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Concomitant COVID 19 Infection And NTDS: 68 Patient Case Series

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Zahko Maternity Hospital, Iraq

Editorial

This issue is rich with papers from the region and worldwide. Al Zahrani et al., did an observational cross-sectional study in the west part of Saudi Arabia. The study's population include all patients of sleeve gastrectomy from the Western Region of Saudi Arabia.

The instrument used was an electronic questionnaire, which included questions about knowledge of sleeve gastrectomy indications and complications. The questionnaire was sent to 451 patients who underwent sleeve gastrectomy, and about 444 patients gave consent to participate. According to the findings of our study, knowledge regarding the indications for and complications associated with sleeve gastrectomy is not satisfactory.

Goweda et al., did a cross-sectional study was carried out in Makkah city and 451 patients were recruited. The aim is to screen for the Prevalence of Obstructive Sleep Apnea among Patients with Cardiovascular Diseases. The majority of studied patients were males 315(69.8%), Saudis 370(82%), married 353(78.3%), diabetic 291(64.5%), and their age between 40 to 59 years. The authors concluded that OSA is highly prevalent among cardiovascular disease patients. physicians' awareness regarding screening, diagnosis, and treatment of OSA is essential to prevent cardiovascular disease risks.

Muhid & Khan, did a quality improvement project looking at The monitoring of DOACs in primary care, a quality improvement project. They stressed that direct acting oral anticoagulation play a key role in preventing thrombotic stoke and thromboembolism. DOACs require careful drug monitoring to prevent unnecessary strokes and hemorrhage. Quality improvement projects/Audits are necessary to highlight, how robust DOAC monitoring is in Primary care.

Alqifari, et al., did a A retrospective survey among patients with history of HZ throughout KSA between June and December 2021. 68 patients were included and data were collected by online questionnaire and telephone interviews. Females were predominantly affected by HZ. Overall Mean age at diagnosis was 39.43±16.50 years. Among all the symptoms; painful blisters were frequently re-ported in 81% of participants. The authors concluded that HZ is a prevalent condition affecting a wide range of patients including geriatrics. Available vaccine products help in reducing both the incidence of HZ and its complications. With the given efficacy of the vaccine prod-cuts, vaccine access should be widened across KSA.

Al Ateeq et al., did a cross-sectional study that was conducted among patients who admitted to dental clinics in order to assess the satisfaction level toward health services using Patients Satisfaction Questionnaire (PSQ-18) that was distributed among the participants using online Google sheets. In this study, we were able to collect data from 300 patients who went to private and governmental dental clinics and agreed to participate in this study. This study showed slightly more than half of the patients of dental clinics were satisfied with health services provided by the clinics especially considering technical aspects. Older patients, non-Saudi patients, less educated patients, and those with lower income showed lower level of satisfaction

Albahrani et al., followed a questionnaire-based cross-sectional survey conducted in outpatient clinics in several hospitals and primary care centers. The aim was looking Hypertensive and Diabetic Patients Knowledge of Myocardial Ischemia and Stroke Symptoms. We enrolled 339 participants who has diabetes, hypertension or both. Poor knowledge score of IHD symptoms showed in 24.8% of participants and 26.3% had poor knowledge score of stroke symptoms. The authors concluded that knowledge of IHD and stroke symptoms was poor in a quarter of at-risk patients in Al Ahsa, Saudi Arabia. The history of IHD in the participants did not correlate with a better knowledge score. Our findings call for more efforts to establish and expand the awareness campaign.

Atalla , et al., included Hypertensive patients attending a single tertiary care hospital in Taif city were recruited for our study after taking informed consent and ethical approval from the institution. The objective is to assess the prevalence of depression symptoms among hypertensive patients in Taif city, Saudi Arabia, and also to analyze various determinants related to their co-existence. The prevalence of depression among these hypertensive patients was 27.5%, and 2.5% had a severe form of depression. The authors concluded that considering the high prevalence of depression among hypertensive patients, it is critical to developing screening programs and community education campaigns.

Raza & Haque reported a case of headache with rare diagnosis. Headache is a common presenting symptom in Primary Care with a wide list of differential diagnoses and important red flag symptoms.It is also crucial to recognise when to get help from secondary care colleagues when faced with rare and complex cases that may need hospital admission for further investigations, management and monitoring. This case highlighted the importance of being aware of different, including rare, differentials when confronted with a common presenting symptom.

Bin Al-Zou, et al , did a retrospective chart review of patients presenting to the dermatology private clinic in Almansoora, Aden, over a 2-year period, complained of acne vulgaris and treated with oral isotretinoin. The total study patients were 86 (68.6% females and 31.4% males). The mean age of patients was 25.6 ± 7.9 years. The difference between means related to sex shows statistically significant ($p = 0.006$). The patients of the age group ≥ 20 years were predominant.

Alfaifi et al., reviewed overtime prevalence of substance use in Saudi Arabia. The authors stressed that substance use disorder is a chronic brain disease. Recently, Saudi Arabia's rank was among the top of the world in amphetamine seizures. Drug smuggling as well as conflicts and wars in the surrounding counties might play a role in that. The current review found a few articles talking about substance use prevalence in Saudi Arabia, much of that work was about Khat substance. In the end, we concluded that there is a considerable need for further research in this field.

Bughamar et al., report a case of Osteoid osteoma of the proximal femur. They presenting a case of a 12 years old male with Proximal femoral OO who was managed conservatively in the beginning and then treated using X-Ray Guided percutaneous Drilling of the lesion with good postoperative clinical outcome.In this Report we are discussing the surgical steps as well as the prognosis compared to other treatment options. The authors stressed that a delay of the diagnosis can occur due to the majorities of differential diagnosis and the difficult the interpretation of the diagnostic imaging, so a high clinical suspicion and early interventions using more advanced imaging modalities

allows earlier diagnosis of ‘’OO” and therefore quicker treatment and relief of patient symptoms .

There are two papers related to covid Abedalrahman et al., did a descriptive study of 68 patient case series. The aim of this study is to describe the clinical characteristics of simultaneous cases of COVID 19 in pregnant women with neural tube defects in their newborns. The series included cases of Neural Tube Defects which their mother were affected with COVID19 infection that reported in Zahko Maternity hospital- labour unit. The general and obstetrical history of the patients, the current study revealed that the affected age group of mothers are as follows; 28 (41.2%) of them (26-30 years), 15 (22.1) of them (> 35). Anemia and fever in the 1st trimester were found in 54 (79.4%) of them. The drugs received during pregnancy, as follows; antibiotic all patients 100%, antihypertensive drug received from 14 (20.6%), antipyretics 29 (42.6%), antacid 21 (30.9%), antifungal 16 (23.5%). Ibraheem et al., looked at case series of patient infected with Covid. The aim of this study is to describe the psychoneurotic symptoms among COVID infected patients. Case series study of 101 patient infected with COVID virus of different severity of the disease.in Tikrit city during 2020-2022. The auditory hallucinations reported among 4(40%), olfactory hallucinations reported among 5(50%), and visual hallucinations among 1(10%). The authors concluded that Neuropsychiatric symptoms was reported as follows; sleeplessness, tremor, and hallucination. Hallucinations mainly affect males, while tremor and sleeplessness mainly occur in females. The patient that had hallucinations had high lung involvement measured by CT of the chest. The patients that had hyperglycemia had higher percentages of sleeplessness, hallucinations. COVID 19 vaccinated persons had lower percentages of sleeplessness, hallucinations and tremor.

