)
Infection by coronavirus provide lifelong immunity	Yes	39(18.8)
	No	65(31.4)
	Don't know	113(52.0)
Source of knowledge about novel COVID-19	Internet, colleagues, social media	13(6.3)
	Internet websites	49(23.7)
	Colleagues/co-workers	6(2.9)
	Medical journal	27(13.0)
	Textbooks	1(0.5)
	News media	7(3.4)
	Social media	17(8.2)
	Laboratory literature	2(1.0)
	All of them	95(43.7)
Common symptoms of COVID-19	Fever, cough, dyspnoea, myalgia	108(49.7)
	Fever, cough, dyspnoea, sore throat	95(45.9)
	Fever, cough, dyspnoea, sputum production	14(6.8)

The history of contact received from confirmed COVID-19 patients by our respondents showed traveling history in 128 (58.9%), followed by gatherings, handshake and close person to person contact. PCR was reported as the most common test used for diagnosis of COVID-19 by 146 (67.2%) participants whereas about one quarter 53(25.6%) of the respondents reported referring patients to other hospitals due to unavailability of testing kits (Table 3).

Table 3: Experience of health care providers related to patient exposure and protective equipment

Variables:		N (%)
Factors that might impede willingness to work during COVID-19 pandemic	Prioritizing wellbeing of family members	35(16.9)
	Inadequate provision of personal protective equipment	88(40.5)
	Insufficient training in infection control management	12(5.8)
	Fear of contacting virus and infection	11(5.3)
	All of the above	61(29.5)
	None of them	10(4.8)
Department/hospital well prepared to diagnose/treat patients	Yes	69(33.3)
	No	131(60.3)
	Not applicable	17(8.2)
I understand the risk of pandemic novel COVID-19 for patients and healthcare workers.	Strongly agree	155(71.4)
	Agree	60(29.0)
	Disagree	2(1.0)
I know how to protect myself and my patients during a novel COVID-19 pandemic	Strongly agree	67(32.4)
	Agree	126(58.0)
	Disagree	24(11.6)
I am well prepared/trained in handling novel COVID-19 cases.	Strongly agree	22(10.6)
	Agree	87(42.0)
	Disagree	108(49.7)
Use soap and water for hand washing before/after patient/sample contact	Always	140(64.5)
	Sometimes	18(8.7)
	Very often	59(28.5)
Contact patients/samples without a surgical mask or N95 mask		78(35.9)
I contact patients without surgical/N95 mask due to unavailability of equipment		78(35.9)
Preventive precautions can be taken until the patient is asymptomatic	Standard precautions	73(35.3)
	Air borne precautions	8(3.9)
	Contact and droplet precautions	136(62.6)
Monitor body temperature daily		127(58.5)
Infection control measures are taken in different clinic/hospital/laboratory	Visitors restriction	46(22.2)
	Closure of OPDs	32(15.5)
	Instituted fever triage ward	9(4.3)
	Novel COVID-19 screening	15(7.2)
	All of them	99(45.6)
	None of them	16(7.7)
Number of confirmed Covid-19 cases reported in your hospital/department	1-10	88(40.5)
	11-20	15(7.2)
	21-30	10(4.8)
	31-40	2(1.0)
	41-50	5(2.4)
	50-100	2(0.9)
	>100	5(2.4)
	No idea	30(14.5)
	None	58(28.0)
	Not allowed to tell	1(0.5)
	Referring suspected cases to relevant centres	1(0.5)

Table 3: Experience of health care providers related to patient exposure and protective equipment (continued):

Test/samples used for detection of novel COVID-19	PCR	146(67.2)
	ELISA	7(3.4)
	CBC, blood culture	2(1.0)
	On the basis of history	7(3.4)
	Referring the patients because test kits are not available	53(25.6)
	Not applicable	2(1.0)
No of colleagues infected with coronavirus in the line of duty	1-5	36(17.4)
	6-10	6(2.9)
	>10	7(3.4)
	None	74(35.7)
	Not sure	89(41.0)
	Not applicable	5(2.4)
Most common contact history given by patients	Gathering, hand shake, person to person contact	39(18.8)
	Complain of fever and cough	20(9.7)
	Traveling	128(58.9)
	Not applicable	30(14.5)

Discussion

Nearly every country across the globe has been reporting cases and deaths due to SARS CoV-2, [15] management of which has now become a great challenge for health care workers. In order to manage the COVID-19 pandemic effectively, health care workers should have adequate knowledge and relevant clinical skills along with adequate provision of personal protective equipment as they are at a higher risk of acquiring the infection.

The majority of the participants in our study reported 1-25 as the suspected number of cases brought to their setup on a daily basis however, confirmed COVID-19 cases reported by different hospital/departments was/were mostly 1-10. It indicates fear of acquiring infection among general public due to which people are visiting hospitals/ laboratories unnecessarily to get themselves tested for COVID-19. Proper public service messages should be conveyed to masses regarding signs and symptoms of the disease and self-isolation in order to avoid unnecessary visits to the hospitals which may increase their chances of acquiring infection. Some 32(15.5%) health care units therefore, closed regular OPDs and many 46(22.2%) imposed visitor's restriction.

In the current study, we found that 36% hospitals/ departments did not have facility of ventilators which is a worrisome situation as approximately 42% of the cases infected with SARS-CoV-2 develop acute respiratory distress syndrome [16] and according to World Health Organization, one in every six COVID-19 patients develop dyspnoea [17]. Ventilators help these patients to breathe and give more time to fight against virus. Unfortunately, prognosis is not good in such cases.

PCR was reported as the most common test used for detection of COVID-19 by the majority of the participants however CT chest has proved to be more sensitive [9]. Referring suspected cases to more advanced hospitals or centres because of unavailability of testing kits was noted in one quarter of 53(25.6%) the participants. It shows that there were still some hospitals/departments which were not well prepared for the diagnosis of disease. Furthermore, referring the suspected COVID cases may have been a cause of further spread of the disease because there must have been some among those referred individuals who might not go to that relevant centre and take necessary precautions till their condition starts deteriorating.

Our study showed that the majority of the health care workers were not well aware of the World Health Organization guidelines for isolation and wearing surgical masks. All suspected cases of COVID-19 can be placed in the same ward when a single well ventilated room is not available [18]. Moreover, wearing surgical mask is not mandatory in community settings if one does not have respiratory tract infection symptoms [19]. Approximately half of the participants agreed that they were not well prepared/trained in handling COVID-19 cases and insufficient training in infection control management might impede their willingness to serve during the COVID-19 pandemic. Earlier, the world has faced different pandemics including plague, influenza, Spanish flu, Asian flu, Ebola virus disease etc. which caused the death of many health care workers also, due to insufficient knowledge about proper use of personal protective equipment and other infection control strategies including environmental and administrative strategies [20]. We should learn from our past experiences and devise a proper system in which health care workers from different departments be given opportunity to perform in infection control management

programs which will not only enhance their clinical skills but will also boost their confidence to perform in case of any upcoming pandemics in future.

Many participants faced unavailability of personal protective equipment during duty hours. Since SARS CoV-2 spreads through close person to person contact [3] and aerosol droplets, [21] wearing mask is necessary for safety of health care workers as they are in close contact with infected patients but unfortunately N95 masks were available to only some 45(21.7%), whereas surgical masks and gloves were provided to most 172(79.2%) of the respondents. Health care workers during this pandemic are acting as frontline warriors and are trying to protect the entire world from this virus. Unavailability of personal protective equipment is increasing their risk of contracting the virus which will cause deteriorating effects not only to their health but also to their colleagues as well as to their patients which will ultimately make the situation more disastrous.

According to the World Health Organization, diagnosis of COVID-19 should be suspected in any individual presenting with fever, cough, dyspnoea, myalgia, either having history of travel or close contact with confirmed or suspected cases of COVID-19 in previous 14 days [22]. Participants in our study also reported traveling 128(58.9%) as most common history given by laboratory confirmed COVID-19 patients.

Limitations of study:
The limitation of this study was the small sample size and less number of responses from health care providers serving especially outside Pakistan. Moreover, we were not able to conduct face to face interview.

Conclusion

Our study concluded lack of knowledge about newly emerged COVID-19 pandemic among health care workers. Shortage of ventilators testing kits and personal protective equipment was reported in many hospitals/ departments. Lack of personal protective equipment and insufficient training in infection control management may act as barriers in delivering health care facilities during COVID-19.

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Does measles immunization lead to immunization for COVID-19? Case series

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Abstract

There are many studies on protective, preventive and treatment methods for about Covid19 pandemic, which affects the whole world.The results of epidemiological studies also guide these researches. The studies of the scientists who are struggling with this pandemic worldwide reveal that the incidence of covid19 is low in the child age group and the disease survived more mildly in childhood. There is an opinion about the reason why covid 19 disease is seen less frequently and milder in pediatric patients, that active immunization created with childhood vaccines. For this reason, we compared the Rubeola immunoglobulin levels formed aganist the measles vector, one of the childhood vaccines which has antigenic similarity with the SARS-CoV family, in patients diagnosed with covid 19 in our hospital and Rubeola immunoglobulin levels of screening performed in healthy individuals before pandemi. As a result , we found the measles IgG levels were statistically significantly higher in patients diagnosed with measles IgG covid 19 compared to the control group. According to this result, this significant increase in level after being infected with SARS-CoV2 in patients with measles immunization may have positive effects on the course of the disease. In addition, we saw that all our Covid-19 patients with high measles antibody recovered without serious mortality and morbidity , despite their age, gender and chronic diseases. Therefore , considering the completion process of vaccination studies, we think that measles vaccination can be applied to risky groups without contraindications to reduce the existing destructive effects of the disease.

Key words: covid 19, measles IgG

Introduction

Many studies are being conducted to investigate the protective, preventive and therapeutic measures towards the COVID-19 pandemic. The results of the epidemiological studies also dominate these researches. The studies of the scientists who are struggling with this pandemic worldwide reveal that the incidence of COVID-19 is low in childhood and children who catch the disease usually experience a mild form (1). Although the immaturity of ACE-2 receptors that the virus uses for adhesion have been suggested to be the reason for asymptomatic cases in this age group (2), active immunization achieved through childhood vaccination is another potential cause (3).

First of the most striking examples about immunization is that COVID-19 was detected on the Diamond Princess cruise boat and 634 out of the 3,711 travelers and crew were found to be COVID-19 positive according to the results of the PCR test, and they were quarantined. Although most of the patients were in 60-80 year age group, the finding that 306 were asymptomatic and 328 were symptomatic (4) may be related to the recommendations of the World Health Organization (WHO) and Center for Disease Control (CDC) about the measles-mumps-rubella (MMR), varicella and tetanus vaccinations for boat travelers (5,6). Another example may be the low incidence of the disease among Syrian refugees potentially due to routine measles vaccination when entering our country. The aim of the present study was to investigate the potential positive effect of measles immunization in COVID-19 cases.

Materials and Methods

Study universe:
Cases diagnosed with COVID-19 through reverse transcriptase polymerase chain reaction (RT-PCR) at Başkent University Alanya Research and Training Center between March 11, 2020 and April 22, 2020 were included in the study.

Computed tomography (CT) of the chest was carried out on all patients except for children.

All patients had undergone the PCR test. A second PCR test had been performed 24 hours later for the patients whose first PCR test was negative and who fulfilled the diagnostic criteria of "probable case".

Antibody test was performed on day 5 of hospitalization for patients whose PCR test was negative twice and CT findings were consistent with viral pneumonia.

Exclusion criteria:
The patients who had positive tomography findings, but negative PCR and antibody tests, were excluded from the study.

Method:
The Rubeola IgG and IgM levels of the patients and the rubeola IgG levels of the health staff carried out for screening and who had been admitted to the immunization outpatient clinic in December 2019 as the control group, were compared. The total IgM and IgG titers, tomography findings, clinical findings and the prognosis of the patients were also evaluated.

Statistical Analysis
Descriptive statistics were used to present the mean ± Standard deviation (SD) or the median (range) for continuous variables, and the counts (percentages) for the categorical variables. Comparisons of the mean covid positive group and general control Rubeola IgG was made using the Mann-Whitney U-test for the independent samples. The data obtained in the study were analyzed statistically using the IBM SPSS statistics software version 25 (IBM Corp, USA). A two-sided value of $p < 0.05$ was accepted as statistically significant.

This study was approved by the Baskent University Institutional Review Board (Project no:KA20/176) and supported by the Baskent University Research Fund.

Results

The study included a total of 10 cases (Table 1). The mean age of the patients was 43.4 years (median 37); the mean value of the IgG titers was 32.2 ntu (median 33.95) (Table 2). Of the patients, 7 were female and 3 were male. While the COVID-19 PCR test was positive in 6, the PCR test was negative, but antibody test was positive in 4. All patients had been discharged with recovery. The IgM and IgG values were within normal ranges in all cases.

All cases in the control group were IgM sero-negative; IgG levels were below 30 ntu in 80% and the median value was 18.15. The rate of the values below 30 ntu was 30% in the COVID-19 group and the median value was found to be 33.95 (Table 3). The Rubeola IgG levels were found to be significantly higher in the COVID-19 group compared to the control group (Table 4).

Discussion

The results of the epidemiological and observational studies about COVID-19, which has led to a pandemic, and the severe mortality and morbidity worldwide have been shared. In a study from China, the rate of positivity was 2% in the 0-19 age group and 0.9% of these cases were below 10 years of age (7). The rate of childhood COVID-19 was reported as 1.2% in data from Italy in March 2020 and no mortality was reported (8). According to the USA 2020 March data, while the pediatric group comprised 5% of the patients, 1% required hospitalization (9). While 90% of the patients were asymptomatic, 5.2% had severe illness and 0.6% had critical illness in the largest case series from China (10). When the prevalence of the patients who had severe disease requiring critical care was evaluated, 10.6% were below 1 year of age, 7.3% were between ages 1 and 5, 4.2% were between 6 and 10, 4.1% were between 11 and 15, and 3% were between 16-17 years of age (10). Half of the patients who required critical care were below 1 year of age according to the same study. In another study including 171 cases, 3 children below 1 year of age (1.8%) needed intensive care and all three were seen to have co-morbid conditions (11). Based on the results of these studies, we may state that COVID-19 is either asymptomatic or mild in age groups where immunization is performed actively, particularly for measles, and the disease is more severe below 1 year of age when vaccination has just begun.

Experimental studies have revealed that immunization against measles with recombinant virus leads to antibody formation against hepatitis B, SIV (Simian immuno-deficiency virus), HIV (human immune deficiency virus) and the West Nile Virus encephalitis (13), and of these studies, the most significant study was that of M. Liniger et al. (2008), who demonstrated that mice infected with SARS-CoV induced high levels of neutralizing antibodies when vaccinated with live attenuated recombinant MV (measles) vaccine (13). Similarly, Walls et al. (2017) reported that trimeric trans-membrane spike (S) glycoprotein, which is responsible for receptor binding to host membranes and the fusion mediated S protein that is a fusion protein, initiated infection through promoting the fusion of viral and cellular membrane through forming a large crown on the virus surface. The authors also reported a significant similarity between the spike (S) protein of the corona virus and F protein, which is found in the paramyxovirus family, which also includes the measles virus, and it is the main target of neutralizing antibody in case of infection (14).

In our case series, all COVID-19 patients were discharged with recovery. In particular, contrary to our expectations, patients of 65 years and above, who had severe co-morbidity, did not experience morbidity and mortality (15). Two patients who did not demonstrate radiological evidence of the disease had been vaccinated against measles due to suspected contact and one of these patients was asymptomatic. In

	M/F	Age	PCR	Ig Rapid Test	R IgG (ntu)	Comorbidity	Tomography	Hospitalisation (Days)	ICU (Days)	MV	Covid-19 Contact	Measles Vaccination (In The Past Year)	Treatment	Result
1	M	85	(+)		35.1	COPD Hypertension	Bilateral Ground-glass	7	1	NIMV	(-)	(-)	Hydroxychloroqine Azithromycin	Cure
2	F	82	(+)		44.1	Rectum Cancer (Cure)	Bilateral Ground-glass	7	1	NIMV	(-)	(-)	Hydroxychloroqine Azithromycin	Cure
3	F	37	(+)		30.7	-	Unilateral Ground-glass	8	-	-	(-)	(-)	Hydroxychloroqine Azithromycin	Cure
4	F	33	(+)		24.7	-	Normal	5	-	-	(+)	(+)	Hydroxychloroqine Azithromycin	Cure
5	F	23	(+)		23.6	-	Normal	5	-	-	(+)	(-)	Hydroxychloroqine Azithromycin	Cure
6	F	4	(+)		46.7	-	Not CT scan	3	-	-	(+)	(-)	Hydroxychloroqine Azithromycin	Cure
7	M	44	(-)	(+)	34.5	-	Bilateral Ground-glass	11	-	-	(+)	(-)	Hydroxychloroqine Azithromycin	Cure
8	M	65	(-)	(+)	34.5	-	Bilateral Ground-glass	12	-	-	(+)	(-)	Hydroxychloroqine Azithromycin	Cure
9	F	24	(-)	(+)	12.4	-	Bilateral Ground-glass	7	-	-	(+)	(-)	Hydroxychloroqine Azithromycin	Cure
10	M	37	(-)	(+)	33.4	-	Normal	Without Hospitalisation	-	-	(+)	(+)	Azithromycin	Cure

Table 1

*M/F: Male/Female,
COPD: Chronic Obstructive Pulmonary Disease,
ntu: NovaTec Test Unit,
R IgG: Rubeola IgG,
Rubeola IgG cut of range 0-9 ntu,
NIMV: Non invasive Mechanic Ventilation,
ICU; Intensive Care Unit

Figure 1

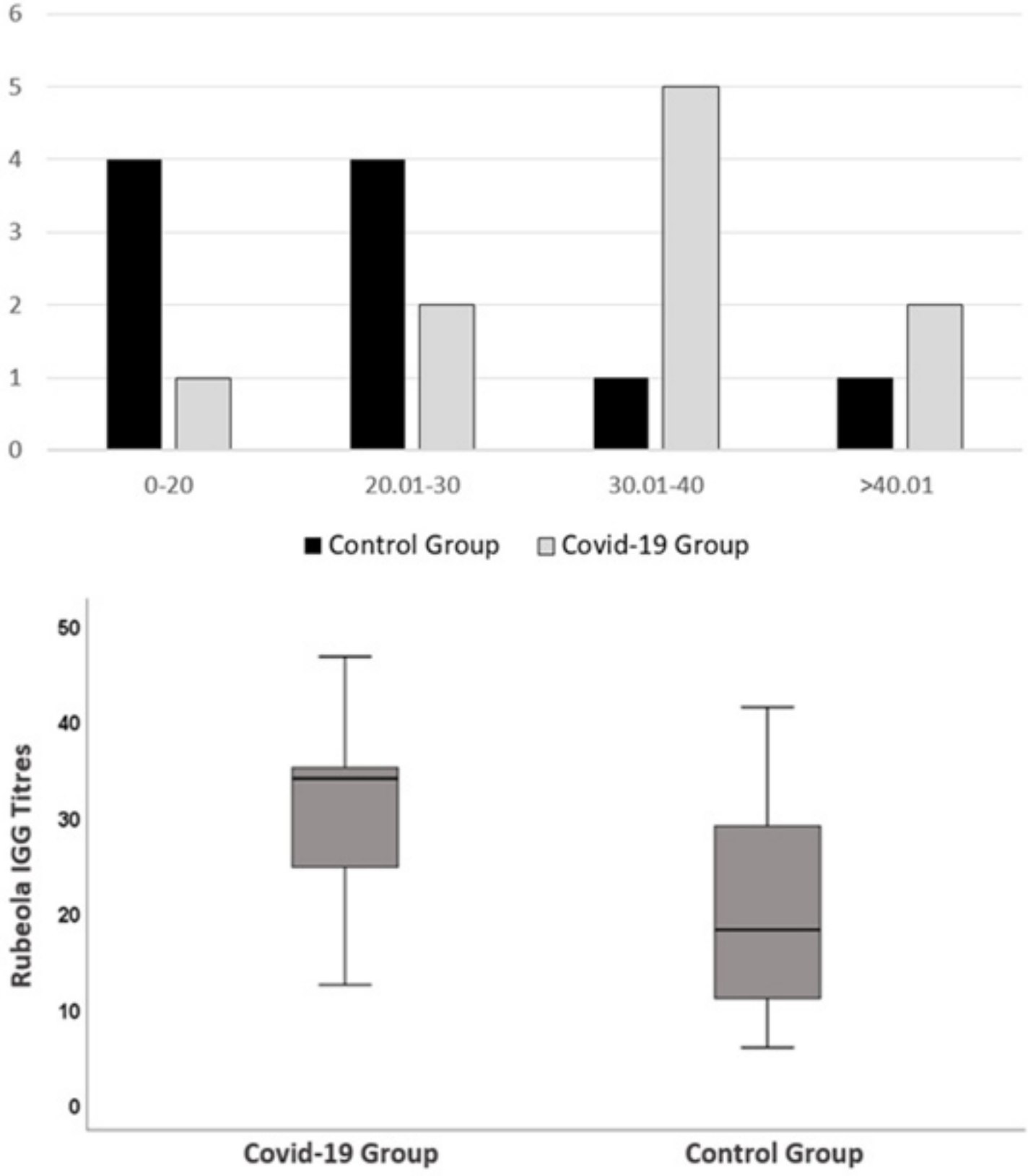
6
5
4
3
2
1
0
0-20
20.01-30
30.01-40
>40.01
Control Group
Covid-19 Group
Rubeola IGG Titres
50
40
30
20
10
0
Covid-19 Group
Control Group

Table 2

COVID CASE DESCRIPTIVE DATA						
	N	Mean	Median	sd	Minimum	Maximum
Covid Age	10	43,4	37.0	26,29	4	85
Covid IgG	10	32,24	33.95	9,97	12.40	46.70

Table 3

RUBEOLA IgG Titres Groups						
	N	Mean ±SD	Median	Min.- Max.	95% CI	p
Covid-19 Group	10	32,24 ± 9,97	33,95	12,40 - 46,70	25,10 - 39,37	0.043
Control Group	10	20,96 ± 11,70	18,15	5,86 - 41,40	12,53 - 29,40	

conclusion, detection of specific IgG with Rubeola IgM sero-negativity in all blood samples indicates that our patients had encountered measles naturally or through immunization, and they had immunization. Besides, there was no increase in the total IgM and IgG levels in any of the patients. This result suggests that total antibody response did not occur with cytokine storm or non-specifically, the Rubeola IgG levels increased against SARS-CoV-2 in COVID-19 patients. Therefore, we consider that Rubeola antibodies increase against SARS-CoV-2 with cross reaction, neutralize the SARS-CoV-2 and have positive effects in the course of the disease, as in the study of M. Liniger et al. (13). In order to support this opinion, studies may be planned with larger patient groups, in different stages of the disease, particularly in cases that result in morbidity and mortality. No specific treatment of COVID-19 has been reported in the literature yet. Based on the results of two patients vaccinated against measles within the recent two years, as in the examples of Syrian refugees and the cruise ship, and given the process of vaccination studies, we consider that the subjects with no contra-indication and those primarily in risky groups may be vaccinated against measles in order to reduce the destructive effects of the disease.

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To What Extent Are Medical Students Benefiting From Mentoring

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Abstract

Background: Various medical schools have developed Mentoring Programs; however, both the mentees' and mentors' prospects have been considered in few studies.

Objectives: To investigate the perceptions of mentees' and mentors' concerning their experience.

Methods: Mentors and mentees at a medical school were requested to take part in a thorough study having questions on perception difficulties and satisfaction about the mentoring program. It was a cross-sectional study based on a questionnaire.

Results: 67% of students (mentees) benefitted from mentoring. One to one mentoring was preferred by most students (82.5%). Only 68.6% of students had satisfactory contact with their tutors. Mostly academic and other personal problems were discussed during mentoring. Only a small number of students (18%) pronounced to have no hindrances in interacting with mentors, whereas other students blamed commitment by students (6%) / lack of interest from mentor (15%), and time limitations (24%) as obstacles. It was suggested by the students to give them the ability to select their own mentors and tackle the above constraints. Mentors' contentment and difficulties are deeply related to students' participation in the activity. The mentors believe that changes noticed in students were more related to their life concerns; for some mentors, there is no appreciation or perception of the program. Nonetheless, many mentors acknowledge the significant differences about themselves: as individuals, faculty members, and tutors.

Conclusion: Attendance is essential for both the mentoring relationship and the amplification of the program. Mentors are motivated in curriculum development and teaching due to students' involvement in the activity; thus, a virtuous circle is created, leading to benefit the whole undergraduate medical education system.

Key words: Mentorship; Mentor; Mentee; Medical Students; Curriculum Development

Introduction

A vital tool for a flourishing career in medicine is mentoring. Mentoring has evolved consistently as a practice and concept for facilitating healthcare professionals since the 1970s, introduced formally in medical education during the late 1990s(1) Standing Committee on Postgraduate Medical [and Dental] Education (SCOPME) has defined mentoring as 'A process whereby an experienced, highly regarded, empathetic person (the mentor) guides another (usually younger) individual (the mentee) in the development and reexamination of their ideas, learning, and personal and professional development. The mentor, who often (but not necessarily) works in the same organization or field as the mentee, achieves this by 'listening or talking in confidence to the mentee'.

Training in humanities makes students more humane, including the medical humanities in medical education(2,3). The immediacy and personalized learning, the chief learner relationship, has weakened in medical education. The prospects for eloquent communications have decreased among many students in academic environments as has the disintegration of knowledge . The interactive relationship in medical schools in the present era is characterised by heavy competition among colleagues and the distance between students and teachers(4,5). These consequences have reinvigorated the progress of Mentoring Programs in various medical schools(1,6–9). Compassion, empathy, philanthropy, and sympathy are effective skills that are desirable in medical students and doctors. Due to strain and whims of our higher educational system, all these characteristics are too often underdeveloped(3,10–14). Unrealistic and extreme parental expectations, panic of getting ragged , humiliating teachers, solitude, extensive syllabus with nominal time for relaxation, and the cloud of other issues make first-year medical school problematic for many students(15–19). A sympathetic foundation will facilitate students to deal with stress in a better way; this is the prime objective for promoting the mentoring programs (10–13).

As a friend, helper, and a role model, a mentor can assist, as a more knowledgeable individual, to the professional and individual progression of a fresh medical student by delivering orientation and support(17,18). Mentoring includes a longstanding association between a senior individual (mentor) who directs and encourages a junior one (mentee); in this case, a medical student, during the complete phase of schooling and coaching. The objective of mentoring is to inspire the student to obtain his/her full aptitude by sharing experience and information and providing emotional encouragement and sustenance. It has been found that mentoring escalates the academic achievement of students(20,21). This association benefits mentors as well, by way of increased output, gratification in the job, and self-satisfaction(22–24). Some reports showed mentors' problems in collaborating with students and occasionally reported the mentors' observations of their personal growth(11). However, a publication by Stenfors-Hayes et al. at the Karolinska Institute Teaching Hospital on the Mentoring program investigated from the mentors' perspective found it was gratifying to be a mentor for most respondents(25). Mentoring developed their relationship with the students fostering an impression on their ethics and practices.

The Mentoring system is in practice in most of the medical colleges around the world. Still, the analysis of how far this mentoring helped the students achieve their targets in Saudi Arabia is not much known. Although it is recognized that a successful career in medicine depends on mentoring, the studies corresponding to mentoring included barely any from Abha, in the Aseer region of Saudi Arabia. Hence, the current study was devised to evaluate students' opinion on the mentoring program and its effect on them.

Materials and Methods

Comprehensive qualitative questionnaires are an imperative tool for creating exhaustive data on issues like education, complex social issues, and behavior by investigating the researchers' viewpoints regarding the meaning of life experiences. Generally, the questionnaires are poorly designed, and include only a few issues. The investigator is required to be exposed to the perceptions and variables that arise instinctively, and provide the questionnaire to the participants for extracting meaning from the data(26–28).

The present study was a cross-sectional study based on a questionnaire conducted at the College of Medicine, King Khalid University, from June 2018 to May 2019. The students studying Bachelor of Medicine, Bachelor of Surgery (MBBS) program were anonymously and voluntarily involved. These students had experienced the mentorship program during their MBBS studying period. The institute had a formal mentoring program for all MBBS undergraduate students (1st semester to 9th semester). A maximum of 20 students were distributed to each teacher. The first week of every month was scheduled for a formal meeting between the mentors and the mentees. Apart from this, the students can meet their mentors whenever needed, which is an informal meeting.

The questionnaire was prepared using survey monkey web site and the link forwarded to all the students by SMS, WhatsApp and email to fill out the questionnaire online and paper copies were also distributed to the students. Adequate time was given to fill it in. The questionnaire consists of the details of demography and questions to evaluate students' perception about the mentoring program and how far they have benefitted from it. Open-ended questions were also included in the questionnaire, like, in which aspects they benefitted and any suggestions/changes they need in the present mentoring program. Ethical authorization from the local ethical committee was obtained before distributing the questionnaire to the students, and the purpose of the questionnaire was clearly explained to them.

The collected data was fed into the Microsoft excel sheet 2010 version. The analysis was done, and the results were expressed in percentages for categorical variables and mean for continuous variables.

Results

The present study included 238 MBBS students; out of these, 162 (68.07%) had responded and filled out the questionnaire. A total of 106 (65.43%) males and 56 (34.57%) females took part in the study. The mean age of the pupils expressed as mean ± SD was 21.64 ± 2.73 years.

Out of 10 mentoring sessions conducted, 33.33% of students had attended all the sessions, whereas, 15.68% have not attended any session. 34.52% attended less than 5 sessions, and 16.47% attended more than 5 sessions. The average number of sessions attended by the students was 5.39 %.

Regarding the type of mentoring (One to one / Group / both) they were exposed to, the majority of them (82.5 %) stated that they were exposed to one to one mentoring, and 12.5% to group mentoring. The remaining students stated that they were exposed to both (Figure 1).

More than half of the students (67%) declared that they benefitted from the mentoring sessions, whereas the remaining students (33%) did not. Among the benefitted students, 68 % stated it as personal, 14.8 % as academic, and 17.2 % as personal and academic.

Most of the students (88.7%) preferred to have mentoring through personal meetings and the remaining preferred through phone (2.3 %), email (1.4 %), and WhatsApp (7.6 %). The contact with mentor was deemed adequate by 88.6% of students, and the rest (11.4%) did not have adequate contact with mentor. 65.8% were proactive during the sessions.

The barriers in communicating with the mentor are specified in Table 1. Some students (22.6%) said that there were no difficulties in collaborating with the mentor for them, and some specified the combination of reasons.

The majority of the students (57.8%) opined that the goal of mentoring was to enhance professionalism and assist students in their personal development. Some students had opted to help in career development, and few opined for the research studies' support.

Regarding the mentors, the results of their personal interview and the questionnaire filled in by them are summarized in Tables 2 and 3. The study's outcome indicates that only 22.73 % of mentors were satisfied with the overall mentoring program. Concerning the number of students allotted to each mentor they were well contented. About 81.82 % of the mentors were disappointed by the response of the students to the mentoring program. Most of the students do not turn up for the meetings, and they needed repeated reminders to attend the meeting. Some of the mentees turned up for the counseling after calling them over the phone during the session.

About 60% of the mentors formed a WhatsApp group, including all their mentees, and frequently chatted over the app. Notice for the counseling sessions was given through this group. Some of the students confirm the notice's receipt and their willingness to attend whereas others just neglected to. About 3-4 announcements had to be made before conducting a successful meeting.

Table 1: Barriers expressed by mentees in communicating with the mentor (Single option only)

Barrier	Number of students: N = 238 (%)
Tried but couldn't meet	18 (7.56)
Time constraints	24 (10.08)
Mentor was disinterested	15 (6.30)
I did not commit to the program	6 (2.52)
Was unaware of the program	67 (28.15)
Mentor allotted not known	66 (27.73)
Combination of the above reasons	24 (10.08)
No barriers	18 (7.56)

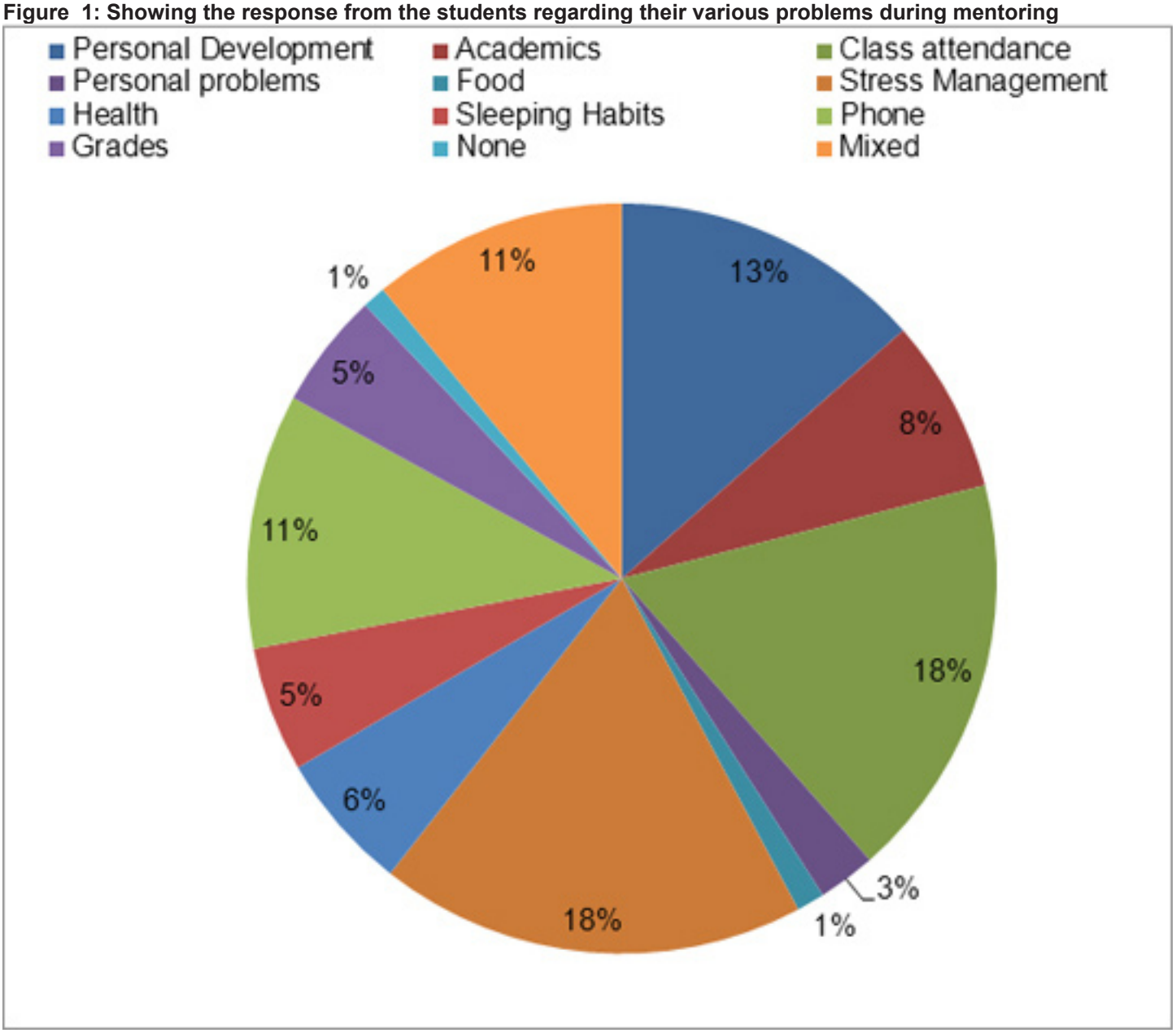
Table 2: Barriers expressed by mentors in communicating with the mentees (Multiple options allowed)

Barrier	Number of teachers: N = 22 (%)
Difficulty in convincing the students to attend the meeting	22 (100)
Time constraints	11 (50)
Most of the Mentees were disinterested	22 (100)
Meetings arranged but none attended	20 (90.9)
Combination of the above reasons	22 (100)
No barriers	0 (0)

Table 3: Showing the opinion of the teachers (N=22) regarding the mentoring program

Sl	Question	Response	Opinion of the mentors (%)
1	Satisfied with the mentoring program	Yes	5 (22.73)
		No	15 (68.18)
2	Adequate students allotted	Yes	20 (90.91)
		No	2 (9.09)
3	Overall response of the students	Good	4 (18.18)
		Bad	18 (81.82)
4	Preferred Type of Mentoring	One-to-one	19 (86.36)
		Group	3 (13.64)
5	Ideal mode of Mentoring (Multiple answers allowed)	Personal Meetings	22 (100.00)
		Email	7 (31.82)
		Phone	12 (54.55)
		WhatsApp	9(40.91)
		Other	0 (0.00)
6	Do you thinkthat mentoring is a good idea	Yes	21 (95.45)
		No	1 (4.55)
7	Should two or more mentors be involved in the same group of menteesto enhance the mentoring program.	Yes	16 (72.73)
		No	6 (27.27)
8	Skills developed in the mentee as a result of the program? (More than one answer)		
	a. Communication skills / listening		9 (40.91)
	b. Reading / preparation for the exam		11 (50.00)
	c. Writing (performance)		8 (36.36)
	d. Improved scores		13 (59.09)
	e. Better class attendance		15 (68.18)
	f. None		10 (45.45)
9	Drawbacks about the program (More than one answer)		
	a. Lack of commitment from both sides		10 (45.45)
	b. Lack of interaction		18 (81.82)
	c. Lack of time		12 (54.55)
	d. Lack of information with the students about the program		20 (90.91)
	e. Unplanned program guidelines		17 (77.27)
	f. Students were unaware about their allotted mentors		22 (100.00)

Figure 1: Showing the response from the students regarding their various problems during mentoring



Discussion

Mentor is a term that originated from the Greek classic story, The Odyssey, in which King Odysseus seeks help from a trustworthy friend named Mentor to guide his son named Telemachus when he was departing for another country to fight a war. Mentoring is derived from the Greek word, which means enduring. Mentoring is a long term association between the mentee and mentor benefitting the mentor, and mentee as well as the society by bringing out the best medical graduate who can take care of the community. It has been shown that mentoring is necessary for career development and the achievement of clinical and research skills.