Alotaibi, et al., did a cross-sectional study was done on diabetic patients in Taif city the current study aims to explore the level of knowledge about diabetes and diabetic foot among the general population. A questionnaire was distributed randomly to the general population and their demographic information were recorded after obtaining their consent. The authors concluded that Healthcare providers should devote more time to educating patients and their families about diabetes, particularly the complications.

Sari, et al., conducted a study among 218 pregnant women who attended one primary care center in Abha City. The aim of this study is to assess the knowledge, attitude and practice of pregnant women regarding the obesity and its negative impact on maternal and fetal health. The participants were interviewed during their visit to the antenatal clinic using valid questionnaire which include many questions exploring the knowledge, attitude and practice regarding obesity during pregnancy. The prevalence rates of overweight and obesity among many pregnant women were high. Knowledge related to obesity and its maternal and fetal risk were inadequate. False beliefs regarding lifestyles during pregnancy were evident. Preconception structured health education program to upgrade knowledge, change attitude, to improve practice and to correct misbeliefs regarding obesity during pregnancy is mandatory.

Basurrah, et al., did a cross-sectional community-based study was done and data was collected via a self-administered Google form questionnaire in Taif city,. Data about demographics,, knowledge about symptoms of BPPV and how to improve this knowledge were collected. to evaluate overall knowledge and perception about the disease among the different demographics of the population in Taif city including its nearby statements. The authors Concluded that a low level of knowledge about vertigo was found among studied sample. Education level was associated with knowledge level, thus awareness campaigns should be done to raise awareness about BPPV.

Aijaz, et al., did a Cross-sectional randomized study to study health-related behaviors of undergraduate medical students of the public sector university of Karachi by analyzing the following aspects :1, Daily water intake and its importance.2, Refractive errors and the importance of their correction3, Sun protection. The authors concluded that with an aspiration to become a nobility amongst doctors, medical students must recognize their responsibility in being the representatives of right and wrong. Thus, the participation of the students in this study provides valuable insight into their health related behaviors portrayed against the risks of sun exposure and the benefits of using sunscreen as a protective measure, along with corrective measures chosen against poor sight such as spectacles, and determining the daily water requirements and their benefits.

Karrar, et al., reviewed the clinical aspect of breast cancer. Breast cancer is considered one of the major healthcare problems and one of the top biomedical research priorities among other biomedical research. The incidence of breast cancer to be more aggressive is increasing, with around one million and seven hundred thousand new cases that get worse yearly. Worldwide, Breast cancer is the most common cancer affecting women. The mortality rates for women who are already diagnosed with breast cancer have improved, but even that, the median survival in the metastatic stage is low around 24 months. For the treatment, chemotherapy is the gold-standard approach for most cancer types and the modest improvement in both survival rates and toxicity reduction. Early detection of breast cancer at a stage when it is potentially curable and there is the possibility of saving a breast should be the goal of all health care professionals. Also, Careful consideration should be given to the unique nature of each tumor and patient. This article aims to provide a brief introduction and the clinical picture of the disease, Etiology, Pathophysiology, Epidemiology, Nutrition, Prevention, and good practice management advice.

Dr. Alshehri, did a cross-sectional study that was conducted among physicians of different regions of Saudi Arabia. The study was conducted using a self-reported questionnaire which was distributed online. The aim of this study is to assess the level of knowledge of physicians in Saudi Arabia toward necrotizing fasciitis of spine. This study was conducted among 161 physicians where 59 % of them were males while 53.4 % of the participants were younger than 35-year-old. n general, 47.2 % of the physicians in this study had adequate knowledge considering NF. The author concluded that there is higher percent of physicians who have inadequate knowledge considering NF including spinal symptoms especially among general practitioners. Urgent need to improve the awareness of physicians toward NF and other rare conditions is important in order to improve the early diagnosis of these conditions and starting medical intervention in earlier stages.

Trends in Herpes Zoster Infection in Saudi Arabia; A Call for Expanding Access to Shingles Vaccination

Saleh F. Alqifari (1)
Rahaf F. Aldawish (2)
Maha A. Binsaqr (2)
Asmaa A. Khojah (2)
Mai R. Alshammari (2)
Aya K.Esmail (2)
Mabrouk Al-Rasheedi (3)

(1) Faculty of Pharmacy, University of Tabuk, Tabuk, Kingdom of Saudi Arabia
(2) College of Medicine, Sulaiman Alrajhi University, Al Bukairiyah, Kingdom of Saudi Arabia,
(3) Albukairyah General Hospital, Ministry of Health, Albukairyah, Saudi Arabia

Corresponding author:
Saleh F. Alqifari
Faculty of Pharmacy, University of Tabuk, Tabuk,
Kingdom of Saudi Arabia
Email: salqifari@ut.edu.sa

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Abstract

Background: Data on Herpes Zoster (HZ) incidence and complications in Saudi Arabia (KSA) are unknown. We aim to evaluate the trends in HZ cases and complications in Saudi Arabia to aid decision makers in optimizing vaccine access.

Methods: A retrospective survey was conducted among patients with history of HZ throughout KSA between June and December 2021. 68 patients were included and data were collected by online questionnaire and telephone interviews.

Results: Females were predominantly affected by HZ. Overall mean age at diagnosis was 39.43±16.50 years. Among all the symptoms; painful blisters were frequently reported in 81% of participants. Symptoms continued for <30 days in two-thirds of the participants, while others remained symptomatic for a longer period. Most females, 40 (59%), were non-pregnant or lactating at time of the infection. Medications used were analgesics, antiviral drug therapy and herbal remedies with 36 (53%) using analgesics alone. The majority of participants, 56 (82%), were not vaccinated against HZ.

Conclusion: HZ is a prevalent condition affecting a wide range of patients including geriatrics. Available vaccine products help in reducing both the incidence of HZ and its complications. With the given efficacy of the vaccine products, vaccine access should be widened across KSA.

Keywords: Herpes Zoster, Healthcare, Vaccination, Shingles, Public Health

Introduction

Herpes zoster (HZ), generally known as shingles, is an extremely contagious dermatomal rash characterized by painful blistering that results from reactivation of the varicella-zoster virus (VZV) (1). Since the rash appears to spread in a belt-like pattern, the name "shingles" is derived from the Latin word "cingulum," which means "belt" or "girdle". VZV is frequently contracted early in childhood and manifests as chickenpox (varicella), after which the virus lies dormant in the dorsal root ganglia (1). The reactivation of the latent VZV has been related to the weakening of immunity that occurs with aging and several immunocompromised states (2). The disease spreads via aerosol and direct skin contact. It manifests as vesicular lesions of the primary infection (chickenpox) and is often characterized by an itchy, painful vesicular rash that commonly starts on the head and face, in addition to fever and malaise (3). Although the pain may last longer, the HZ rash usually lasts 7 to 10 days, with the skin healing entirely in 2 to 4 weeks (4).