According to Scott, professional mentoring relationships are for the sake of career counseling and assistance with interpersonal challenges(29). There are five dimensions of mentoring, according to Scott:

1) Mentoring relationship involves a more senior mentor and a less experienced mentee.
2) Mentoring consists of 3 emotions: emotional support, career assistance, and role modeling.
3) Both mentor and mentee will benefit from this process.
4) Successful mentorship requires personal interaction and exchange between the two parties.
5) A mentor has a more powerful position and broader experience within an organization.

Although mentoring in Medical schools is gaining popularity and is running successfully in western universities, it is still lagging behind in the globe's eastern part. As seen in our study, we had a feeble response to our mentoring sessions. A low number of students attended the mentoring sessions in our institute, which is negligible, though we had informed the students about the mentoring sessions' benefits and outcomes. Hence, we feel that the mentors have increased responsibility in this region to impress the students who attend the mentoring sessions and bring out successful results among the students who regularly attend the mentoring

The mentor should tame the mentee in such a manner that the student who regularly attends the mentoring sessions improves and tops his academic performance, is psychologically sound, socially motivated, performs well in sports, and other academic and extracurricular activities. Additionally, the students who are regularly in contact with the mentor during the mentoring sessions and in one-to-one communication have a good rapport with other classmates and various teachers. Looking into the improvements in the students who are regularly in touch with their mentor and who exhibit excellent performance, will instigate more and more students to take up the mentoring activities.

Further, in our mentoring program, one-to-one mentoring, considered to be more effective in motivating the students in improving their personality, failed to a great degree, most probably due to distance and gap between the students and the teachers. This lacuna is basically due to the pupil feeling shy to approach his / her mentor, perhaps due to their fear of getting scolded by the teacher or losing marks in the exam if their weakness is exposed. In such a case, the mentor should approach his mentees and increase friendly relationships to relieve the students from any type of fear from their mind.

The mentee's opinion regarding the mentoring program was not satisfactory as per the statistics of this questionnaire. This inadequacy in the mentoring program's overall success at our institute can be attributed to the flawed attitude of the mentors, probably due to lack of experience and familiarity dealing with the personal and academic issues faced by the mentees. Hence, the mentors need excessive training and know-how to tame students psychologically and emotionally, and to motivate them to take more and more mentoring sessions. The major constraint expressed by the students (Table 1) was lack of time to approach the teacher, and who for most of the occasions, was not available for discussion with the mentee. A lower rate of achievement of this program in our institute can be attributed to the development of a negative impression about mentoring that neither helps in developing the professionalism nor in supporting students in their personal development. There is an urgent need that the students should be taken out of this dilemma and a clear cut image be exhibited to them and create such an atmosphere in the campus that more and more students are attracted to the mentoring program.

This manuscript presented a closed-ended questionnaire study of 238, MBBS students' perceptions of their experiences with mentors. Furthermore, 22 mentors were also included in the study to provide an opinion of the mentees from the mentors' point of view. The questionnaire was mostly multiple-choice questions and a few open-ended response opportunities. After analysis via Microsoft Excel, we describe responses to the various questions. Most students were mentored as one-on-one as opposed to in groups, and a little more than half of the students benefited from being mentored. In-person mentoring was preferred to telephone or electronic communications. Most students indicated that time constraints were a barrier to meeting with a mentor while professionalism was the top named goal. This was a single-institution study that most likely has a limited impact on theory or practice for a broad TLM (teaching/learning materials) audience due to the presence of mature mentoring programs in western medical schools. A major lacuna in our study, which we observed, is that the mentoring program in the eastern countries like Saudi Arabia is not on par with those in western medical schools. Mentoring in Saudi Arabia has not been as popular as those in the UK and the US. The mentors are not well trained and mentally prepared to take up the mentoring program. On the other hand, the mentees (medical students) are also unaware of such a program's benefits, and they have not seen their seniors benefit from mentorship.

Thus, there is an urgent need to recruit such persons in these medical schools who are pioneers in mentoring the undergraduate medical students and simultaneously tame and develop a positive impression in the students' minds regarding mentorship. The mentees should be trained by taking personal interviews. These will enhance the mentoring capacity of the mentors. As done in the western countries, the teachers in the medical schools in Saudi Arabia should be trained as was done by Patrícia Lacerda Bellodi(30). In their study, in-depth qualitative interviews were conducted four years after the launch of the program. A quantitative methodology was used to interview all 80 mentors in the Mentoring Program. There were open-ended questions in interviews containing items to explore the perceptions of mentors regarding satisfaction with the mentoring program, complications, and modifications occurring from the program mentors with time. These were conducted with each mentor privately and lasted 30 to 90 minutes. Before performing each interview, the professional and personal data of the mentor (name, age, gender, specialty) was validated to create affinity. Data regarding program mentor's participation such as duration of involvement, the number of sessions organized with students and student presence was also verified. The First question of the interview was, "Are you happy as a mentor? Why?" The next question for the mentors was, "When did you feel like a mentor?" and "What kinds of difficulties have you faced as a mentor?" The next question was asked to estimate the mentors' observation regarding the changes in the mentoring program. The question was, "Have you observed any transformations in yourself, medical school, or the students because of the Mentoring Program?" The data having recorded answers to the questions during the interview was submitted for qualitative analysis. The responses having similar concepts were categorized to form specific research questions (thematic analysis) after a thorough study. The number of respondents can estimate the importance of different categories. The quotes by mentors are used to demonstrate and authenticate the findings.

The report presents that they interviewed 80 mentors, of which 24 were females and 56 males, accurately indicating the overall gender distribution in the medical school faculty. Their age lay between 30 to 60 years. There were different

medical specialties in this group, including surgery and specialties, psychiatry, ophthalmology, gynecology-obstetrics, anesthesiology, internal medicine and subspecialties, orthopedics, forensic medicine, pathology, otorhinolaryngology, pediatrics, and preventive medicine. However, there were six full professors, eighteen associate professors, forty-six teachers with doctoral degrees, and five teachers with Master's degrees regarding academic status. Most of the mentors, i.e., seventy-four out of eighty, had been a part of the program since the establishment in 2001, while six of them had recently joined the group. According to fifty-one mentors, students' attendance remained uneven over time; according to ten mentors, the devotion rate had decreased, while only five mentors had reported an increase in students' participation. Only fifteen mentors had considered students' attendance as stable. Regardless of the reported disparities in attendance, the program was deemed to be outstanding or good by sixty mentors, and seventy-four of them had shown their intention to remain in the program. Such collaboration is a necessity in the eastern countries to enhance the performance of mentoring programs. The host organization should be responsible for planning the mentoring, which supervises, supports, and administers the mentoring program. Planning for mentoring involves shaping the mentoring process, selecting and training mentors, mentee briefing, and creating an environment favorable for mentoring.

The mentoring outcomes and experiences can be enhanced by selecting experienced mentors with a proven performance history in clinical mentoring. The preparation of mentors for their responsibilities and roles enhances the mentoring effects. In nearly 63% of new US medical schools, mentors and 32% of mentoring programs in Germany had obtained formal training. The mentors can access an information pack explaining the mentorship program to participate in seminars and workshops related to mentoring in this mentoring training(31). Oelschlager et al. illustrated monthly faculty training activities containing teaching professionalism and clinical skills, sessions on mentoring, and sharing opinions to keep mentors supported and up-to-date(32).

On the other hand, planning for Mentees involves determining the clear goals of mentoring with mentors and understanding the way and frequency of communication and cooperation that will be provided. Mentee training or briefing is used to enhance the Mentee preparation. Fornari et al. found that 13 of the 14 US medical schools examined the mentees to be trained for mentoring involvement(33). The information packs of mentee training involve participation in thorough foundation courses conducted by the host organization. Preparatory, initiation, and supportive stages in the process of mentoring are part of organized mentoring programs. The structured mentoring programs involve mentor training, skills training, and orientation programs, which help the mentee prepare for their mentoring experiences and increase their sense of connectivity, advocacy, and autonomy. Structured programs define the mentor and mentees' responsibilities and roles and specify the duration, form, and frequency of the mentoring meetings by establishing a standard of practice and social conduct. Indeed, other most important roles played by the structured mentoring programs are fostering professional identities, encouraging mentoring relationships, nurturing a mentoring culture, role modeling and longitudinal relationships, and increasing mentoring experiences for mentees and mentors by applying a coherent approach to mentoring oversight and interactions.

Undergraduate educational culture in health professions is analyzed by the Dundee Ready Educational Environment Measure (DREEM), a culturally generic and nonspecific instrument(34). DREEM has been considered trustworthy in different situations. Institutes can detect their deficiencies and articulate changes in the curriculum with the help of DREEM. Five domains can be accessed by the DREEM, a questionnaire with 50 elements. These five domains are: (i) students' perceptions for teachers with 11 items and maximum score 44 (ii) academic self-perception of students with 8 items and maximum score 32 (iii) learning perceptions of students with 12 items and maximum score 48 (iv) social self-perception of students with 7 items and maximum score 28 (v) perceptions of students about atmosphere with 12 items and maximum score 48. A 5-point Likert scale from 0-4 is used to rate each item, where 0= strongly disagree, 1= disagree, 2= unsure, 3= agree, and 4= strongly agree. Correction is made for nine negative items, including 4, 8, 9, 17, 25, 35, 39, 48, and 50 items, by reversing the scores. Thus, higher scores show dissimilarity with that item after correction has been made. The true positive points are the items with a mean score of ≥ 3.5; problem areas have a mean score of ≤ 2; aspects that require to be improved have values in between these two limits. The questionnaire has a maximum global score of 200 which is elucidated as: 151-200= excellent; 101-150 = more positive than negative; 51-100 = many problems; 0-50 = very poor. Such DREEM questionnaires are required to be implemented during the upcoming studies on mentoring in India to enhance its acceptance among the medical schools.

At this platform, let us discuss the difference in mentoring programs between Western countries and Eastern countries, especially in middle-Asia countries like India, Pakistan, Bangladesh, and Saudi Arabia. In western countries, the mentor and the mentee remain like friends, and they are closely associated with one another. This reduces the gap between the teacher and the student. Now that the mentor and the mentee are close together, the mentoring program can run smoothly and successfully. There will be minimum hindrances and problems encountering this issue, so mentoring will be easy and successful. Due to a close association between the two, the mentee can discuss personal, psychological, emotional, and academic issues without any fear or hesitation.

On the other hand, the mentor can also solve his students' problems efficiently by discussing the issue more intimately with the mentee; therefore, the mentoring program is more successful in western countries. Whereas in countries like

Saudi Arabia, there is no such close friendly and open association between the teacher and the student. The reasons for this distance between the two are many; to quote a few, the cultural atmospheres in these countries is such that most of the students are afraid of their teachers and thus fear approaching their mentor. All the students may not be scared of the teacher; instead, some of them have very high respect for their teacher. The teaching profession is presumed to be the noblest among all the professionals in these countries, which cannot be compared with any other country. Owing to this perception in the students' minds, they keep a distance from their teachers, fearing that they may misbehave with their teachers in the event of their being very free and liberal with their teachers. This criterion is a significant drawback in the implementation of a successful mentoring program in Eastern countries. In fact, most of the colleges or organizations in Saudi Arabia do not have any mentoring programs in their establishment. This scenario is not only in medical schools, but all other technical institutes lag behind in taking up the mentoring programs. Hence it is high time that mentoring be popularized in as many institutes as possible and train the mentors such that the program is successful to a great extent, and this will propagate with other institutes. Slowly all the institutes will have good mentoring programs running. On the other hand, it is also important to motivate students to participate in these mentoring programs. Active participation of both the mentee and the mentor is essential for the mentoring program's success on par with Western countries.

Future investigation should test the theoretical understanding of phenomena in medical practice and education. The objective of forthcoming Investigations should be to extend theory, which is a conceptual description or explanation of a phenomenon, and not a practical problem or gap, by revealing causal relationships and specifying how/when they hold. There is a need for new theoretical understanding enabled by the more investigations related to mentoring programs.

To summarise, this paper pronounces our initial understanding of a recognized mentoring program for medical scholars. Mentoring is believed to be an important component of medical education. It is not very challenging for dedicated teacher and student mentors to spare some time for their mentees, so significantly less determination is required for mentoring. Notably, both mentees and mentors have an advantage; further trust and bonding among students and teachers increase. Mentees with operative mentors as a good example will take on their qualities, be good mentors in the future, and propagate this legacy. Contingent on the traditional understandings and needs, each college can be encouraged to participate in its mentoring program. The outcome, not the process, must be the main motive of the program. Research in the future could focus on nurturing and sustaining philanthropic mindsets in medical college faculty and students using medical humanities and mentoring.

Conclusion

An essential instrument in the career development of a medical student is mentoring. A goal-oriented and well planned mentoring program is not only beneficial for mentees but also the mentors. Strategies should be planned, especially in the developing countries, to motivate the students and the teacher equally for the success of such programs.

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Burnout among Turkish Physicians: A Systematic Review

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Abstract

Introduction and objectives: By evaluating systematically and collectively studies examining burnout and accompanying factors of physicians in Turkey, we aimed to obtain a meta-perspective of the relevant reader or researcher.

Material and Methods: English and in Turkish databases (Pub Med, Google Scholar, Ulakbim) were searched by using key words of physician, burnout and Turkey to identify Turkish physician burnout studies that have been published.

Results: The databases search resulted in finding of forty-nine articles most of which were regional and only seven representing the nationwide perspective. A total of 12,598 physicians were evaluated in the surveys. The calculated mean values, supposedly roughly representing the total universe evaluated in all studies, were 18.3 for emotional exhaustion (EE), 7.9 for depersonalisation (DP) and 20.1 for personal accomplishment (PA), respectively.

Conclusion: There is a low level of EE, DP and a high decrease in the sense of PA in physicians working in Turkey. The overall burnout experienced by them is not very high, but also is not very low. Female physicians appear to be at higher risk for EE sub-dimension and the risk of burnout is reduced with increasing age or experience.

Key words: physician, burnout, review, Turkey.

..... She takes a deep breath, tries to ignore the gnawing pain in her upper abdomen and the headache from lack of sleep, glances at her notes, and realizes that the first patient is a fourth opinion for abdominal pain dating back more than 20 years. She throws her notes down on the floor and screams at the scheduler, "This is completely inappropriate! I am sick and tired of seeing patients with chronic abdominal pain. If this happens again I'll make sure you are fired.....'

Introduction and Aims

The concept of burnout, which can be seen with all its nakedness in the upper passage (1) an excerpt from a case report, is one of the important phenomena of recent times. The concept was first used in the novel "A Burnt-Out Case" (2), published in 1961, by the British writer Graham Greene. The novel is about an architect who collapsed psychologically, quitting his job and escaping to the African forests; describes how excessive exhaustion turns into anger towards work, and how the individual becomes hateful of his job. It was first used in science literature by H. Freudenberger. The article (3) published by Freudenberger in 1974 with his colleague G.North was based on the observations of volunteer staff at a free clinic for drug addicts. He defined burnout as a state of mental and physical exhaustion caused by overly demanding work environments, characterized by a series of signs such as fatigue, headache, insomnia, irritability, and introverted thinking. After the publication of Freudenberger's article, interest in "burnout" grew. C. Maslach defined burnout as emotional exhaustion (EE), depersonalisation (DP), and work-related personal accomplishment (PA). In 1981, C. Maslach and S. Jackson published the principle instrument (4), the Maslach Burnout Inventory (MBI), which is widely used to assess burnout today. Over time, Maslach's burnout conceptualization was also adopted by the World Health Organization (WHO), although there were some counter publications in the following period.

Burnout is not included as a separate diagnostic code in the current revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5); it is coded as ‘’Adjustment Disorders and Undefined Trauma and Stressor Related Disorders’’ (5). International Classification of Diseases (ICD-10) accepted burnout as one of the factors affecting health status and access to health services, and coded it under the subtitle “Z73.0 non-medical life management difficulties” (6). ICD-11, a code named “QD 85 Burnout” is available in the new version (7) and expresses the situation as follows: Burnout is a syndrome thought to be caused by chronic workplace stress that cannot be managed successfully. It is characterized by three dimensions; 1) energy depletion or emotional depletion; 2) increased mental distance from one’s work or negativity or cynicism about one’s job; and 3) reduced sense of professional satisfaction and personal accomplishment. Burnout specifically refers to phenomena in a professional context and should not be used to describe experiences in other areas of life. Apparently, the burnout code definition of ICD11 was taken almost exactly from MBI’s. MBI consists of 22 items, divided into three sections, each focusing on one of the three critical burnout patterns. In the answers given to the statements in the scale, it is scored as “never” 0, “very rare (several times a year) 1” “sometimes (several times a month) 2” “more time (a few times a week) 3” and “always (everyday) 4”. Statements evaluating EE and DP dimensions are negative and the PA dimension consists of positive expressions. In other words, while increasing scores in EE and DP sub-dimensions indicate burnout, decreasing scores in PA expressed burnout. 1,2,3,6,13,14,16,20th rank expressions were evaluated with EE dimension (score range 0-36); 5,10,11,15,22nd rank statements with PA dimension (score range 0-20); the statements in ranks 4,7,12,17,18,19,21 are related to the PA dimension (score range 0-32). Generally, a cut-off value was not determined in the evaluation of the scale and the scores were expressed separately in three sub-dimensions as mean ± SD. However, in some studies, an evaluation classifying the three sub-dimensions as lower, middle and upper groups express them separately in certain cut-off values also used. The translation in Turkish and validity study of this scale was conducted and published by C. Ergin from Hacettepe University in 1991 (8). Historically, MBI has focused on service professionals (teachers, social workers, health workers, etc.) working face to face with people (9, 10). The professional burnout has a special importance of people working in the field of health, because of the nature of the service they provide and the special group to whom they provide services. Burnout in this occupational group may cause the applicants not to meet their needs adequately and it may decrease the quality of health care. Among the healthcare professionals, there is an additional burden of professional, moral and legal responsibility imposed on physicians. Because of this burden, and moreover, due to their natural characteristics such as compulsiveness, perfectionism, denial of personal vulnerability, and being brought up by working in a medical culture based on delaying to achieve pleasure, physicians are more prone to burnout and even deny that they are exhausted. Therefore, it makes them a special and risky group that should be evaluated as separate from other healthcare professionals in terms of burnout.

In addition, all over the world in the last 30 years, shifting to marketing and to populist policies of the health service, the pressure of reimbursement institutions and the impossibility of fulfilling expectations created among the people who receive the service etc, all dominate the professional traditions of physicians, increase the workload and suppress their income. Also being surrounded by malpractice laws causes health professions to take precautions through increased use of laboratory or imaging and exaggerated detailed medical records during their daily practice (1). All of this results in the spread of burnout among physicians of pandemic-shaped proportions. As a matter of fact, a study conducted in the USA found that physician burnout increased from 45% to 54% between 2011 and 2014, but there was no such increase in other occupational groups in the same period (11). One of the largest studies published to date, involving 7,288 physicians thought to represent 814,000 physicians who are members of the American Medical Association (12), the highest rates of burnout were found in the emergency room (52%) and intensive care (50%) physicians and the lowest burnout rates, which can still be considered very high, were found in psychiatrists (33%) and pathologists (33%). In a study conducted by Shanafelt et al. (13), it was found that 45% of physicians experienced at least one dimension of burnout. In another large online physician survey (14), burnout prevalence was reported as 39.8%.

In this review article, by evaluating systematically and collectively studies examining physician burnout and accompanying factors in Turkey, we aimed to obtain a meta-perspective of the relevant literature or research to highlight the issues.

Material and Method

Databases in English and Turkish (Pub Med, Google Scholar, Ulakbim) were searched by using key words of ‘physician’, ‘burnout’ and ‘Turkey’ to identify Turkish physician burnout studies that have been published. For studies that were not in the first screening list but were included in cross references, a study-based secondary manual search was performed to reach relevant articles. Studies published in English or Turkish until June 2020, using MBI for determining burnout, available in full text and which included only physicians were selected. Each study was evaluated on a modified five-point Nottingham-Ottawa scale to assess bias risk. The risk of bias was assessed in five different areas: 1) representativeness of the sample (low risk - multiple institutions / specialties; high risk - single institution / specialization), 2) sample size (high risk - less than 200; low risk - 200 and above), 3) response rate (low risk - 80%; high risk - <80%), 4) assessment of burnout (low risk - use of MBI to assess burnout; high risk - use of a non-standard tool other than MBI) and 5) quality of reporting (low risk - burnout defined using predefined thresholds published in the literature; high risk - burnout prevalence defined using the authors’

own thresholds or no burnout reporting). Each criterion was scored 1 (low risk of bias) or 0 (risk of high bias), and the maximum score achievable was 5 (higher scores indicate higher study quality). The total numerical score of 3 points or less corresponds to a high risk of bias (low reliability). The authors independently assessed the risk of bias for each study, and conflicts were attempted to be overcome by a joint review meeting of the two authors. EE, DP and PA mean scores of each study were multiply by subject number of each study in the first step and secondly all finding numbers in first step added and divided to the total subject number of studies, to find an weighted average value that would roughly represent the universe. Since it was designed as a systematic review and collective evaluation of the published studies, it did not require any ethical committee and administrative permission.

Results

The article search in the databases resulted in finding 49 articles that met our inclusion criteria. The research tags and the results are summarized collectively in Table 1 (15-63). Most of those 49 studies were regional and the only seven studies represented the full nation which almost all of were limited to a specific specialty, except one including all physicians. A total of 12,598 physicians consisted of assistant physicians (in 21 studies), family physicians (in 7 studies), all physicians (in 13 studies), emergency physicians (in 2 studies), urology specialists (in 1 study), chest physicians (in 1 study), paediatric surgeons (in 1 study) and psychiatrists (in 2 studies), were included in the studies. The calculated mean values of means supposed to roughly represent the total universe evaluated in all studies, were 18.3 for EE, 7.9 for DP and 20.1 for PA. From aspects of the cut-off values determined by Ergin et al. (8), the calculated mean scores reflect low burnout in EE, in DP and high burnout in PA. The results were reported as percentage (%) in 6 studies (15,40,48,50,58,60), as according to the cut-off value grouping in two studies (40,48), and the overall burnout prevalence was presented in only two studies (15,50). All other studies preferred a presentation in the form of a mean± SD score. Many parameters were evaluated in terms of relation with burnout. In five studies (39,41,47,51,61), EE was higher in female physicians, in another six studies (34,28,42,43,50,61) DP was higher in male physicians, and in another four studies (23,38,49, 61) PA scores were lower in female physicians. Gender was evaluated with no relation to burnout in the remaining studies (16,18,20,21,24,44,45,46,48,57,58,59,60,62,63). In a study (25), PA of physicians over 40 years of age was found to be lower than physicians under 29 years old. However, other studies (19,22,26,30,32,33,42,44,50,51,52,55,56,61,62) reported that the risk of burnout decreased with increasing age. In nine studies (20, 21, 23, 46, 48, 49, 53, 57, 59), no relationship was found between age and burnout. Marital status was associated with burnout in twelve studies (16,34,38,41,42,45,46,49,52,54,56,61) and in thirteen studies (17,18,20,21,23,24,37,44,48,43,57,59,63) it was found to be unrelated. Presence and number of children was associated with burnout in three studies (38, 43, 56), and unrelated in five studies (16,20,21,53,59). Existence of hobbies, time allocated to hobbies, frequency of social activities and time allocated to social activities, reading non-medical books, going on regular vacation, regular sports, having leisure time, having good and sufficient time with the family, supportive social environment and not feeling lonely reduced burnout in 12 studies (15,16,18,19,25,26,37,42,44,48,52,60). Only two studies (15,21) that evaluated one or more of these factors were found unrelated to burnout. Neurotic personality traits, self-esteem, problem or emotion-oriented solutions and management strategies, mature or immature psychological defence mechanisms, depression-anxiety levels, history of antidepressant usage and sleep duration and irregularity, love of profession, and love of the chosen branch, effective factors in the process of profession selection (18,20,21,24,26-29,35,37,45-47,50,52,55,60,62) were all related to the burnout, while in only a few (18,46) were they unrelated. The presence of a diagnosed chronic disease was considered to be associated with burnout in some studies (28.47.61), and unrelated in others (24.37.52.53). Compatible, non-discriminatory, easily accessible consultant and manager-supported work environment with low risk for work accident or occupational disease, low stress and time pressure, was found to be associated with low burnout scores in eleven studies (20.24.26.37-39.44.47.49.52.60). Alcohol was related to burnout in some studies (16.50.59.61) and unrelated in other studies (20.45.48.52.53). Smoking was also associated with burnout in some studies (16 .20.37.48.50.52.59.61), and unrelated in a few others (45.53.57). Monthly income level was deemed unrelated in some studies (16.20.28.30.37.43.47.49.52) and it was related to burnout in some others (18.21.48.53.57.60). Weekly working hours, working in a shift manner, number of night-shifts, number of patients cared for daily, was related to burnout in lots of studies (16.18.20.22.26.29.30.33.34.39.42.47.48.53.55.59.60.61), and in a few studies (16.17.18.21.46.52) was unrelated. The total time spent in the profession was evaluated in lots of studies (21.22.26.32.33.34.38.42.43.45.49.55.56.59.61) related to burnout, and in some studies (16.17.18.20.23.24.46.48.53) it was considered unrelated. The history of exposure to physical and verbal violence was evaluated in five studies (16.26.33.36.41) and was found in all, of being associated with burnout. The city being worked in, the hospital, the unit, the branch, being academic staff or not, whether or not to undertake responsibilities as a manager, were all related to burnout in lots of studies (16,19,20,22,27,30,33 ,37,39-43,47,49-52,54-56,58,61-63) and it was evaluated unrelated in some others (15,17,18,23,48,53,57,59). The malpractice case story was the subject of a study (59) and it was considered unrelated to EE and DP, but related to PA.

Table 1. Surveys on physician burnout in Turkey (ND: No Data)

Name Year Ref. no	Place – region - city	Included doctors Number (N) Response-rate (%)	Burnout damnations				Nottingham-Ottawa scale
			Emotional exhaustion (EE%) mean±SD	Depersonalisation (DP%) mean±SD	Personal accomplishment (PA%) mean±SD	Overall Burnout mean±SD (OB%)	
D.Y.AKSOY 2014 (15)	ANKARA	Resident physicians N=55/100 Response-rate: 66% paediatrics internal medicine	18 % 17 %	6% 7 %	20.5 % 20 %	27% 33%	2
B.ERDUR 2015 (16)	DENİZLİ	Emergency room physician N=174/205 Response-rate: %85 male female	24.6±6.0 24.1±6.7	11.0±3.2 10.7±4.1	30.0±3.4 29.9±3.9	ND	3
A.GÜL 2017 (17)	NATİONWİDE	Physiciatry physicians N=201/? Response-rate: %? Pharmacotherapy Physicotherapy	24.6±6.9 23.2±4.6	10.5±4.1 9.8±3.5	19.5±5.1 18.1±4.2	ND	2
N. KARAOĞLU 2015 (18)	KONYA	Paediatrics resident N=74 Response-rate:%79	23.8±5.3	14.9±2.8	26.7±3.6	ND	3
Z.KOŞAN 2018 (19)	ERZURUM	All-physicians N=663/730 Response-rate: % 90	15.6±7.0	5.7±3.9	21.0±4.4	ND	4
E.PRİNCCİ 2015 (20)	ELAZIĞ	Resident physicians N=222/261 Response-rate: % 86	22.3±8.4	8.7±4.7	18.7±5.9	ND	3
N. TURGUT 2016 (21)	İSTANBUL	Resident physicians N=127/? Response-rate: %? 1.year 2.year 3.year 4. year	15.5±3.3 15.9±3.5 14.2±3.1 13.9±2.8	11.1±6.4 9.5±5.2 10.0±5.1 8.8±4.6	32.1±6.6 32.3±6.1 29.6±7.1 28.1±6.0	ND	2
M.ANIL 2017 (22)	İZMİR	Paediatrics resident N=102/111 Response-rate: % 91,8	15.8±6.4	10.7±7.8	32.9±12.5	ND	2

A.T. SUNTER 2006 (23)	SAMSUN	Practionary physicians N=85/112 Response-rate: % 75.9 male female	 14.6±5. 7 15.4±6.2	 4.5±3.0 5.4±3.2	 21.4±2.9 19.5±4.45	ND	2
Z.BAYKAN 2014 (24)	KAYSERİ	Family physicians N=143/280 Response-rate: % 51,1	16,1±7,2	4,3±3,2	21,0±3,7	ND	3
A.ARAS 2012 (25)	ERZURUM	Practionary physicians N=246/253 Response-rate: % 97	17.1±7.5	5.8±3.8	20.±4.3	ND	1
İ.TOKER 2015 (26)	NATİONWİDE	Emergency room resident N=160/410 Response-rate: % 40.7	21.3±6.4	10.2±3.9	19.8±3.9	ND	2
O.TAYCAN 2013 (27)	MUŞ	All-physicians N=139/207 Response-rate: %71.2	14.9±7.02	5.8±3.3	20.3±3.8	ND	3
C.SÖNMEZ 2018 (28)	DÜZCE	Resident physicians N=89/152 Response-rate: %58,5	27,7±7,8	12,7±4,1	27,6±5,0	ND	1
O.HURŞİTOĞLU 2019 (29)	K.MARAŞ	Resident physicians N=147/156 Response-rate: % 94	19.4	7.5	21.1	ND	2
M. ATİK 2019 (30)	NATİONWİDE	Chest-respiratory physicians N= Response-rate:?	11	7	20	ND	3
S.ÜNAL 2001 (31)	MALATYA	All-physicians N=384/593 Response-rate: % 64	14.0±6.0	5.3±3.1	20.5±4.2	ND	2
S.U. TANGÜL 2018 (32)	NATİONWİDE	Paediatric surgery N=98/176 Response-rate: %55 Non-paediatric surgery N=97/193 Response-rate: % 50	19.8±6.8 15.3±6.3	7,2±3,8 5.3±3.5	11.3±4.4 10.3±3.7	ND	2

S.ERSOY 2011 (33)	ANKARA	Emergency room Resident N=206/? Response-rate: %?				ND	2
		State Hospital	27.5 ±5,4	15,5±3,4	26.3±4.7		
		Univer. Hospital	24,6 ±5. 6	13.3±3,8	27.0±4.4		
A.EROL 2006 (34)	ANKARA	Resident physicians N=117/135 Response-rate: %86					2
		male	20.4±1.04	8.6±0.6	19.0±0.6	ND	
		female	19.1±0.92	6.7±0.6	18.9±0.8		
A.YILMAZ 2018 (35)	DİYARBAKIR	Family physicians N=343/? Response-rate: % ?	16,7±7,3	5,6±4,1	20.3±5,4	ND	3
H.T. YASAR 2020 (36)	ORDU	All-physicians N=310/? Response-rate: ?%	21,3±7,0 %79	7,9±3,4	20.1±3,7	ND	4
M.S. BOLAT 2019 (37)	NATİONWİDE	Urology physicians N=369/2000 Response-rate: % 18	16,8± 8,7	6 ±4,6	8,2±5,6	ND	2
Y.Ç.ABUT 2012 (38)	İSTANBUL	Anaesthesiology resident N=157/159 Response-rate: %98.7				ND	2
		male	19,3±5,8	7,4±4,4	21.0±5,4		
		female	20.4±0.9	6,1±3,9	22,7±4,8		
B.METE 2020 (39)	BİNGÖL	All-physicians N=119/150 Response-rate: %79				ND	3
		male	21,0±7,5	7,2±4,4	22,0±5,0		
		female	24,2±7,5	7,5±4,7	20,4±4,2		
H.CAN 2020 (40)	İZMİR	Resident physicians N=165 /? Response-rate: %?				ND	2
		Non-Surgery					
		low	9,4%	11,8%	11,8%		
		moderate	12,5 %	15,0 %	8,8 %		
		high	15,3%	24,7%	30,6%		
		Surgery					
		low	37,5 %	20,0%	33,8%		
		moderate	75,3%	63,5%	57,6%		
		high	50,0%	65,0%	57,5%		
B.SERİK 2016 (41)	SAKARYA	Family physicians N=157/258 Response-rate: % 60.8	17.5±7,1	5.4±3.4	21.1±3,9	ND	1
A.ÖZYURT 2006 (42)	İSTANBUL	All-physicians N=598/768 Response-rate: %78				ND	4
		male	13,3±6,3	4,6±3,4	22.6±4.4		
		female	13,5±6	4± 3,2	22.6±3.9		
R.ALGÜL 2016 (43)	İSTANBUL	All-physicians N=79/88 Response-rate: %89				ND	3
		Non-Surgery	12.8±6.8	7.4±3	8.7±3.2		
		Surgary	13.1±5.9	7.4±2.9	9.5±3.6		
A.D.ESEN 2015 (44)	İSTANBUL	Family physician resident N=46/? Response-rate: % ?	22.2±5.6	21.4±5.5	30.9±4.9	ND	1

H.YAMAN 1998 (45)	ANKARA	Family physician resident N=91/135 Response-rate: % 67	16.7 ±7.4	9.9± 5.6	26.1± 7.4	ND	2
H. ASLAN 1996 (46)	ADANA	Practionary physician N=101/? Response-rate: % ?	15.4±5,9	5,2±3,1	21,3±3,9	ND	2
M.N. İLHAN 2005 (47)	ANKARA	Resident physicians N=416/452 Response-rate: %96 Laboratory Non-Surgery Surgery.	 15.6 ±6.2 16.8±6.0 17.0 ±6.3	 5.6±3.99 6.3 ±3.59 7.1±3.5	 18.3±5.2 19.1±4.0 20.2 ±3.6	ND	4
M.ALİ KURÇER 2005 (48)	URFA	All-physicians working in a university hospital N=135/216 Response-rate:%62.5 low moderate high	17.4±0,6 80,3% 8,9% 9,1%	6.8±0,3 63,7% 27% 9,3%	20.7±0,4 67,8% 22,1% 8,3%	ND	2
N.HAVLE 2008 (49)	İSTANBUL	Physiciatry physicians N=226/? Response-rate: % ?	**18.8±6.3**	**5.4±3.6**	**21.4±4.8**	ND	3
J.C. SOLER 2008 (50) M. UNGAN	12 EUROPEAN COUNTRİES TURKEY SECTİON	Family physician N=1393/3500 Response-rate: %39 Family physician N=112/500 Response-rate: % 22.4	43% 15.2%	15.2% 35%	32 % 69.4%	12%	4
E.ÇAN 2006 (51)	TRABZON	Resident physicians N=192/215 Response-rate:%89.3 Non-Surgery male female Surgery male female	 12.3±3.4 11.6±4.9 8.5±5.7 12.3±7.9	 5.1±3.3 5.1±3.3 11.0±5.0 10.9±6.4	 12.3±3,4 11.6±4.9 12.3±3.4 13.1±5.	ND	3
S.BEYHAN 2013 (52)	ADANA	Anaesthesiology physicians N=87/? Response-rate:?	15,5±6.1	5,3±3,0	9,2±3,4	ND	2
M.BİRCAN 2005 (53)	KONYA KARAMAN AKSARAY	Physicians working in emergency room and ambulance N= 246 /? Response-rate:?	16,5±6.7	6,3±3,8	21,9±3,8	ND	2
K. MARAKOĞLU 2019 (54)	KONYA	Resident physicians and academic physicians N= 894/978 Response-rate: % 91	16.4±7.80	6.2±3.9	20.3±4.6	ND	4

G.ÖZKULA 2014 (55)	ANKARA	All-physicians working in a university hospital N=258/480 Response-rate:%53 male female	 22.7±8.1 24.0±7.2	 14.5±4.1 13.7±4.0	 30.0±5.0 29.9 ±4.6	ND	3
G.ÖZTÜRK 2012 (56)	ANKARA	Physicians attending to the army N=215/ ? Response-rate: % ?	21,8±5,3	9,6±3,1	17,3±3,9	ND	3
K. MARAKOĞLU 2013 (57)	KONYA	Resident physicians **N=160/200** Response-rate: % 80	**17.7±7.2**	**6.7±3.6**	**20.1±4.3**	ND	3
E. DİKMETAŞ 2009 (58)	SAMSUN	Resident physicians N=270/510 Response-rate: % 52,9	2,9/5	2,9/5	2,9/5	ND	2
Ö. GÖCEN 2018 (59)	DİYARBAKIR	Resident physicians N= ? /200 Response-rate:?	31,5±11,6	11,7±6,4	29,4±7,7	ND	4
R.DABAK 2007 (60)	İSTANBUL	Resident physicians N=52/? Response-rate:? high moderate low	 %67.3 %32.6 0	 %51.9 %48.08 0	 %63.4 %17.3 %19.2	ND	2
D. ASLAN 2005 (61)	NATİONWİDE	All-physicians N=1754/? Response-rate%?	15.4±6,7	5.5±3,5	22.0±4.0	ND	4
R. BUĞDAYCI 2003 (62)	MERSİN	All-physicians N=455/500 Response-rate:%91 male female	 12,7±6,1 12,6±5,5	 4,1±3,2 4,1±3,0	 23,2±4,8 22,5±4,1	ND	4
N.Ç.ORAY 2013 (63)	İZMİR	Resident physicians N=189/523 Response-rate: % 36	19,1 ± 8,3	18,9± 7,7	24,3 ± 6,2	ND	2

Discussion

In this part of the article, most extreme values determined included in the studies will firstly be discussed regarding the meanings of, the causes of and the possible consequences of. Following, Turkish physician's burnout prevalence based on the calculated mean values will be presented in comparison with the values reported from other countries. Each parameter in relationship with burnout has been reported in the results section, and will be discussed in the next step, to reveal the exact or the closest to exact situation about accompanying factors of burnout by comparing meta-analyses' findings in the international literature if it exists, if not, by comparing the findings of the studies with high definition power depending on the design, sample size and the statistical method used. Later, the limitations of the included studies will be discussed and some suggestions will be put forward to avoid the limitations in future studies. The highest EE scores were determined in the study of Ersoy (34) which evaluated emergency medicine assistants in Ankara in 2011, and in the study of Sonmez (28) in Düzce in 2018, which included assistant physicians regardless of their branch. In both studies, the limited number of residents who were subject to heavy, long working and training hours were evaluated, and in one of them only emergency medical assistants working in a department which is in the most difficult areas to manage chronic workplace stress were included, and may explain the high points. In addition, there was found to be higher burnout levels in young physicians in many

previous studies. Assistant physicians are a relatively young population. But interestingly, contradicting these findings and explanations, the lowest EE score was determined in the 4th year assistant physician group in the study of Turgut (21) in 2016, in which he evaluated the assistants in Istanbul. How should it be discussed that while the highest and the lowest EE score was determined in the three assistant physician studies which did not show a significant difference in terms of sample size, average age, gender distribution and statistical methods used? Perhaps the 4th year assistants answered the questionnaires with the optimism of it being the end of hard work and training period and / or living in a metropolis of Istanbul, the feeling of being in the center may also have created a certain optimism. However, it should be borne in mind that may be an accidental finding. The highest DP scores were determined in two (18, 33) studies conducted on small samples that would cause us to approach these extreme values with suspicion. The lowest DP score was reported by Baykan (24) among family physicians in Kayseri in 2014. This value is less suspicious as it is very close to the values reported in other studies involving family physicians, general practitioners and all physicians in Table 1. The highest PA scores were in the study of Anil (22) where he evaluated paediatric assistant physicians in İzmir in 2017, and Turgut's study (21) conducted among assistant physicians in the second year of the assistant group, in Istanbul in 2016. The extreme PA points may reflect the reality depending on 1) the close memory of assistant physicians' passing a challenging selection exam such as TUS, 2) living in centers such as Izmir or Istanbul, and 3) PA is the last parameter affected by the development process of professional burnout. The lowest PA score was also in Erol's study (34) which included assistant physicians in Ankara in 2006, overshadowing the arguments speculated above. However, the value was only in the female assistant physicians group causing weakness of the overall representation power.