HZ is primarily a disease of nerve tissue, but the acute and long-term manifestations require a multidisciplinary management approach. Complications of HZ can be dermatological (e.g., secondary bacterial infection) or neurological (e.g., postherpetic neuralgia (PHN), segmental paresis, stroke or herpes zoster ophthalmicus (HZO); a condition in which the infection involves the first division of the trigeminal nerve). Disseminated zoster occurs mainly in immunocompromised patients and, in the case of visceral location, can lead to pneumonia, encephalitis, with associated cognitive impairment and sensory or motor deficits, and hepatitis with a 5–10% fatality rate (5). Ocular involvement is one of HZ serious complications. It can affect the eyelid leading to blepharoconjunctivitis, the episclera/sclera causing episcleritis/scleritis or it can affect other structures of the eye causing uveitis, retinal necrosis, optic neuritis or oculomotor palsies (6). The most common encountered complication is PHN, which is a very debilitating condition. PHN is defined as persistence pain lasting for 3 months after the onset of the infection which is often accompanied with burning, throbbing, steady or intermittent pain (7). Prevalence of PHN increases with age, and most cases occur above 50 years of age. Even though the disease is usually mild, its complications, particularly PHN, may significantly burden the patient, caregivers, the healthcare system, and employers (8).

Acyclovir, valacyclovir, and famciclovir are three antiviral drug therapies used to manage HZ infection. These modalities help reduce the length and severity of the illness. Analgesic medications can help in reducing the pain, while itching can be relieved with wet compresses, calamine lotion, or colloidal oatmeal baths (7).

For the prevention of HZ infection and its complications, the United States Food and Drug Administration (USFDA) approved two vaccine products, SHINGRIX® and Zostavax®. These products are approved for adults 50 years and older (7).

Zostavax® is a single-dose live attenuated vaccine that has been recommended in older adults as a way to reduce the incidence and duration of HZ infection and PHN. Zostavax® reduced the incidence of HZ infection in those aged 60 years and older and in those aged 70 years and older by 51.3% and 38% respectively, and the incidence of PHN by 66.5% and 66.8% respectively. Serious side effects related to the vaccine were reported in only a few cases including uveitis, sciatica and lumbar radiculopathy (9).

SHINGRIX® is a two-dose recombinant subunit vaccine regimen which was approved by the USFDA in October, 2017 as HZ prophylaxis with an overall efficacy of 97.2% among participants 50 years of age or older. The commonly reported side effect is injection-site reaction with a minority of patients experiencing hypotension with syncope (10).

HZ infection remains a major public health issue worldwide despite the recent advances in its management and prevention. With an estimated one million cases occurring annually in the United States, the incidence ratio is approximately 4 cases per 1,000 with increasing incidence among individuals 60 years and older (10,11). In Saudi Arabia, the incidence of HZ and HZ-related complications remains unknown. A few independent small studies have provided some insight on incidence and outcomes of HZ, but no inclusive data from multiple regions of Saudi Arabia has been reported to date. More importantly, to date, the HZ vaccine in Saudi Arabia is still not available despite the effectiveness of the vaccine products and its availability in many countries. As a result, it is crucial for decision-makers and healthcare practitioners to remain updated on the most recent research on the disease burden of HZ infection, its sequelae, and vaccination.

Our protocol aims to evaluate the current trends in HZ infection and its complications in Saudi Arabia to aid decision-makers in optimizing vaccine access. The reported studies about the incidence, prevalence, and complications of HZ infection in Saudi Arabia are insufficient. Only three studies were conducted in three different healthcare centers.

An observational retrospective cross-sectional study from 963 records of King Fahd Hospital (KFH) dermatology clinic, Albaha region, was conducted between January 2017 and December 2019. It reported HZ infection as the second most common viral skin disease among the study group with a prevalence of (20.8%) among other viral skin infections. The study found 200 HZ cases with males constituting (52.9%) of the sample. The Prevalence of HZ in relation to age was (3.5%) for patients less than 18 years, (35.1%) for patients between 18-36 years, (27.1%) for patients between 37-54 years, and (34.2%) for patients above 54. The study showed that HZ infection increased with age, which is in agreement with other regional and global data. Also, it showed that HZ largely affects males in contrast to females (12).

In King Fahad Hospital of the University in Alkhobar, a retrospective study was conducted at the outpatient clinic of the dermatology department for the period between

January, 2010 and December 2014. A variety of viral skin infections were diagnosed, and HZ comprised (7.7%) of the total skin infection cases with no specific age distribution of the total reported cases. A previous report studying the pattern of skin diseases in the eastern province of Saudi Arabia between 2002-2003 reported that HZ incidence was 6.2%. The increase in incidence could be attributed to increased incidence of diabetes mellitus, use of immunosuppressive drug therapy and increased lifespan of patients who are more prone to HZ (13).

Another retrospective case-control study of HZ infections in patients with systemic lupus erythematosus (SLE) conducted at King Saud University Hospital between 1982 and 2006 found that HZ infections are more common in SLE patients and are associated with significant morbidity. Immunosuppressive therapy and severe lupus symptoms might increase the risk for HZ infection regardless of illness flare or immunosuppressive therapy. Patients with SLE have a higher risk of infection, with 11–23% of all hospitalized patients developing serious infections, and 50% of all SLE patients developing major infections during the course of their condition. Furthermore, HZ is the most common viral infection in SLE patients around the world (14).

Materials and Methods

Study Design

This is a retrospective study of HZ infected cases conducted in Saudi Arabia between June 2021 to December 2021. A total of 68 participants with a history of HZ who completed the study survey were included. Patients with incomplete records were excluded. The survey was conducted via an online questionnaire for (50 Participants) from multiple regions in Saudi Arabia, and through telephone interviews for (18 Participants) whose contact information was obtained from the electronic medical records at MOH hospitals. Informed consent was obtained for all participants. The study protocol was approved by the medical ethical committee in the Al-Qassim region, Saudi Arabia.

Data Collection

The survey contains variables that assist in reporting the HZ prevalence and complications. It includes demographic data: age, gender, age at incidence, history of chickenpox, chickenpox vaccination status, HZ symptoms, duration of HZ symptoms, HZ vaccination status, medication therapy utilized for symptoms management, and history of concomitant pregnancy or lactation.

Data Analysis

Descriptive statistics were utilized to describe variables of interest in the study. Mean and standard deviation were calculated for continuous variables, and frequency was reported for categorical variables.

Results

The study included 68 participants with a mean age of 43.60±16.53 years. Females constituted around 63% of the sample. The mean age of incidence of HZ in this sample was 39.43±16.50 years. Of all participants, 42 (61.8%) had reported a history of previous chickenpox during childhood, 9 (13.23%) of the participants denied being infected at any point in their life, and 17 (25%) of them did not know if they had a history of chickenpox or not. A considerable percentage of the sample 31 (45.6%) didn't know if they were vaccinated against chickenpox, 18 (26.5%) had the vaccine, and 19 (28%) were not vaccinated. Baseline characteristics of participants are illustrated in Table 1.

The spectrum of experienced symptoms of HZ reported by the participants includes painful blisters, fever, fatigue, headache, diarrhea, vomiting, sensitivity to light and rash. A summary of the number of the reported individual symptoms is shown in Figure 1.

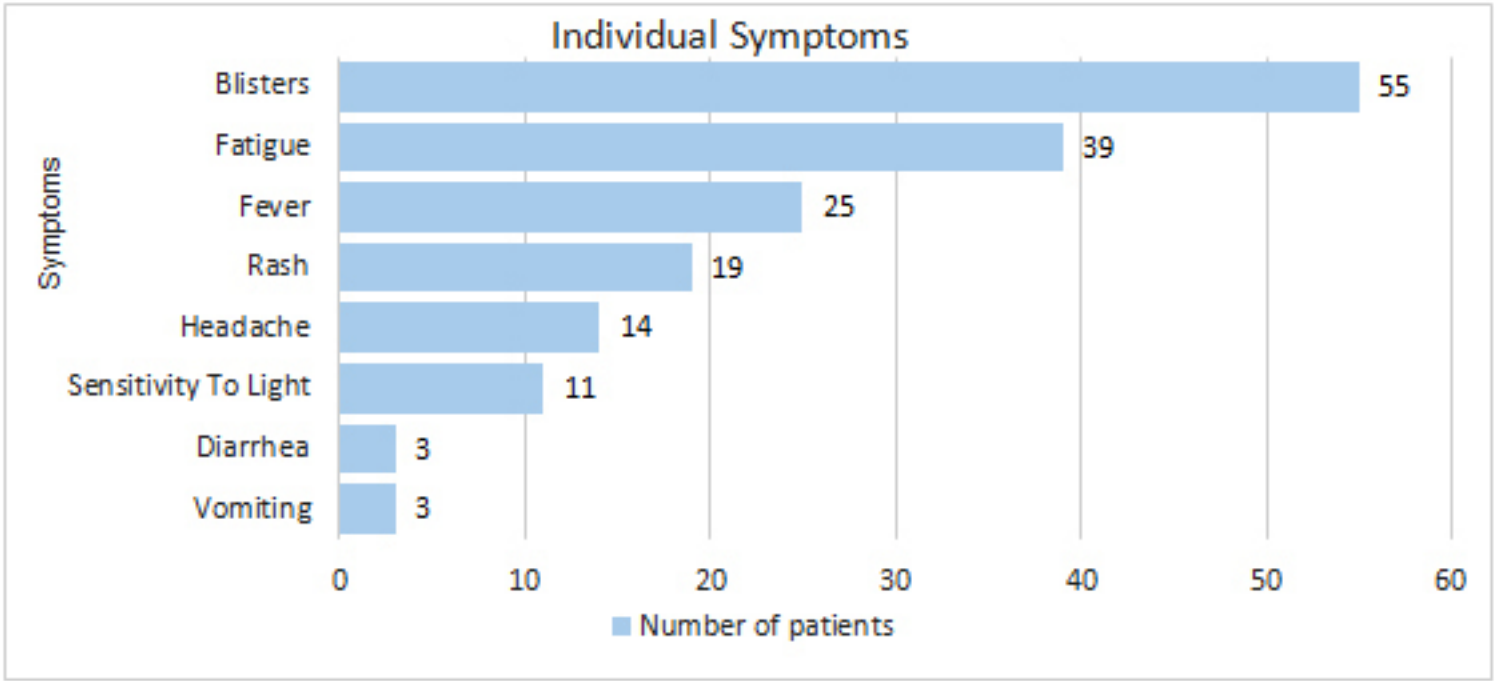
Painful blisters were the most frequently reported symptom in this sample which were experienced in 55 patients as demonstrated in Figure 1, with 13 (19.11%) of the participants having only painful blisters as the presenting symptom, and others had painful blisters along with other groups of symptoms as shown in Figure 2.

The reported symptoms in different age groups were variable according to gender, group of symptoms and duration of the symptoms. A summary is shown in Table 2.

Table 1: Baseline characteristics of participants

Characteristics		Mean ± SD
Age (years)		43.60 ±16.53
Age of incidence		39.43 ±16.50
		N (%)
Gender	Female	43 (63.2%)
	Male	25 (36.8%)
History of chickenpox	Yes	42 (61.8%)
	No	9 (13.23%)
	Don't know	17 (25%)
Chickenpox vaccination status	Yes	18 (26.5%)
	No	19 (28%)
	Don't know	31 (45.6%)
Shingles symptoms duration	Less than 30 days	44 (64.7%)
	1-3 months	21 (30.9%)
	More than 3 months	3 (4.4%)
Shingles vaccination status	Yes	2 (2.9%)
	No	56 (82.4%)
	Don't know	10 (14.7%)
Medication therapy used	Herbal remedies	5 (7.4%)
	Analgesics	9 (13.2%)
	Analgesics+ Antivirals	36 (52.9%)
	Analgesics+ Antivirals+ Herbal remedies	5 (7.4%)
	Antivirals	13 (19.1%)
History of concomitant pregnancy or lactation	No pregnancy or lactation	40 (58.8%)
	Pregnancy only	3 (4.4%)
	Lactation only	2 (2.9%)

Figure 1



Our sample showed an overall variability in the symptom constellations as summarized in Figure 2.

Figure 2: Number of patients for different combination of symptoms.