The calculated mean values of means, representing the total universe evaluated in all studies, were 18.3 for EE, 7.9 for DP and 20.1 for PA, respectively. According to the low, medium and high cut-off values determined by Ergin et al. (8) for each burnout subcomponent, there is low burnout in EE and in DP, while the score in the PA subscale reflects high burnout. Burnout values reported from many countries are expressed in subscales and the overall burnout rate as a percentage. The situation makes it difficult for us to discuss the physician burnout in our country in comparison with the prevalence of physician burnout in the world. Portuguese (64) anaesthesiologists were evaluated in a study; EE was reported as 57% and DP 91%. In contrast, Spanish (65) anaesthesiologists reported an overall burnout rate of 13%. In the Netherlands (66), the overall burnout rate for anaesthesiologists was 18%. In Spain (68), overall burnout among family physicians is 35% was reported. In a study conducted on a group of approximately 500 Hungarian (69) family physicians, there were scores of 30% EE, 60% DP and 80% a low PA score. In Switzerland (70), moderate or high burnout is defined in 1/3 of approximately 1,800 family physicians. Another study conducted in Switzerland (71) to compare burnout syndrome prevalence among oncologists, paediatricians and family physicians, EE was detected in 33% of all groups examined. In 2008, in a study (50) covering nearly 1,400 family physicians from 12 European countries including Turkey, of the physicians studied, 43% reported high EE, 35% high DP and 32% low PA. Only one third of the physicians did not exhibit any sub-dimension of burnout. High and moderate burnout syndrome was detected in 80% of Polish (72) radiologists. High degrees of EE were also reported among Italian (73) psychiatrists. In New Zealand (74), two-thirds of psychiatrists exhibited moderate or high EE and low PA. The prevalence of burnout syndrome among Brazilian (75) oncologists was reported as 69%. In a group of American (76) oncologists the rate of burnout was 36%. The rate of burnout was 35% of gynaecological oncologists in Australia (77) and a high degree of EE was shown in about 50% of them who had considered a job change in the past 6 months. A study (78) conducted in a group of 7,715 oncologists in the USA found significant burnout in 60% of physicians. Of orthopaedics and trauma surgeons in Saudi Arabia (79) 50 % had high EE and DP. In a study among primary care physicians in the UK (80), it was found as 46% EE, 42% DP and 34% PA. In the UK (81), in a study covering more than 500 surgeons, one third were exhausted and it was determined that most of them were thinking of early retirement without waiting for the age. In a systematic review (82) of 182 studies involving 109 628 physicians from 45 countries found considerable variability in published prevalence of burnout that ranged from 0% to 80.5% and it was also found to have at least 142 different definitions to meet the total burnout or burnout subscale criteria. So, there was no consensus on burnout evaluation. It was emphasized that the heterogeneity among the studies evaluated was at a level that would make it question whether any prediction of prevalence for burnout could be interpreted meaningfully. As seen, both from our country and from other countries, physician burnout figures are quite heterogeneous. As it changes in country, region and branch, the heterogeneity increases which makes it impossible to compare and discuss.

In physician burnout studies in Turkey, including our review, many potential accompanying factors with burnout divided into three basic groups as demographic-individual, organisational and occupational factors, were analyzed. When gender, one of the demographic-individual factors, was evaluated in terms of burnout in Turkish physicians, EE was found to be higher in female physicians in five studies, DP higher in male physicians in six studies and PA lower in female physicians in four studies. In other studies, gender was evaluated as unrelated to burnout. Similarly, while gender is not an independent determinant of burnout in many studies in the international literature, it has been reported that female physicians have 20-60% higher burnout rates than men in some studies (83). In a Norwegian study (84) examining risk factors for physician burnout, higher levels of burnout were found in female physicians and it was discussed as possible work-home conflict. A study examining differences in burnout and career satisfaction between male and female surgeons in

the US (85), including 7,858 surgeons, and found that 43% of women experienced burnout compared to 39% of men. Although the low response rate (32%) caused a potential bias, the relatively large sample combined with rigorous statistical analysis including logistic regression reinforces the validity of this study. In another study including 7,197 surgeons across the USA (86), burnout was found to be significantly higher in female physicians. In contrast, in a European (50) study burnout was reported to be more common among men. However, in this study, the sample size was smaller than in US studies. In addition, the questionnaire was translated into many languages, but they did not use a professional translator service, instead they relied on family physicians who coordinated the work to translate MBI into their native language. This raises great doubts about the accuracy and consistency of the translation. In the light of all above information, we can say that gender does not have a definite and clear effect on occupational burnout as an independent variable. Yet, female physicians appear to be at higher risk in terms of EE and PA subscales, and the DP dimension may be more prominent in males. The issue of age is also controversial in its relationship to burnout, as is gender. Initially, burnout was thought to be a late career phenomenon, but in recent studies it has begun to be reported more frequently that younger physicians have a higher risk of burnout than their older colleagues (87). In a study included in our review, the average PA score of physicians over 40 years was found to be lower than physicians under 29, supporting the late career phenomenon claim. However, fifteen studies that found a relation between aging and professional burnout reported that the risk of burnout decreases as age increases. Nine studies found no relation between age and burnout. One US study (86) found that the risk of burnout decreases with increasing age. A cross-sectional multicenter European study (50) showed a significant association between age or years of graduation and burnout, in that increasing age and years of post-graduation decreased burnout. In another study (88), no significant relationship was found between burnout and age. However, the participants in this study were predominantly consulting physicians, with only 4% under the age of 39, which makes the study less representative for age. As a result, we can say that the risk of burnout decreases with increasing age and experience, and generally, the evidence shows that burnout is more common among young doctors. The twelve studies evaluated in this review, found a relation in burnout with marital status, while it was reported unrelated in thirteen studies. The status and number of children were evaluated to be related to burnout in three studies, and unrelated in five studies. In a systematic review (89) conducted in the UK, being single was associated with burnout in six studies, but not in one study. Having children was associated with less burnout. In a study by Woodside and colleagues (90), conducted among psychiatry and family medicine residents, residents with children had lower burnout scores than childless residents, regardless of gender. This was in line with the relatively large international study of Jovanović and colleagues (91) that found that severe burnout was 44% higher in psychiatric residents without children compared to those with children. However, Martini and colleagues (92) found no relation between marital or parental status and burnout. Jugale (93), Shetty (94) and Sreelatha (95) found that unmarried people were more likely to have burnout. According to all those findings, we can think that being married with children provides social support and has a protective effect on burnout. However, some studies (96) have shown that being married and having children (more prominently in female physicians) increases burnout, and a possible interpretation for this situation is home-work or work-home conflict due to the difficulty of coping with other tasks while being subjected to a significant workload. For example, in a review of 47 articles (97), home-work conflict was a common theme affecting the burnout rate. A study involving surgeons in the USA (85) found that 62% of women experienced a job-house conflict in the last three weeks compared to 49% of men, and higher rates of burnout were found in women who experienced work-home conflict. Work-home conflict has been identified as an independent risk factor for burnout, especially among female surgeons. The US team conducting this study expanded the hypothesis to other specialties of the non-surgical discipline with a design that included 465 internal medicine doctors to validate the importance of work-home conflict. In this study (98), physicians who experienced work-home conflict in the last three weeks had a higher rate of reporting symptoms of EE or DP. In a cross-sectional study (99) in which 3,196 physicians in France were evaluated, it was calculated that work-family conflict increased the risk of burnout four times. In the studies included in our review; existence of hobbies, time allocated to hobbies, frequency of social activities and time allocated, reading non-medical books, going on regular vacations, doing regular sports, having leisure time, having good and sufficient time with family, supportive social environment, and not feeling lonely were found to lower burnout rates. Only two studies that evaluated one or more of these factors showed un-relation to burnout. In a study evaluating the relationship between American surgeons' living habits and burnout (86), regular exercise was associated with a lower risk of burnout. Also, surgeons who reported high levels of participation in personal health strategies (such as going on vacation and having a positive attitude) had a lower risk of burnout. Although it is thought that physicians who participate in these health strategy programs and pay more attention to their personal health have a reduced risk of burnout, these results may also be a manifestation of selection bias, i.e. there are personality organizations who are geared towards reducing the risk of such individuals' lifelong suffering, and the relationship described in this regard may be entirely due to this situation. Lefebvre (100) reported that regular exercise is associated with a reduction in burnout in residents. In a review of psychiatric residents (101), the absence of extra-curricular social activities and hobbies was associated with higher levels of burnout. In our review, neurotic personality traits, self-confidence, problem or emotion-oriented solutions and management strategies, mature or immature psychological defence mechanisms,

depression-anxiety levels, history of antidepressant use, sleep time and irregularity, love of the profession and the chosen branch, satisfaction with the profession, and effective factors in the career selection process etc, was associated with burnout in eighteen studies, while it was unrelated in two studies. In the international literature, career satisfaction was found to involve less burnout in those who had self choice of profession and who wanted their children to turn to the same career, while the desire to leave the profession before retirement was found to be associated with higher burnout (96,97). Ripp et al. (102) reported that physicians who described themselves as anxious, disorganized, or less calm had significantly higher burnout rates. Similarly, Eckleberry-Hunt et al. (103), in a study involving physicians from 13 different specialties, found that personality traits such as pessimism and perfectionism, lack of coping skills, lack of autonomy, inability to cope with time pressure, and poor relationships with colleagues increased burnout. In the same study, the use of prescription antidepressants or anti-anxiety medication was associated with a lower risk of burnout. Shapiro et al. (104), on the other hand, reported that burnout and loneliness were related in a dose-dependent manner. In most studies in which depression, anxiety, and post-traumatic stress disorder were evaluated with specific scales, it was shown that all three conditions were associated with burnout (105). Extraversion, compliance, conscientiousness, and openness are associated with lower levels of burnout, while neuroticism is linked to higher burnout (104). Increasing self-efficacy levels are associated with low levels of burnout (96). In a study based on self-reporting, chronic insomnia (98), and suffering from sleep disorders were associated with burnout. In this review, the presence of a diagnosed chronic disease was considered to be associated with burnout in three studies, and unrelated in four. In some international publications, higher burnout points were found in those with illness and related work attendance problems (100). In addition, those who reported lower physical and social quality of life also reported higher burnout, while those who reported high physical capacity and good general health condition were found with lower burnout (86). Working environment with low risk of work accident or occupational disease, low stress and time pressure, harmonious, non-discriminatory, easily accessible consultant and manager-assistance was found to be associated with low burnout scores in 11 studies included in our review. Poor working relationships and conflict between colleagues were found to be associated with higher burnout scores. Similarly, in the international literature, it has been emphasized that prioritizing appropriate feedback and supportive attitudes towards colleagues who perform poorly in the work environment is associated with lower burnout, while environments with lack of administrative support, which prioritize embarrassment by confronting mistakes and a culture of bullying to crush, are associated with higher burnout. A multi-specialty study showed that increased sense of belonging to the institution or team was associated with lower burnout. Also, surgeons who had access to mentoring had lower burnout levels (94, 96, 101). Alcohol was considered to be related with burnout in four studies included in our review, and unrelated in five studies. Smoking was deemed to be associated with burnout in nine studies and unrelated in three studies. In the international literature, physicians with a history of substance abuse (including smoking and alcohol) had a higher risk of burnout (97). Monthly income level was deemed to be related with burnout in nine studies and unrelated in six studies included in our review. In the international literature, lower income is also associated with higher levels of burnout. A study of orthopaedic assistants showed that debt burden and financial concerns were associated with higher burnout. Conversely, two small studies in Fiji and Saudi Arabia found that income did not make a difference in burnout levels (79,106). Estryn-Behar et al. in a study (99) in which they evaluated emergency physicians in terms of job satisfaction, showed that doctors who stated that their earnings were insufficient had a higher burnout risk. Another study (99) conducted in France showed that physicians who found their earnings insufficient were more likely to suffer from burnout. In the eighteen studies included in our review, weekly working hours, shift working, number of night shifts, number of patients cared for per day were considered to be related to burnout, whereas in six studies it was unrelated. Studies in the international literature also show that burnout is generally associated with increased workload and long working hours. Self-report criteria were used in most studies to determine the working hours. In a review article, four studies independently associated long working hours with burnout, while two studies reported that a correlation was detected in univariate analysis, but this relationship was not verified in multivariate analysis. In two longitudinal studies that were the subject of the same review article, a significant decrease was found in burnout scores after the adjustment of shortening in working hours. No correlation was found between working hours and burnout in eight studies included in the same review article (89). Al-Dubai and Rampal (107) found a significant relationship between the prevalence of burnout in physicians and long working hours (working over 40 hours per week). The findings of Stodel and Stewart-Smith (108) supported this hypothesis. They showed that long working hours were the third most common cause of burnout and accounted for 16% of cases, whereas workload was the most important cause and accounted for 26% of cases . A study involving general practitioners, paediatricians, and cancer physicians in Switzerland (71) showed that physicians working more than 50 hours per week had a higher risk of having burnout. A study evaluating hospital consultant physicians in New Zealand (74) revealed that consultants who work long hours are at increased risk of burnout. In the studies included in our review the following factors; hospital, unit, branch, academic staff, and whether or not to undertake responsibilities as a manager, were evaluated in terms of relation to the burnout. It was found related in twenty four studies while it was found unrelated in eight studies. In some publications in the international literature, academic and research studies have been found to be protective against burnout (89, 90, 92, 96-99,101,103). In one study, working as a clinician or as research staff did not make a difference regarding burnout (107). In terms of branches

and units; in a sample of 7,288 physicians, the highest burnout rates were found to be 52% in emergency room physicians and 50% in intensive care physicians, while the lowest burnout rates are still very high in 33% of psychiatrists and 32% of pathologists (12). The history of physical and/or verbal violence was evaluated in the five studies included in our review, and it was associated with burnout in all of them. The malpractice case story was the subject of a study and it was found not related to EE, but related to DP. Similarly, conflict with patients and high patient expectations are associated with burnout in the international literature. Being accused of wrong treatment is associated with higher burnout in neurosurgeons. Medical errors have been shown to be independently associated with burnout in a large and multi-disciplinary study and in a smaller study involving only orthopaedic-trauma surgeons. A similar correlation has been found in plastic surgeons (96-99).

It is important to note that although the factors associated with burnout have been discussed individually and independently, they may actually be interrelated. For example, age and working hours may be linked through work environments governed by established coercive traditions in teaching hospitals, where young physicians are faced with more pressure to increase their knowledge and skills through practice. In addition, lack of experience can increase the time it takes to complete tasks and thus increase working hours.

This article is the most comprehensive example of its kind in the national literature with its scope, which uses studies that describe burnout rates and related factors in physicians in our country with different specialties and degrees, and tries to analyze these findings in comparison with international literature data. However, there are some important limitations worth highlighting. The vast majority of the literature reviewed consists of cross-sectional studies using questionnaires sent to participants online or by mail. In some, the number of participants, in others the response rate, is low enough to make the results questionable. In some study reports, the response rate is not specified. Most of the studies made no effort or no explanation in the report to increase the response rate by sending reminders or repeating questionnaires. Unresponsiveness or bias may have affected the results. That is, those who already suffer from burnout and are interested in the topic are more likely to have completed questionnaires. On the other hand, it is possible that others did not complete the questionnaire due to burnout. Although cross-sectional survey studies are useful in enabling the examination of very large samples, they make it difficult to confirm the existence of a cause-effect relationship. An example of this is the relationship between low job satisfaction and burnout. While researchers suggest that low job satisfaction is a risk factor for burnout, it is possible that burnout is a risk factor for low job satisfaction, or drop satisfaction itself is a symptom of burnout. The same is true for the relationship between burnout and work-home conflict. In addition, although the most frequently used scale is MBI, the usage of a modified or a shortened version of the scale makes it difficult to evaluate both collectively and comparatively with the findings of the literature. The fact that the percentage values are not included in the research reports, result in the same difficulty. In studies I to be conducted in our country in the future it is preferred they use the MBI and the translation and validity study to be conducted by Ergin (8), and the prevalence of burnout must be expressed in the subscales and the overall burnout as percentage. In this regard, it will mediate a unity of understanding and terminology. The choice of research techniques that will reveal the causal-effect relationship more clearly and reliably than cross-sectional studies will be the basis for determining the factors associated with burnout.

Although it is very difficult to reach reliable or definitive conclusions, we can say that there is a low level of EE, a low level of DP and a high decrease in the sense of PA in physicians working in our country. The overall burnout reported by those is not very high, but also is not very low. When the many factors were reviewed in terms of the relationship with burnout, many contradictory findings were encountered. Yet, we can say that female physicians appear to be at higher risk for EE sub-dimension, and the risk of burnout is reduced with increasing age or experience. There is an urgent need to conduct studies in large samples representing the physician population throughout the country to define burnout prevalence and accompanying factors, especially reversible ones for design of certain intervention program of physician burnout.

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Islamic Religion and Psychoanalysis: An Overview

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Abstract

Religion is an important constituent of a person's identity. All religions share some common features that affect the analyst and the analysand's reactions (1). All major religions contain ideas about human motivation, interpersonal relations, and moral behavior that reflect a specific view of human nature (3). Many psychoanalysts have focused on religion's impact on therapy; both positive and negative, and some psychoanalysts and psychoanalytic thinkers have written more recently on Islam. In this review, we conduct an overview of the Islamic religion and psychoanalysis. We conclude that the outcome of the psychoanalysis of Muslim patients may go either very well or very poorly, and that Islam, per se, presents no major obstacle to psychoanalysis.

Introduction: Religion is an important constituent of a person's identity. All religions share some common features that affect the analyst and the analysand's reactions (1). Some have mistakenly believed Islam to have been dismissive of psychopathological phenomena, but it has expanded beyond a limited psychopathological viewpoint, and has widened the horizons of psychoanalytic teachings (Fayek, A., 2004).

Some psychoanalysts and psychoanalytic thinkers have written more recently on Islam. Historically, psychoanalysts have not made Islam a significant object of study or concern.

This article presents an overview of the Islamic religion and psychoanalysis.

Key words: Islam, Psychoanalysis, Therapy

Demographic Background

Islam emerged from the Arabian Peninsula in the 7th century. People who follow Islam are called Muslims. They represent 23% of the total world population. It is commonly found in the Arabian peninsula, the Near and Middle East, North Africa, and major parts of Asia, comprising more than 50 countries. As it spread to different peoples and nations, its beliefs were influenced by the different religious and cultural identities it encountered. Given its enormous spread, Islamic communities have had to deal with the sociohistorical impact of the introduction of Islam into their pre-Islamic beliefs and culture (14).

The Islamic religion and psychoanalysis

All major religions contain ideas about human motivation, interpersonal relations, and moral behavior that reflect a specific view of human nature (3). Many psychoanalysts have focused on religion's impact on therapy, both positive and negative. For example, Freud's rather negative view of religion is that God arises out of Oedipal Conflict, where a powerful father provides for and makes demands upon those under his care, while other psychoanalysts argue for a more positive interpretation, some defining faith as a state of relatedness to an object whose dimensions exceed the reach of our affective or cognitive grasp (8). Consequently, a psychoanalyst's view of religion's impact on therapy will vary depending on which psychoanalytic thinking the analyst follows.

Islam, like other major religions, praises self knowledge, values morality and transcendence, and teaches the primacy of meaning. Psychoanalysis similarly seeks deepening of self-knowledge through introspection, searching for value, and the personal meaning of one's experiences (8). Islam has a deterministic view of human life, which may resemble Freud's doctrine of psychic determinism. For a Muslim, God knows everything about the individual from infancy to death. And the Muslin prioritizes community needs over their needs. In addition, faith is regarded as a transformative force, able to perform miracles, and this is core to a Muslim believer's integrity and sense of self (8). These factors may inhibit therapy as the patient may deny having issues or the need to change.

Studies show that personality development in Muslims is similar to that of other religions. Personality is conceptualized as a configuration of cognition, emotion and habit, activated when situations stimulate their expression (7).The Islamic view centers around the Islamic 'self' (Nafs), which encompasses heart (Galb), spirit (Ruh), intellect (Aql) and desire (Irada) (10). The Nefs has different levels. At a superficial level, it corresponds to the psychological ego. At a lower level, it encompasses all the basic qualities of an individual, including physical appetites and any inclination toward evil or undesirable behavior. At the deepest level, it represents the individual's conscience; roughly it may correspond to Freud's superego (3), but the Islamic superego may differ from it.

Thus the Islamic view of mental structure, is difficult for a traditional psychoanalyst to grasp, and posing an obstacle to therapy, it would at the same time aid a therapist in working with a Muslim client if properly understood. It is also the case that some Islamic traditionalists believe that new knowledge may lead to harmful innovation and the unknown (10), which may perhaps explain why some Muslims don't seek psychoanalytic therapy.

In Islam, as in other faiths, self-sacrifice and the suppression of forbidden impulses require constant vigilance. Psychoanalytic treatment may indeed facilitate and enhance spiritual growth and faith (8) to bridge this gap.

In order to facilitate therapeutic process, psychoanalysts wishing to work with Muslim patients ought to be familiar with the above-mentioned factors, and have a grasp of the various cultural peculiarities and moral and gender boundaries which determine what is permissible in public and in private (8). Failure to do so, may negatively affect the therapy.

Conclusion

We conclude that psychoanalysis with Muslim patients may go well or poorly, but understanding Islam's view of mental structure is a good starting point for the therapist who wishes to work with a Muslim patient. While there may not be any major intrinsic obstacle in Islam for the successful practice of psychoanalysis, there are few case reports of Muslims in psychoanalytic therapy, and so it is premature to arrive at any final conclusion. Therefore, we recommend further studies.

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Subclinical Hypothyroidism: Management in Primary Care - To treat or not to treat?

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Abstract

Subclinical hypothyroidism (SCH) is a relatively common condition, and it increases with age. A proportion of SCH patients will go on to develop overt hypothyroidism. Furthermore, there is concern that SCH increases the likelihood of extra thyroidal illness, such as cardiovascular disease. The diagnosis of SCH is a biochemical one, and given the common use of blood tests where thyroid function may be one component, the primary care clinician needs to understand what to do when a patient appears to have SCH. There are a variety of guidelines about the management of SCH for non-pregnant adults. The clinician needs to be aware that certain conditions can cause transient aberrations of thyroid blood test, and of those with persistent SCH, which patients might benefit from treatment and which would be better served with observation over time.

Key words: Subclinical hypothyroidism; Hypothyroidism; Levothyroxine

What is Subclinical hypothyroidism?

Subclinical hypothyroidism (SCH) is a biochemical diagnosis characterized by an elevated serum TSH but a normal free T4 [1]. It represents a compensated state in which increased TSH output is required to maintain normal circulating thyroid hormone levels [2].

SCH has been reported in 5–10% of the population, being more common in women and increasing with age [3]. It is thought to affect approximately 1% of people younger than 70 years of age and 6% of people by 80 years [4]. A study conducted in 2011 in Libya reported the prevalence of subclinical hypothyroidism as 2.3% [5] and the prevalence of subclinical hypothyroidism was 5.98% among females and 4.40% among males in Jordan [6].

The most common cause for SCH is chronic autoimmune thyroiditis [7] where thyroid peroxidase antibodies will be positive. Transient increases in TSH can occur in conditions like subacute thyroiditis, or during recovery from a non-thyroidal illness or when taking medication like lithium or amiodarone [3].

As symptoms are frequently absent in SCH, and free T4 is within the normal reference range, uncertainty exists as to whether there is any benefit from increasing those hormones with replacement therapy [4]. The International Classification of Diseases (ICD) does not provide a separate code for SCH; instead, it is usually labelled as “hypothyroidism, unspecified” [8].

TSH level

TSH is a frequently requested investigation. For instance, although the prevalence of hypothyroidism is estimated to lie between 1-2 % in the UK [9], approximately 25% of adults have thyroid function tests every year [10]. The normal reference range in non-pregnant patients is typically cited as between 0.4 and 4.0 mU/l [11]. By convention, a reference range usually only comprises 95% of a reference population, hence 5% of 'normal' will be outside of that range [2]. The reference range for TSH varies in different ethnic communities, pregnancy and by age [12].

SCH is generally classified into a mild version with TSH levels in the range 4.0 and 10.0 mU/l or a severe version with TSH greater than 10.0 mU/l [13]. 90% of cases of SCH occur in the serum TSH range of 4.0–10.0 mU/l [14]. TSH levels can return to normal in 6–35% of cases of SCH [13]. This reversion to normality is more likely within the first two years of diagnosis, and if the TSH level is less than 10mIU/l and there are no antithyroid antibodies [2].

The reference range used in pregnancy is different and varies according to the trimester [15] and discussion of the management of SCH in this subset of the population is outside the scope of this article.

Symptoms of SCH

The relationship between symptoms suggestive of thyroid hormone deficiency and the biochemical finding of subclinical hypothyroidism is not clear [1]. Symptoms attributable to hypothyroidism, such as weight gain and lethargy can occur in up to 25% of the healthy population, and approximately a third of patients with SCH have no symptoms at all [16]. Although the term subclinical implies that patients with SCH should be asymptomatic, this is difficult to assess, especially in patients with nonspecific complaints such as tiredness who undergo a TSH check [2]. The most frequent symptoms reported were problems with memory, constipation, slow thinking, tiredness, hoarse voice, puffy eyes, feeling colder, muscle weakness and cramps and dry skin [16].

Health consequences of SCH

In the general population, the lifetime risk for developing clinical hypothyroidism has been calculated to be 2.3%, with women having greater risk (3.5 vs 1.0% in men) [17]. Often symptoms develop insidiously, are non-specific and can remain unrecognized for prolonged periods [18]. Untreated hypothyroidism can lead to a variety of symptoms including hair loss, cold intolerance, weight gain, depression, constipation, lethargy, and outcomes like thyroid cancer and even death [19].

It is estimated that 5–8% of people with SCH per year will progress to overt hypothyroidism [13]. In a prospective study of 82 female patients with SCH, after a ten year follow up, the incidences of overt hypothyroidism were 0%, 42.8%, and 76.9%, when the initial TSH was 4-6mU/L, >6-12 mU/L, >12 mU/L, respectively [20]. In patients who have circulating thyroid peroxidase antibodies, there is also a greater risk of progression from subclinical to overt hypothyroidism [21].

SCH may be associated with an increased risk of cardiovascular disease, especially when the serum TSH concentration is above 10 mU/L [22]. Epidemiological studies have demonstrated an association between coronary heart disease and SCH in younger people [23]. In a study of 1100 consecutive patients with heart failure, those patients with SCH, compared with those who were euthyroid, had impaired exercise capacity, higher pulmonary artery pressures, and increased cardiovascular events [24]. In a cross-sectional study of 25,862 participants (median age 56 years), patients with TSH between 5.1 and 10 mU/L had significantly higher mean total cholesterol concentrations than those with normal TSH levels [16].

In an observational study of 47,573 adults (3,451 had SCH) spanning fifty years, there was an increased risk of fatal stroke in the age groups 18-49 and 50-64 years, with a HR of 4.22 (95% CI, 1.08-16.55) and 2.86 (95% CI, 1.31-6.26), respectively (p trend 0.04). No increased risk was identified for those 65-79 years old (HR, 1.00; 95% CI, 0.86-1.18) or ≥80 years old (HR, 1.31; 95% CI, 0.79-2.18). There was a pattern of increased risk of fatal stroke with higher TSH levels [25].

In a cross-sectional study assessing nonalcoholic fatty liver disease (NAFLD), 30 and 36 percent of individuals with subclinical or overt hypothyroidism, respectively, had typical ultrasonographic findings of NAFLD (versus 20 percent of controls), while 20% and 26% of individuals with subclinical or overt hypothyroidism had abnormal liver enzymes [26].

However, in a recent systematic review and meta-analysis of RCTs in nonpregnant adults with subclinical hypothyroidism, thyroid hormone therapy was not associated with benefit regarding general quality of life, thyroid-related symptoms, depressive symptoms, fatigue/tiredness, cognitive function, muscle strength, blood pressure, or body mass index [27].

A case-control study in which patients 65 years or older with TSH levels of 4.2-10mU/L who died in the years 2012-2016 ('cases') were compared with matched individuals who did not die during this period ('controls'). Use of levothyroxine was compared between groups. On multivariate analysis, treatment with levothyroxine was associated with significantly increased mortality (HR=1.19 CI 1.03-1.38) [28].

A guideline panel recently issued a strong recommendation against thyroid hormones in adults with SCH. The recommendation does not apply to women who are trying to become pregnant or patients with TSH >20 mU/L, and the panelists considered the recommendation may not

apply to patients with severe symptoms or young adults (such as those ≤30 years old) [8].

Guidelines for managing SCH

There are several guidelines for the management of SCH in non-pregnant individuals [8]. Relatively recent guidelines have been produced by UpToDate [22], NICE [29] and the European Thyroid Association [30].

UpToDate

TSH less than 7mIU/L:
• Treat if aged less than 65 to 70 years with convincing symptoms of hypothyroidism.
• For patients who are older, the TSH values are considered age appropriate, and treatment not recommended,

TSH 7-9.9mIU/L:
• Treat if aged less than 65 to 70 years because of the reported increase in cardiovascular mortality with that level of TSH.
• Treat if older than 65 to 70 years only if there are convincing symptoms of hypothyroidism

TSH 10mIU/L or greater:
• Treatment is recommended due to the risk of progression to overt hypothyroidism and the association with atherosclerosis and myocardial infarction.

Treatment:
Aim to reduce patient's serum TSH concentration into the age-appropriate reference range.

There are two suggested regimes of LT4:
• Start at a low dose to avoid overtreatment, typically 25 to 50 mcg day. This approach is suggested for older adults or if there is underlying cardiovascular disease.
Or,
• Initiate treatment at slightly below full replacement doses (1.6 mcg/kg/day) depending on the cause of the subacute hypothyroidism.

Follow up:
• TSH is rechecked after 6 weeks and increments of 12.5 to 25mcg per day used to increase or decrease LT4 depending on whether the target TSH has been met.
o Each adjustment of LT4 requires another TSH recheck after 6 weeks, and an annual check is required once the correct LT4 dose is found.
• For patients with SCH who are not treated with LT4, a six-monthly check of TSH and FT4 is required and annual checks can be undertaken when those levels are stable.

NICE Guidance for Thyroid disease: assessment and management. NICE guideline [NG145]

Referral or discussion with an endocrinologist is recommended if the person:

• Has suspected subacute thyroiditis.
• Has a goiter, nodule, or structural change in the thyroid gland.
• If malignancy is suspected, refer using a suspected cancer pathway.
• Has suspected associated endocrine disease, such as Addison's disease.
• Is female and is planning a pregnancy.
• Has atypical or difficult to interpret thyroid function tests.
• Has a suspected underlying cause of SCH, such as drug treatment with amiodarone or lithium.

In the absence of any of the above, then:

If TSH is greater than 10mIU/L:
• Treat if less than 70 years.
• Watch and wait if aged 70 years or more.

If TSH is 4-10mU/L:
• Consider a trial levothyroxine if age is less than 65 years.
• Watch and wait if aged 65 years or more

Follow up:
• NICE recommends 3 monthly review of the person and TSH levels, adjusting the dose according to symptoms and TFT results. FT4 should be rechecked if there are ongoing symptoms despite treatment.
o Aim to resolve symptoms / signs of hypothyroidism.
o Aim to maintain serum TSH and FT4 levels to within or close to the normal reference range.
o If symptoms persist, consider adjusting the dose of LT4 further to achieve optimal wellbeing, taking care to avoid over-treatment.
o Once the TSH level is stable (2 similar measurements within the reference range 3 months apart), check TSH annually.

• If the person has untreated subclinical hypothyroidism or if LT4 therapy has been stopped, consider measuring TSH and FT4:
o Annually if there are clinical features suggesting underlying thyroid disease, such as previous thyroid surgery or raised levels of thyroid peroxidase antibodies.
Or,
o Once every 2–3 years if there are no features suggesting underlying thyroid disease.

A referral to an endocrinologist should be considered if there are ongoing abnormal TFTs despite adequate LT4 treatment and possible underlying causes have been managed or excluded.

European Thyroid Association Management of Subclinical Hypothyroidism

If there is an elevated TSH with normal free T4 level: Repeat the measurement of TSH and free T4, and check for thyroid peroxidase antibodies, after a 2-to-3-month interval.

Individuals found to have positive antithyroid peroxidase or thyroglobulin antibodies, and/or those with a hypoechoic or an inhomogeneous echo pattern on thyroid US should have serum TSH measured.

Patients with persistent SCH and diffuse or nodular goiter should be treated with LT4 replacement with the aim to achieve serum TSH levels.

If TSH greater than 10mU/L

• Age less than 65-70 years: treat even if no symptoms of hypothyroidism
• Age over 70 years: consider treatment if clear symptoms or high cardiovascular risk

If TSH 4-10mU/L

• Age less than 65-70 years:
  o in the presence of symptoms, a trial of LT4 replacement therapy should be considered.
  o in the absence of symptoms, observe.
• Age greater than 70 years: observe

Treatment:
Daily oral LT4 is the treatment of choice.

• If LT4 therapy has been initiated, TSH should be re-checked after 2 months, and dosage adjustments made accordingly.
• The target TSH is in the lower half of the reference range (0.4–2.5 mU/l).
  o If there is no cardiac disease, a weight-related dose of LT4 should be used, approximating to 1.5 µg/kg/day (e.g. 75 or 100 µg/day for a woman, 100 or 125 µg for a man).
  o If there is cardiac disease and for the elderly, a small dose of LT4 should be started, 25 or 50 µg daily. The dose should be increased by 25 µg per day every 14–21 days until a full replacement dose is reached.
  o in the elderly, any treatment should be individualized, gradual and closely monitored.
  o for older patients (>70–75 years), a higher treatment target for serum TSH (around 1–5 mU/l) is acceptable.
  o For patients with mild SCH (serum TSH <10 mU/l) started on LT4 for symptoms attributed to SCH, the response to treatment should be reviewed 3 or 4 months after target TSH is reached. LT4 therapy should generally be stopped if there is no symptomatic improvement.

Follow up:
• Treated patients: TSH should be monitored at least annually.
  o in younger patients with symptoms, the aim is to alleviate their symptoms, with a target for a TSH in the lower half of the reference range (0.3–2.5 mU/l)
  o for older individuals, more relaxed targets are acceptable, with a target TSH between 1.0 and 5.0 mU/l in patients over 70 years of age.
• Untreated patients: repeat the thyroid function test within 8–12 weeks along with thyroid autoantibodies.
  o If thyroid function becomes normal: no further testing if asymptomatic, lack thyroid autoantibodies or do not have goiter.
  o If persistent SCH: thyroid function should be tested 6 monthly at least for the first 2 years and then annually.

Commonalities in guidelines

LT4 is the medication of choice in hypothyroidism, aiming to restore wellbeing and normalize serum TSH determined both by clinical and biochemical assessment, and avoiding detrimental health effects from inadequate or excessive treatment [2]. TSH is categorized into the range of 4 – 10 mU/L or the range greater than 10mU/L. The guidelines also divide people into an older or younger subgroup and management options are also differentiated by whether symptoms of hypothyroidism are present or not. Follow up with blood tests and / or observation is also recommended for those who receive treatment or do not.

To treat or not to treat

Arguments for and against treatment of SCV have been suggested [22]:

Arguments for treatment:
• To prevent progression to overt hypothyroidism, particularly when severe SCH (TSH is greater than 10 mU/L and in the presence of thyroid peroxidase antibodies.
• To possibly improve nonspecific symptoms of hypothyroidism and decrease the size of goiter, if present, in those with mild SCH.
• To possibly improve cardiac contractility and serum lipid concentrations

Arguments against treatment:
• The cost of medication and monitoring
• The commitment to lifelong daily medication in asymptomatic patients
• The potential risk of overtreatment

Suggested approach to a raised TSH with normal free T4

Take a careful history:
• What is the age and gender of the patient?
• Are there symptoms for overt hypothyroidism?
• Are there medications, such as amiodarone or lithium?
• Is there an intercurrent illness that could be causing a raised TSH?
• How long has the TSH been raised for - persistent SCH is more likely if duration is greater than 2 months?
• What is the level of TSH - is it in the mild or severe SCH range?
• Has presence of thyroid peroxidase antibodies been checked?
• Are there features to suggest significant co-morbidities eg cardiovascular disease or dyslipidemia?

Focused examination:
• Are there any signs of hypothyroidism?
• Is there a goiter?
• Are there signs to suggest significant co-morbidities e.g. cardiovascular disease or dyslipidemia?

Establish a clinical diagnosis:
• Do they have mild or severe SCH?
• Is it persistent SCH?
• Is further investigation or referral to a specialist required?
• Do they have features, eg age profile and co-morbidities to suggest whether levothyroxine therapy or observation is appropriate?

Partnership decision with the patient:
• Explain to the patient the doctor'suggested course of action.
• Establish with the patient what he or she would want to do.
• Agree on the best management.
• Follow up in primary care as appropriate.

Conclusion

Although the treatment of SCH continues to be debated, it is an ideal condition to be managed in the first instance in primary care. In the setting of family medicine, an individualized approach to each patient can then be undertaken and advice from specialist colleagues obtained, as necessary. The family medicine doctor can follow up the patient within existing guidelines, alert to any change to the patient's condition and any new understanding of SCH.

Learning Points

Subclinical hypothyroidism (SCH) is a common condition and is a biochemical diagnosis where the TSH is raised but FT4 is normal.

A proportion of SCH will progress to overt hypothyroidism and there is concern that SCH is associated, for some patients, with an increased risk of adverse outcomes such as cardiovascular disease and non-alcoholic fatty liver disease.

Associated complications of SCH appear to be more likely for patients younger than 70 years of age and in severe SCH where the TSH is above 10mU/L.

There are several guidelines available to the primary care clinician to help guide the management of a patient diagnosed with SCH.

The guidelines agree that if treatment is proposed, levothyroxine is the medication of choice.

The patient and doctor will need to carefully weigh the risks and benefits of treatment versus a conservative approach, particular in the older population.

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Hip Position during Common Lower Limb Rehabilitation Exercises Effects Gluteal Electromyographic Activity: A Systematic Review

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Abstract

Objective: Decreased strength of the hip muscles, especially the Gluteus Maximus and the Gluteal Medius muscles contributes to the etiology of various orthopedic pathologies of the lower limbs, low back pain and pelvic stability. Several studies have evaluated the effect of different proximal rehabilitation exercises by gluteal EMG and the effective position to recruit and activate gluteal musculatures. The systematic review synthesizes the differences in the EMG activation during different hip positions in order to better understand the role of specific hip position in recruiting and activating hip muscle.

Methods: PubMed, EMBASE and WEB OF SCIENCE databases are the main evidence sources searched; searched from 1989 up to April 2015. Search was for the key terms: Electromyography AND hip abduction OR hip extension, EMG activity AND Hip strengthening exercises. Unpublished articles were not sought. After excluding two articles of Case report-based studies, title and abstracts were reviewed. 189 articles were excluded from the title, six articles were excluded because of duplications, eight articles were excluded after reviewing the abstracts and two articles were excluded after reviewing the full text, to end up with 10 relevant and related articles to the review question. Data on research design, participants, EMG variables, hip position and confidence interval were evaluated. Two independent reviewers assessed each paper for inclusion and quality.

Results: Ten prospective observational studies, and no case-control were identified. Five studies had level two evidence which indicated G.Med. EMG Peak magnitude was effectively recruited in NWB hip abduction exercises with resistance. In addition, level three evidence studies show no differences in G.Med level of activation when controlling the external resistance, whereas G.Max, EMG shows effective recruitment during NWB hip extension positioned exercises.

Limitation: Most studies were not sufficiently powered with unreported power of the sample size; only three out of the ten eligible studies reported the power 0.90 - 0.91, as well as lack of control and blindness.

Conclusions: Several previous conducted studies show the association between hip muscles activity and lower limb pathology by evaluating the EMG. The current review aims to evaluate the differences in electromyographic activation with different hip position activities. There was limited evidence due to an absence of control, low sample size and heterogeneity in methodological design. Further research evaluating the value of different hip positions and to rank the best hip position in activating and targeting hip musculature is needed.

Key words: Electromyography activities, Hip abduction, Hip extension, proximal rehabilitation.

Introduction

Electromyography (EMG) is the electrical voltage associated with muscular contraction. EMG analysis can provide information about timing and intensity of muscle contraction, whether the muscle contracting is in the correct order (phasic) and at the right time. Surface EMG has high Reliability established in ISOMETRIC exercise, but a limited use in dynamic motion (19,20). The improvement in the efficiency of a movement will lead to correct use of muscles (efforts and economics) which will prevent injury.

Decreased strength of the hip muscles (Gluteal muscles) especially the Gluteus Maximus and the Gluteal Medius muscles contributes to the etiology of various orthopedic pathologies of the lower limbs like the patellofemoral pain which accounts for 25%-40% of all knee problems seen in sports and injury clinic(18) and femoroacetabular impingement with an incidence of 25% in men and 5 % in women (asymptomatic young adults) (4), low back pain and pelvic stability (1,2). Previous observational research conducted by Tadanobbu et al. found that the delay in these muscles' activity pattern causes sacroiliac instability and increased strain on the soft tissues. N.C Casartelli and N. Maffiuletti found that patients with symptomatic Femoroacetabular impingement (FAI) present with weakness in all hip muscles groups, except for internal rotations and extensors (4). Tadanobou et al. studied the influence of hip joint position on hip muscles' activity and they found that the Gluteal Maximus is significant in early onset recorded by surface Electromyography (s EMG) in two main positions (hip Abduction and Abduction with external rotation) (2). Also in other research conducted by Joseph Mcbeth et al. showed that the Gluteal Medius is most active during hip abduction exercises compared to other positioned exercises by using Electromyography (EMG) (5). Another research study by Kristen Boren ranked the clinical hip exercises in order from highest (EMG) value, to determine which exercises recruit the gluteal muscles, specifically the Gluteal Maximus and Gluteal Mediuse and found that side plank with hip abduction produces the highest value with Maximum Voluntary Isometric Contraction (MVIC) more than 80 % (3). A recent systematic review identified four studies that assessed gluteus maximus and gluteus medius during twenty rehabilitation exercises and categorized them according to the EMG activation level (Reiman et al. 2012) (17).

In a research study by Adam Semciw et al 2014, comparing the surface EMG and fine wire EMG in recording the Gluteus Medius activities during selected Maximum Isometric Voluntary Contraction of the hip they found additional myoelectric activity from middle Gluteus Medius at low intensity by surface EMG (6). Whereas according to the fine wire recordings, Gluteus Medius (GMed) is active at very high intensities during maximum resisted abduction and internal rotation, and active at a very low intensity during maximum resisted external rotation, which means that caution should be used when interpreting surface electrodes study.

Previous conducted studies evaluated the different common lower limb rehabilitation exercises by measuring different EMG variables and no recent systematic review measured the effect of different hip position in EMG activities. The purpose of this systematic review is to know if specific hip exercise positions, especially hip abduction and external rotation, leads to increase the level of Gluteal muscles activation in EMG which indicates improvement in hip muscles' (Gluteal muscles) functioning. The aim of this review is to establish if differing hip positions result in different EMG activity in the gluteal muscles both within asymptomatic and symptomatic populations, which will assess in focusing on variables that should be considered in screening and rehabilitation programs.

Objectives

With reference to PICOS (Participants, interventions, Comparisons, Outcome and Study design)

P	Healthy, Lower Limbs pathology, Athletic sample, patients with lower back pain
I	EMG
C	None
O	Increase in hip muscles activation with different hip positions
S	Cohort studies, Cross sectional and Prospective Observational studies

Methods

Eligibility criteria:

Inclusion criteria:
- Studies investigating hip muscles activity by Electromyography in different hip positions with and without rehabilitation exercises.
- Cohort studies, Cross sectional studies and observational studies.
- Limited to English language.
- Limited to humans.
- Studies from 1989 – 2015

Exclusion criteria:
- Case reports and Case series.

Search strategy:
PubMed, EMBASE and WEB OF SCIENCE databases are the main evidence sources searched, searching from 1989 up to April 2015. Search for the key terms Electromyography AND hip abduction OR hip extension. EMG activity AND Hip strengthening exercises. Unpublished articles were not sought, although this may lead to publication bias.

Review process:
Title and Abstracts of the identified articles in the search, reviewed and any duplications deleted. All publications were assessed by two independent reviewers for inclusion with the full texts of the obtained published articles. Any discrepancies were resolved during a consensus meeting and a third reviewer was available if needed.

Study analysis:
One scale was used to evaluate methodological quality, MINORS checklist (Methodological Index For Non-Randomized Studies) (7). MINORS contained 12 items, the first eight being specifically for non-randomized studies. MINORS checklist has external validity and high test –retest reliability. Each item scored as 0 (not reported), 1 (reported but inadequate), or 2 (reported and adequate). The ideal global score was 16 for non-comparative studies and 24 for comparative studies (7). MINORS score varies from low score 6 to high score 18(8). Sample size, participants' demographics, population sources, activities and EMG variables were extracted and evaluated, shown in Tables 1, 2.

Quality assessment:
Preferred Reporting Items For Systematic Reviews and Meta-analysis (PRISMA) 2009 checklist (10) was followed to structure the review and the Methodological Index For Non-Randomized Studies (MINORS) (7) checklist used to assess the quality of the included searched articles. MINORS contained 12 items, the first eight being specifically for non-randomized studies. MINORS checklist has external validity and high test –retest reliability. Each item was scored as 0 (not reported), 1 (reported but inadequate), or 2 (reported and adequate). The global ideal score was 16 for non-comparative studies and 24 for comparative studies. MINORS score varies from low score 6 to high score 18 (8). Level of evidence was evaluated using Oxford Center of Evidence Based Medicine recommendation. Table 3 A and B:

Table 3 A:

Methodological Index For Non-Randomized Studies (MINORS)	
The items are scored	Meaning of the score
0	Not reported
1	reported but inadequate
2	reported and adequate

Table 3B

CEBM of Oxford – Level of evidence (March 2009)	
Level of evidence	Characteristic of the study
1a	SR (homogeneity) of RTC
1b	Individual RCT (with narrow confidence interval)
1c	All or non
2a	SR (homogeneity) of cohort studies
2b	Individual cohort study or low quality RCT <80% follow up
2c	Outcome research, ecological studies
3a	SR (homogeneity) of case–control
3b	Individual case control study
4	case series and (poor quality cohort and case control)
5	Expert opinion

Results

Search results details and process of inclusion and exclusion of the searched published articles is explained in Figure 1. After excluding two articles of Case report-based studies, title and abstracts were reviewed . 189 articles excluded from the title, six articles were excluded because of the duplications, eight articles were excluded after reviewing the abstracts and two articles were excluded after reviewing the full text to end up with 10 relevant and related articles to the review question; all 10 studies evaluated the GMed and GMax, while three studies evaluated hamstring, quadriceps muscles. The reason for excluding the two articles after reviewing the full text is the hip positions during the activity were evaluated in the studies. There is currently low MINORS score [10,13]; two contained evidence that gluteal muscles (GMed) peak magnitude were effectively recruited in NWB (hip abduction) exercise with resistance and the second lot of evidence indicated no differences between elastic resistance or machine resistance in peak magnitude during the hip abduction, external rotation and internal rotation position, whereas the other article with MINORS score 11 showed no differences in the GMed muscles activation between NWB and WB when controlling the external peak resistance. The same study shows effective recruitment of GMax in NWB with hip extension. In addition, another study with strong evidence indicates that (Maximum abduction strength unit) does not change with increasing hip flexion angle. A study by Kristen Boren et al with low MINORS score of 10 confirms that EMG magnitude (%MVIC) higher level is achieved during side-lying hip abduction in GMed. and during single limb squat in GMax. However, the remaining studies with low-moderate score assess the onset timing of the EMG increase in abduction and external rotation, whereas one study shows 2 SD increase in EMG activity from natural sit-to-stand in older adults of GMed.

Figure 1: Flow diagram summarizing study selection for inclusion

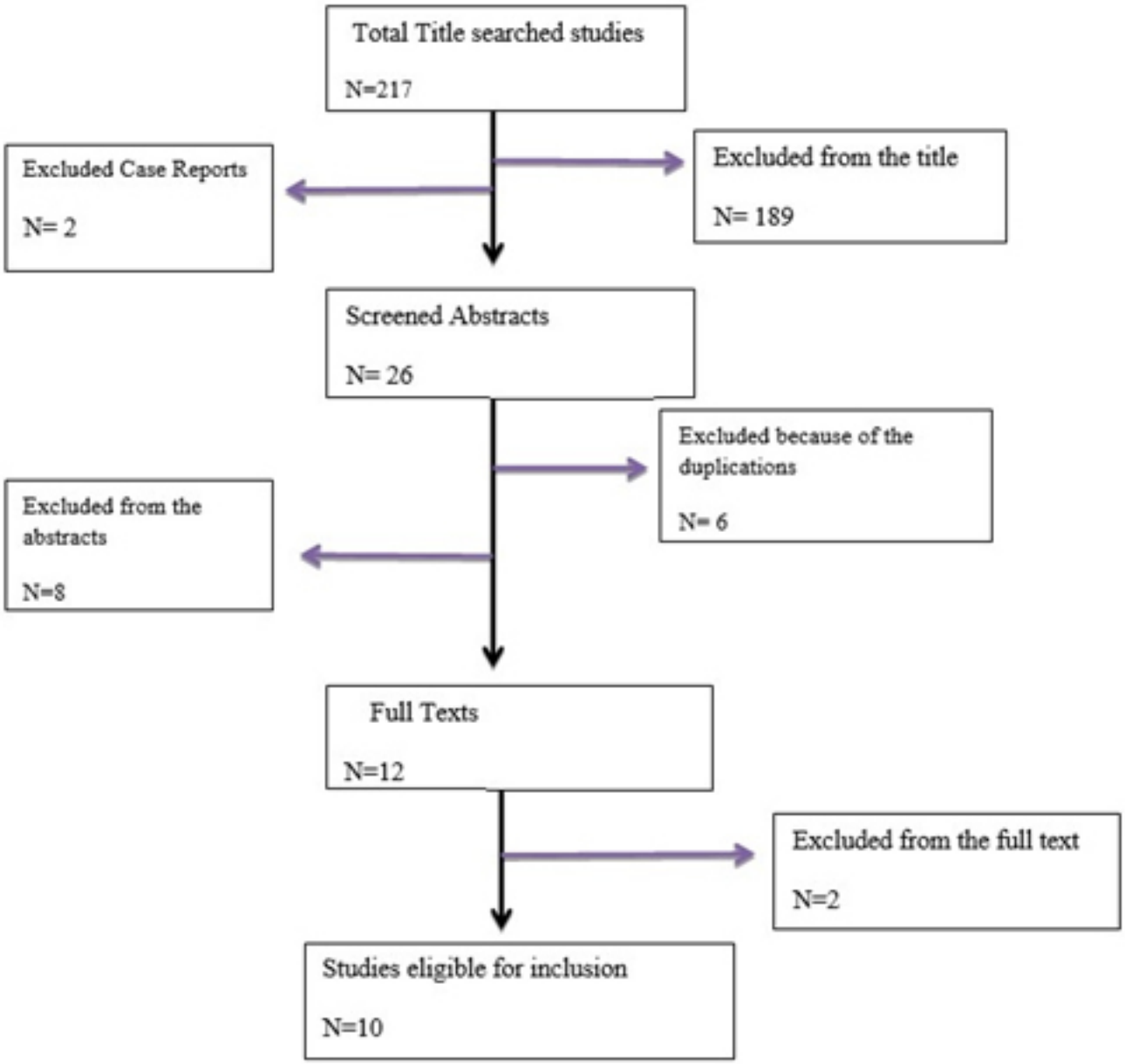

Table 1: Study details including sample size and participants demographic

Paper	Sample Size	Age range(mean)	Gender
Cale A. Jacobs et al.	15 volunteers	57.4+- 10.2	6(F), 9(M)
Matthew J. Mac Askill et. al	34	21.2+-1.8 (M) 21.7+-1.6 (F)	20(F) 14(M)
Adam I. Semciw. et al	10 volunteers	23.8(1.6) years	4 (F) 6(M)
Ji-hyun Lee et al	19	21.00 +- 1.73	11(F) 8(M)
Hiroyuki Fujisawa et al	27	21.5+-1.2	27 (M)
Donald A Neumann et al	40	26.5+-506	20(F) 20(M)
Tadanobu Suehiro et al	21	20.2+-0.4	21 (M)
Mikkel Brandt et al	16	45.7+- 8.6	16 (F)
Eun-Mi Jang et al	30	27.13+- 5.26 (young) 67.75 +- 1.61 (elderly)	30 (F)
Kristen Boren et al	24	21-23 year (mean: NR)	NR

Table 2: Population sources, activities, evaluated muscles and EMG variables.

A- Symptomatic Populations:

Paper	Population Sources	Activities	Evaluated Muscles (Method)	EMG Variable	Conclusion P value
Cale A. Jacobs et al.	Post-unilateral primary total hip arthroplasty	Weight bearing and Non weight bearing exercises	Gluteus Medius (surface)	Root-Mean-Square amplitude (%MVIC)	No differences noted between WB and NWB exercises in activating GMed P<0.05
Ji-hyun Lee. et al	Not reported	Different hip rotation during isometric side-lying hip abduction	Gluteus Medius, Gluteus Maximus, Tensor fasciae latae (surface)	Peak magnitude (%MVIC)	GMed EMG activity significantly increased with hip abduction and medial rotation. P< .017

B- Asymptomatic Populations:

Paper	Population Sources	Activities	Evaluated Muscles (Method)	EMG Variable	Conclusion P value
Matthew J. MacAskill. et .al	Subjects respond to fliers, electronic advertisement and word of mouth.	Weight bearing and Non weight bearing exercises.	Gluteus Medius Gluteus Maximus (surface)	Peak magnitude (%MVIC)	Gmax: effectively recruited in NWB exercise with hip extension. Gmed: effectively recruited in NWB exercise with resistance abduction. P0.55
Adam I. Semciw. et al	Not reported	Maximum isometric voluntary contraction (abduction, internal rotation, external rotation)	Gluteus Medius, Gluteus Maximus. (surface, intramuscular)	Average magnitude of activity (normalized amplitude, %MVIC)	Additional activity from middle Gmed during low intensity and under high load. P<0.05
Hiroyuki Fujisawa et al	Not reported	Incremental increase in hip flexion angle during isometric hip abduction.	Gluteus Maximus (upper and lower portion) Gluteus Medius Tensor fasciae latae. (surface)	Maximum abduction strength, unit (%MVIC)	Gmed EMG activity during isometric abduction does not change with increase in hip flexion angle. P<0.001
Donald A Neumann. et al	College students	Hip abduction	Hip abductors(surface)	Neural drive index (NDI) (magnitude of submaximal% isometric hip abduction)	Rapid increase of the NDI as the length of the muscle shortened P< 0.05.
Tadanobu Suehiro. et al	Not reported	Neutral Abduction, Abduction and external rotation.	Gluteus Maximus, Hamstring, Lumbar erector spinae, Lumber Multifidus (surface)	Onset timing (GM) increase in EMG activity during ABER in compare to N.	Gmax EMG activity onset timing earlier relative to the hamstring during hip abduction. P<0.05
Mikkel Brandt et al	Office workers and laboratory technicians.	Hip abduction (elastic resistance/ machine) Hip adduction (elastic resistance /machine)	Gluteus Medius, Gluteus Maximus, Vastis medialis, Vastus lateralis, rectus femoris, external oblique, rectus abdominas. (surface)	Peak magnitude (% Maximal normalised EMG)	Elastic resistance hip abduction associated with greater muscular recruitment measured by EMG in compared to the Machine exercise abduction. P<0.05

B- Asymptomatic Populations: (continued)

Eun-Mi Jang et al	University and community.	Natural sit-to-stand Sit-to-stand with abduction	Gluteus Medius Rectus femoris	-Onset timing (2 SD increase in EMG activity from natural sit-to-stand in older adult) of GMed. -Onset timing of rectus femoris (4 SD decrease in EMG activity during sit-to-stand with abduction)	Gmed EMG activity in the elderly significantly increased during natural STS compared to young female subjects. P<0.05
Kristen Boren. et al	University, community	18 hip strengthening exercises.	Gluteus Medius, Gluteus Maximus	Peak magnitude (%MVIC)	Gmed: Higher %MVIC achieved during side-lying hip abduction. Gmax: Higher %MVIC during single limb squat P value (not reported).

Discussion

This systematic review was completed by synthesis findings from previous research evaluating the associations of different hip exercises and activities in various hip positions with the level of EMG muscle activations. Oxford Centre for evidence-based medicine –levels of evidence (March 2009) was used to assess the level of the evaluated studies' evidence (9). All the ten evaluated studies were graded as level two (2c) evidence, which evaluates different EMG variables:

- **EMG Peak Magnitude:**

Two studies among symptomatic (weak GMed.) and asymptomatic population evaluated EMG peak magnitude and indicated that the GMed. Muscle EMG peak magnitude significantly increased with hip abduction and medial rotation position and side-lying hip abduction exercise, while the GMax. higher peak magnitude was achieved with single-limb squat exercise.

- **EMG Level of activation:**

Six studies evaluated the EMG level of activation; three out of the six studies measured the EMG level of activation and the onset of timing among hip muscles which significantly increased during hip abduction position and activities. The remaining three studies evaluated muscle activation level (peak or average magnitude) of the gluteal muscles during different hip positions and they found that the activation level increased in specific hip positions (abduction and extension).

- **EMG Maximum abduction strength unit:**

One study indicated GMed EMG maximum abduction strength unit does not change with increasing hip flexion angle.

- **EMG Onset of timing:**

Only one study measured the EMG timing onset which showed that it increases by 2 SD during natural sit-to-stand among old adults in compression; the EMG timing onset increased by 6 SD during sit-to-stand with abduction activities among young females.

Limitations:

- Low sample size.
- Source of the population not reported in four studies out of the ten eligible studies.
- Lack of controls.
- No follow up period.
- P value not reported in one study.

Conclusion

Current research evaluated the differences in electromyographic activation with different hip position activities and exercises among healthy and individuals with lower limb pathology. Limited evidence was due to an absence of controls, low sample size and heterogeneity in methodological design. All the ten studies had level two evidence, indicating that the GMed. Muscle EMG peak magnitude significantly increased with hip abduction and medial rotation position and side-lying hip abduction exercise. While the GMax. higher peak magnitude was achieved with single-limb squat exercise, while the onset of timing among hip muscles significantly increased during hip abduction position and activities. Six studies evaluated muscle activation level (peak or average magnitude) of the gluteal muscles during different hip positions and they found that the activation level increased in specific hip positions (abduction and extension). One study indicated GMed EMG maximum abduction strength unit does not change with increasing hip flexion angle. Additionally, a study measured the EMG timing onset and shows that it increases by 2 SD during natural sit-to-stand among old adults in compression and the EMG timing onset increases by 6 SD during sit-to-stand with abduction activities among young females. Further research evaluating the value of different hip positions and to rank the best hip position in activating and targeting hip musculature is needed.

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Knowledge, attitude and practice of diabetic retinopathy care and prevention among diabetic patients in Saudi Arabia: a systematic review

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Abstract

Background: In Saudi Arabia, recent studies have reported a high prevalence of diabetic retinopathy (DR) among diabetics in different regions of the country.

Objectives: To summarize available published studies about knowledge, attitude and practice of diabetic retinopathy (DR) care among the population of the Kingdom of Saudi Arabia.

Methods: The standard reporting guidelines outlined in PRISMA statement were followed for the preparation of this systematic review. In April 2020, a literature search in PubMed and Google scholar was conducted using the following key words; retinopathy and Saudi Arabia (knowledge or awareness or attitude or compliance). Results were screened, and relevant studies were involved in this review and synthesized narratively.

Results: 11 studies were included in this review. All studies (n=11) targeted the diabetic population. This systematic review reveals a huge variation of knowledge about diabetic retinopathy (25.2%-92%) in Saudi studies. This variation was accompanied by a negative attitude and poor compliance among patients in most studies.

Conclusion: The results of this systematic review reveal the importance of enhancing diabetic patients' knowledge, attitude, and practice towards diabetic retinopathy in Saudi Arabia. This highlights the major role of the general physician as frontline and the role of the ophthalmologists in providing patient education to correct their misconceptions as well as the need for considering this issue in health policy and the provision of more awareness programs.

Key words: knowledge, practice, diabetic, retinopathy Saudi, review

Introduction

Diabetic retinopathy is the most common cause of blindness in adults aged 20 - 74 years. Nearly all patients with type 1 diabetes and over 60% of patients with type 2 diabetes develop retinopathy over the first two decades of diagnosis (1).

The duration of DM is probably the strongest predictor for development and progression of retinopathy (1). Microangiopathy due to hyperglycemia in patients with diabetes mellitus results in vascular leakage, which causes capillary occlusion. Capillary occlusion then again causes retinal ischemia and increased levels of vascular endothelial growth factor (VEGF) which are responsible for the development of neovascularization and the proliferative stage of diabetic retinopathy (2).

Diabetic retinopathy can be classified as non-proliferative or proliferative. Non-proliferative can then be further classified by severity ranging from mild to moderate and severe. Non-proliferative diabetic retinopathy (NPDR) is characterized by the presence of microaneurysms, hard exudates, cotton-wool spots, and/or retinal hemorrhages. Pre-proliferative diabetic retinopathy changes include vasculopathies such as intraretinal microvascular abnormality (IRMA), whereas proliferative diabetic retinopathy is defined by the presence of neovascularization or vitreous hemorrhage or pre-retinal hemorrhage (3).

A recent large meta-analysis of 35 studies carried out between 1982 and 2008 reported an estimated worldwide prevalence for any DR at 35.4% (4).

Locally, in Saudi Arabia, recent studies have reported a high prevalence of DR among diabetics in different regions of the country. A recent population-based study in Taif, in the Western region of KSA reported that 33% of all diabetics have some form of DR (5); while another hospital-based study in the Madinah region reported the same estimate at 36%(6). A more recent study in the Jazan district, Southern Saudi Arabia reports a lower prevalence of diabetic retinopathy of 27.8% (7).

Due to population growth, aging, urbanization and increased prevalence of obesity and physical inactivity, the number of people with diabetes is increasing (8). In 2019, there were 351.7 million working-age people (20-64 years) with diagnosed or undiagnosed diabetes worldwide. In 2030 this number is expected to increase to 417.3 million, and by 2045 to 486.1 million. The biggest change would arise in areas where populations shift from low-to middle-income status (9).

According to the World Health Organization (WHO), Saudi Arabia ranks second highest in the Middle East and is seventh in the world for diabetes. About 7 million people are known to be diabetic and about 3 million have pre-diabetes(10).

Patients with DM should be encouraged to optimize their control of the disease to prevent the development and progression of diabetic retinopathy. Overall, screening of DR is required to detect patients with visually threatening DR, as they need timely treatment before developing potentially irreversible vision loss.

From the literature review of Saudi studies, we conclude that there is a wide variation in the level of knowledge regarding DR among Saudi Arabian city populations. However, compliance with the best medical practice for monitoring eye disease in diabetic patients through regular eye examination is poor in Saudi Arabia. To the best of our knowledge, there is no previous study that summarizes the knowledge, attitude, and practice of patients with diabetes regarding diabetic retinopathy in Saudi Arabia and from the studies done in Saudi Arabia there is a variation in the knowledge and the practice of patients with this eye complication. Hence, this reflects the importance of our study which aims to summarize the level of knowledge, attitude, and practice of diabetic retinopathy care among diabetic patients in Saudi Arabia.

Review Methodology

The preparation of this systematic review strictly followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement.

The strategy of the Literature search: A systematic literature search was carried out in the following two databases: firstly PubMed and secondly Google scholar throughout April 2020 and the keywords used in the search where diabetic retinopathy AND Saudi Arabia (knowledge OR awareness OR attitude OR practice), which applies to the subject region and were the most suitable terms for the review. The results of the search from these databases were restricted to the English language, Boolean operators, peer-reviewed, research articles and using (allintitle) advanced Google scholar search operators with no time frame limit.

Method of Study selection: All researchers independently screened the literature search results for relevant studies. Initially, a computerized search was done on the first database; results showed 40 potential studies. The second database showed 16 potential studies. The titles and abstracts of a Total 56 studies were screened to detect relevant studies which excluded (42) non-relevant studies keeping only (14) possible studies. Finally, the researchers reviewed the full text of all studies selected during the previous step in detail which resulted in excluding 3 studies targeting the non-diabetic population. There was no disagreement between researchers about the relevance of any study. After this review process, 11 studies were selected to be relevant and were included in the systematic review.

Eligibility criteria: All studies fulfilled the following inclusion criteria: 1) studies that were described as cross-sectional studies,2) Studies that were done among Saudi Arabia population 3) studies that explored the knowledge, Awareness, Attitude, or practice of the diabetic patient about diabetic retinopathy and were included in this review. All studies that were 1) Not done in Saudi Arabia, and 2) the Non-diabetic population wer excluded.

Data extraction: Data were extracted autonomously by the researchers to a uniform data extraction sheet. The extracted data involved 1) characteristics of the study design, 2) data of the study outcomes.

Synthesis of results: Included studies were arranged depending on the following:
1) studies assessed the level of knowledge or awareness, 2) studies assessed the attitude, and 3) studies assessed the practice. Extracted data from each study were arranged and tabulated narratively.

Results

Characteristics of included studies: The search strategy in the systematic review retrieved 56 published articles. 11 articles fulfilled the eligibility criteria for systematic review. Diabetic patients were the only study populations in all studies (n=11. The flow diagram of the study selection process is shown in Figure 1.

Knowledge regarding diabetic Retinopathy:

The Saudi studies showed a huge variation (25.2% - 92%) in the level of knowledge among diabetic patients regarding diabetic eye disease.

Al-Asbali et al found that only 45% of diabetic patients' knowledge regarding DR was graded as excellent and interestingly this level of knowledge was higher among diabetic patients attending eye clinics than those attending diabetic clinics (11). Albalawi et al conducted a cross-sectional study on 382 Type 2 Diabetes mellitus patients who visited the PHC at King Salman Armed Forced Hospital, Tabuk and they found only 25.2% of the participants had good knowledge about diabetic retinopathy where almost half of the patients had poor level of knowledge (around 47.1%) (12). In another cross-sectional study conducted by Alzahrani et al targeting PHC visitors in Jeddah, they found a poor level of knowledge as around 36% of participants reported that they didn't receive any information about DR from their doctors (13). AlHargan et al conducted a study targeting patients with diabetes in two primary health centers in Riyadh, and found a high level of knowledge among 88% of the patients who were aware of the effect of diabetes on the retina; 76% were aware that controlling blood sugar can reduce the risk of DR, while only 66% of them were aware that DR can lead to blindness and there was a significant association between formal education and the awareness about DM and retinopathy(14). In Al hasa there were two studies. The first one was conducted on a large number of patients with type 2 diabetes by Khan et al and they found more than 92% of participants know the importance of annual eye examination and more than 73% knew about retinal eye disease of diabetics (15). Whereas 66% of patient in Neama et al's study had heard about DR. Almost half of them were able to define DR as a complication of diabetes correctly, but 42.6% didn't know that with age the risk of DR increases. Interestingly they found that a poor level of knowledge was associated with sociodemographic factors like aging and female patients (16). A good awareness level was graded in 75.62% of diabetic patients by Al Zarea et al (17) in the endocrine clinic at King Abdelaziz Specialized Hospital in Taif where 64% of screened Type 2 Diabetes mellitus patients had good knowledge (18). The knowledgeable group was significantly more likely to have higher school educational level, a longer duration of DM, and low risk factors that may affect their HgA1c control (18). Nevertheless around 50% were not aware of the recommendation for DR annual screening and thought there is no need for it unless symptomatic (18).

Level of education, source of information and area of residency were all significantly associated with level of awareness about eye complications (p=0.05) as reported in Fallatah et al's survey (19). Regarding Saudi diabetic patients they had overall an acceptable knowledge, (80.8%) and (82.8% %) as shown in Abdulaal et al and Alsaidan et al's studies respectively (20,21).

Attitude Regarding Diabetic Retinopathy:

Positive attitude regarding this eye complication of diabetes mellitus among diabetic patients attending a private hospital in Riyadh was only 20% (11). In AlJouf and Hail Province a study conducted by Al Zarea showed a bad attitude among participants as 61.50% were answering that there was no need to go for an eye checkup with controlled blood glucose (17) and 29.7% of the poorly controlled group, think there is a need to screen the eye with good controlled blood sugar in Abdulaal et al's survey (20). This attitude was also found in more than 77% of patients with diabetes in Khan et al's study as they think that there is no need for regular eye checkups if there were no symptoms (15). However the study conducted by Albalawi et al reported good attitude among 71.7% of the participants as they believed eye checkups are still necessary (12). More than 75% believed that diabetes type 2 could cause Diabetic Retinopathy, which may lead to loss of vision (18).

Practice Regarding Diabetic Retinopathy:

Most studies in Saudi Arabia scored low regarding annual eye examination of diabetic patients. In Riyadh, annual eye examination was followed only by one quarter of diabetic patients in Al-Asbali et al's study (11). AlHargan et al found that only 48% of the Diabetic population followed Annual eye examination guidelines where 45% did not have an eye examination (14). This study also showed that 91% of patients who had awareness were adhering to their current DM treatment and 72% were measuring their

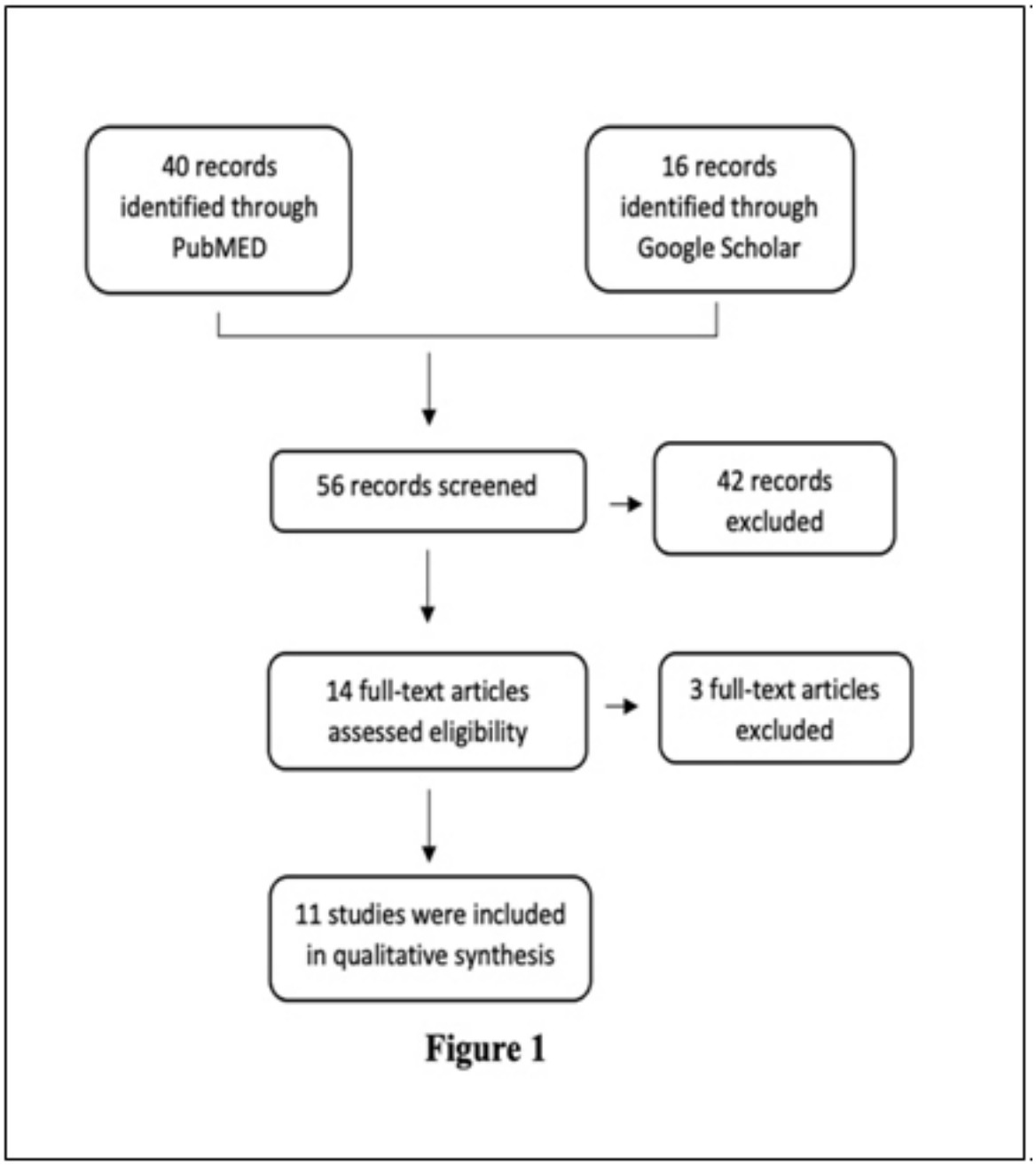

Figure 1: Review method

blood sugar at home, while 64% were adhering to their current DM treatment and 39% were measuring their blood sugar at the home of patients who didn't have awareness (14). In Jeddah, Alzahrani et al's study showed around 35% of diabetic patients didn't go for eye screening (13). 46% of patients with diabetic in Al-hasa district in regard to Khan et al's study do not follow the advice of their family doctors about the need for eye examination where 54% of participants said their ophthalmologist does not give them adequate information about this ocular complication (15). In the north of Saudi Arabia (AlJouf and Hail Province) regarding the Al Zarea survey, only 48.97% of diabetic patients went for annual eye checkups (1 7).

Albalawi et al found 39.5% of the participants felt that they needed to go for annual eye checkup only when vision is affected (12), with poor level of knowledge recorded among 22.5% of those who didn't visit an ophthalmology clinic (16). 28.4% of the participants in the Almalki study thought that the optometrist visit is enough for DR diagnosis and the most likely barriers that prevent patients from going to the Ophthalmologist for the recommended annual DR screening were the difficulty to get an appointment and unawareness of the possible eye complications from T2D (18).

Discussion

This review shows that diabetes is a common health problem in Saudi Arabia. Most of the studies showed moderate knowledge about diabetes mellitus and its complications. Most patient's attitudes towards DM were not t good enough. On the other hand, regarding Diabetic Retinopathy most of the patients even with good knowledge, had poor compliance. The positive attitude percentage towards Diabetic Retinopathy was very different from one study to another, and it was not shown that there was a close association between positive attitude and educational or social level.