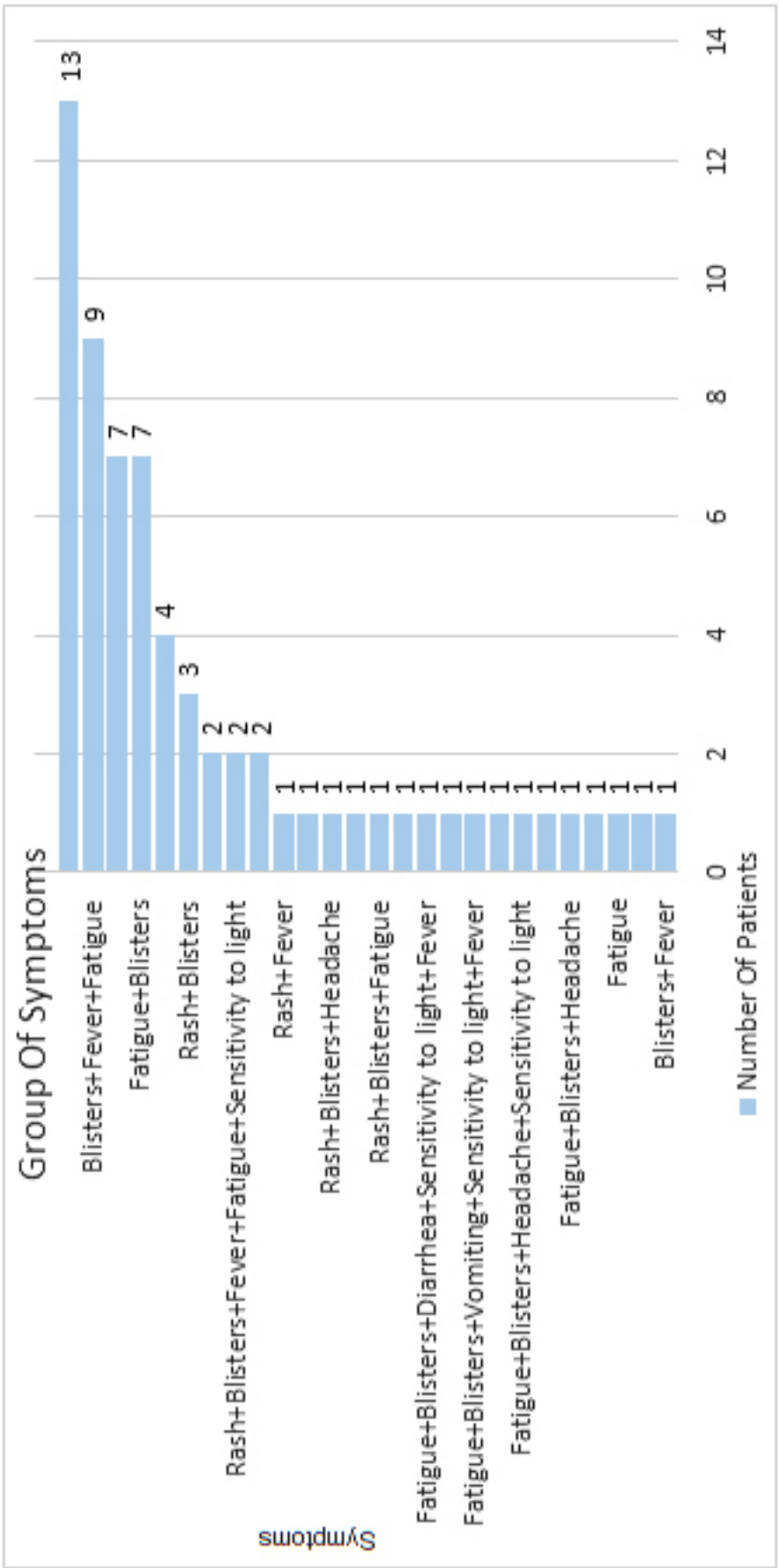


Table 2. Summary of reported symptoms in each age group.

AGE YEARS	GENDER		SYMPTOMS		DURATION OF SYMPTOMS		
	Male	Female	Less than 3	More than 3	≤1 Month	1-3 Months	≥3 Months
≤ 10	1	-	1	-	1	-	-
10-19	2	4	4	2	3	2	1
20-29	2	11	8	5	9	4	-
30-39	6	11	11	6	15	2	-
40-49	6	4	7	3	7	3	-
50-59	4	7	2	9	4	6	1
60-69	4	4	2	6	3	4	1
≥70	-	2	-	2	2	-	-

Discussion

The topic of HZ vaccination and complications has not been explored comprehensively in Saudi Arabia. We lack epidemiological and clinical data as no studies in Saudi Arabia have yet investigated the need for broad vaccine access and its implications. To our knowledge, this is the first comprehensive study to emphasize the current trend of HZ infection implying the need for vaccine access in Saudi Arabia. Unlike earlier hospital-based studies, the present research relies on evaluating HZ cases from multiple regions in Saudi Arabia and analyzes the cases according to a variety of symptoms, duration of symptoms, complications, use of different medications, history of chickenpox and vaccine status, rendering this protocol more representative of HZ characteristics across Saudi Arabia.

We showed that HZ infections predominantly occurred among females with a female-male ratio of 1.72:1. Our result is consistent with a previous systematic literature review of HZ incidence worldwide conducted by van Oorschot et al. in 2021. It estimated that female preponderance is more common than male (15). The finding is in contrast to findings from nearby countries that showed a male to female ratio of 4:1, 2.5:1, and 3:2 in Qatar, Nepal, and Iran, respectively(16–18).

The reason behind gender differences in the incidence of HZ infection remains unknown; a review in this regard attributed this to gender bias at the time of diagnosis as females usually seek medical attention more frequently than males (19). It is also hypothesized that physiological stressors and hormonal changes among females may also have an effect on HZ prevalence (20).

The incidence of HZ is thought to rise with age and to frequently affect the elderly. However, in this report, the maximum incidence was in the age group between 30–39 years (25%), followed by 50-59 years (16%). Minimum incidence was observed in the groups of extreme age, less than 10 years and above 70 years, which was 1.5% and 2.9%, respectively, as shown in Table 2. The findings are consistent with a study by Al-Ghamdi et al. done in the southern Albaha region of Saudi Arabia in 2020, which indicated that HZ primarily affected adults in their 30s and 40s (12).

Similar to a Canadian study by van Oorschot et al, the disease-defining symptoms of rash and painful blisters were reported by nearly all patients (21). As expected, with increase in age, the number and spectrum of symptoms also increased. Patients above the age of 50 had more than three symptoms combined with a longer duration of symptoms. Additionally, only three individuals in our sample had PHN, and two of them were over the age of 50 years, as shown in Table 2.

In our sample, it was evident that the majority of the symptom constellations and complications affected the elderly. Thus, vaccine access is imperative at a national level.

Pregnancy is one of the major causes of HZ reactivation, leading to maternal and fetal complications (22). Additionally, the presentation of HZ resembles other serious pregnancy complications exposing mothers to extensive and expensive evaluations. Furthermore, medications used for the management of the illness's acute flares may carry more risks than benefits for pregnant females (22,23).

The acute phase and complications of HZ such as PHN hinders patients' quality of life and imposes a huge economic burden on the society and healthcare system with drug costs of $127.34 per episode according to a population-based analysis done in Canada (24). This raises the need for a cost-effective vaccine to prevent HZ infections. The cost of SHINGRIX® vaccine is 122 Canadian dollars per dose and Zostavax®

cost is approximately $176.77 (25). Cost-effectiveness of SHINGRIX® was evaluated in Canadians aged 60 years or older(25). In comparison to no vaccination, the SHINGRIX® vaccine would prevent 554,504 HZ infections and 166,196 cases of PHN. This was estimated to be cost effective with 28.36 Canadian dollars per quality-adjusted life year (QALY). This is below the willingness to pay (WTP) threshold used in Canada and also the proposed threshold in Saudi Arabia (26). Comparing SHINGRIX® against Zostavax® resulted in a $2,513 per QALY, which indicates a preference of SHINGRIX® over Zostavax® is more cost-effective. A similar study done in the United States estimated that in comparison to no vaccination, SHINGRIX® would prevent 103,603 HZ infections, 11,197 PHN cases, and 14,455 other complications, at $11,863 US dollars per QALY. Additionally, compared to Zostavax®, SHINGRIX® would prevent 71,638 HZ infections, 6403 PHN cases, and over 10,582 other complications, resulting in net total cost savings of over $US96 million (27).

Anecdotal reports of vaccine product availability in some MOH facilities have been reported on social media. However, to our knowledge, no targeted vaccine campaigns have been released to the public to date.

Study limitations:
Our study was limited as patient's comorbidity such as diabetes and use of immunosuppressant medications were not assessed in the survey. Recall bias is another limitation of this study as participants were asked to self-report previous history of HZ infection.

Conclusions

HZ is a quite common contagious condition affecting a wide range of residents of Saudi Arabia, especially the geriatric group. Health institutions in Saudi Arabia need to address the concerns regarding the burden of this condition, its catastrophic complications, and its preventive tools. Available vaccines against HZ provide a great effectiveness in reducing both the incidence of HZ and its complications. Widening the vaccine access and incorporating the vaccines in the immunization protocols in Saudi Arabia is important to improve population immunity against HZ infection.

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Informed Consent Statement: Informed consents have been obtained prior to the start of the interview with each participant in this study. All participants received clear information of the purpose of the study, their rights during completing the questionnaire and withdrawal from data collection at any stage. Data confidentiality and all the requirements in completing the questionnaire. Participation was voluntary and only those who provide informed consent were included in the study.
Data Availability Statement: all the provided data of this study are available by contacting the corresponding authors upon request.
Conflicts of Interest: The authors declare no conflict of interest.