Importance of DR education in SA

Education toward diabetes mellitus self-management is the process of teaching patients to administer their disease. The goals of this education include improving metabolic control, preventing acute and chronic complications and improving one's quality of life at reasonable costs. In a study that was conducted at University Diabetes Center in King Abdul Aziz University Hospital, Riyadh, Saudi Arabia, they found that after one year of 5-days Education Program, there was a significant improvement for all metabolic parameters in type 2 diabetes patients except in HDL (22). Other similar findings have reported that reduction in body weight and better control of blood pressure, glucose and serum lipids can be achieved by patient education on life style modification. According to our study and other results, increasing knowledge and awareness of DM in KSA will contribute to the improvement of community health results as increasing knowledge about DM will help them to improve their lifestyles, pharmacological habits, and how to deal with the longterm side effects of the disease that will finally lead to the improvement of clinical results.

Risk factors and misconceptions regarding DR

Most studies showed that many patients do not seem to understand their disease or treatment regime, although patients had a reasonable understanding of the basic risk factors for DR such as diabetes control, although they were less clear about specific risk factors such as blood pressure and lipid control. Regarding the patient's own disease, most patients attributed their DR either to poor diabetes control or to failings of the healthcare system. Some patients believed that their DR was a result of health aspects beyond their control or environmental factors, whereas others were unsure about the cause. Obviously, there is a gap between patients' knowledge and damaging beliefs about the cause and treatment of DR despite most patients having good knowledge about their state, but their knowledge isn't enough and not all patients have this knowledge. The deficiency of information about handling the DR risk factors like high blood pressure or glycemic levels has a large effect on the deterioration of the case (1). The wrong handling of the disease and the lack of knowledge leads to bad results such as the deterioration of the patient's condition and in other cases may lead to blindness, so as mentioned earlier it is important to activate the role of education about the disease and the symptoms and expected results.

Role of health care professionals

With effective diabetes management, regular eye screening, and timely treatment great outcomes are found. Ensuring all people with diabetes have access to these important health care services requires a new approach in service provision and cross-sectoral collaboration. Primary health care workers are at the frontline of providing services to people with diabetes, and this must include screening and monitoring diabetic eye health, and timely referral to eye specialists for further examination and treatment. The first line management that can be provided in Primary health care level includes glycemic control, and blood pressure control.

Higher centers and eye specialist hospitals may be reserved for further examination and advanced treatments that include Laser Photocoagulation and, in some cases, surgical treatment is required, such as vitrectomy.

The most important issue in treating diabetic eye disease is the follow up, so the physician shouldn't forget about the great role of patient education; as mentioned above, the more the patient knows the more, the more he/ she becomes willing to cope better with their condition.

Critical appraisal of included articles:

There were some methodological limitations that were noticed in some of the included articles in this review. For instance, regarding targeting population Naif R. Almalki (18), Amal Mohammed Albalawi (12), Alsaidan et al (21) and Khan et al (15) studies were targeting only Type 2 diabetes so their result cannot be generalized for all the diabetic population. Another issue regarding the selected

population was noticed in Abdulaal et al (20) and Alsaidan et al (21) studies as they were targeting only Saudi citizens.

Study setting also showed some limitations for example Al-Asbali et al (11) were targeting the diabetic patients in two different specialty clinics (eye clinics and diabetes clinics) which might affect the overall result of knowledge, attitude, and practice. Where Fallatah et al (19) conducted their study in an eye hospital which might explain their results of the highest score of knowledge 92.4 % compared to the rest of the studies.

Regarding the data collection method Naif R. Almalki (18), Al-Asbali et al (11) and Khan et al (15) used interview techniques in the data collection method in their studies which had a potential risk of interviewer bias.

Sampling technique reveals some limitations in AlHargan et al's (14) study. They used convenience sampling rather than random sampling which may affect the generalizability of the result to their population.

Strengths and limitations of this review

Strong points of this review are that it was following PRISMA statement guidelines during the whole process and it reviewed the results of other published studies from different geographical areas with different settings in Saudi Arabia which gave better representation of awareness, attitude and practice toward DR among diabetic patients. While the limitations of this review are that the results of the study were not systematically assessed and combined to perform a Meta-Analysis and the included studies vary in quality and have several methodological limitations, which include: varying questionnaires used to assess study outcomes, limited validated questionnaires which make it difficult to do any statistical analysis or inference. Also, this review didn't look for unpublished articles and those published in other languages. These limitations need to be taken into consideration in future studies to ensure high quality evidence that is reproducible and generalizable.

Implications for health policy:

The results of this review showed a variation in the level of knowledge and attitude with compliance among diabetic patients in Saudi Arabia regarding Diabetic Retinopathy. These results have several implications for primary health care providers, diabetic care providers, ophthalmologists, and policy makers. General practitioners should carry a great responsibility toward patients, families, with community education about DR risk factors and prevention, importance of regular eye screening and early detection. In addition they need to provide more information about DR treatment methods. In regard to policy makers it is really important to organize and conduct education programs about DR in a simple familiar language through mass media for the whole community in order to improve awareness level and enhance their practice as well as the creation of an appropriate and easy referral system.

Conclusions

This review shows that diabetes is a common health problem in Saudi Arabia. Most of the studies showed moderate knowledge about diabetes mellitus and its complications. Most patients' attitudes towards DM was not good enough. On the other hand, regarding Diabetic Retinopathy most patients even with good knowledge, had poor compliance. The positive attitude percentage towards Diabetic Retinopathy was very different from one study to another, and it was not proven that there was a close association between positive attitude and the educational or social domains.

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Table 1: Summary of cross-sectional studies performed in the Kingdom of Saudi Arabia about knowledge, awareness, attitude and practice of diabetic retinopathy care and compliance among diabetic patients.

Reference	Study setting	Population	Sampling method	Sample size	Key Outcomes
Al-Asbali et al [11]	Private multidisciplinary hospital in central Saudi Arabia	Diabetic patients	Simple random sampling	200	45% had excellent Knowledge 20% Had positive attitude 75% had poor practice
Neama et al [12]	Primary healthcare centers at Al-ahsaa, Saudi Arabia	Diabetic patients	Simple random sampling	383	66% heard about diabetic retinopathy 54% defined DR as one of diabetes complications that lead to visual loss 42.6% didn't know that with age, the risk of DR increases 22.5% never visited ophthalmology clinic
AlHargan et al (13)	Two primary healthcare centers at Riyadh, Saudi Arabia	Diabetic patients	Convenience sampling	280	88% aware that diabetes mellitus can affect the retina; 76% aware that control of blood sugar reduces the risk of DR 66% aware that DR can lead to blindness. Formal education was significantly associated with the awareness about DM and retinopathy well controlled diabetes in 61% 48% had annual eye examination and 45% did not have eye examination
Naif R. Almalki (14)	King Abdulaziz Specialized Hospital, Division of Endocrinology, Taif city, Saudi Arabia.	Type 2 DM patients	Systematic random sampling	253	64% Had good knowledge 75% Had positive attitude 28.4% Had poor practice
Amal Mohammed Albalawi (15)	King Salman Armed Forced Hospital-Primary Health Care Centers, Tabuk	Saudi patients with type 2 DM	Simple random sampling	382	The overall awareness was among 86.9% 47.1% had poor knowledge; 25.2% had good knowledge. 71.7% had good attitude 39.5% had bad practice
Al Zarea (16)	5 Ministry of Health hospitals in AlJouf and Hail Province	DM patients	Simple random sampling	439	75.62 % had a good knowledge, 61.50 % had a bad attitude as they believed in no need for eye checkup with controlled blood glucose
Alzahrani et al (17)	Primary health care centers, Jeddah	DM patients	Systematic random sampling	377	82.6% had a good awareness level while 36% had no information at all 35% did not go ever to their eye checkups.

Fallatah et al(18)	Jeddah Eye Hospital	DM patients	Simple random sampling	380	92.4 % had a good knowledge 67.2% reported health care workers as their source of information. 66.9% of participants diagnosed already with diabetic retinopathy.
Abdulaal et al(19)	Saudi Arabia public facilities	Diabetic Saudi citizens	Simple random sampling	385	80.8% had a good knowledge while 25.7% had an extremely poor knowledge
Alsaidan et al(20)	Security forces hospital	Saudi patients with type 2 DM	Simple random Sampling	174	The overall awareness was among 82.8% participants, and only 17.2% had no awareness
Khan et al (21)	chronic disease clinics in Al ahsa district	type 2 diabetic patients	Multistage cluster random sample.	2016	Most of patients 92% are knowledgeable about Diabetic retinopathy. 77% think there is no need for eye checkup if asymptomatic 46% of them do not follow the recommendation of regular eye examination

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Prevalence of Low Back Pain and Its Associated Risk Factors among Female Nurses Working in a tertiary hospital in Dhahran, Eastern Province, Saudi Arabia

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Abstract

Background: Nurses are exposed to some work-related activities and body positions that affect their musculoskeletal system and predispose them to pain, particularly in the shoulder and back regions. Low back troubles (LBT) affect the quality of life and have grave effects on economics and work because of sick leave and absenteeism.

Objective: The aim of this study was to estimate the prevalence of low back pain and to assess the risk factors associated with it among nurses working in tertiary hospital in Dhahran in the Eastern Province in Saudi Arabia.

Methods: Nurses working in a tertiary hospital in Dhahran were asked to fill in a self-administered questionnaire that included a section of LBT adapted from the previously validated and modified version of the Standardized Nordic Questionnaire of Musculoskeletal Symptoms.

Results: The prevalence of LBT was 74.1% and out of the respondents 44.3% had an attack during the last week. Multivariate analysis revealed that risk factors significantly associated with LBT were moving wheelchair, bending and standing (increasing the risk), longer breaks, trolley moving, positioning patients, moving beds, and longer sitting time (decreasing the risk).

Conclusion: LBT was highly prevalent among nurses, irrespective of their age, body mass index, department and work experience. Risk factors included short breaks and sitting time, long standing times, and some work activities (wheelchair, trolley or bed moving, positioning patients). We recommend that hospital administrations arrange proper rest periods for at-risk staff. Also, nurses should be educated about proper body mechanics when lifting heavy objects.

Key words: low back pain; nurse; work; survey; Saudi Arabia.

Introduction

Low back pain is one of the most common complaints among the general population. It is thought to be one of the greatest causes of disability globally. Low back pain is estimated as the sixth cause of overall disease burden worldwide (1). Low back pain originating from occupational hazard is an important cause of disability (2).

Health care workers encounter low back pain more than other occupational groups with highest prevalence reported in nurses (3, 4). Worldwide, a number of studies have been carried out to investigate the prevalence of low back pain among nurses. The prevalence varied from 40.6% in Hong Kong, to as high as 70% and even more in Gaza, Nigeria, and Switzerland (5-8).

Since nursing is a high stress job, there are many risk factors that participate to the occurrence of low back pain such as high physical workload, standing for a long time, carrying patients and lifting heavy objects, as well as long working hours especially in surgical departments (3, 9).

Several studies have reported that low back pain may be associated with negative consequences among nurses such as decreased productivity and increased absenteeism from work (10).

In Saudi Arabia, few epidemiological studies have investigated the prevalence of low back pain and its associated risk factors among nurses, especially in the eastern region. More local information and studies are needed to improve the working environment and to enhance the occupational safety for nurses. Hence, the aim of this study was to estimate the prevalence of low back pain and to assess the risk factors associated with it among nurses working in a tertiary hospital in Dhahran in the Eastern Province of Saudi Arabia.

Methods

Study setting: This study was conducted in a tertiary hospital located in Dhahran city in the Eastern Province of the Kingdom of Saudi Arabia.

Study design: This study had a cross sectional design.

Study population: The target population of the study were female nurses working in a tertiary hospital in Dhahran . The total number of nurses was around 790 nurses.

Eligibility criteria:

- **Inclusion criteria:**
  All working Saudi and non-Saudi registered female nurses.
- **Exclusion criteria:**
- Male nurses.
- Pregnant ladies.
- Nurses with back pain before getting the job.
- Nurses with previous history of surgery.

Sample size: Thirty percent of the total number of female nurses that fit with the inclusion criteria were selected to participate in the study.

Sampling technique: Stratified random sampling technique was used. The hospital was divided into different wards and functioning units. Thirty percent of each stratum was chosen randomly.

Data collection tool: Self-administered questionnaire was used including a section about demographic data regarding age, weight, height and number of children and pregnancy, the second part is about working conditions regarding patient care activity and the third part is concerned about low back trouble that was adapted from the previously validated and modified version of the Standardized Nordic Questionnaire of Musculoskeletal Symptoms (SNQ) that was established by Kuorinka et al. (11).

Data collection technique: The questionnaire was collected from nurses in their place of work.

Study variables:
(a) The dependent variable was low back pain, which was defined as any ache or discomfort in the spinal region (between the lower costal margin and gluteal fold) whether or not extending from there to one or both legs at least one day during the past 12 months (11, 12).
(b) The independent variables included age, height, weight, number of children, level of physical activity, length of employment, working department, and working hours.
Data entry and analysis:

Data analysis was carried out using SPSS version 22 for windows. Numerical variables were checked for normality by Shapiro Wilk test. All numerical variables were found to follow normal distribution; therefore, values were summarized as mean ± standard deviation and Independent samples T test was performed for comparison between nurses with and without LBT. For qualitative data, Pearson's Chi square test was used to examine association between sex and age groups. Backward stepwise binary logistic regression was carried out to predict the risk factors of LBT. Significance was adopted at $p < 0.05$ for interpretation of results of tests.

Pilot study: The questionnaire was pretested initially among 10% of nurses to test the tool, methodology, and the analysis for modification if needed.

Ethical considerations: The study received ethical approval from the Institutional Review Board of the tertiary Hospital in Dhahran city, Kingdom of Saudi Arabia. Confidentiality of the collected data and participant's privacy were assured, and the data were used only for research purposes. Written informed consent was obtained from each participant. The study did not have any physical, psychological, social, legal, economic, or any other anticipated risks to participants, and it did not present a direct benefit for the study's participants.

Results

In this study, 263 nurses responded to the questionnaire. Figure 1 shows that the majority of respondents had a history of suffering from low back pain (n = 195, 74.1%). Table 1 and Figures 2 and 3 show the characteristics of LBT in the respondents. The majority have not been hospitalized nor had to change jobs because of LBT, while only 7.2% were hospitalized and 6.2% changed their jobs/duties. About half of the nurses who suffered LBT had an attack of pain that lasted one week or less, while 13% suffered an episode that extended more than 30 days (but not daily pain). About half the nurses with LBT had to reduce their work and leisure activities during the last 12 months. The total length of time (during which LBT prevented accomplishing normal activities ranged from one to seven days in 53.8% of respondents. Most respondents with LBT (78.9%) did not consult a doctor or any specialist for this pain during the last 12 months. As regards recent attacks of LBT, 44.3% had pain during the last 7 days.

Table 2 shows the sociodemographic characteristics of the respondents and their association with low back pain. The mean age was 36 years old. Half the respondents had one or no pregnancy and one or no children. The average body mass index was 26.1. The median years of work was 10 years with interquartile range = 6 – 16 years. As regards the current department, 18.3% of respondents worked in orthopedic, 17.9% in pediatric, and 16.3% in internal medicine departments. Most respondents (78.7%) worked for more than two years in their current departments and had shifts (84%). The average hours of work per week was 48. About two thirds had two breaks daily. There was no significant association of any of these respondents' characteristics and the occurrence of LBT.

Table 3 demonstrates frequency of work activities that can cause low back pain in nurses with and without LBT. The activities included trolley or chair pushing, positioning patients, helping patients get to toilet or taking bath, ambulation of patients, moving furniture and bed, and bending. There was no significant association of any of these activities and the occurrence of LBT.

Table 4 outlines other daily activities and their association with LBT. Most nurses used to stand or walk 4 hours or more and sit for two hours or less. Also, exercise was practiced by less than half the nurses (with or without LBT). A significantly higher percentage of nurses with LBT used to sit for less than two hours. Standing and walking were not significantly associated with LBT. Although the percentage of nurses with LBT who practiced exercise was less than those without LBT (39.5% vs 48.5% respectively), this difference did not reach statistical significance. Neither the frequency of exercise nor its duration was significantly different between the two groups.

Table 5 shows the results of a backward stepwise binary logistic regression analysis that was carried out to identify risk factors of LBT in the respondents. Sociodemographic factors and activities of nurses were included in the first step of the analysis, then in each step a variable was excluded that did not contribute significantly to the model. The factors that contributed significantly were retained to the last step. Some factors had a p value of Wald test above 0.05, but modified other significant factors, so they were also retained. Factors that increased significantly the risk of LBT included moving wheelchair, bending and standing; each increasing the risk by two fold for each increase in times of activities. Factors that were associated with decreased risk included longer breaks, trolley moving, positioning patients, moving beds, and sitting; each decreasing the risk to half or less for each decrease in duration or times of the activity.

Discussion

Many health care workers are exposed to some work-related activities and body positions that affect their musculoskeletal system and predispose them to pain, particularly in the shoulder and back regions (13-15). Nurse work involves activities such as bending, twisting, lifting of heavy objects, and awkward static posture that are likely to cause back pain (12, 16-18). LBT affects the quality of life and has grave effects on economics and work as it leads to sick leave and absenteeism.

We found the prevalence of LBT high among our respondents as the majority of respondents (74.1%) had a history of LBT and out of them 44.3% had an attack during the last week; which is in line with other studies that were conducted in Saudi Arabia and worldwide. The reported rates from Saudi Arabia were 84.4 % from Taif (19) and 76.5 % from Mecca (20). Other reported rates worldwide were 75% in Greek nurses (21), 71% in Japan (22), 86% in Italian nurses (23), 76% in Dutch nurses (14), 82% in Taiwan (24), and 79.3% in Egypt (25). The rate of this prevalence is much greater than that for the general population which is 18.8% in Saudi Arabia (26). Moreover, the rate of LBT in the present study is even higher than rates reported by previous studies which were 46% in Nigeria (27), 54.7% in Japan (17), 51% in Tunisia (13), 30% in Ireland (28), and 61.3% in Turkey (4).

Although health workers in general (doctors, nurses, dentists) are at high risk of suffering from LBT, nurses seem to have an even higher risk (4, 12, 14, 17, 21, 27, 29-34). This may explain the higher rate found in our study as many of the previous studies included other health care workers besides nurses. Potentially contributing factors to this high rate in nurses are the nature of their work activities as well as the greater susceptibility of women generally to back pain, as this type of pain was more commonly reported by women than men (4, 13, 20, 35, 36). The high prevalence of LBT among nurses may reflect the unawareness of body mechanics and lack of back muscles fitness

Figure 1: prevalence of low back trouble among the respondents.

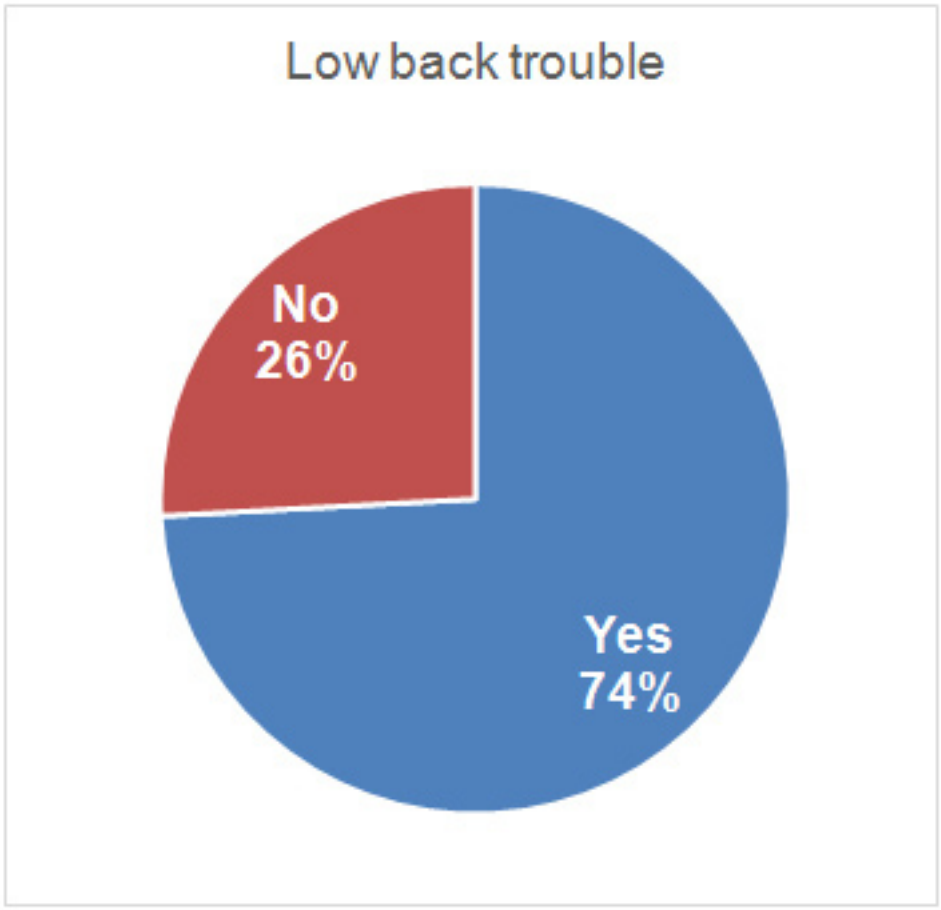

Table 1: Characteristics and effects of low back trouble (LBT) on the studied nurses (n = 195).

		n	%
2-Have you ever been hospitalized because of LBT	no	180	92.8%
	yes	14	7.2%
3-Have you ever had to change jobs or duties because of LBT?	no	182	93.8%
	yes	12	6.2%
4-What is the total length of time that you have had LBT pain during the last 12 months?	0 day	24	12.4%
	1-7 day	106	54.9%
	8-30 day	22	11.4%
	more than 30 day, but not every day	25	13.0%
	every day	16	8.3%
5a-Has LBT caused you to reduce your work activity during the last 12 months?	no	87	50.0%
	yes	87	50.0%
5a-Has LBT caused you to reduce your leisure activity during the last 12 months?	no	95	54.9%
	yes	78	45.1%
6-What is the total length of time that LBT has prevented you from doing your normal work (at home or away) during the last 12 months)?	0 day	58	33.5%
	1-7 day	93	53.8%
	8-30 day	14	8.1%
	more than 30 day	8	4.6%
7-Have you been seen by a doctor, physiotherapist, chiropractor or other such person because of LBT during the last 12 months?	no	138	78.9%
	yes	37	21.1%
8-Have you had LBT at any time during the last 7 days?	no	97	55.7%
	yes	77	44.3%

LBT: low back trauma; n: number.

Figure 2: Effects of low back trouble (LBT) on the respondents

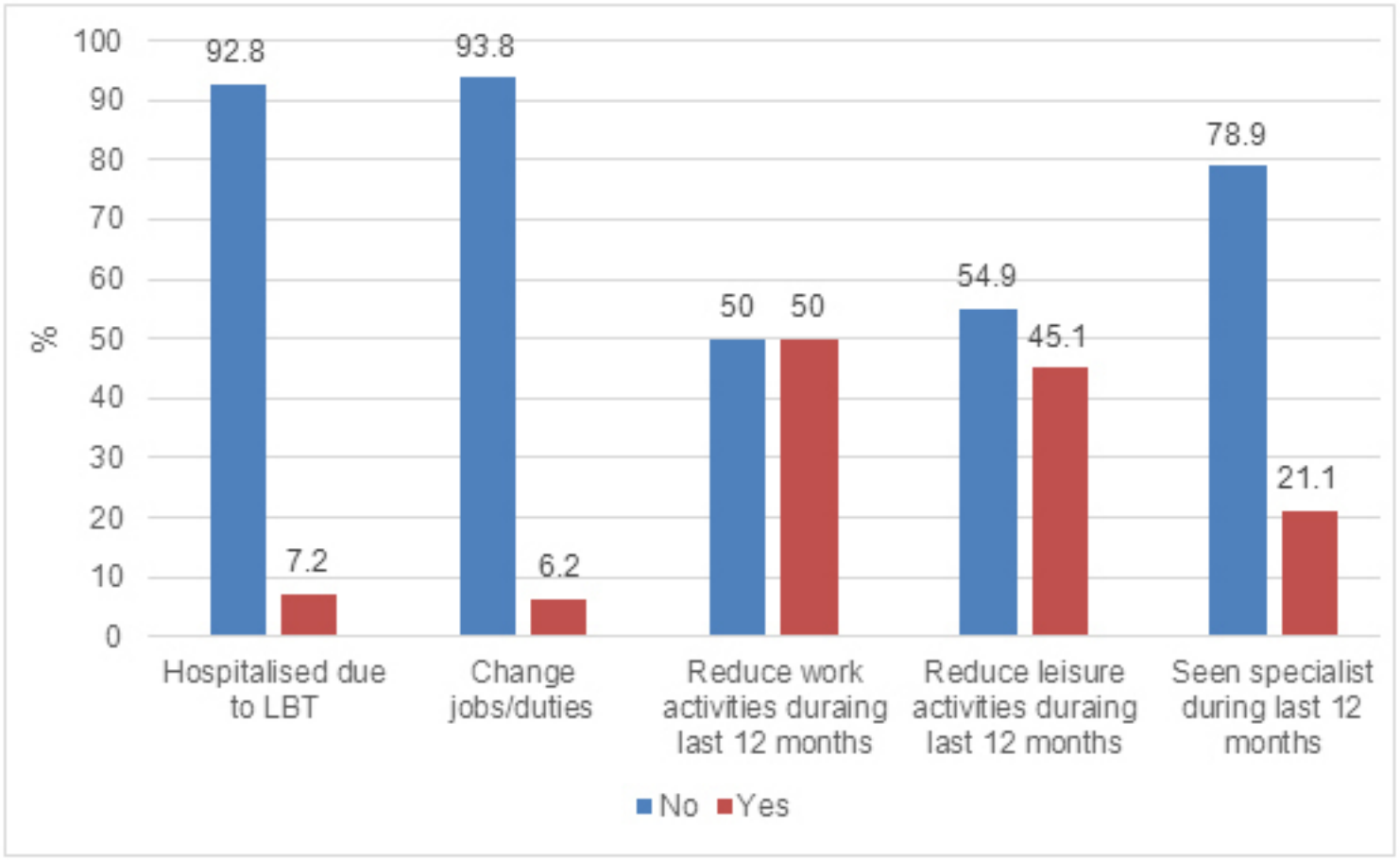

Figure 3: Time length of having pain or and prevention of normal work during the last 12 months in respondents with low back trouble (LBT)

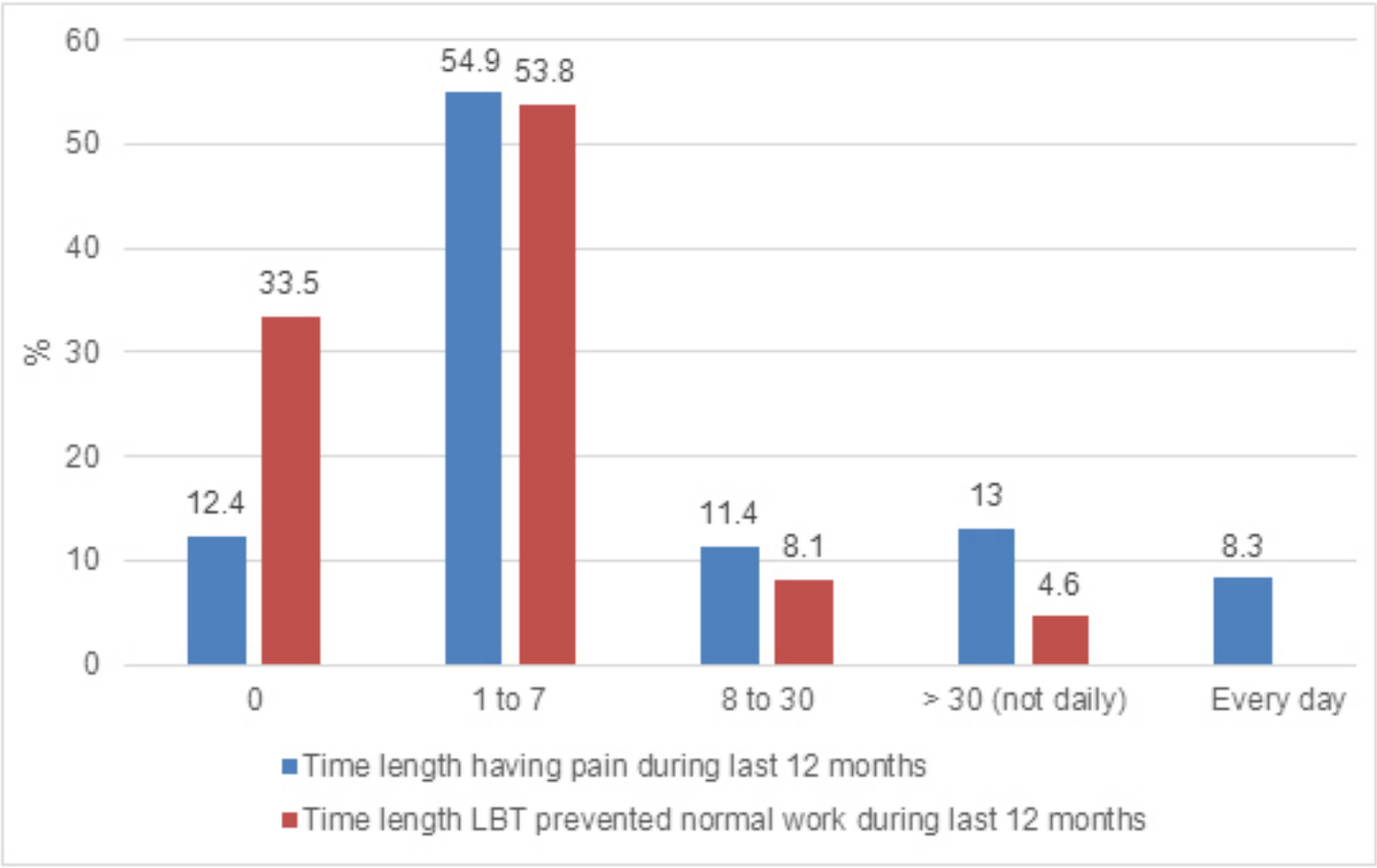

Table 2: Association between low back trouble (LBT) and sociodemographic characteristics of the studied nurses (total number = 263).

		Total (n = 263)		No LBT (n = 68)		LBT (n = 195)		p
Age mean±SD		36 ± 8		36 ± 9		36 ± 8		0.664
Pregnancy Median, IQR		1	0 to 2	1	0 to 2	1	0 to 2	
Child Median, IQR		1	0 to 2	1	0 to 2	1	0 to 2	
BMI Median, IQR		26.1	4.7	26.8	5.4	25.9	4.4	0.162
Years Median, IQR		10	6 to 16	10	6 to 15	10	6 to 16	0.904
Department n, %	surgery	34	12.9%	8	11.8%	26	13.3%	0.425
	medical	43	16.3%	6	8.8%	37	19.0%	
	pediatrics	47	17.9%	16	23.5%	31	15.9%	
	ICU	16	6.1%	6	8.8%	10	5.1%	
	OB	16	6.1%	3	4.4%	13	6.7%	
	ER	23	8.7%	6	8.8%	17	8.7%	
	OR	22	8.4%	4	5.9%	18	9.2%	
	OPD	48	18.3%	15	22.1%	33	16.9%	
	CW	14	5.3%	4	5.9%	10	5.1%	
Duration of work in the present department n, %	less than 1 year	27	10.3%	6	8.8%	21	10.8%	0.888
	1-2 years	29	11.0%	8	11.8%	21	10.8%	
	more than 2 years	207	78.7%	54	79.4%	153	78.5%	
Type	fixed	42	16.0%	12	17.6%	30	15.4%	0.661
	shift	221	84.0%	56	82.4%	165	84.6%	
Average work hours per week mean ± SD		48 ± 6		49 ± 5		48 ± 7		0.114
Breaks	1	69	26.2%	13	19.1%	56	28.7%	0.297
	2	160	60.8%	45	66.2%	115	59.0%	
	more than 2 per day	34	12.9%	10	14.7%	24	12.3%	

IQR: interquartile range; LBT: low back trauma; n: number; SD: standard deviation.

Table 3: The association between work activities that can cause low back pain and occurrence of low back trouble (LBT) pain (n = 263).

Activity	LBT	Number of times per day doing the activity				p
		not done or less than 2 times per day	2-5 times per day	6-10 times per day	more than 10 times per day	
Trolley	no	38 (55.9%)	18 (26.5%)	8 (11.8%)	4 (5.9%)	0.404
	yes	98 (50.3%)	71 (36.4%)	19 (9.7%)	7 (3.6%)	
Chair	no	38 (55.9%)	24 (35.3%)	3 (4.4%)	3 (4.4%)	0.444
	yes	113 (57.9%)	52 (26.7%)	17 (8.7%)	13 (6.7%)	
Position	no	14 (20.6%)	28 (41.2%)	16 (23.5%)	10 (14.7%)	0.565
	yes	47 (24.1%)	64 (32.8%)	58 (29.7%)	26 (13.3%)	
Toilet	no	42 (61.8%)	16 (23.5%)	6 (8.8%)	4 (5.9%)	0.860
	yes	112 (57.4%)	47 (24.1%)	25 (12.8%)	11 (5.6%)	
Bath	no	52 (76.5%)	12 (17.6%)	4 (5.9%)	0 (0.0%)	0.674
	yes	139 (71.3%)	44 (22.6%)	9 (4.6%)	3 (1.5%)	
Ambulation	no	39 (57.4%)	20 (29.4%)	3 (4.4%)	6 (8.8%)	0.756
	yes	97 (49.7%)	70 (35.9%)	9 (4.6%)	19 (9.7%)	
Furniture	no	25 (36.8%)	24 (35.3%)	7 (10.3%)	12 (17.6%)	0.774
	yes	62 (31.8%)	73 (37.4%)	28 (14.4%)	32 (16.4%)	
Move bed	no	30 (44.1%)	18 (26.5%)	6 (8.8%)	14 (20.6%)	0.100
	yes	71 (36.4%)	81 (41.5%)	19 (9.7%)	24 (12.3%)	
Bend	no	24 (35.3%)	25 (36.8%)	8 (11.8%)	11 (16.2%)	0.129
	yes	48 (24.6%)	62 (31.8%)	39 (20.0%)	46 (23.6%)	

LBT: low back trauma; n: number; * significant at p <0.05.

Table 4: Association between daily activities and occurrence of low back trouble (LBT) pain (n = 263).

		No LBT (n = 68)		LBT (n = 195)		P
		n	%	n	%	
Standing	less than 2 hours	2	2.9%	6	3.1%	0.706
	2-4 hours	4	5.9%	7	3.6%	
	4 hours or more	62	91.2%	182	93.3%	
Sitting	less than 2 hours	48	70.6%	165	84.6%	0.011*
	2 hours or more	20	29.4%	30	15.4%	
Walking	less than 4 hours	13	19.1%	25	12.8%	0.203
	4 hours or more	55	80.9%	170	87.2%	
Exercise	no	35	51.5%	118	60.5%	0.193
	yes	33	48.5%	77	39.5%	
Times	less than 2 sessions per week	24	72.7%	50	64.9%	0.426
	3 to 5 sessions per week	9	27.3%	22	28.6%	
	5 or more sessions per week	0	0.0%	5	6.5%	
Length	20 min per session with some sweating or increased breathlessness	19	57.6%	42	54.5%	0.681
	20 min per session with high sweating or increased breathlessness	1	3.0%	7	9.1%	
	30 min per session with some sweating or increased breathlessness	13	39.4%	28	36.4%	

LBT: low back trauma; n: number; * significant at p <0.05.

Table 5: Backward stepwise binomial logistic regression analysis of risk factors and prevalence of low back pain among hospital staff (n = 263).

	p	Odds ratio	95% C.I.for odds ratio	
			Lower	Upper
Breaks	.087	.510	.236	1.102
Trolley	.044*	.432	.191	.976
Chair	.042*	2.417	1.031	5.664
Position	.085	.573	.304	1.080
Move bed	.039*	.523	.283	.969
Bend	.024*	2.032	1.096	3.770
Standing	.090	2.327	.875	6.185
Sitting	.031*	.281	.088	.891
Constant	.138	10.905		

We investigated the association between LBT and various risk factors that encompassed sociodemographic characteristics, lifestyle, and work activities and duration. The occurrence of LBT in the present study was not associated with age, number of pregnancies or siblings, BMI, duration of work, and departments. Similarly, Homaid et al. (20) did not find a statistically significant relationship between LBT and age, BMI, specialty, or work experience. This is in contrast to other studies that reported the presence of a significant relationship of some of these factors with LBT (4, 25, 36). Yassi et al. (36) and Karahan et al. (4) found that younger individuals had a higher prevalence of LBT than the older age group and attributed this to the allocation of younger and less experienced staff to more physically demanding work. Also other studies have reported that LBT was more common among nurses aged 30 - 40 years and in age group 20 – 30 years (25, 37, 38). In addition, a study showed – in contrast to our results – that nurses working in an ICU are at a higher risk of developing back pain (39). Again these contrasts could be partially explained by differences in the study population as studies involved a variety of health workers. There was no significant difference in BMI between nurses with and without LBT in this study, which is in agreement with Aljeesh, and Nawajha (6). However, a BMI of 30 kg/m2 was significantly associated with LBT in other studies (13, 25).

Many lifestyle factors were condemned in literature as potential risk factors for LBT, including sedentary life and standing for long periods (4, 13, 27, 40, 41). Also, work related activities that demand lifting heavy objects or bending, play a role in precipitation of back injuries and pain (16, 27, 32). However, the only factors in our study that were found to be significantly associated with LBT were moving chair, bending and standing (increasing the risk), longer breaks, trolley moving, positioning patients, moving beds, and longer sitting time (decreasing the risk).

Similar activities were revealed by previous studies to be risk factors of LBT. French et al (31) have shown that nurses attributed their LBT mainly to transferring and lifting patients without assistance (4) and that the percentage of LBT was higher among health care workers that performed such activities while neglecting sound body mechanics. However, one study in Taiwan (24) and a systematic review (42) reported the absence of significant association between workplace manual work and low back pain.