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Prevalence of depressive symptoms in hypertensive patients in Taif city

Ayman A. Atalla (1)
Rana S. AlQarni (2)
Reema S. Althubaiti (2)
Kholoud A. Alhasani (2)
Bushra S. Alghamdi (2)
Hadeel S. Alghamdi (2)

(1) Family medicine Department, medical college, Taif university, Saudi Arabia
(2) Medical student, Taif university, Saudi Arabia

Corresponding author:
Dr. Rana S. AlQarni
Taif city, Saudi Arabia
Tel. 0554199751
Email: AlQarni.Rana.s@hotmail.com

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Abstract

Background: The co-existence of depression and hypertension increases the risk of cardiovascular disease mortality than hypertension alone. It is postulated that both these conditions share a common pathway, and understanding the natural history of their co-existence would be helpful for effective management.

Objectives: to assess the prevalence of depression symptoms among hypertensive patients in Taif city, Saudi Arabia, and also to analyze various determinants related to their co-existence.

Methods: Hypertensive patients attending a single tertiary care hospital in Taif city were recruited for our study after taking informed consent and ethical approval from the institution. A pretested proforma was used to collect data from the participants. Data were collected using three methods; the investigator recorded participants' medical history and other clinical findings from hospital records in the first part. The participants themselves filled the second and third parts during their consultation in FM clinics. All data obtained were subjected to statistical analysis by an independent biostatistician.

Results: The prevalence of depression among these hypertensive patients was 27.5%, and 2.5% had a severe form of depression. Middle-age was found to be an independent risk factor for the co-existence of hypertension and depression. Female hypertensive patients had a comparatively higher prevalence of depression (p=0.05). Even though depression was more seen among patients who smoked and didn't do any physical activity, these were statistically not significant.

Conclusion: Considering the high prevalence of depression among hypertensive patients, it is critical to developing screening programs and community education campaigns.

Keywords: Prevalence, depressive, symptoms, hypertensive, patients, Taif

Introduction

Hypertension is recognized by elevation of blood pressure above certain values. It is classified into two stages, stage one is defined as systolic blood pressure (SPB) between 130-139 or diastolic blood pressure (DBP) between 80-89. While SBP of ≥140 mmHg or DBP ≥90 mmHg is considered stage two (1).

As reported by the WHO, 1.13 billion people globally have hypertension (2). Hypertension is the leading risk factor for premature mortality and impairment for both genders worldwide (2). It is a well-known fact that hypertension could lead to chronic kidney disease (CKD) or cardiovascular disease (CVD) including: hemorrhagic stroke, ischemic heart disease, atrial fibrillation and aortic aneurysm (3).

In KSA, a population-based study was done in 2018 and found prevalence of hypertension of 4.9% (4). Depression contributes significantly to the global burden of the disease; WHO reported depression to be in the third place worldwide in 2008 and it is projected to become the leading cause of disease burden in 2030. The female burden for depression is 50% higher than males (5).

In Saudi primary health care around 16% of visitors are found to be depressed (6). Depression is one of the most common mental illnesses affecting patients with chronic medical diseases; it is associated with poor medical prognosis (7). It has been suggested that the hypertensive condition of the patients as well as the need to comply with the therapy put a psychological strain on their heath that result in stress and depression.

Many studies reported the prevalence of psychological disorders such as distress, anxiety and depression in chronic diseases such as hypertension and diabetes. One of those was carried out in diabetic and hypertensive Saudi PHC patients in Alkhobar city and found a high prevalence of depression and anxiety in participants. The study reported that patients with uncontrolled blood glucose or blood pressure had a significantly higher prevalence rate of depression than those with controlled blood pressure and blood glucose (8). Sleep disturbances and weight changes were identified as factors that have a significant impact on depression (9).

A study in Al-Hijrah PHCC in Makkah found that depression was a highly prevalent disorder among hypertensive patients and the degree of severity of depression among them was 66.7% (10). A cohort German study among elderly adults found a positive association between depression and hypertension (11). Other research in Nepal stated a 15% prevalence of undiagnosed (subclinical) depression among patients with hypertension. Age, female gender, smoking, and poor adherence to antihypertensive medication contribute to a higher Beck Depression Inventory score (12).

In Ethiopia, the level of depression among a sample of 310 hypertensive patients was found to be 73 (24.7%). The results of this study confirmed that those who did not have social support or are illiterate were found to be more depressed than those who have social support or who have completed primary school respectively (13).

Furthermore, awareness of hypertension seems to contribute to the prevalence of depression as stated by research conducted in Finland. Unaware hypertensive patients who don't take anti-hypertensive medication, and the mean of their home BP monitoring was ≥135 mm Hg for systolic or ≥85 mm Hg for diastolic BP had a lower risk for developing depressive symptoms (14). In contrast to the previous studies, we found a study in the USA that reported no connection between depressive symptoms and high blood pressure. Instead, their results pointed to a connection between antidepressant use and high blood pressure. The participants on SSRIs were more likely to have hypertension (15).

This study aimed to assess the prevalence of depression symptoms among hypertensive patients in Taif city, Saudi Arabia and to determine whether life style factors such as smoking, exercise and employment state affects the link between depression symptoms and hypertension and compares the association of these factors.

Subjects and Methods

Study design and time frame: this was a cross sectional study conducted from January 2021 until January 2022.
Study setting: the study was conducted at the family medicine clinic at Prince Mansor Military Hospital (PMMH) that was opened in 1951. The PMMH is located in Taif city, KSA. Taif city is in the west of Saudi Arabia. It is located in the Makkah province. The city population comes from a rural region, while others come from an urban one. Total population in Taif city in the last statistics at 2010 was around 987,914 (16). Taif city has all governmental facilities and services; these include education, municipality and health. It has 16 governmental hospitals and 106 PHC Centers (17).

Study participants: the inclusion criteria were hypertensive patients above 18 years and the exclusion criteria were non hypertensive people outside the age range.

Sample size: the sample size was calculated to be 72 based on a study that was done in 2018 and found a prevalence of hypertension in Saudi Arabia of 4.9% [4], but we increased the sample size by 60% to be 120 to increase the accuracy. Our target population was those who attended family medicine clinics at PMMH in Taif city and accepted the invitation to participate in the study.

Data collection: data were collected by 3 methods; the first part we was interviewing the participants and collecting their BP and BMI data from patients' files. The second and third parts were filled out by patients in their family medicine clinics. The questionnaire consisted of three components.

The First part of the questionnaire was about hypertension and BMI. We classified participants with hypertension according to the American Heart Association with normal

less than 120/80 mm Hg, elevated top number (systolic) between 120-129 and bottom number (diastolic) less than 80, Stage one systolic between 130-139 or diastolic between 80-89, Stage two systolic at least 140 or diastolic at least 90 mm Hg. Also, we asked participants about the adherence of medications and complications of hypertension.

The second part was to assess depression by Becks Depression Inventory scale (18). It is for evaluating the severity of depression in normal and psychiatric populations and consists of twenty one items. We utilized the validated Arabic version (19). It covers all symptoms of depression such as sadness, hopelessness, feelings of guilt, changes in sleep, and appetite, remember incidents that occurred during the previous week. Items are scored 0–3 with an instrument range of 0 to 63. The patient had no depression when having a score < 13. Patients' depression level was assessed as follows: mild (14-19), moderate (20-28) and severe (29-63).