This study was subject to some limitations. Being a questionnaire-based study, it was amenable to recall bias. Also, nurses who suffered from back pain may have been more willing to participate. Finally, work psychological stress was not investigated in this study, but it was mentioned as a potential risk factor (4).

Limitations

This study was limited by its cross-sectional nature that revealed associations between variables without revealing the causal relationship.

Conclusion

This study found a high prevalence of LBT among nurses, irrespective of their age, BMI, department and work experience. Risk factors included short breaks and sitting time, long standing times, and some work activities (wheelchair, trolley or bed moving, positioning patients). It is recommend that hospital administrations arrange proper rest periods for at-risk staff. Also, nurses should be educated about proper body mechanics when lifting heavy objects.

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Nutritional supplements and hormonal use among Gym exercisers in Jeddah city, Saudi Arabia

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Abstract

Background: There is a recent increase in popularity and demands of nutritional supplements and hormonal use among men and women gym exercisers; and their accompanying adverse effects are evident in the literature.

Objectives: To study the pattern and determinants of use of nutritional supplements among recreational gym exercisers in Jeddah city, Saudi Arabia.
Methods: It was a cross-sectional study which was conducted online using Google form. It was a non-probability convenient sample of 260 gym exercisers. Data was collected using a questionnaire which provided information on the socio-demographic characteristics, aspects of sport practiced, intake of nutritional supplements, as well as on the awareness of the side effects of hormones use. SPSS version 23 was used; Chi square, and Multi-nominal logistic regression tests of significance, were used; and the Odds ratio (OR) and 95% CI were calculated. The level of significance was 0.05.

Results: Nutritional supplements were used by 59.1% of the Gym exercisers. About 82% got them without advice from health care personnel; coaches were counselled on the type of nutritional supplement in 20% of the cases. They were used mainly to build muscles (52.6%), improve performance (22.2%), or to reduce weight (16.3%). Carbohydrate rich diet, weight gain supplements and fat burning supplements were the most frequently used types. Older age group exercisers were significantly more likely to use nutritional supplements (B= - 0.058). The males were 2.99 times more likely to consume nutritional supplements compared to the females (OR= 2.985; 95% CI 1.575, 5.660). The smokers were 3.541 times more likely to consume nutritional supplements compared to the nonsmokers (OR= 3.541; 95% CI 1.713, 7.313). The subjects with total period of training of more than 12 months, were significantly more likely to consume nutritional supplements compared to those with total period of 1 – 6 months (OR= 0.413; 95% CI 0.202, 0.845, $p < 0.016$), or of 7-12 months (OR= 0.308; 95% CI 0.126, 0.775, $p < 0.016$). The subjects with total period of training per day of more than 2 hours, were significantly more likely to consume nutritional supplements compared to those with total period of less than 1 hour per day (OR= 0.045; 95% CI 0.004, 0.845, $p < 0.570$, $p < 0.017$), and of 1 - 2 hours per day (OR= 0.083; 95% CI 0.007, 0.997, $p < 0.050$).

Conclusion: Use of nutritional supplements is common among the exercisers in Saudi Arabia, but mainly without medical supervision. Health education programs are needed to educate the exercisers on the potential harmful effects of supplements, if taken without medical advice and supervision. Educating gym employees may have a positive influence on the use of supplements and hormones.

Key words: Nutritional supplements, Saudi Arabia, gym exercisers

Introduction

Nutritional supplements aimed at improving physical performance or altering body composition have become readily available worldwide. Athletes have been the greatest consumers of many of these products [1–3]. One of the places that emerged as the main place of consumption are the gyms [4, 5]. The term nutritional supplement has been popularly used to describe any product (other than tobacco) that is intended to supplement the diet that contains one or more dietary supplements [6]. Dietary supplements are used in foods and beverages [7-9]. They are not intended to replace food [10]. Nutritional supplements can be traditionally classified into three essential parts; dietary supplements like vitamins, minerals, and antioxidants, the ergogenic supplement like the coenzyme Q10, BCAA, and caffeine and sports food like sports drinks [11-13]. According to the United States of America Food and Drug Administration (FDA) any product labeled as a "supplement" means that its contents and the claims on the label have not been approved or evaluated by the FDA [14, 15]. It is well documented that the use of some of these products may lead to serious health injury [16]. The regular gym users are at risk resulting from taking various categories of nutritional supplements intended for athletic improvement [17]. The Kingdom of Saudi Arabia has an expanding population in which the young constitute the majority, with an increasing number of people attending athletic activities and with easy access to dietary supplements [18]. An increasing number of gym exercisers are eager to take dietary supplements in order to increase lean body mass quickly [19], but without the advice provided by health professionals that athletes have available [5]. They often rely only on the information on the label, which may not be fully representative of the actual content of the supplement [19], or on the information provided by the manufacturer, that does not have to demonstrate the supplements' safety and efficacy [20]. Although there is much information on the use of dietary supplements by athletes [21, 22], however, little is known about supplement intake among people exercising in gyms. The use of dietary supplements by gym exercisers appears to be influenced by their country [4, 23-26] and culture [27], therefore it is necessary to provide population-specific data on nutritional supplement use in gym exercisers, and allow for targeted strategies to be drawn. Thus this study was conducted to explore the pattern, determinants and use of nutritional and hormonal supplements, among gym exercisers, and study their awareness about side effects of use of steroids.

Subjects and Methods

The design of this study was a cross-sectional one; where an online survey using Google form questionnaire, was sent via email to the residents of Jeddah, Saudi Arabia. Sampling method was a non-probability convenient one. Sample size for the present study was determined using G*power software [13] ($\alpha = 0.05$, Power = 0.95, effect size = 0.3 and degree of freedom = 5), where the minimal sample size required was 224. The total number of subjects who responded was 260 (age: 17 years through to 69 years). Data was collected using the questionnaire which included the following sections: Personal questionnaire which provided information about socio demographic characteristics, hobbies, and habits; information about type, nature and duration of playing sports; information about use of nutritional supplementation, and hormones; and awareness of side effects of hormones. Data analysis and statistical tests: Statistical Package for Social Sciences (IBM SPSS, version 23, Armonk, NY: IBM Corp.) was used. Chi square test of significance and Multi-nominal Logistic regression method were used; Odds ratios (OR), 95% confidence interval (95% CI), and p values were calculated. The level of significance (α) was 0.05.

Ethical considerations

Ethical clearance was obtained from the institutional review board (IRB). In order to keep confidentiality of any information provided by study participants, the data collection procedure was anonymous. Availability of the data: the raw data is available at the research center of ISNC and all results of the data are included in the paper.

Results

The total number of gym exercisers was 260. They were practicing exercises in gyms at Northern Jeddah (41.2%), Western Jeddah (18.1%), Central Jeddah (15.8%), Eastern Jeddah (16.9%) and at Southern Jeddah (8.1%). The age range of the exercisers was 17 to 69 years, with mean age of 29.9 years (SD 11.37). Out of the 260 exercisers, 43.1% were males and 56.9% were females. Among the studied exercisers, 59.1% used nutritional supplements. Those who have ever used steroids were 6.2% of the exercisers. The majority of the exercisers (68%) took nutritional supplements without consultation of health care experts; while 20% took them on recommendation of their coaches. Health care experts were consulted on nutritional supplements by 12% of the exercisers. Over half of the exercisers used them to build muscles (52.6%), while 22.2% used them to improve performance. On the other hand, 16.3% used them to reduce weight. Over half of the exercisers admitted that they obtained the desired effect from the use of the nutritional supplements, while 8% admitted that they suffered from their side effects. Table 1 shows the distribution of exercisers by age groups according to personal characteristics, and frequency and duration of training. The majority of subjects were of normal BMI (48.1%), or overweight/obese (46%). Those who are under 20 years of age tended to be normal (56.7%), or underweight (20.0%). Overweight was mainly encountered among those aged 50 to less than 60 years (65.5%), while obese subjects were more encountered among those aged 40 to less than 50 years (53%). These differences were statistically significant where $p < 0.05$. The majority of the subjects had total period of training of 1 – 6 months (46.5%). Those subjects aged 20 to 30 years have practiced training for more than 12

months (49.4%), while those aged 50 to 60 years had the shortest period of training (69.0%). These differences were statistically significant where p <0.002. The majority of the subjects spend 3- 5 hours training per day (63.8%), and for 3 -5 times per week (50%). Younger age groups spent more time per day and more days per week in training (p< 0.05). Table 2 displays relationship between BMI categories and sociodemographic characteristics and intake of nutritional supplements and hormones. The proportion of females was higher than males in this study (56.9% and 43.1% respectively). The proportion of subjects who were overweight or obese (51.2, and 52.9% respectively) were higher in males; whereas the proportion of U/W subjects was higher among females (80.0%). The majority of the studied subjects were Saudis (89.2%). About three quarters of the subjects were non-smokers (75.8%). The majority of the subjects were university degree holders or higher (87.3%). Half of the subjects used nutritional supplements (50%), whereas, 6.2%, only, ever had cortisol. Table 3 shows the awareness of the subjects about side effects of cortisol and BMI. The majority of the subjects (49.2%) did not know that cortisol is associated with increased occurrence of hypertension, or associated with increased blood glucose level (51.2%), or its association with vision problems (57.3%), prostate enlargement(52.7%), kidney problem (43.1%)), testicular atrophy (49.6%), or with increased RBCs (54.2%). BMI of the subjects was irrelevant to their awareness about these side effects (p > 0.05). Although the majority did not know that cortisol could produce gynecomastia (40.4%), a high proportion of those who were overweight (35.3%) realized this association. This difference was statistically significant where p <0.029. A large proportion of those who were underweight realized that cortisol could produce psychological upset (53.3%). This difference was statistically significant where p <0.019. Table 4 reveals the distribution of subjects by BMI and type and frequency of nutritional supplements used. The type of nutritional supplement used 4 times per day were sports drinks (44.4%), carbohydrate rich supplements (43.0%), creatine (39.3%), vitamins/minerals (25.2%), fat burning substances (50.4%), and weight gain substances (52.6%). However, no significant differences were found between different categories of BMI and intake of nutritional supplements (p > 0.05). Table 5 shows the results of logistic regression relationship of the variables which are related to the use of nutritional supplements. Older age groups were significantly more likely to use nutritional supplements compared to the younger ones (B= - 0.058; p < 0.000). The males were 2.985 times more likely to consume nutritional supplements compared to females (OR= 2.985; 95% CI 1.575, 5.660, p < 0.001). The smokers were 3.541 times more likely to consume nutritional supplements compared to the nonsmokers (OR= 3.541; 95% CI 1.713, 7.313, p < 0.001). The subjects with total period of training of more than 12 months, were significantly more likely to consume nutritional supplements compared to those with a total period of 1 – 6 months (OR= 0.413; 95% CI 0.202, 0.845, p < 0.016), and those with a total period of 7-12 months (OR= 0.308; 95% CI 0.126, 0.775, p < 0.016). The subjects with a total period of training per day of more than 2 hours, were significantly more likely to consume nutritional supplements compared to those with a total period of less than 1 hour per day (OR= 0.045; 95% CI 0.004, 0.845, p < 0.570, p < 0.017), and those with a total period of 1 - 2 hours per day (OR= 0.083; 95% CI 0.007, 0.997, p < 0.050).

Discussion

This study allowed us to explore the use of nutritional supplements by exercisers in the five districts of Jeddah city, Saudi Arabia. The proportions of males and females who practice exercises were similar with no significant differences, however, BMI was significantly different, where females tended to be underweight, while obesity was more common among males. In the present study, the BMI of the exercisers was not associated with intake of nutritional supplements, or with the type of supplement used. This is consistent with another study [17]. In the present study, we found that the total period of training, and number of hours of training per day were significant determinants of use of nutritional supplements among gym goers. This is consistent with findings from another study [29]. In the present study we found that older gym goers, and male gender, as well as smoking, were significantly more likely to use nutritional supplements (using multinomial logistic regression). This was in line with a previous study [5]; however, it was not in line with another study [29]. In the present study over 59% of the Gym exercisers used nutritional supplements. This is in line with the majority of the studies conducted in different parts of the world, which revealed prevalence ranging from 36% to 80% [5, 19, 24, 29 - 30]. The discrepancies in the reported prevalence rates may be related to sociodemographic and cultural characteristics, the type of gyms included or methodologic aspects, namely what was considered to be a supplement, and the method of data acquisition [23]. A previous study revealed that the more years of experience, the greater the belief that diet is insufficient to cover the requirements associated with exercise [32]. This indicates the relationship that could exist between the years of training and the use of nutritional supplements, a similar situation to that shown by gym-exercisers in the present study. Regarding the characteristics of the used nutritional supplements, the six most used nutritional supplements were sports drinks, carbohydrate rich supplements, creatine, vitamins/minerals, fat burning substances, and weight gain substances. This is in line with reports from studies conducted on gym exercisers in Saudi Arabia and in other regions [24, 31, 33], which found a high use of amino acids, proteins, and multivitamins. This finding can be explained by the importance, that optimal protein intake, has in increasing muscle mass [34], and the convenience of supplements [35]. It is not always feasible to ingest an adequate amount of protein exclusively from food, due to difficulties in preparation or transportation, lack of time or the volume needed to reach optimal doses [36]. Supplements also represent an easy way to increase protein intake in out-of-home snacks, promoting a more equitable distribution throughout the day, with advantages for muscle synthesis [37].

Table 1: Distribution of the Gym trainee subjects according to Age groups and BMI, and training periods

Variables	Categories	Age groups in years							P - value
		< 20 No (%)	20 - No (%)	30 - No (%)	40 - No (%)	50 - No (%)	60 + No (%)	Total No (%)	
Use of nutritional supplements	Yes	13 .43,3%	105 63.3%	8 50,0%	4 26.7%	5 17.2%	0 0.0%	135 51.9%	0.000
	No	17 56.7%	61 36.7%	8 50.0%	11 73.3%	24 82.8%	4 100.0%	125 48.1%	
BMI	Under weight	6 (20.0%)	9 (5.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	15 (5.8%)	0.000
	Normal	17 (56.7%)	99 (59.6%)	2 (12.5%)	1 (6.7%)	6 (20.7%)	0 (0.0%)	125 (48.1%)	
	Overweight	5 (16.7%)	44 (26.5%)	10 (62.5%)	6 (40.0%)	19 (65.5%)	2 (50.0%)	86 (33.1%)	
	Obese	2 (6.7%)	14 (8.4%)	4 (25.0%)	8 (53.3%)	4 (13.8%)	2 (50.0%)	34 (13.1%)	
Total period of training	1-6 months	20 (66.7%)	62 (37.3%)	9 (56.3%)	8 (53.3%)	20 (69.0%)	2 (50.0%)	121 (46.5%)	0.002
	7-12 months	7 (23.3%)	22 (13.3%)	2 (12.5%)	2 (13.3%)	5 (17.2%)	0 (0.0%)	38 (14.6%)	
	more than 12 months	3 (10.0%)	82 (49.4%)	5 (31.3%)	5 (33.3%)	4 (13.8%)	2 (50.0%)	101 (38.8%)	
Training times per week	less than 3 times	13 (43.3%)	45 (27.1%)	3 (18.8%)	7 (46.7%)	22 (75.9%)	0 (0.0%)	90 (34.6%)	0.000
	3-5 time	15 (50.0%)	92 (55.4%)	10 (62.5%)	4 (26.7%)	5 (17.2%)	4 (100.0%)	130 (50.0%)	
	more than 5 times	2 (6.7%)	29 (17.5%)	3 (18.8%)	4 (26.7%)	2 (6.9%)	0 (0.0%)	40 (15.4%)	
Total training hours per day	less than 1 hour	10 (33.3%)	47 (28.3%)	0 (0.0%)	7 (46.7%)	18 (62.1%)	2 (50.0%)	84 (32.3%)	0.003
	1-2 hours	20 (66.7%)	110 (66.3%)	16 (100.0%)	8 (53.3%)	10 (34.5%)	2 (50.0%)	166 (63.8%)	
	3-5 hours	0 (0.0%)	9 (5.4%)	0 (0.0%)	0 (0.0%)	1 (3.4%)	0 (0.0%)	10 (3.8%)	
Gender	Males	3 10.0%	91 54.8%	10 62.5%	4 26.7%	2 6.9%	2 50.0%	112 43.1%	0.000
	Females	27 90.0%	75 45.2%	6 37.5%	11 73.3%	27 93.1%	2 50.0%	148 56.9%	

Table 2: Distribution of the Gym trainee subjects according to BMI and personal characteristics

Variables	Categories	BMI categories					P -value
		U/W No (%)	Normal No (%)	O/W No (%)	Obese No (%)	Total No (%)	
Gender	Male	3 (20.0%)	47 (37.6%)	44 (51.2%)	18 (52.9%)	112 (43.1%)	0.038
	Female	12 (80.0%)	78 (62.4%)	42 (48.8%)	16 (47.1%)	148 (56.9%)	
Nationality	Saudi	15 (100.0%)	111 (88.8%)	76 (88.4%)	30 (88.2%)	232 (89.2%)	0.586
	Non-Saudi	0 (0.0%)	14 (11.2%)	10 (11.6%)	4 (11.8%)	28 (10.8%)	
Smoking Status	Smokers	2 (13.3%)	31T (24.8%)	22 (25.6%)	8 (23.5%)	63 (24.2%)	0.780
	Non-smokers	13 (86.7%)	94 (75.2%)	64 (74.4%)	26 (76.5%)	197 (75.8%)	
Level of education	Lower secondary school	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (2.9%)	1 (0.4%)	0.106
	Higher secondary school	2 (13.3%)	15 (12.0%)	8 (9.3%)	7 (20.6%)	32 (12.3%)	
	University	13 (86.7%)	103 (82.4%)	75 (87.2%)	23 (67.6%)	214 (82.3%)	
	Master	0 (0.0%)	7 (5.6%)	3 (3.5%)	2 (5.9%)	12 (4.6%)	
	Doctorate	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (2.9%)	1 (0.4%)	
Use of nutritional supplement	Yes	5 (33.3%)	67 (53.6%)	41 (47.7%)	17 (50.0%)	130 (50.0%)	0.475
	No	10 (66.7%)	58 (46.4%)	45 (52.3%)	17 (50.0%)	130 (50.0%)	
Use of cortisol	Yes, on an ongoing basis	2 (13.3%)	1 0.8%	5 5.9%	1 2.9%	9 3.5%	0.065
	I used it and stopped using	0 0.0%	5 4.0%	2 2.4%	0 0.0%	7 2.7%	
	May use it in the future	1 6.7%	25 20.0%	20 23.5%	3 8.6%	49 18.8%	
	I cannot use it	12 80.0%	94 75.2%	58 68.2%	31 88.6%	195 75.0%	

Table 3: Distribution of the Gym trainee subjects according to BMI and awareness of steroid use complication

Variables	Categories	BMI categories					P-value
		U/W No (%)	Normal No (%)	O/W No (%)	Obese No (%)	Total No (%)	
S/E: Hypertension	Yes	4 (26.7%)	35 (28.0%)	30 (34.9%)	6 (17.6%)	75 (28.8%)	0.151
	No	3 (20.0%)	22 (17.6%)	19 (22.1%)	13 (38.2%)	57 (21.9%)	
	I don't know	8 (53.3%)	68 (54.4%)	37 (43.0%)	15 (44.1%)	128 (49.2%)	
S/E: Increase blood sugar level	Yes	5 (33.3%)	35 (28.0%)	18 (20.9%)	6 (17.6%)	64 (24.6%)	0.067
	No	1 (6.7%)	26 (20.8%)	21 (24.4%)	15 (44.1%)	63 (24.2%)	
	I don't know	9 (60.0%)	64 (51.2%)	47 (54.7%)	13 (38.2%)	133 (51.2%)	
S/E: Vision problems	Yes	2 (13.3%)	29 (23.2%)	18 (20.9%)	11 (32.4%)	60 (23.1%)	0.168
	No	0 (0.0%)	27 (21.6%)	16 (18.6%)	8 (23.5%)	51 (19.6%)	
	I don't know	13 (86.7%)	69 (55.2%)	52 (60.5%)	15 (44.1%)	149 (57.3%)	
S/E: Psychological problems	Yes	8 (53.3%)	48 (38.4%)	42 (48.8%)	10 (29.4%)	108 (41.5%)	0.019
	No	0 (0.0%)	23 (18.4%)	12 (14.0%)	13 (38.2%)	48 (18.5%)	
	I don't know	7 (46.7%)	54 (43.2%)	32 (37.2%)	11 (32.4%)	104 (40.0%)	
S/E: Prostate enlargement	Yes	1 (6.7%)	23 (18.4%)	25 (29.1%)	7 (20.6%)	56 (21.5%)	0.186
	No	6 (40.0%)	28 (22.4%)	22 (25.6%)	11 (32.4%)	67 (25.8%)	
	I don't know	8 (53.3%)	74 (59.2%)	39 (45.3%)	16 (47.1%)	137 (52.7%)	
S/E: Kidney problems	Yes	5 (33.3%)	46 (36.8%)	39 (45.3%)	12 (35.3%)	102 (39.2%)	0.064
	No	1 (6.7%)	21 (16.8%)	12 (14.0%)	12 (35.3%)	46 (17.7%)	
	I don't know	9 (60.0%)	58 (46.4%)	35 (40.7%)	10 (29.4%)	112 (43.1%)	
S/E: Testicular atrophy	Yes	3 (20.0%)	27 (21.6%)	26 (30.2%)	8 (23.5%)	64 (24.6%)	0.255
	No	4 (26.7%)	29 (23.2%)	20 (23.3%)	14 (41.2%)	67 (25.8%)	
	I don't know	8 (53.3%)	69 (55.2%)	40 (46.5%)	12 (35.3%)	129 (49.6%)	
S/E: Gynecomastia	Yes	2 (13.3%)	39 (31.2%)	28 (32.6%)	12 (35.3%)	81 (31.2%)	0.026
	No	10 (66.7%)	30 (24.0%)	22 (25.6%)	12 (35.3%)	74 (28.5%)	
	I don't know	3 (20.0%)	56 (44.8%)	36 (41.9%)	10 (29.4%)	105 (40.4%)	
S/E: Increased RBCs	Yes	3 (20.0%)	23 (18.4%)	27 (31.4%)	9 (26.5%)	62 (23.8%)	0.123
	No	2 (13.3%)	24 (19.2%)	21 (24.4%)	10 (29.4%)	57 (21.9%)	
	I don't know	10 (66.7%)	78 (62.4%)	38 (44.2%)	15 (44.1%)	141 (54.2%)	

Table 4: Distribution of the Gym trainee subjects according to BMI and awareness of steroid use complication

Types of nutrition supplements	Categories	BMI categories					P –value
		U/W No (%)	Normal No (%)	O/W No (%)	Obese No (%)	Total No (%)	
Sports drinks times per day	≤ 1	4 (80.0%)	33 (47.8%)	22 (50.0%)	10 (58.8%)	69 (51.1%)	0.851
	2-4	0 (0.0%)	3 (4.3%)	2 (4.5%)	1 (5.9%)	6 (4.4%)	
	>4	1 (20.0%)	33 (47.8%)	20 (45.5%)	6 (35.3%)	60 (44.4%)	
Carbohydrate-rich supplements Times per day	≤ 1	4 (80.0%)	27 (39.1%)	17 (38.6%)	9 (52.9%)	57 (42.2%)	0.434
	2-4	0 (0.0%)	10 (14.5%)	9 (20.5%)	1 (5.9%)	20 (14.8%)	
	>4	1 (20.0%)	32 (46.4%)	18 (40.9%)	7 (41.2%)	58 (43.0%)	
Creatine Times per day	≤ 1	94 (80.0%)	34 (49.3%)	26 (59.1%)	10 (58.8%)	74 (54.8%)	0.818
	2-4	0 (0.0%)	4 (5.8%)	3 (6.8%)	1 (5.9%)	8 (5.9%)	
	>4	1 (20.0%)	31 (44.9%)	15 (34.1%)	6 (35.3%)	53 (39.3%)	
Vitamins / Minerals Times per day	≤ 1	4 (80.0%)	43 (62.3%)	31 (70.5%)	10 (58.8%)	88 (65.2%)	0.915
	2-4	0 (0.0%)	8 (11.6%)	3 (6.8%)	2 (11.8%)	13 (9.6%)	
	>4	1 (20.0%)	18 (26.1%)	10 (22.7%)	5 (29.4%)	34 (25.2%)	
Fat burning supplements Times per day	≤ 1	4 (80.0%)	32 (46.4%)	22 (50.0%)	6 (35.3%)	64 (47.4%)	0.635
	2-4	0 (0.0%)	1 (1.4%)	1 (2.3%)	1 (5.9%)	3 (2.2%)	
	>4	1 (20.0%)	36 (52.2%)	21 (47.7%)	10 (58.8%)	68 (50.4%)	
Weight gain supplements Times per day	≤ 1	4 (80.0%)	28 (40.6%)	18 (40.9%)	8 (47.1%)	58 (43.0%)	0.346
	2-4	0 (0.0%)	5 (7.2%)	0 (0.0%)	1 (5.9%)	6 (4.4%)	
	>4	1 (20.0%)	36 (52.2%)	26 (59.1%)	8 (47.1%)	71 (52.6%)	

Table 5: Multinomial Logistic Regression for using nutritional supplements and related variables

Variable	Categories	B	Sig	Exp (B)	95% CI for Exp (B)	
					Lower bound	Upper Bound
Intercept		4.158	.002			
Age in years		-.058	.000	.944	.916	.973
Gender	Male	1.094	.001	2.985	1.575	5.660
	Female	0				
Smoking	Yes	1.265	.001	3.541	1.713	7.323
	No	0				
Total period of training	1-6 months	-.883	.016	.413	.202	.845
	7-12 months	-1.178	.010	.308	.126	.755
	more than 12 months	0				
Total training hours per day	less than 1 hour	-3.096	.017	.045	.004	.570
	1-2 hours	-2.489	.050	.083	.007	.997
	more than 2 hours	0				

When we explored the reason why the gym exercisers use nutritional supplements, these were mainly to gain muscle mass (52.6%), improve performance (22.2%), and reduce body fat (16.3%). This was in line with other studies [17, 29]. Use of hormones among the gym exercisers was low (3.9%), which is similar to another study [17]; thus the information on this type of supplement was not enough to reveal its characteristics. However, the information about side effects of use of corticosteroids was poor among the majority of the gym exercisers in the present study. In general, the results of the present study, showed that, gym exercisers were seeking to meet goals that were more associated with fitness and aesthetics rather than sport performance. These results are in line with those found in other, similar investigations [17, 24, 32]. The fact that 53% of exercisers use nutritional supplements raises the question whether, in actual fact, so many individuals actually have an unbalanced diet, making it necessary to ingest these supplements in order to cover the nutrient deficiency, as there is sufficient evidence to indicate that the physically active population does not require additional nutrients to those provided by a balanced diet [34], or whether, in actual fact, marketing and a lack of knowledge, leads them to ingest products that they probably do not need. Added to the above, only 11% of exercisers state that the use of nutritional supplements was recommended by health care personnel or an expert nutritionist. Similarly to what was previously reported [5, 19, 29], the present study revealed that, there was a high dependence on the internet as a source of information and place of purchase. This scenario could contribute to a greater use of nutritional supplements with little scientific evidence or, even worse, the use of nutritional supplements that could represent a health risk. This question takes on even more importance if it is considered that 50% of the nutritional supplements consumed by exercisers are classified as type C (little meaningful proof of beneficial effects), according to the sports supplement program of the Australian Institute of Sport, a result that is lower than the 57.9% reported by one study [32].

In conclusion, consumption of nutritional supplements is large among gym exercisers in Saudi Arabia, mainly men; however, the majority use it without medical supervision. Sports drinks, carbohydrate rich supplements, creatine, vitamins/minerals, fat burning substances, and weight gain substances, were the most consumed supplements. Gaining muscle mass, improving performance, and reducing weight are the main reasons for consuming them. This generalized consumption of supplements occurs despite the scarce evidence of their effects and the lack of knowledge of pre-existing nutritional deficiencies. This study establishes a baseline for future investigations related to the use and intake of nutritional supplements among recreational gym exercisers, in Jeddah Saudi Arabia. Health education programs are needed where sports nutrition experts should provide scientifically correct information about the benefits and risks of using supplements, so that consumers can make informed choices, and encourage the role of a balanced diet in achieving their specific goals. Educating gym employees may have a positive influence on the use of supplements and hormones among gym exercisers.

Limitations

Our study has inherent limitations, which should be acknowledged, the main one concerning the method of data collection (a self-administered online questionnaire) and the sample being of convenience. Furthermore, participants use the internet, so results may not reflect the views of those unfamiliar with the internet, and living in very remote regions and living traditional / nomadic lifestyles. Despite these limitations, our results have generated important information on nutritional supplement intake among Saudi exercisers, an otherwise unexplored area of health care.

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Prevalence and prognosis of ABO blood groups among COVID-19 patients at KAUH, Jeddah

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Abstract

Background: COVID-19 has spread rapidly across the globe and has generated over 1,130,000 confirmed infections worldwide as on fifth of April 2020. There is limited research about ABO blood group and COVID 19 prevalence and prognosis in the Middle East region.

Objectives: The aim of this study was to assess the prevalence and prognosis of ABO blood groups in (COVID-19) patients at King Abdulaziz University Hospital in Jeddah.

Methods: This is a retrospective study analyzing 122 inpatients' medical records of patients above 18 years who were COVID-19 positive at King Abdulaziz university hospital, Jeddah, Saudi Arabia, between March to June 2020, prognosis of the disease studied by the patient's situation and the need for intubation or ICU admission.

Results: From a total of 790 patients, 122 met the study criteria. The most frequent ABO group was O blood group with a percentage of 40.2% followed by A blood group 35.2%. Hypertension and diabetes mellitus were common medical comorbidities 42.6%, 41%, respectively. 80.3% of patients were alive with no significant relation between Blood group and ICU admission p=0.705 or intubation p=0.702.

Conclusion: O blood group was frequently seen among COVID-19 patients followed by A blood group, with a non-significant relationship between blood groups and ICU admission or intubation. Future multicentric studies are recommended, including larger samples.

Key words: prevalence, prognosis, ABO, blood, COVID-19, KAUH

Introduction

The 2019 novel coronavirus (COVID-19) caused by severe acute respiratory syndrome coronavirus (SARS-CoV-2) was first identified as an epidemic of respiratory tract infection in Wuhan City, China (1), then spread all over the world. The rapid evolution of the outbreak had distressing consequences for healthcare systems and communities worldwide. Then the World Health Organization announced on March 11, 2020, that the Coronavirus disease-2019 (COVID-19) is a pandemic (2). It has rapidly spread globally and had generated over 1,130,000 confirmed infections and over 62,000 deaths worldwide as of April 5, 2020 (3).

Recently, COVID-19 has affected over 200 countries, and the mortality rate has reached as high as 8% in Italy (4). By measures of social distancing and the socioeconomic impact of the pandemic, billions of citizens are affected (5). Since the discovery of COVID-19, there has been an increasing interest in this virus's risk factors. There are many risk factors associated with Severity and Mortality in COVID-19 (Older age, underlying hypertension, diabetes mellitus, COPD, high cytokine levels (IL-2R, IL-6, IL-10, and TNF-α), and elevated lactate dehydrogenase level, d-dimer levels greater than 1 μg/mL, and higher SOFA score on admission) (6,7,8,9).

Many researchers have shown the impact of ABO blood groups and the host susceptibility to many infections such as norovirus, HIV, SARS, and hepatitis B virus (10). A previous study on COVID-19 patients in Wuhan and Shenzhen, China discovered associations between ABO blood types and infection; the result showed Blood Group A has a higher risk of death compared with B, AB, O groups (11).

On the contrary, another two studies done in New York on April 11, 2020, and in Changsha, China in June both showed that group A has a higher risk for COVID 19 which so far is consistent with the Wuhan study (3,12). Regarding research that has been reviewed, very little discussed this issue in the Middle East, especially in Saudi Arabia. This study should encourage further investigation of the relationship between the ABO blood group and COVID-19 susceptibility so we aimed to explore the distribution of ABO blood groups related to (COVID-19) infection and the prognosis of the disease in all individuals at King Abdulaziz University Hospital in Jeddah.

Methodology

A retrospective study was done at KAUH in Jeddah, Saudi Arabia from March to June, on all inpatients' records who had Nasopharyngeal swab for COVID-19. Patients ≥ 18 years old who tested positive for COVID-19 were included in the study and classified according to their ABO blood group. The comorbidities that were assessed in those patients have (DM, HTN, Cardiovascular diseases, Pulmonary diseases, and Tumors) and the prognosis of the disease was studied according to the patient's situation (alive or deceased) (need for intubation or ICU admission). Also, age, gender, and BMI play an essential role in determining prognosis. Data was entered using an online Google drive form then exported to Microsoft Excel. Statistical analysis was achieved by using the Statistical Package for the Social Sciences (SPSS) version 21. The Mean and the standard deviation were calculated to describe continuous variables, while numbers and percentages were used for categorical variables. Student t-test and chi-square test were used to evaluate the association between continuous and categorical variables, respectively. A p-value <0.05 was considered significant. The ethics committee approved this study at KAUH (Reference No. 371-20).

Results

During the study period, a total of 790 patients underwent laboratory tests for COVID-19. Patients who had negative results or positive results without a cross-match test were excluded from our study.122 patients had a positive COVID-19 result and had a cross-match test. The mean age of presentation was 49.12 ± 16.859. More than half, (51.6%), were male. Common presenting BMI was Obese 36.1% and Overweight 32.8%. HTN and DM were found in most of the patients, with a percentage of 42.6%,41%, respectively. All of them had nasal swabs (Table 1).

O blood group was frequently seen with a percentage of 40.2%, followed by A blood group of 35.2%. Most of the patients were alive 80.3%. There was no significant relation between Blood group and ICU admission p=0.705 or intubation p=0.702 (Table 2).

Table 1. Characteristics of COVID 19 patients

Demographic Data		N (%), Mean ± SD	P-value
Age		49.12 ±16.859	
Gender	Male	59 (48.4)	
	female	63 (51.6)	
BMI categories	Underweight	3(2.5)	0.98
	Ideal	34(28.6)	
	Overweight	39(32.8)	
	Obese	43(36.1)	
Chronic disease	DM	50(41)	0.886
	HTN	52(42.6)	0.807
	Pulmonary disease	12(9.8)	0.175
	Cardiovascular disease	30(24.6)	0.551
	Tumor	9 (7.4)	0.789
Swab type	Nasal swab	122 (100)	
ABO group	A	43(35.2)	
	B	20(16.4)	
	O	49(40.2)	
	AB	10(8.2)	
Rh	Positive	115(94.3)	
	Negative	7(5.7)	
Patient situation			0.359
	Alive	98(80.3)	
	Deceased	24(19.7)	
Patient prognosis	ICU admission	42(34.4)	0.705
	Intubation	26(21.3)	0.702

Table 2. Blood group comparison

Characteristic /ABO group		A,43(35.2) N (%)	B, 20(16.4) N (%)	O, 49(40.2) N (%)	AB, 10(8.2) N (%)
Gender	Male	17(39.5)	10(50)	27(55.1)	5(50)
	Female	26(60.5)	10(50)	22(44.9)	5(50)
BMI categories	Underweight	1(2.4)	1(5.3)	1(2)	0(0)
	Ideal	13(31.7)	5(26.3)	14(28.6)	2(20)
	Overweight	13(31.7)	7(36.8)	16(32.7)	3(30)
	Obese	14(34.1)	6(31.6)	18(36.7)	5(50)
Chronic disease	DM	18(41.9)	7(35)	20(40.8)	5(50)
	HTN	20(46.5)	8(40)	21(42.9)	3(30)
	Pulmonary disease	2(4.7)	4(20)	4(8.2)	2(20)
	Cardiovascular disease	10(23.3)	3(15)	15(30.6)	2(20)
	Tumor	3(7)	2(10)	4(8.2)	0(0)
Rh	Positive	41(95.3)	19(95)	45(91.8)	10(100)
	Negative	2(4.7)	1(5)	4(8.2)	0(0)
Patient situation	Alive	38(88.4)	16(80)	36(73.5)	8(80)
	Deceased	5(11.6)	4(20)	13(26.5)	2(20)
Patient prognosis	ICU admission	14(32.6)	5(25)	19(38.8)	4(40)
	Intubation	7(16.3)	4(20)	12(24.5)	3(30)

Discussion

The aim of this study was to assess prevalence and prognosis of ABO group in COVID-19 patients at King Abdulaziz University Hospital in Jeddah. Generally, the predominant blood group in the western region of Saudi Arabia is O, followed by A, B, AB, respectively (13). In our study, we found that O group has a higher incidence with COVID-19 infection, and the least incidence was AB blood group. On the contrary, A blood group has the highest incidence in Wuhan, Changsha and New York studies (3,11,12,13,14,15). In our study, all hospitalized patients were diagnosed by Nasopharyngeal swab; this type of swab is recommended by Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens for COVID-19 although oropharyngeal swab is acceptable (16,17). There are 60 confirmed risk factors identified for COVID-19 severity. Increasing in age is classified as one of the highest consistency risk factors for Covid-19 severity in a brief review done on first of June 2020 (18).

Patients with pre-existing comorbid conditions showed a high association for COVID-19 infection in this study, and the most distinctive was hypertension, followed by diabetes mellitus. That was similar to two different studies done in China (19,20). Hypertension carries a nearly 2.5 fold increased risk of severe COVID-19 and higher mortality (21). Now worldwide it is recognized, that having at least one such comorbidity is an unfavorable prognostic factor in patients with pneumonia of various etiologies (22). However, the strength of the association between these comorbidities and an increased risk of COVID-19 severity has not been established yet. Obesity is considered the chief risk factor for the comorbidities discussed before. We found the highest percentage from the sample was obese, similar to a previous study that found almost half of the patients were obese, and the majority of them required mechanical ventilation (23). Previous studies showed a good prognosis for most COVID-19 patients and a small percentage of them had severe or critical manifestations (14,15). This result agrees with our findings where more than half of the patients didn't intubate or were admitted to ICU.

O blood group has the worst prognosis in our study as it was associated with more ICU admission and risk of intubation compared to non-O blood groups. Moreover, most of the deceased cases were in O blood group; this could be due to a higher incidence of hypertension among them. Blood group A is associated with a lower recorded number of deaths. A different distribution pattern was shown in the Wuhan study: Where blood group A has a higher proportion of death (11). In contrast, a meta-analysis study done in New York showed AB blood group has a higher association with intubation and death among COVID-19 patients (3).

Limitations

One of the limitations of this study was it being conducted in one hospital with a limited population of 122 patients. Also, many patients didn't have a cross match test for their blood group.

Conclusion

The present study assessed the relation between COVID-19 infection and ABO blood groups among 790 patients. The mean age of the participants was 49.12 ± 16.859 and it was found that O blood group was frequently seen among patients with a percentage of 40.2%, followed by A blood group of 35.2%. A non-significant relationship was found between blood groups and ICU admission or intubation. As the first study to assess this relationship, it is recommended to conduct similar future multicentric studies including larger samples to represent the population accurately.

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Prevalence, risk factors and types of urinary incontinence among females: A cross sectional study

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Abstract

Background: To determine the prevalence and risk factors associated with urinary incontinence (UI) and its subtypes among females, moreover, to assess UI management among affected females and its impact on their quality of life.

Study method: A cross sectional study was carried out among females aged 18 years and above in Taif city, Saudi Arabia. A total of 500 females participated in the study.

Results: The prevalence of UI among participating women was 16.8% (84/500). The results revealed that there was a statistically significant relationship between UI prevalence and age, body mass index, social status, and education ($p<0.001$). Among participants who reported UI, approximately 44% stated they had urge UI, 41.7% confirmed mixed UI, while 14.3% experienced stress UI.

Conclusion: Age, education level, multiple pregnancies, constipation, and non-use of some chronic medications were associated risk factors for UI subtypes. The highest frequency of urine leakage was 'once or more daily'. The study showed that UI, irrespective of the types had affected negatively the quality of women's life. The prevalence of UI is expected to increase in females with increase in age which may put a burden on health-care services in the future.

Key words: Urinary incontinence, urge UI, mixed UI, stress UI

Introducttion

International Continence Society defined Urinary Incontinence (UI) as “the complaint of any involuntary leakage of urine” (1). Urinary incontinence is a worldwide problem that affects both males and females but the prevalence in females is higher. It impairs their quality of life and restricts social activity (2, 3). Globally, 200 million people suffer from UI (4). Many studies have been conducted in different countries dealing with UI among females. A study conducted by Ghafouri et al. 2014, reported 21% UI in investigated women in Qatar (5). However, 49.3% UI was reported in Kuwait in the same year (6). In Saudi Arabia, studies demonstrated that the prevalence of UI among females is higher in Jeddah (41.4%) and lower in Riyadh (29%) (7, 8). UI is categorized into 3 subtypes; stress urinary incontinence (SUI), urge urinary incontinence (UUI), and mixed urinary incontinence (MUI). The SUI is a complaint of involuntary leakage of urine by exertional activities such as laughing, coughing, sneezing, running, and lifting. The UUI includes urgency with or without leakage, or when bladder muscle is overactive. The MUI has more than one form of UI (9, 10).

The magnitude of the problem varies by geographical locations and culture. In Sweden, China, and Saudi Arabia, SUI was the most prevalent type among all UI subtypes (7, 8, 11, 12). Among women in Kuwait, Turkey and the United Arab Emirates; the most common type was UUI (6, 13, 14). However, MUI was more common in women with diabetes mellitus (DM) in Kuwait and Egypt (15, 16). Several variables have been identified as being possible risk factors for UI. Previous studies showed that eldery people (12, 13, 17), obese (12, 13, 18), diabetic (8, 14, 17), hypertensive (3, 12), postmenopausal (3, 18), pregnant (19, 20), and nursing women (3) experienced higher rates of UI. In addition, bronchial asthma (5), UTI (13), constipation (3, 12, 13), chronic cough (17) displayed an assoociation with greater incidence of UI. Further, lack of exercise (12), parity (13, 17), number of abortions (13), vaginal delievery (11, 18), and chronic pelvic pain (12) have an increased risk of developing UI. Various drugs could theoretically induce UI such as alpha-receptor antagonists, antipsychotics, benzodiazepines, antidepressants, and hormone replacement therapy in postmenopausal women (21). Although UI is not a life threatining condition, prior studies have raised concerns as to how UI affected negatively women’s quality of life. It troubled their daily work and marital relationship, limitated their social activities, and made it difficult doing housework and praying. They had to avoid coughing and restrict fluid intake to avoid such problems (8, 11-13, 16, 22).

Despite experiencing a sense of shame, the majority of affected women did not look for health consultation for this problem (3, 8, 22, 23). Barriers that prevent Middle Eastern women from seeking medical consultation mostly include the misconceptions about the causes of UI and the availability of treatment options, and embarrassment (24). Due to variation of prevalence, risk factors, and unawareness regarding UI; physicians find it difficult to perform early diagnosis and treat¬ment. Therefore, the purpose of the study is to determine the prevalence and risk factors associated with UI and its types among females in Taif City, Saudi Arabia, moreover, to assess the management of UI among affected women and its impact on the quality of life.

Materials and Methods

Study design

A cross sectional study was conducted among females in Al-Hada Hospital for Armed Forces, King Faisal Hospital, Prince Mansour Armed Forces Hospital and Prince Sultan Hospital for Armed Forces, Taif, Saudi Arabia. The target population were female aged 18 years or above, irrespective of their nationality. A total of 500 females agreed to participate in the study. The sample size was calculated by using survey system and Rasoft program. Simple random sampling technique was adopted for distribution selection.

Inclusion criteria

The study enrolled females visiting hospitals in the period of study in Taif city, aged 18 years old or above, regardless of nationality.

Exclusion criteria

The study excluded females less than 18 years old, not living in Taif city, critically ill, and any female patient who had undergone surgery in the urinary systemprior.

Data collection

An inclusive pretested self-administered questionnaire was used to elicit female’s answers on different variables to address study objectives. The questionnaire was developed in English and translated to Arabic language. The questionnaire consisted of five sections: The first section included demographic information. The second section contained risk factors associated with UI such as pregnancy, number and mode of delivery, smoking, caffeine consumption, fluid intake, chronic diseases, and medications. The third section comprised questions on severity and type of UI. The fourth section dealt with management of UI among female participants. The last section included the impact of UI on their quality of life. The questionnaire was tested for internal consistency and then piloted on a random convenient sample of women in Taif city. The piloted data is not included in the study sample.

Ethical considerations

During the research activities, each participant was informed about the study topic and objectives with confidentiality of the collected data and sample results, and gave verbal consent to be included in the study. The study was approved by the ethical approval committee, Taif University (No. 40-35-0138), Research Ethics Committee of Armed Forces Hospitals, and Research and Studies Department in Directorate of Health Affairs, Taif, Saudi Arabia.

Statistical analysis

The collected data were entered, processed, and analyzed using Statistical Package for Social Sciences program (IBM SPSS) version 22. Frequencies and percentages were computed for discrete variables, mean, and standard deviation for continuous variables. The chi-square and Fisher's exact tests were used to test the association between UI and study variables. The 0.05% level of significance was taken to test the significance of results.

Results

Demographics data and prevalence of UI among participants

Demographic data of participants in correlation to UI prevalence are presented in Table 1. The prevalence of UI among participating females was 16.8% (84/500). The results of the study revealed that there was a statistically significant relationship between UI prevalence and age, BMI, social status, and education ($p<0.001$). The highest percentage of UI was experienced by female participants aged above 50 years (66.6%). None of the underweight females reported UI. However, the prevalence of UI increased with increase in BMI. The prevalence rate of UI was less among unmarried females 5 (4.1%).

Among participants who reported UI, approximately 44.0% stated to have UUI, 41.70% confirmed MUI, while 14.30% experienced SUI (Figure 1). By analyzing the correlation between demographics and all UI subtypes, participants with age less than 50 years had more SUI, while those aged above 50 years experienced more MUI ($p<0.001$). SUI was reported more in the participants with BMI ≥25. Half of the participants with UUI were overweight, while two-thirds of participants with MUI were overweight and obese. However, there was not a statistically significant difference between BMI and all subtypes ($P>0.197$). Similarly, social status showed no significant correlation with all UI types ($p>0.05$). All married female participants had the highest rate of all types of UI. Approximately 60% of the participants with SUI were graduates, while those with MUI were illiterate ($p<0.05$).

Relationship between risk factors associated with each type of UI

The relationship between each UI subtype and the risk factors associated with it was analyzed; there was a significant difference between all types of UI and age, education level, multiple pregnancies, constipation, and nonuse of chronic medications ($P<0.05$). There was not any statistically significant relationship between UI subtypes and the other risk factors such as BMI, mode of delivery, smoking, caffeine consumption, daily fluid intake and comorbidities ($P>0.05$) (Table 2). Regarding usage of any drug that could induce UI such as neurological medications, loop diuretics, alpha-receptor agonist, alpha-blockers, angiotensin-converting enzyme (ACE) inhibitors, or sedative-hypnotics; Approximately 23% (33/84) of the affected participants were taking medications. Out of them, 20.2% (17/84) of the participants were taking medications for neurological diseases, 6% (5/84) were taking furosemide, and 1.2% (1/84) were on other medications like doxazosin, prazosin and terazosin.

Severity of UI

Eighty-two percent of the participants experienced symptoms of UI for more than 3 months. The highest rate of daily frequency of urine leakage was reported in all UI subtypes (range from 50% to 71%). Further, the observed amount of urine leakage was a few drops in all UI subtypes (range from 37.8% to 58.3%). Results revealed that there was a significant association between UI subtypes and duration of symptoms, frequency of urine leakage and amount of urine leakage. (Table 3).

Attitude of participants towards UI

Most of the participants did not smoke (95%) and half of them consumed only 1 to 2 cups of coffee daily (54.8%, $p>0.05$). Among the participants, 51% of them did not visit a physician to discuss UI problems. A total of 39.3% of the participants believed that this type of problem does not require any treatment, 29.8% of them did not visit a physician due to shyness, while the remaining assumed that no treatment is available for UI. However, the majority of UI patients were taking medications according to physician's prescription (94.4%). The majority of participants (77.4%) preferred to use medicines for a long period, rather than surgery. On the other hand, the level of education had a significant impact on the choice of UI medication prescriber, preferences of UI management, and awareness of exercise benefits in UI. A total of 63.1% of the participants reported that they have no idea about special types of exercise for UI problems and the difference was statistically significant ($p<0.001$). Regarding medications to treat UI, 19% (16/84) of the participants stated that they have not taken any medication, while the remaining participants were on medications.

Impact of UI on the quality of life

It was observed that UI had an impact on the quality of participants' lives. Less than 20% of participants always tried to avoid coughing, sneezing, laughing in public, or reduced fluid intake. A total of 8 (9.5%) participants reported that they always experienced decrease in abilities to do household duties, 31 (36.9%) stated sometimes, while 45 (53.6%) of them never had any difficulty. However, in travelling 18 (21.4%) of the participants reported facing a problem always, 40 (47.6%) described having difficulty occasionally, while 26 (31%) participants never had any difficulty in travelling. Almost 42.9% of the participants faced difficulty in sleeping, 34.5% experienced it every so often, while 22.6% of the participants never observed difficulty in sleeping. Approximately, 44% of the participants reported they had normal physical activities, 47% faced difficulty occasionally, while 8% of females experienced a decrease in physical activities. A total 11.9% of the participants always faced difficulty in social performance, 42.9% observed it from time to time, while 45.2% of participants has good social functioning.

Table 1. Demographic data of participants and UI prevalence

Characteristic		UI		Total	p value
		No (n=416)	Yes (n=84)		
Age	18-30	213 (94.2%)	13 (5.8%)	226	<0.001
	31-40	79 (84%)	15 (16%)	94	
	41-50	54 (72%)	21 (28%)	75	
	51-60	44 (66.7%)	22 (33.3%)	66	
	> 60	26 (66.7%)	13 (33.3%)	39	
BMI	Underweight (< 18.5)	27 (100%)	0 (0%)	27	<0.001
	Normal (18.5-24.9)	130 (92.9%)	10 (7.1%)	140	
	Overweight (25-29.9)	110 (76.9%)	33 (23.1%)	143	
	Obese (30-34.9)	103 (79.2%)	27 (20.8%)	130	
	Severely obese (35-39.9)	29 (69%)	13 (31%)	42	
	Morbidly obese (≥ 40)	17 (94.4%)	1 (5.6%)	18	
Social status	Married	273 (79.6%)	70 (20.4%)	343	<0.001
	Divorced	7 (70%)	3 (30%)	10	
	Widow	20 (76.9%)	6 (23.1%)	26	
	Unmarried	116 (95.9%)	5 (4.1%)	121	
Education	Illiterate	78 (69.6%)	34 (30.4%)	112	<0.001
	Primary school	39 (67.2%)	19 (32.8%)	58	
	Middle school	8 (72.7%)	3 (27.3%)	11	
	High school	90 (91.8%)	8 (8.2%)	98	
	University	194 (91.1%)	19 (8.9%)	213	
	Postgraduate	7 (87.5%)	1 (12.5%)	8	

Figure 1. Distribution of different types of UI among female participants.

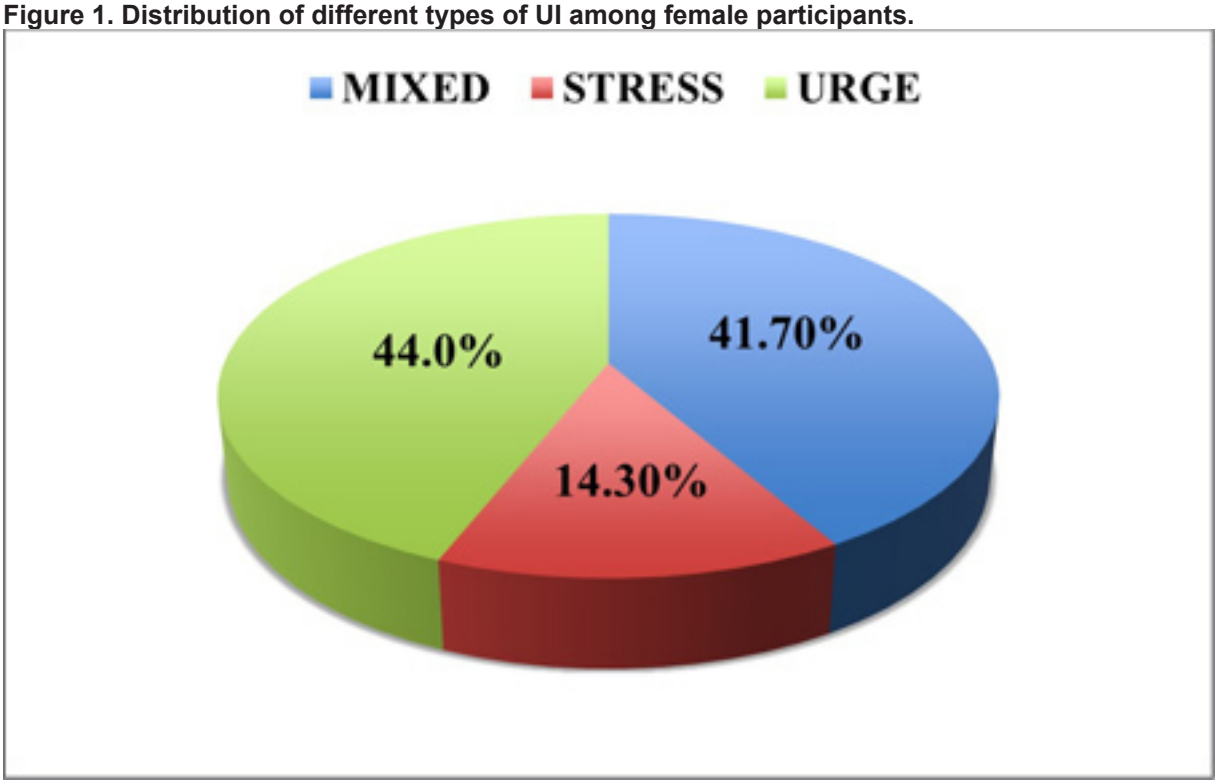

Table 2. Risk factors associated with each UI subtype

Risk factors		SUI		UUI		MUI	
		n=12 (%)	p value	n=37 (%)	p value	n=35 (%)	p value
Age	18-30 years	3 (25.0%)	<0.05	6 (16.2%)	<0.05	4 (11.4%)	<0.05
	31-40 years	5 (41.7%)		3 (8.1%)		7 (20.0%)	
	41-50 years	3 (25.0%)		15 (40.5%)		3 (8.6%)	
	51-60 years	1 (8.3%)		13 (35.1%)		8 (22.9%)	
	>60 years	0 (0%)		0 (0%)		13 (37.1%)	
BMI	Normal	1 (8.3%)	>0.05	4 (10.8%)	0.021	5 (14.3%)	>0.05
	Overweight	2 (16.7%)		20 (54.1%)		11 (31.4%)	
	Obese	5 (41.7%)		8 (21.6%)		4 (40.0%)	
	Severely obese	4 (33.3%)		4 (10.8%)		5 (14.3%)	
	Morbidly obese	0 (0%)		1 (2.7%)		0 (0%)	
Mode of delivery	Normal	6 (50.0%)	>0.05	20 (54.1%)	>0.05	24 (68.6%)	>0.05
	Caesarian	1 (8.3%)		2 (5.4%)		0 (0%)	
	Both	5 (41.7%)		12 (32.4%)		9 (25.7%)	
	Never	0 (0%)		3 (8.1%)		2 (5.7%)	
Education	Illiterate	0 (0%)	<0.001	12 (32.4%)	<0.05	22 (62.9%)	<0.001
	Primary	4 (33.3%)		11 (29.7%)		4 (11.4%)	
	Middle school	0 (0%)		3 (8.1%)		0 (0%)	
	High school	1 (8.3%)		4 (10.8%)		3 (8.6%)	
	University	7 (58.6%)		6 (16.2%)		6 (17.1%)	
	Postgraduate	0 (0%)		1 (2.7%)		0 (0%)	
Number of pregnancies	Never	0 (0%)	0.002	3 (8.1%)	<0.001	2 (5.7%)	0.003
	1-2	3 (25.0%)		6 (16.2%)		1 (2.9%)	
	3-4	4 (33.3%)		4 (10.8%)		0 (0%)	
	> 4	5 (41.7%)		24 (64.9%)		32 (91.4%)	
Constipation	Yes	1 (8.3%)	0.021	8 (21.6%)	0.012	16 (45.7%)	0.034
	No	6 (50.0%)		21 (56.8%)		10 (28.6%)	
	Sometimes	5 (41.7%)		8 (21.6%)		9 (25.7%)	
Asthma	Yes	3 (25.0%)	>0.05	5 (13.5%)	>0.05	11 (31.4%)	>0.05
	No	9 (75.0%)		32 (86.5%)		24 (68.6%)	
Diabetes mellitus	Yes	3 (25.0%)	>0.05	12 (32.4%)	>0.05	19 (54.3%)	>0.05
	No	9 (75.0%)		25 (67.6%)		16 (45.7%)	
UTI	Yes	6 (50.0%)	>0.05	12 (32.4%)	>0.05	11 (31.4%)	>0.05
	No	6 (50.0%)		25 (67.6%)		24 (68.6%)	
Smoking status	Yes	0 (0%)	>0.05	2 (5.4%)	>0.05	2 (5.7%)	>0.05
	No	12 (100%)		35 (94.6%)		33 (94.3%)	
Caffeine consumption	Neither	4 (33.3%)	>0.05	5 (13.5%)	>0.05	6 (17.1%)	>0.05
	1-2 cups	6 (50%)		23 (62.2%)		17 (48.6%)	
	>=3 cups	2 (16.7%)		9 (24.3%)		12 (34.3%)	
Fluid intake per day	<10 cups	10 (83.3%)	>0.05	33 (89.2%)	>0.05	26 (74.3%)	>0.05
	>=10 cups	2 (16.7%)		4 (10.8%)		9 (25.7%)	
Depression	Yes	2 (16.2%)	>0.05	6 (16.2%)	>0.05	4 (11.4%)	>0.05
	No	10 (83.3%)		31 (83.8%)		31 (88.6%)	
Hypertension	Yes	1 (8.3%)	>0.05	11 (29.7%)	>0.05	12 (34.3%)	>0.05
	No	11 (91.75)		26 (70.3%)		23 (65.7%)	
Neurological diseases	Yes	0 (0%)	>0.05	0 (0%)	>0.05	2 (5.7%)	>0.05
	No	12 (100%)		37 (100%)		33 (94.3%)	
Chronic medications	Yes	1 (8.3%)	<0.05	4 (10.8%)	<0.05	12 (34.3%)	<0.05
	No	11 (91.7%)		33 (89.2%)		23 (65.7%)	

UTI: Urinary tract infection

Table 3. Severity of UI based on UI subtypes

UI symptoms		Types of UI n=84			Total n=84 (%)	p value
		SUI n=12(%)	UUI n=37 (%)	MUI n=35 (%)		
Duration of UI symptoms	≤ 3 months	4 (33.3%)	8 (21.6%)	3 (8.6%)	15 (17.9%)	>0.05
	> 3 months	8 (66.7%)	29 (78.4%)	32 (91.4%)	69 (82.1%)	
Frequency of urine leakage	Once or more weekly	5 (41.7%)	7 (18.9%)	5 (14.3%)	17 (20.2%)	>0.05
	2-3 times weekly	0 (0%)	7 (18.9%)	5 (14.3%)	12 (14.3%)	
	3-5 times weekly	1 (8.3%)	0 (0%)	0 (0%)	1 (1.2%)	
	Once or more daily	6 (50%)	23 (62.2%)	25 (71.4%)	54 (64.3%)	
Amount of urine leakage	Never	0 (0%)	10 (27%)	2 (5.7%)	12 (14.3%)	<0.05
	Few drops	7 (58.3%)	14 (37.8%)	14 (40.0%)	35 (41.7%)	
	Moderate amount	2 (16.7%)	11 (29.7%)	9 (25.7%)	22 (26.2%)	
	Large amount	3 (25%)	2 (5.4%)	10 (28.6%)	15 (17.9%)	

Discussion

This cross-sectional study was designed to determine the prevalence and risk factors of UI and its subtypes among females in Taif City. The results showed that the prevalence of UI among participating females was 16.8%. The prevalence rate was increased with increase in the age of participants. The study results showed a lower UI prevalance rate than other similar studies conducted in Riyadh (41.4%) and Jeddah (29%) cities of Saudi Arbia (7, 8). The highest rate of UI was observed in the age above 50 years. The increased incidence of UI with a higher age group may be due to the fact that these females may experience gradual loss of muscle tone, reduction in contractility, hormonal changes, and could also be due to repeated injuries during vaginal deliveries of child birth (25). It was also noted that UI was comparatively higher in females with increased BMI. These findings were in accordance with several studies conducted in different countries where they reported a positive association with increased BMI (12, 13, 18, 26).

The study results further exhibited that there was an association between marital status and the incidence of UI. Married females had more possibity of getting UI than unmarried ones. This is similar to the data reported by earlier findings (27, 28). This may be due to the reason that married females experience urogenital changes because of hormonal deficiency which might lead to vaginal dryness, reduced libido, dyspareunia and vaginal itching, and all of these changes could lead to involuntary urinary muscular control (29-31). In the present study, the most common type of UI was reported as UUI (44%). Our results were in accordance with the findings of studies conducted in Kuwait (18.7%) and the Emirates (59.4%) (6, 14), whereas, SUI accounted for the highest rate of UI in Riyadh (50%) and in Jeddah (36.4%) cities of Saudi Arabia (7, 8).

In the current study, the incidence of all types of UI was assosiated with age, pregnancy, and use of medications. The association of UI with age is well characterized. A meta-analysis study reported that the age specific incidence was less than 2/1,000 person-years before age 40 years and it increased thereafter (32). In prior studies, pregnant females stated a significant association with UI (19, 20). It occurred due to pressure on bladder by coughing, sneezing, laughing, exercising, or lifting heavy objects (33). In the current study, the frequency of involuntary urine loss was 'more than once daily' in the majority of participants. This finding is in accordance with the study conducted by Deffieux et al (34). About two-thirds of the participants reported that they had at least one or more daily urine leak. Similar results were reported by studies conducted in Europe and the USA (35, 36). Excessive diurnal frequency of excretion (more than eight times per day) was reported in a study conducted by Swithinbank et al (37). Most of the females did not seek medical help because of shyness or other personal reasons. Some of the females stated that there is no treatment available for UI; some believed that UI does not need a treatment. These findings are similar to reports by other studies (38, 39). In the current study, 19% of females used different medications to manage UI symptoms. On the other hand, the study results indicated that UI had a negative impact on the quality of females' lives and effects on emotional, socio-demographic, and lifestyle domains. The majority of females experienced anxiety, difficulty in coughing, or sneezing in public. It also decreased their physical recreation and social activities. These results are in accordance with the earlier findings that UI significantly reduced the quality of life in females and had a major impact on their mental and social determinants of health (8, 11-13, 16, 22).

Conclusion

UI was prevalent among females in Taif city, with a higher rate of UUI and had a negative impact on the quality of life. Higher age, lower education level, marriage, multiple pregnancies, constipation, and use of some chronic medications are associated risk factors for UI subtypes. Most of the females in the study preferred to use medicines than surgery to manage UI. The prevalence of UI is expected to increase in females with increase in age which may put a burden on health-care services in the future. In order to limit the burden, physicians must be updated and aware of screening, diagnosis and management of UI conditions to improve the quality of life of females.

Limitations of the study

Further research is needed to extend the generalizability of the present findings to reduce any potential bias. Specific information about exercise and sexual behavior is also required. The study relied on patient reporting of symptoms only, not on the clinical data.

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Knowledge and Awareness of Parents about pediatric obstructive sleep apnea in KSA, cross-section study, 2019

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Abstract

Background: Obstructive Sleep Apnea (OSA) is a chronic disorder defined as frequent episodes of complete and partial obstruction of the upper airway during sleep. Eventually, untreated OSA causes severe morbidities such as neurobehavioral, cardiac, and growth deficiency. Most of these are reversible via early detection and therapy. Unfortunately, studies in Saudi Arabia that promote the general public's awareness about OSA in the pediatric age group are limited.

Objectives: This study aims to assess the level of Awareness about pediatric OSA among Saudi parents. Additionally, we wanted to study the relationship between parents' knowledge and their educational level and determine the best method for increasing the public's awareness.

Methods: A cross-sectional study was done on 675 parents and data were collected randomly through a self-administered online questionnaire. An awareness score level was calculated to assess the level of participants' knowledge.

Results: Most of the parents had a medium level of knowledge, 6.2% had a high level of awareness and 50.7% stated that awareness campaigns should be done to increase public awareness about pediatric OSA. Parents who were more educated had more knowledge about the disease.

Conclusion: There is a high rate of missed awareness and knowledge about pediatric OSA which highlights the need for further studies in the future.

Key words: Knowledge, Awareness, pediatric, sleep, apnea, KSA.

Introduction

Obstructive Sleep Apnea (OSA) is a chronic sleeping disorder defined as frequent episodes of complete and partial obstructions of the upper airway during sleep (1). These breathing gaps result in low oxygen supply to the brain and an accumulation of carbon dioxide in the blood (2). As a result, nocturnal sleep will be disturbed and eventually lethargy and day time tiredness will ensue. With knowledge improvement regarding the pathophysiology and clinical complications of the disorder, most affected patients could be diagnosed (2). By history taking from the patient or bed partner about the signs and symptoms of the disease including loud snoring, observed episodes of breathing pauses during sleep, daytime fatigue and sleepiness, identification of patients who need further diagnostic assessment could be done (3).

According to the American Sleep Association (ASA) OSA is the most common type of sleep apnea (4). Furthermore, its prevalence in the pediatric age-group was 5% (5). Additionally, another article illustrated that the most common cause for OSA in children is adenotonsillar hypertrophy with a peak range between 3-6 years old (6). Although the condition is not acutely life-threatening, if left untreated it may cause many complications such as high blood pressure, metabolic and cardiovascular disease (7).
A study on young school-aged children showed that the risk increased according to severity, which leads to reduced cognitive and behavioral capabilities that likely impact optimal health development. As a consequence, those who have moderate to severe OSA were harmed in their social and academic life (8), in patients' families and the community as a whole (7). The prevalence of OSA in Saudi Arabia was initially assessed by Bahammam et al, nearly a decade ago on 400 middle-aged women by using the Berlin Questionnaire stratification for risk of OSA. The results showed that 39% of women were considered as high risk for OSA (9).

Additionally, in another Bahammam study on Saudi primary school-children, they stated that the prevalence of habitual snoring was 17% (10). Furthermore, a survey conducted in Jeddah city included 65 children with Sickle cell disease at a tertiary hospital where they assessed the prevalence of OSA among them, revealed that it's prevalence was high at 80% (52 patients) using an apnea-hypopnea index cutoff of ≥1 (11). A study by Scott J et. al recommended increasing awareness of sleep-disordered breathing (SDB), particularly in children with more severe OSA as it will help in decreasing the burden on families with an affected child as well as the community (8).

In Kingdom of Saudi Arabia (KSA), studies which encourage the awareness of the general population about OSA in the pediatric age group are limited. This study aimed to assess the level of Awareness about pediatric OSA among Saudi parents, and the relationship of this knowledge to their educational level.

Methodology

A cross-sectional study was done to assess Pediatric Obstructive Sleep Apnea (POSA) awareness among Saudi parents during the period from October 2019 to April 2020. The sample included all Saudi parents from both genders who agreed to participate. We excluded non-Saudi participants. The sample size was around 700 subjects.

Data collection methods and procedure:
The data was collected randomly through a self-administered online questionnaire. We conducted the survey in Arabic language and directed it to all parents in Saudi society through (WhatsApp, Twitter, Facebook, Path, Telegram, Tumbler, Instagram). The questionnaire contained two parts: The first part contained items on socio-demographic data like: Age, Nationality, gender, marital status, region of origin, education, and specialty.

The second part included some questions of knowledge about OSA. About 14 questions attempted to assess the respondent's awareness, and understanding of pediatric obstructive sleep apnea, starting with "Are you aware of a condition known as obstructive sleep apnea?" to see the extent of the society's understanding of OSA, the definition of POSA, risk factors, the most common criteria of POSA, and treatment options of POSA, by the principal investigators. Additionally we assessed which media helped the community to obtain their information about POSA, an to report the community's needs to know more about POSA in the future. Finally, we asked if they think they are in need of further awareness about POSA.

Statistical analysis: The data were entered using Microsoft Excel 2010; they were coded and analyzed by the (SPSS) Package for the Social Sciences program version 25. Data analysis included descriptive statistics frequency. The percentage was used to describe the demographic information and variables and Chi-Square (X2) test was done to asses the relationship between variables. A p-value less than 0.05 was considered significant.

Ethical Consideration: The survey of this study was on the social media websites to reach a large number of respondents. Thus, there was no need for data collectors in this situation. Then electronic consent was obtained from those who agreed to participate in the study and all were informed that the information required would be used for research purposes only.

Results

Table 1 shows the socio-demographic data of our sample. Their age ranged from 18 to more than 66 years, with the most common age group range from 31 to 40 years old. Most of our sample (N=620), (91.9%) were female. Most of them (N=271), (40.1%) lived in the western region; (N=633), (93.8%) were married. (N=429), and 63.6%of participants hold a bachelor's degree. (N=415), (61.5%) were teachers.

More than three quarters (77.8%) of the participating parents knew about sleep apnea from a medical article. As shown in Table 2 most of the participants (N=532), (78.8%) correctly defined sleep apnea as "Repeated episodes of obstruction of breathing during sleep". While 18.1% incorrectly thought that OSA is a normal phenomenon during sleeping.

Figure 1 describes the frequencies of correct answers for questions about OSA symptoms among children affected by the disease. The chart shows that mouth breathing is the most prevalent symptom with 43.1%, while bedwetting is the less frequent symptom with only 3.1%.

When participants were asked about the risk factors of OSA, most of the parents expressed their agreement to all the mentioned factors (enlarged tonsil, adenoid, Down syndrome, asthma, diabetes mellitus, allergic sinusitis, cerebral palsy, sickle cell disease, history of low birth weight and smoking), where the "Yes" answers ranged between 64.1% to 68.9% except for obesity, for which 90.7% of them answered "No" as shown in Figure 2.

We conducted a knowledge score level according to the frequency of the correct answers about the definition, symptoms, and risk factors' knowledge. Then we categorized them into three groups as follows, low score from (0-5), medium knowledge score (6-11), and high score from (12-16). As shown in Figure 3 most of the parents (N=369), (58.7%) had a medium knowledge score with the mean score of 6.74, SD=3.25. However only (N=42), (6.2%) scored a high score, and a significant percentage of low knowledge score with (N=237), (35.1%) of the parents.

When participants were asked, "Do you think you need more information about POSA?". (N=46), (68.4%) of them stated they do need more information about POSA, while only (N=33) parents (4.9%) answered they did not need more information.

Figure 4 illustrates what further information the parents would like to know about the disease, which showed that the majority (74.4%) would like to gain knowledge about the disease in general.

We asked parents about the best method to increase public awareness about pediatric OSA. As shown in Figure 5 more than half (50.7%) of them stated that a volunteer awareness campaign is the best method to increase public awareness about pediatric OSA.

As shown in Table 3 the percentage of the parents who answered the OSA definition question according to their educational level and the relationship between knowing the correct definition of OSA and their educational level, which revealed a significant correlation ($X2= 20.440$, $P<0.05$). Accordingly parents who had a higher degree had the highest percentage in answering the correct answer (92.1%). On the other hand, there was no significant association between awareness of POSA and Age group. Additionally, there was no statistically significant association between any of the assessed OSA risk factors.

Discussion

Healthy sleep is crucial for the central nervous system development in children, particularly infants. However, one of the most typical sleep problems is pediatric obstructive sleep apnea, especially in obese children (12,13). Due to the increasing prevalence of pediatric obesity in the Middle East and gulf area, the incidence of pediatric sleep apnea is also on the rise (14,15). Accordingly, it is essential to understand the knowledge of parents about obstructive sleep apnea in childhood.

The present quantitative study examined parents' knowledge and awareness towards pediatric obstructive sleep apnea in Saudi Arabia through a survey. The study demonstrated that about half of the participants represented the western region in Saudi Arabia and had a university degree. Furthermore, 77.8% of parents read medical articles on POSA, though half of the parents (58.7%) had medium knowledge about the disease, while only 6% had high knowledge about POSA.

Moreover, it was revealed that the level of knowledge was significantly correlated to the parents' level of education, while it was non-significantly associated with their age. Additionally, 68.4% of the parents thought they need further information on POSA.

Healthy sleep patterns and obstructive sleep apnea in childhood have been examined in different settings. A recent review by McDowall et al. (16) examined parents' knowledge of sleep symptoms in childhood and demonstrated poor knowledge of sleep symptoms, with a slightly improved knowledge of healthy sleep practices. Furthermore, McDowall et al. (16) showed a significant correlation between parents' knowledge and the sleep duration of children and sleep symptoms (16).

Another study by Jones et al. (17) evaluated the impact of a training session on POSA and other sleep symptoms in childhood on parents' knowledge. Jones et al. (17) included parents with children aged below 12 years old and demonstrated that educational interventions could be a useful tool to improve parents' knowledge about the disease and reduce symptoms in their children (17).