The last part was about demographic and risk factors questions. Eight items included age, gender, marital status, pregnancy, occupation, smoking status, physical workout and additional chronic disease.

Data analysis: Data were analyzed using (SPSS) version 26. 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), where Mann-Whitney (U) test was used for non-parametric variables. Multivariate logistic regression analysis was done to assess the the independent predictors (risk factors) of depression among studied patients and the Odds ratio was determined at a confidence interval (CI) of 95%. A p-value of <0.05 was statistically significant.

Results

Table 1 shows that 42.5% of patients had an age older than 60 years, 68.3% were females and 80% were married. Of those who responded, 79.2% were not pregnant. Only 15% were employed and 38.3% were practicing regular physical activity.

Table 2 shows that more than half of studied patients (56.7%) had chronic diseases other than HTN, and the most common comorbidity was DM. Of them, 25% had complications, with blurred vision the most common complication (86.6%). Most patients (85.8%) had medication compliance, 50.8% had a BP of 90 or higher / 140 and 45.8% were obese (BMI ≥ 30 kg/m2).

Of studied patients 27.5% had depression, with 16.7%, 8.3% and 2.5% having mild, moderate and severe depression respectively (Figure 1).

Figure 2 illustrates that depression was significantly higher among patients who had an age ranging from 41-50 years compared to other age groups (p=< 0.05).

Table 3 demonstrates that a non-significant relationship was found between depression and all patients' demographic data other than age and all clinical data (p=> 0.05).

Table 4 shows that the multivariate logistic regression analysis to assess the in-dependent predictors (risk factors) of depression among studied patients was done. It was revealed that having an age that ranges from 41-50 years was a risk factor to develop depression and the studied hypertensive patients (CI:95%, p= < 0.05).

Table 1. Distribution of studied patients according to their demographic data, smoking and physical activity (No. 120)

Variable	No. (%)
Age	
19-30	1 (0.8)
31-40	10 (8.3)
41-50	14 (11.7)
51-60	44 (36.7)
Older than 60	51 (42.5)
Gender	
Female	82 (68.3)
Male	38 (31.7)
Marital status	
Married	96 (80)
Single	4 (3.3)
Divorced	4 (3.3)
Widowed	16 (13.3)
Pregnancy	
NA	25 (20.8)
No	95 (79.2)
Employment	
No	102 (85)
Yes	18 (15)
Smoking	
No	107 (89.2)
Yes	13 (10.8)
Regular physical activity	
No	74 (61.7)
Yes	46 (38.3)

Table 2: Distribution of studied patients according to their clinical data (No. 120)

Variable	No. (%)
Chronic diseases other than HTN	
No	52 (43.3)
Yes	68 (56.7)
If yes, what?	
DM	43 (35.8)
Thyroid disorders	16 (13.3)
Eczema	2 (1.7)
Dyslipidemia	9 (7.5)
Asthma	5 (4.2)
CVD	4 (3.3)
SLE	1 (0.8)
More than one chronic disease	
Complications	
No	90 (75)
Yes	30 (25)
If yes, what?	
Angina pectoris	1 (3.3)
Kidney failure	1 (3.3)
Blurred vision	26 (86.6)
Stroke	1 (3.3)
Peripheral arterial disease	1 (3.3)
Medication compliance	
No	17 (4.2)
Yes	103 (85.8)
BP	
89-80/139-130	47 (39.2)
90 or higher / 140 or higher	61 (50.8)
Less than 80 / Less than 120	12 (10)
BMI (kg/m2).	
18-24.9	13 (10.8)
25-29.9	52 (43.3)
≥ 30	55 (45.8)

Figure 1. Percentage distribution of studied patients according to prevalence of depression and its types