The present study demonstrated that 35.1% of parents had an insufficient level of knowledge, while only 6.2% had a high level of POSA knowledge. Although the present

Table 1. Demographic data information

Factor		Frequency	Percent
Sex	Male	55	8.1%
	Female	620	91.9%
Age	18-30	126	18.7%
	31-40	310	45.9%
	41-50	192	28.4%
	51-60	42	6.2%
	>60	5	0.7%
Region	Central	107	15.9%
	Southern	75	11.1%
	Northern	183	27.1%
	Eastern	39	5.8%
	Western	271	40.1%
MS	Married	633	93.8%
	Divorced	25	3.7%
	Widowed	17	2.5%
Education	Did not attend school	6	0.9%
	High school degree	136	20.1%
	Some college but no degree	41	6.1%
	Bachelor Degree	429	63.6%
	Higher degree	63	9.3%
Occupation	Health sector	55	8.1%
	Engineer	21	3.1%
	Teacher	415	61.5%
	Pilot	4	.6%
	Soldier	7	1.0%
	Other	173	25.6%

Table 2: Correct definition of OSA

Factor	Frequency	Percent
Repeated episodes obstructions of breathing during sleep	532	78.8%
Total obstruction of breathing during sleep until waking up	21	3.1%
Normal phenomena during sleep	122	18.1%
Total	675	100%

Figure 1: Expected POSA Symptoms

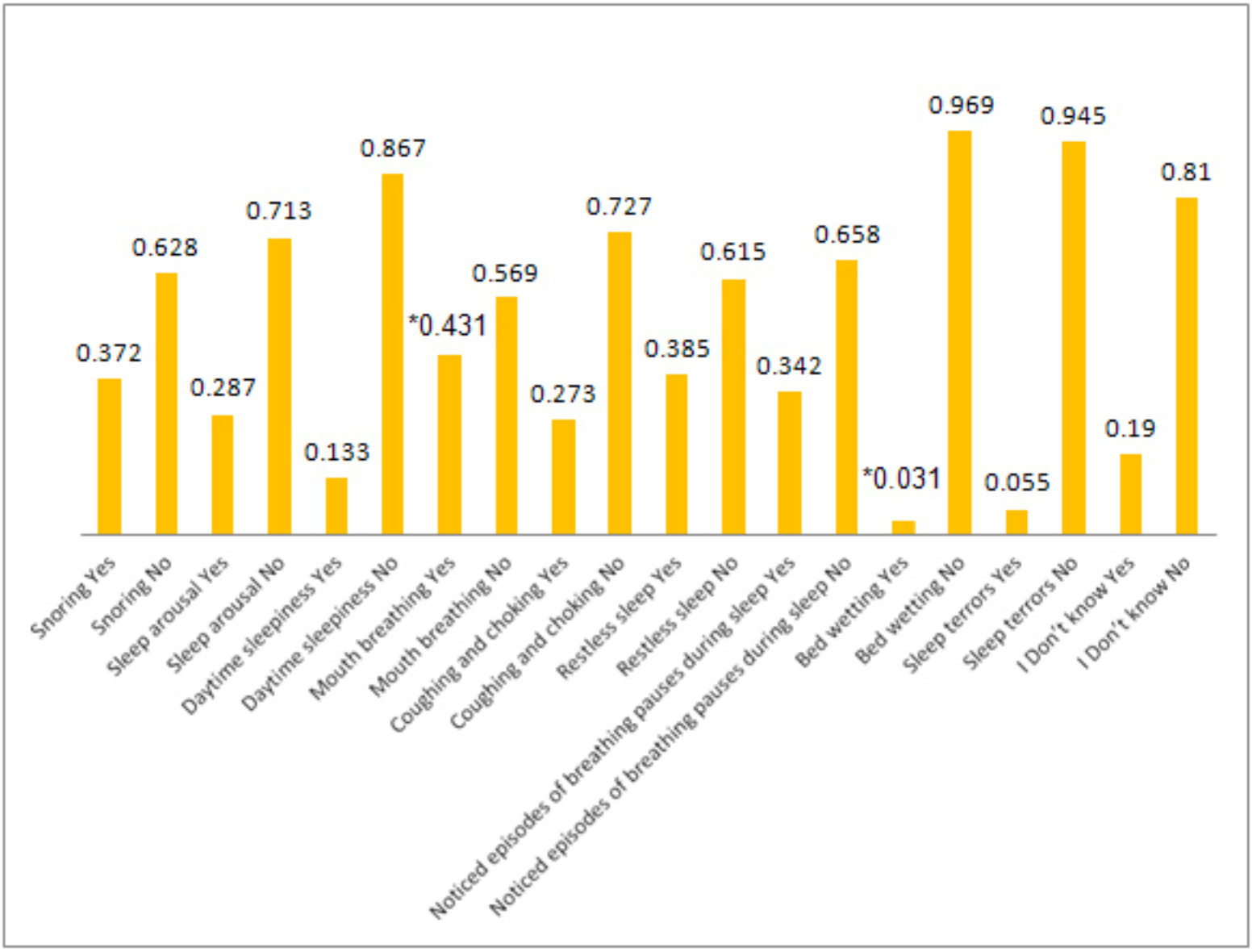

Figure 3. Knowledge score level

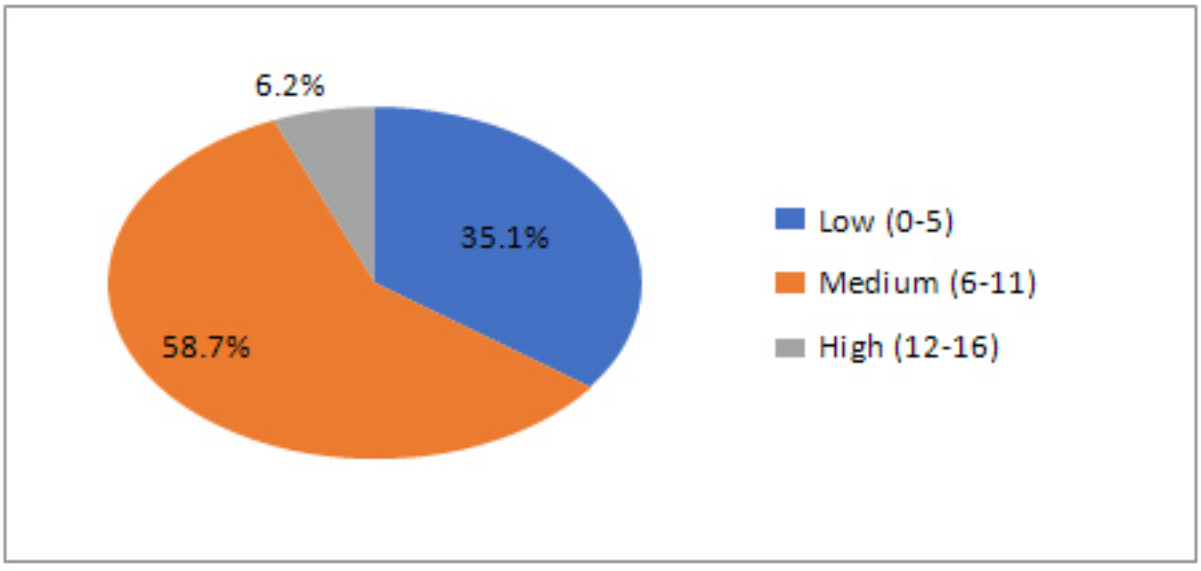

Figure 2: The Risk factors of Obstructive sleep apnea

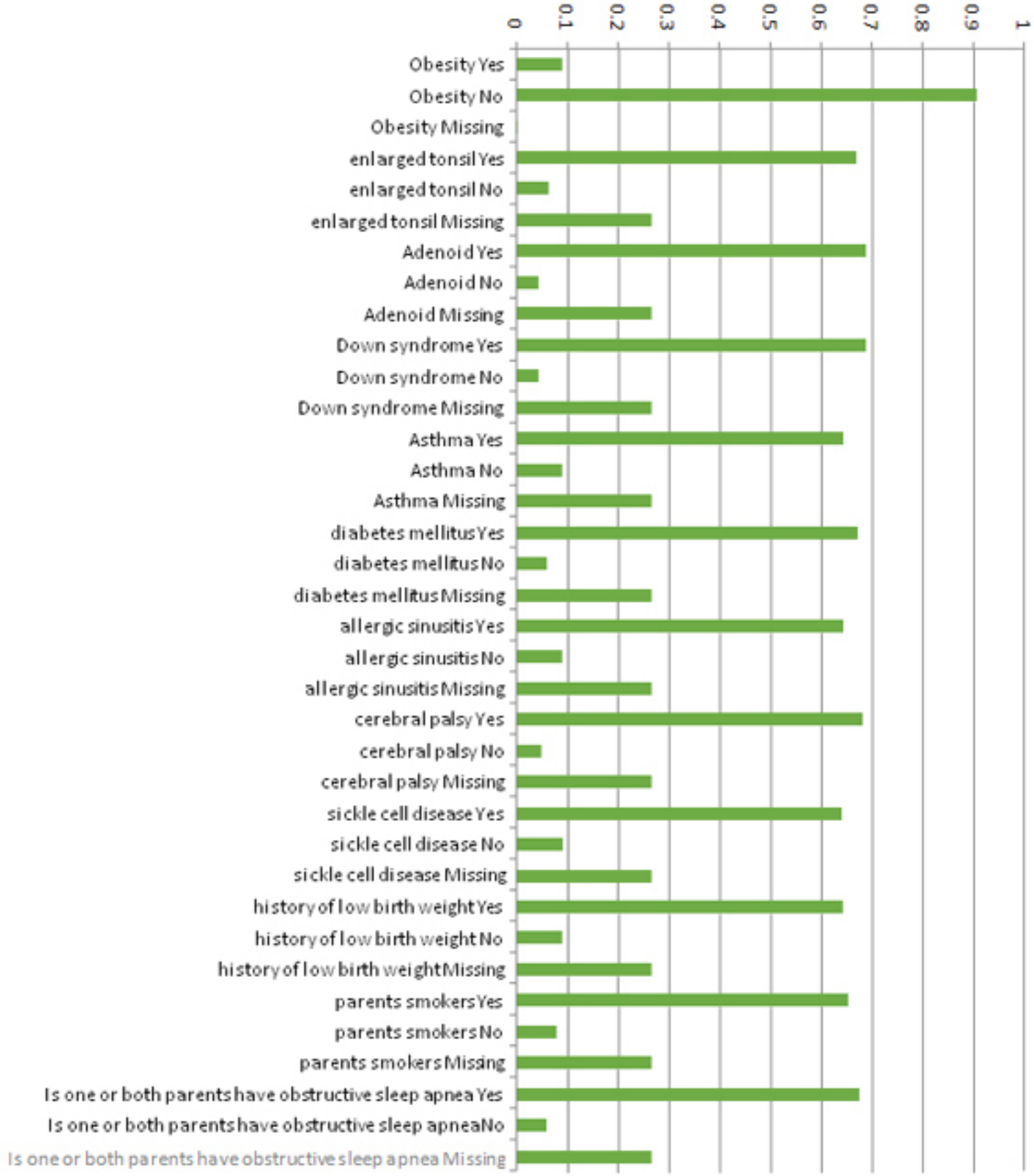

Figure 4. The information parents would like to know more about POSA

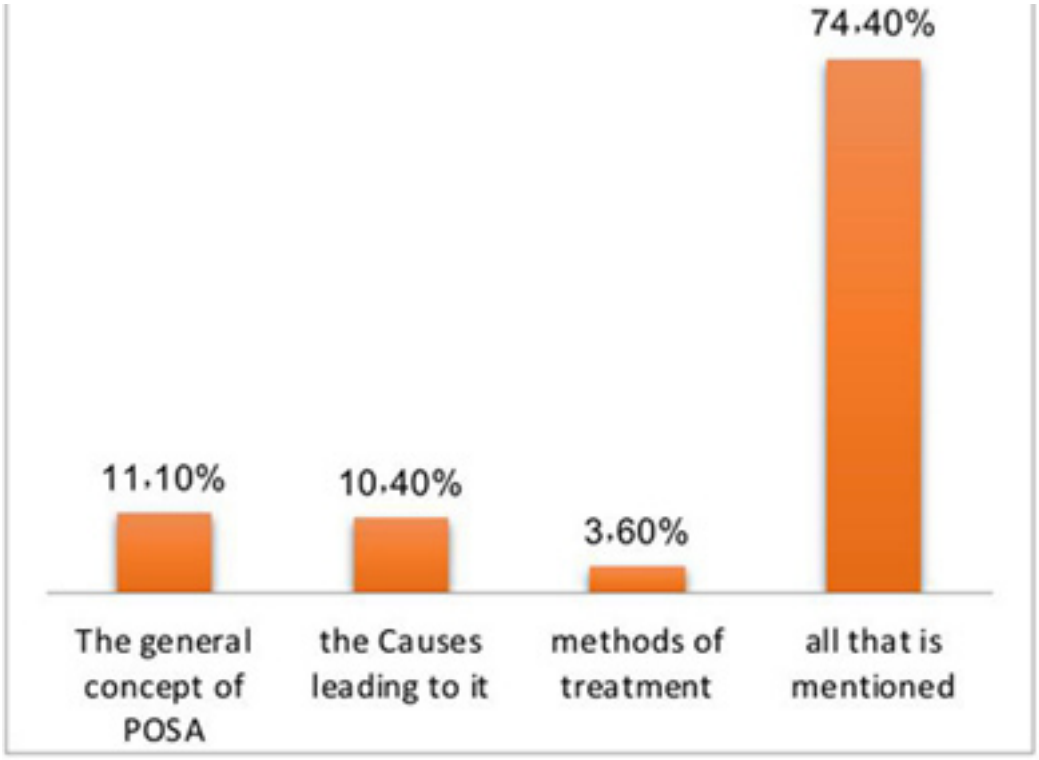

Figure 5: The best methods to increase the public awareness about POSA

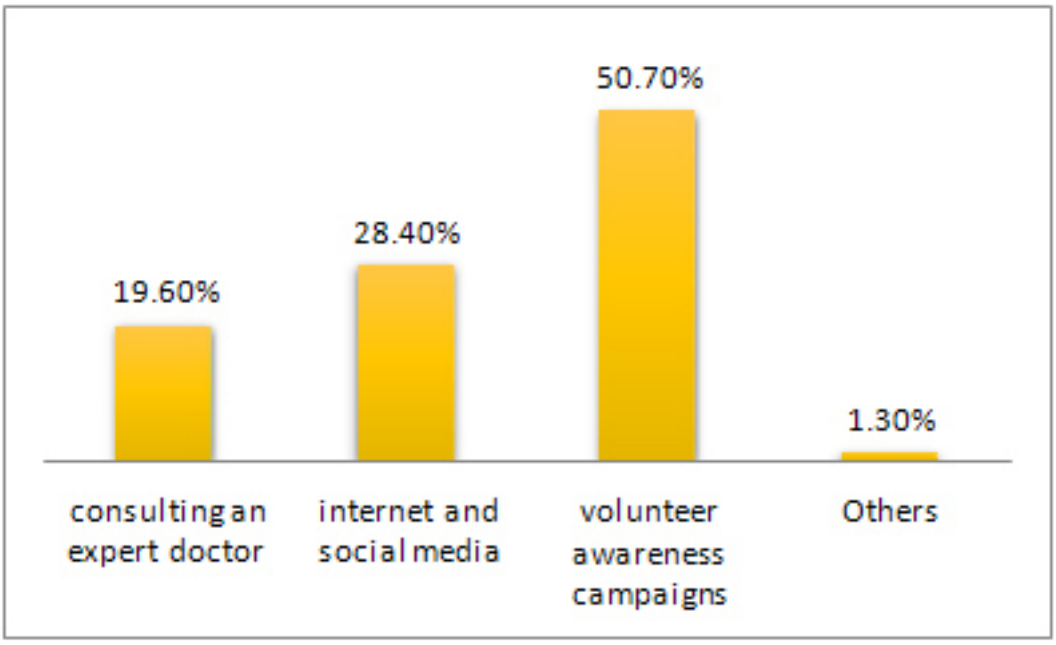

Table 3. The relationship between education and OSA

What is sleep apnea?	Education					Total	X^2 / p
	Did not attend school	High school degree	Some college but no degree	Bachelor Degree	Higher degree		
Repeated episodes obstructions of breathing during sleep	3	97	29	345	58	532	20.440** / 0.009
	50.0%	71.3%	70.7%	80.4%	92.1%*	78.8%	
Total obstruction of breathing during sleep until waking up	0	3	2	15	1	21	
	0.0%	2.2%	4.9%	3.5%	1.6%	3.1%	
Normal phenomena during sleep	3	36	10	69	4	122	
	50.0%	26.5%	24.4%	16.1%	6.3%	18.1%	
Total	6	136	41	429	63	675	
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
**Chi-Square (X^2) is significant							

study did not involve an assessment before and after an educational session, 77.8% of parents had already read at least an article on POSA. Additionally, 68.4% of parents thought their knowledge needs to be improved.

Also, Wilson et al. (18) evaluated children's sleep symptoms in low-income preschools after providing their parents with training on sleep education, including sleep apnea. The study included 152 families and demonstrated that children's sleep symptoms had been reduced after a noticeable improvement in parents' knowledge after the session (18).

Due to the significantly high percentage of parents with a low level of knowledge on POSA (35.1%) in the present study, it is highly recommended to implement a training program for parents living in Saudi Arabia about POSA and evaluating their awareness and knowledge after the training. Additionally, Owens et al. (19) supported this recommendation through a survey study by including 253 parents who were asked questions to evaluate their knowledge of sleep symptoms and childhood obstructive sleep apnea. Similar to the present study, Owens et al. (19) illustrated that higher educated parents had higher levels of knowledge, yet recommended the implementation of awareness campaigns for parents on POSA due to the gap in knowledge identified in the rest of the cohort (19).

It is worth mentioning that the present study demonstrated some limitations. Almost half of the included sample represents one area in Saudi Arabia, which makes the findings' external validity inapplicable. Furthermore, due to the study's survey nature, the participants' responses depend on their honesty and subjective opinion, which might affect the reliability of the findings. Finally, this is the first study to demonstrate parents' knowledge and awareness in Saudi Arabia about obstructive sleep apnea in childhood.

Conclusion

This study concluded that the level of knowledge and awareness of parents towards POSA is low in almost a third of the population, which requires the attention of healthcare decision makers. National awareness campaigns are one of the best feasible solutions to improve this level of knowledge, which can have a positive implication on children's symptoms. Further studies are also required with better representation for all regions in Saudi Arabia. Furthermore, comparative studies that compare knowledge and awareness of parents before and after training are endorsed by the findings of our study.

Limitations

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

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Risk factors for hypothyroidism in Saudi Arabia

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Abstract

Background: There have been many studies recorded from different parts of the world that reflects the prevalence of hypothyroidism, and studies done in Saudi Arabia revealed a high prevalence among the population.

Materials and methods: A cross-sectional analysis was conducted using a validated online elf-administered questionnaire on 981 of the Saudi population. The questionnaire was circulated via social media and the study participants were a total of 981 participants. A pre-designed questionnaire was used to collect participant data; characteristics, hypothyroidism diagnosed, chronic diseases, obstetric history for women, having a family history of hypothyroidism, smoking, medication taken and eating certain foods.

Results: The prevalence of hypothyroidism was 20.6% and women who had DM who had exophthalmos or swollen neck or who were obese, smokers who had a family member who had been diagnosed with hypothyroidism and women who had previously been diagnosed with an ovarian cyst or elevated lactation who drank coffee, sugary foods and treats such as chocolate and doughnuts or soft drinks had a substantially higher percentage of those having hypothyroidism. Binary logistic regression analysis showed that the risk factors of being diagnosed with hypothyroidism for participants in the studies were developing ovarian cysts for women and having a hypothyroid family member.

Conclusion: There is a need to raise awareness of the Saudi population about risk factors of hypothyroidism.

Key words: Risk, factors, hypothyroidism, Saudi Arabia

Introduction

Hypothyroidism is a common endocrine disorder worldwide (1). It can result from a defect anywhere in the hypothalamic-pituitary-thyroid axis. In the vast majority of cases, it is caused by thyroid disease (primary hypothyroidism). Much less often, it is caused by decreased secretion of thyroid-stimulating hormone (TSH) from the anterior pituitary gland or by decreased secretion of thyrotropin-releasing hormone (TRH) from the hypothalamus (1) .

Primary hypothyroidism is characterized by a high serum thyroid-stimulating hormone (TSH) concentration and a low serum free thyroxine (T4) concentration, whereas subclinical hypothyroidism is defined biochemically as a normal free T4 concentration in the presence of an elevated TSH concentration. Secondary (central) hypothyroidism is characterized by a low serum T4 concentration and a serum TSH concentration that is not appropriately elevated.

In community surveys, the prevalence of overt hypothyroidism varies from 0.1 to 2 percent (1,2,3,4,5). The prevalence of subclinical hypothyroidism is higher, ranging from 4 to 10 percent of adults, with possibly a higher frequency in older women. However, there is an age-related shift towards higher TSH concentrations in older patients (1).

In 2019, there was a study published in Nigeria which included 354 T2DM and 118 non-diabetic persons. About 56.5% of the T2DM patients who participated in this study were females and 62.7% of the controls were females. The T2DM patients had significantly higher BMI than controls (27.6 ± 5.0 kg/m2 vs. 26.2 ± 3.8 kg/m2, p = 0.002). Mean HbA1c was significantly higher in T2DM patients than in the controls (7.8 ± 2.0% vs. 5.8 ± 1.2%, p = 0.001). Female gender, central obesity, DM nephropathy, HbA1c ≥7% and duration of DM >5years were significantly associated with thyroid dysfunction in T2DM patients in this study (2).

A study published in 2019 estimated that female gender, central obesity, DM nephropathy, above normal HbA1c, and duration of DM were risk factors of thyroid dysfunction in type 2 DM patients in this study (3).

A study published in The Egyptian Journal of Hospital Medicine (2018) estimated that the prevalence of hypothyroidism in Arar city in Saudi Arabia was 25.5% (116/454); females were more affected than males as 57.7% of the cases were female, most of them aged 21-60 years old and 40% of the cases had a family history of the disease. 64.7% of the cases were on medical treatment but only 16% of them responded, while surgical treatment was found in only 8% of the cases (4).

In 2018, there was a study that included 186 individuals who underwent laparoscopic sleeve gastrectomy. Results of this study demonstrated that the levels of TSH decreased significantly in patients who underwent LSG and that the decrease was independent of the changes in BMI. (5)

A Chinese study done in 2017 estimated that the prevalence of hypothyroidism was 10.1% (overt hypothyroidism: 1.5%subclinical hypothyroidism: 8.7%). Females (12.1%) had a higher percentage when compared to males (7.5%). In addition to the increased odds with older age and female gender, current or previous smoking history, salty taste preference and a frequent seafood intake tended to be associated with reduced risk of hypothyroidism (6).

In 2016, there was a longitudinal retrospective cohort study that included 8,412 residents enrolled in the Fernald Medical Monitoring Program. Headache disorders were present in about 26% of the residents and new onset hypothyroidism developed in ~7%. The hazard ratio for the development of new onset hypothyroidism was 1.21 for those with headache disorders (7).

In 2013, there was a study published in North India that included 1,000 pregnant women enrolled in a prospective observational study. The mean (SD) age of study subjects was 25.6 (11.1) years and mean (SD) gestational age was 10.3 (3.4) weeks. One hundred and forty-three (14.3%) subjects had TSH values more than 4.5 mIU/L above the cutoff used for definition of hypothyroidism. Out of these, 135 had normal free T4 and were therefore labeled as subclinical hypothyroidism and 7 had low free T4 suggestive of overt hypothyroidism. TPO Ab was positive in 68 (6.82%) of total, 25 (18.5%) of subclinical and 5 (71%) of overt hypothyroid patients (8).

In 2011, there was a study that included 293 patients with chronic HCV who received Interferon; Hypothyroidism was the most frequent thyroid disorder in them, especially during the first cycle of α-interferon. Genotype 1 virus was associated with a risk two times higher for developing the illness (9).

And in 2010, there was study for a total of 1,170 type 2 diabetic patients. There were 127 type 2 diabetic patients with SCH and 200 euthyroid type 2 diabetic patients. Those with more severe than moderate non-proliferative diabetic retinopathy were classified as having sight-threatening diabetic retinopathy (STDR). The trend for severe retinopathy was significantly higher in the SCH group than in the euthyroid group ($\chi 2 = 20.43$, $P = 0.000$). SCH was associated with greater prevalence of diabetic retinopathy, especially STDR odds ratio (10).

This study aimed to assess risk factors of hypothyroidism among the population of Saudi Arabia.

Methodology

Study design and time frame: a cross sectional study using an online self-administered validated questionnaire was done from May 2020 to January 2021.

Sample size and participants: the questionnaire was distributed through social media and a number of 981 respondents were the study participants.

Study instrument: a predesigned questionnaire was used to collect data about participants; characteristics, being diagnosed with hypothyroidism, having chronic diseases, obstetric history for women, having a family history of hypothyroidism, smoking, medication taken and eating certain foods.

Data Analysis: Data was analyzed using SPSS version 25. Qualitative data was expressed as numbers and percentages, and Chi- squared test ($\chi 2$) was applied to test the relationship between variables. A p value less than 0.05 was considered statistically significant.

Ethical considerations: Ethical approval was obtained from the research ethics committee of Taif university; an electronic consent was collected from those who agreed to participate in the study.

Results

Table 1 shows that 26.4% of the participants had an age ranging from 31-40 years, 59.7% were females, 60.3% were from the western region, and 63% were married. Figure 1 shows that 20.6% of the participants were diagnosed with hypothyroidism.

Table 2 shows that 8.5% of the participants had DM. For women diagnosed with hypothyroidism, 71.7% were diagnosed after the second pregnancy or more, 17.1% were using birth control pills, and 24.1% were diagnosed with elevated lactation. Of the participants, 34.9% had a family member who had been diagnosed with hypothyroidism. 7.5% of the participants had exophthalmoses, 10% had swollen neck, 35.1% were obese and only 1.9% of the participants were eating sea food more than twice a week. 20.1% of the participants were smokers, of them 55% were smoking cigarettes. Table 3 shows that 96.6% of the participants were not taking any medication.

Table 4 shows that participants who had DM, those who had exophthalmos or swollen neck, those who were obese, a smoker, who had a family member diagnosed with hypothyroidism, and women who had previously been diagnosed with an ovarian cyst or elevated lactation had a significantly higher percentage of those who had hypothyroidism ($p=< 0.05$).

Table 5 shows that participants who were drinking coffee, eating sugary foods and sweets, such as chocolate and doughnuts or soft drinks had a significantly higher percentage of those who had hypothyroidism ($p=< 0.05$).

Table 6 shows that binary logistic regression analysis revealed that having ovarian cyst for women and having a hypothyroid family member were risk factors of being diagnosed with hypothyroidism among study participants.

Discussion

The prevalence of hypothyroidism among studies participants was 20.6%. Previous studies found a high prevalence of hypothyroidism among the Saudi population. Saudi Arabia has been studying the prevalence and types of thyroid disorders (11,12). Hypothyroidism has been reported to be 47%. A recent Saudi study done in 2019 revealed a similar prevalence as observed in the present study, where prevalence of 29.1% was found (13).

This study found that a significantly higher percentage of those who had hypothyroidism were participants who had DM, who had exophthalmos or swollen neck, who were obese, smokers, who had a family member diagnosed with hypothyroidism, and women who had previously diagnosed with ovarian cyst or elevated lactation.

It was found that diabetes mellitus and thyroid dysfunction are the most common endocrine diseases seen in the adult population (14), while insulin or thyroid hormones metabolism can result in functional abnormalities of one sort or another. The American Diabetes Association (ADA) was encouraged by the strong link between diabetes and thyroid diseases to propose that people with diabetes must be regularly checked for thyroid dysfunction (15).

Previous studies have shown that morbidly obese people show a high prevalence of overt and subclinical hypothyroidism, accounting for 19.5 percent (16, 17), showing the relationship between obesity and hypothyroidism. Furthermore, the relationship between smoking and hypothyroidism present in this study has been reported previously. In the general population, smoking has been identified as a risk factor for thyroid dysfunction, particularly when smoking is highly prevalent (18,19).

In the present study, by doing binary logistic regression analysis, women having ovarian cyst and participants having a hypothyroid family member were at risk of having hypothyroidism. The same result was revealed from previous studies (20,21,22, 23).

Limitations

The cross-sectional design used could reveal the relationships between variables but not the causal relationships.

Table 1. Distribution of the participants according to socio demographic characteristics

Socio demographic Characteristics	Descriptive	
	Frequencies	Percentage
Age group		
10-13	3	0.3%
14-17	9	0.9%
18-22	114	11.6%
23-30	246	25.1%
31-40	259	26.4%
41-50	185	18.9%
51-60	128	13.1%
61-70	31	3.2%
71-80	5	0.5%
Gender		
Female	586	59.7%
Male	395	40.3%
Region		
North	24	2.4%
South	53	5.4%
East	98	10%
West	592	60.3%
Middle	214	21.8%
Marital status		
Single	309	31.5%
Married	618	63%
Divorced	39	4%
Widower	15	1.5%

Figure 1. Percentage distribution of the participants according to hypothyroidism prevalence

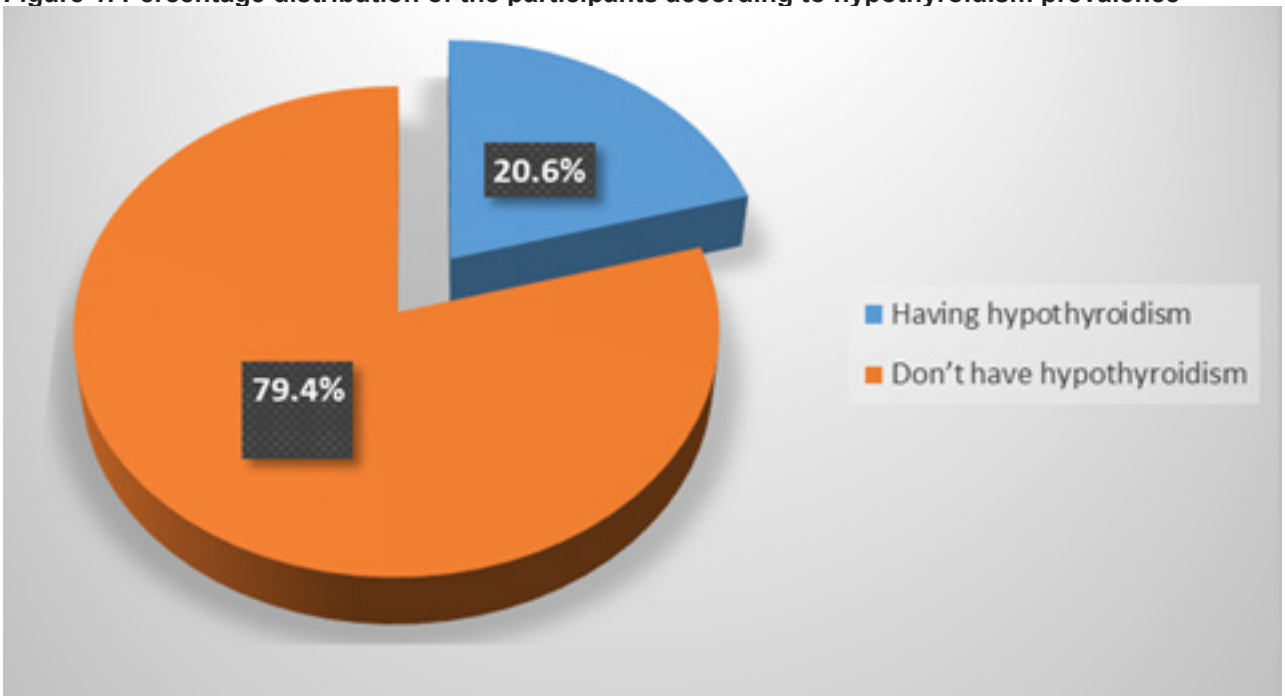

Table 2. Distribution of the participants according to chronic diseases, obstetric history for women, having a family history of hypothyroidism and smoking

Statement		Frequencies	Percentage
Do you have diabetes?	No	858	87.5
	Yes	83	8.5
	I don't know	40	4.1
"Women Only" When were you diagnosed with hypothyroidism?	During pregnancy	32	21.1
	After pregnancy, from 1 to 3 months	11	7.2
	After the second pregnancy or more	109	71.7
"Women only" Do you use birth control pills?	No	422	82.9
	Yes	87	17.1
"Women only" Have you previously been diagnosed with an ovarian cyst?	No	419	78.2
	Yes	117	21.8
"For Women Only" Have you ever been diagnosed with elevated lactation?	No	403	75.9
	Yes	128	24.1
Do you have a family member who has been diagnosed with hypothyroidism	No	550	56.1
	Yes	431	43.9
Do you have exophthalmoses?	No	907	92.5
	Yes	74	7.5
Do you have a swollen neck?	No	883	90
	Yes	98	10
BMI level	Underweight	54	5.5
	Normal	339	34.6
	Overweight	242	24.7
	Obese	344	35.1
How often do you eat seafood?	More than twice a week	19	1.9
	Less than twice a week	67	6.8
	More than twice a month	106	10.8
	Less than twice a month	278	28.3
	More than twice a year	290	29.6
	Less than twice a year	158	16.1
	I never take it	63	6.4
Smoking	Yes	197	20.1
	No	784	79.9
Smoking type	Cigarettes	127	55.0%
	Shisha	91	39.4%
	Tobacco	13	5.6%

Table 4: The relationship between hypothyroidism and chronic diseases, obstetric history for women, having a family history of hypothyroidism and smoking

Statement		Diagnosed with hypothyroidism		Total	X^2	*p*
		No	Yes			
Do you have diabetes?	No	701	157	858	**26.868**	**<0.001**
		81.7%	18.3%	100.0%		
	Yes	48	35	83		
		57.8%	42.2%	100.0%		
	I don't know	30	10	40		
		75.0%	25.0%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
"Women Only" When were you diagnosed with hypothyroidism?	During pregnancy	8	24	32	0.537	0.765
		25.0%	75.0%	100.0%		
	After pregnancy, from 1 to 3 months	2	9	11		
		18.2%	81.8%	100.0%		
	After the second pregnancy or more	21	88	109		
		19.3%	80.7%	100.0%		
Total		31	121	152		
		20.4%	79.6%	100.0%		
"Women only" Do you use birth control pills?	No	293	129	422	1.802	0.179
		69.4%	30.6%	100.0%		
	Yes	54	33	87		
		62.1%	37.9%	100.0%		
Total		347	162	509		
		68.2%	31.8%	100.0%		
"Women only" Have you previously been diagnosed with an ovarian cyst?	No	304	115	419	12.320	<0.001
		72.6%	27.4%	100.0%		
	Yes	65	52	117		
		55.6%	44.4%	100.0%		
Total		369	167	536		
		68.8%	31.2%	100.0%		
"For Women Only" Have you ever been diagnosed with elevated lactation?	No	295	108	403	11.939	<0.001
		73.2%	26.8%	100.0%		
	Yes	73	55	128		
		57.0%	43.0%	100.0%		
Total		368	163	531		
		69.3%	30.7%	100.0%		
Do you have a family member who has been diagnosed with hypothyroidism	No	479	71	550	45.182	<0.001
		87.1%	12.9%	100.0%		
	Yes	300	131	431		
		69.6%	30.4%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		

Table 4: The relationship between hypothyroidism and chronic diseases, obstetric history for women, having a family history of hypothyroidism and smoking (continued)

Do you have exophthalmoses?	No	734	173	907	16.931	<0.001
		80.9%	19.1%	100.0%		
	Yes	45	29	74		
		60.8%	39.2%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
Do you have a swollen neck?	No	734	149	883	74.683	<0.001
		83.1%	16.9%	100.0%		
	Yes	45	53	98		
		45.9%	54.1%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
BMI level	Underweigh t	51	3	54	56.363	<0.001
		94.4%	5.6%	100.0%		
	Normal	305	34	339		
		90.0%	10.0%	100.0%		
	Overweight	185	57	242		
		76.4%	23.6%	100.0%		
	Obese	236	108	344		
		68.6%	31.4%	100.0%		
Total		777	202	979		
		79.4%	20.6%	100.0%		
Smoking	No	608	176	784	8.240	0.004
		77.6%	22.4%	100.0%		
	Yes	171	26	197		
		86.8%	13.2%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		

Table 3. Distribution of the participants according to medication taken

Factor	Frequencies	Percentage
Amiodarone	10	1.0%
Lithium	4	0.4%
Interferon	3	0.3%
Philippic acid "Depakene"	13	1.3%
Alimtuzumab for "multiple sclerosis"	4	0.4%
I don't use any of it	952	96.6%

Table 5: Relationship between hypothyroidism and participants' eating

Statement		Diagnosed with hypothyroidism		Total	X^2	*p*
		No	Yes			
Cruciferous vegetables like kale, cauliflower, cabbage, and broccoli	No	612	157	769	0.067	0.796
		79.6%	20.4%	100.0%		
	Yes	167	45	212		
		78.8%	21.2%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
Soy or its products	No	720	184	904	0.396	0.529
		79.6%	20.4%	100.0%		
	Yes	59	18	77		
		76.6%	23.4%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
Coffee	No	174	31	205	4.741	0.029
		84.9%	15.1%	100.0%		
	Yes	605	171	776		
		78.0%	22.0%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
Milk	No	410	100	510	0.628	0.428
		80.4%	19.6%	100.0%		
	Yes	369	102	471		
		78.3%	21.7%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
Gluten (found in barley, oats, and wheat)	No	589	141	730	2.842	0.092
		80.7%	19.3%	100.0%		
	Yes	190	61	251		
		75.7%	24.3%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
Fats and fries	No	376	99	475	0.035	0.851
		79.2%	20.8%	100.0%		
	Yes	403	103	506		
		79.6%	20.4%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
Sugary foods and sweets, such as chocolate and doughnuts	No	386	71	457	13.371	<0.001
		84.5%	15.5%	100.0%		
	Yes	393	131	524		
		75.0%	25.0%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		

Table 5: Relationship between hypothyroidism and participants' eating (continued)

Soft drinks	No	462	146	608	11.451	<0.001
		76.0%	24.0%	100.0%		
	Yes	317	56	373		
		85.0%	15.0%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
Canned and frozen foods	No	590	158	748	0.545	0.461
		78.9%	21.1%	100.0%		
	Yes	189	44	233		
		81.1%	18.9%	100.0%		
Total		779	202	981		
		79.4%	20.6%	100.0%		
Fruits and starchy plants such as sweet potato, cassava, peaches, strawberries	No	468	122	590	0.026	.873
		79.3%	20.7%	100.0%		
	Yes	311	79	390		
		79.7%	20.3%	100.0%		
Total		779	201	980		
		79.5%	20.5%	100.0%		
Nuts and seeds such as millet, pine nuts, and peanuts	No	478	124	602	0.007	0.932
		79.4%	20.6%	100.0%		
	Yes	301	77	378		
		79.6%	20.4%	100.0%		
Total		779	201	980		
		79.5%	20.5%	100.0%		
Foods that contain extra fibre from beans, legumes, and vegetables	No	480	119	599	0.392	0.531
		80.1%	19.9%	100.0%		
	Yes	299	82	381		
		78.5%	21.5%	100.0%		
Total		779	201	980		
		79.5%	20.5%	100.0%		

Table 6: Binary logistic regression analysis of risk factors of hypothyroidism among studied participants

Variable	B	WALD	p-value	Odds' ratio
Diabetes	0.33	0.43	0.5	0.71
Smoking	0.54	0.31	0.57	0.57
Having ovarian cyst for women	1.35	4.47	0.03	3.86
Having elevated lactation for women	0.04	0.006	0.93	0.95
Having a hypothyroid family member	1.23	5.75	0.01	3.42
Having exophthalmos	0.33	0.11	0.73	1.391
Having swollen neck	.36	2.34	0.12	3.93
Drinking coffee,	0.62	1.21	0.27	1.87
Drinking sugary foods and sweets, such as chocolate and doughnuts	0.75	1.85	0.17	2.13
Drinking soft drinks	0.55	0.89	0.34	0.57

Conclusion

The present study showed a prevalence of hypothyroidism among studied participants of 20.6%. Participants who had DM, who had exophthalmos or swollen neck, who were obese, a smoker, who had a family member diagnosed with hypothyroidism, and women who had previously been diagnosed with an ovarian cyst or elevated lactation, those who were drinking coffee, sugary foods and sweets, such as chocolate and doughnuts or soft drinks had a significantly higher percentage of those who had hypothyroidism. Binary logistic regression analysis found that having ovarian cyst for women and having a hypothyroid family member were risk factors of being diagnosed with hypothyroidism. The study calls for raising awareness of the Saudi population about preventable risk factors of hypothyroidism. Future studies that include a larger national sample is recommended.

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