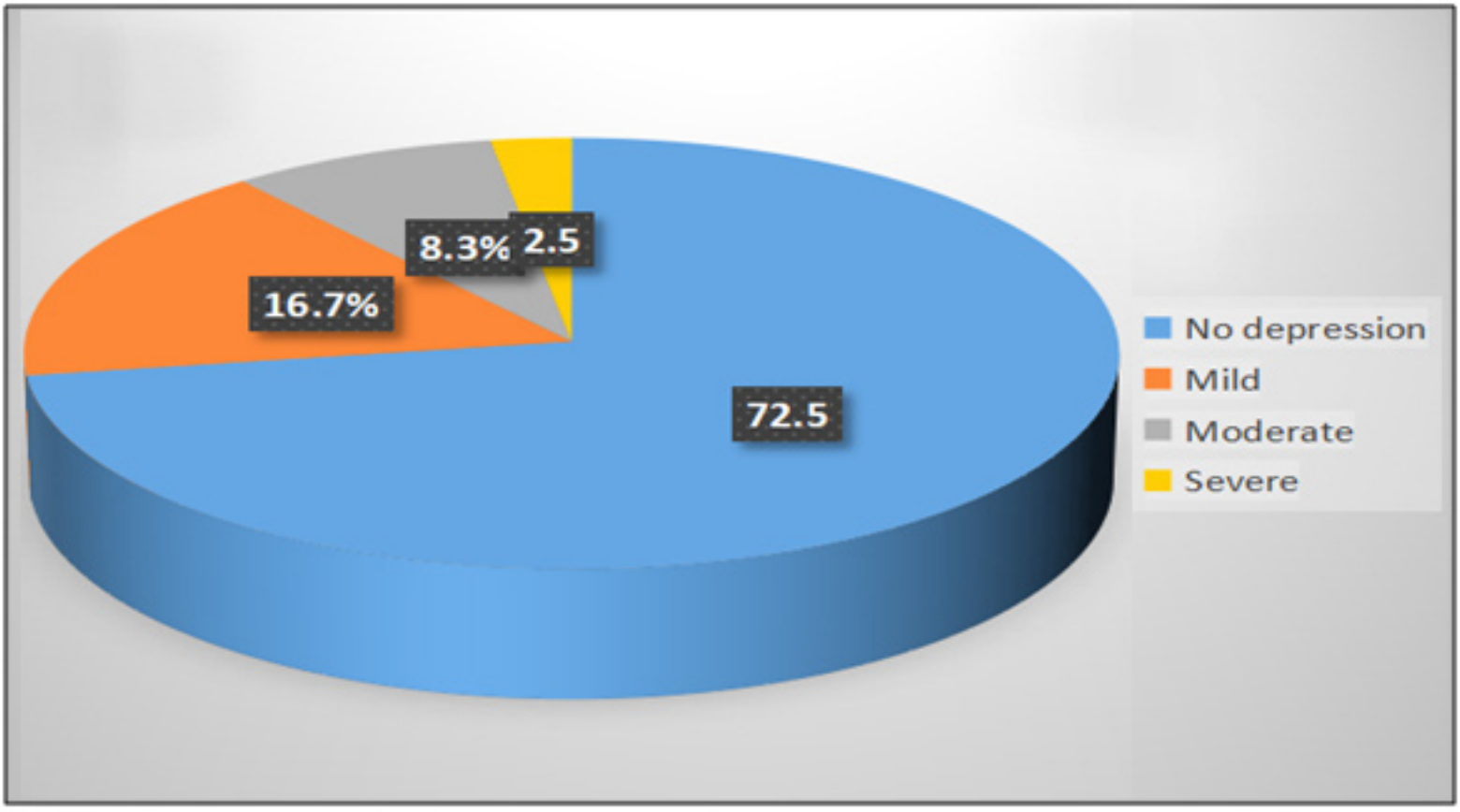
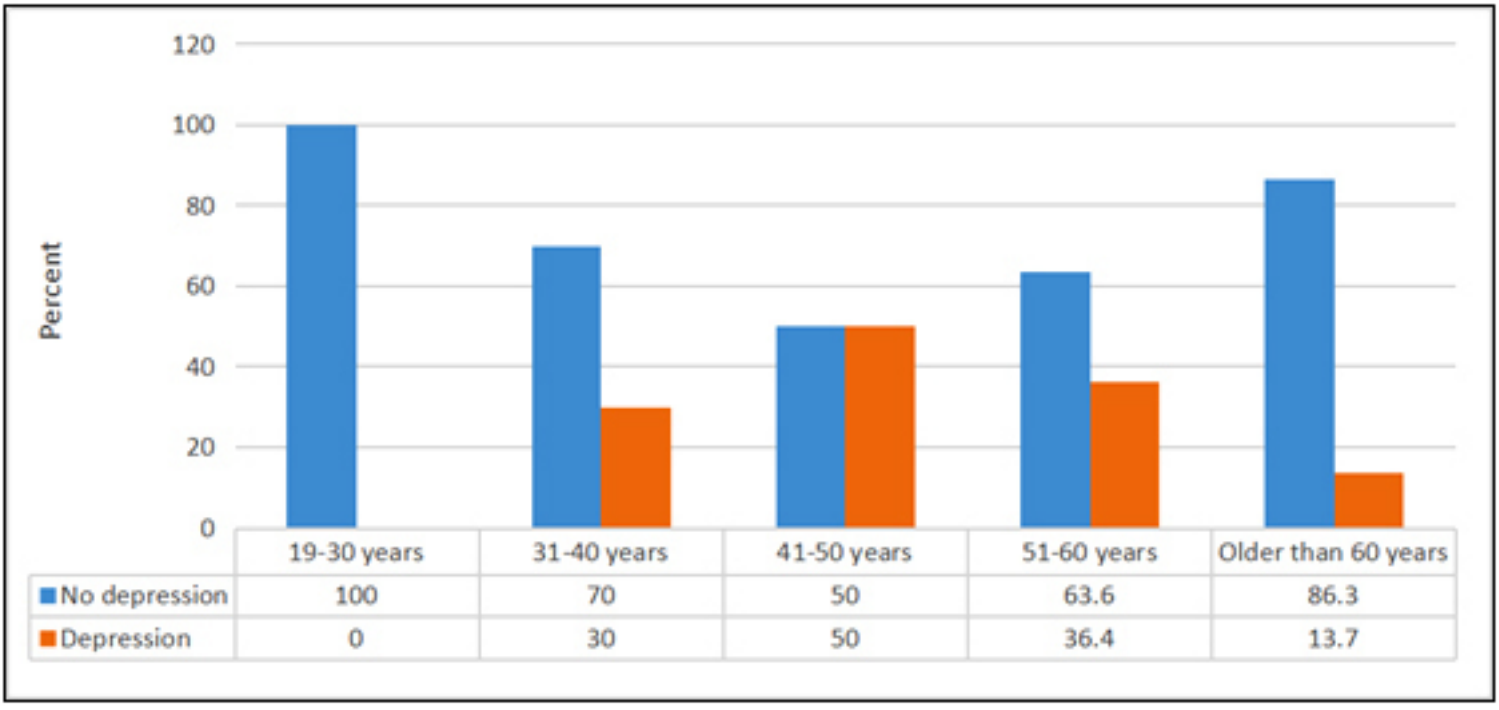


Figure 2. Relationship between depression and patients' age groups



	19-30 years	31-40 years	41-50 years	51-60 years	Older than 60 years
No depression	100	70	50	63.6	86.3
Depression	0	30	50	36.4	13.7

N.B. ($\chi 2 = 10.55$, p-value = 0.032)

Table 3. Relationship between depression and patients' demographics and clinical data (No.120)

Variable	Depression		χ2	p-value
	No No. (%)	Yes No. (%)		
Gender				
Female	55 (67.1)	27 (32.9)	3.82	0.05
Male	32 (84.2)	6 915.8)		
Marital status				
Married	71 (74)	25 (26)		
Single	3 (75)	1 (25)	1.24	0.74
Divorced	2 (50)	2 (50)		
Widowed	11 (68.8)	5 (31.3)		
Pregnancy				
NA	20 (80)	5 (20)	0.89	0.345
No	67 970.5)	28 (29.5)		
Smoking				
No	76 (71)	31 (29)	1.07	0.3
Yes	11 (84.6)	2 (15.4)		
Employment				
No	75 (73.5)	27 (26.5)	0.36	0.548
Yes	12 (66.7)	6 (33.3)		
Regular physical activity				
No	50 (67.6)	24 (32.4)	2.35	0.125
Yes	37 (80.4)_	9 (19.6)		
Chronic diseases other than HTN				
No	36 (69.2)	16 (30.8)	0.49	0.483
Yes	51 (75)	17 (25)		
Complications				
No	23 (76.7)	7 (23.3)	0.34	0.555
Yes	64 (71.1)	26 (28.9)		
Medication compliance				
No	13 (76.5)	4 (23.5)	0.15	0.692
Yes	74 (71.8)	29 (28.2)		
BP				
Lessthan 80 / Lessthan120	8 (66.7)	4 (33.3)	2.7	0.259
89-80/139-130	38 (80.9)	9 (19.1)		
90 or higher / 140 or higher	41 (67.2)	20 (32.8)		
BMI				
18-24.9	7 (53.8)	6 (46.2)	4.37	0.112
25-29.9	42 (80.8)	10 (19.2)		
≥ 30	38 (69.1)	17 (30.9)		

Table 4. Multivariate logistic regression analysis of the independent predictors (risk factors) of depression among studied patients

Variable	B	Wald	p-value	Odds Ratio (CI:95%)
Age	0.68	5.66	**0.017**	0.5 (0.28-0.88)
Gender	0.86	1.77	0.183	0.24 (0.11-1.5)
Marital status	0.14	0.49	0.481	1.15 (0.77-1.72)
Smoking	1	1.03	0.309	0.36 (0.05-2.54)
Employment	0.86	1.28	0.258	2.38 (0.53-10.7)
Medication compliance	0.29	0.22	0.639	1.34 (0.39-4.57)
Complications	0.31	0.38	0.585	1.36 (0.51-3.63)
BP	0.24	0.57	0.449	1.27 (0.67-2.41)
BMI	0.12	0.14	0.7	0.88 (0.47-1.64)

Discussion

According to the recent reports of the World Health Organization, it is estimated that about 5% of the population suffers from depression (20). Patients with co-morbid hypertension and depression are a higher-risk population for cardiovascular disease-related mortality. The comorbidity existence of depression and hypertension increases the risk of cardiovascular disease mortality (21,22). The findings of our study showed that the prevalence of depression in these hypertensive patients was 27.5%, whereas 2.5% showed severe hypertension. However, it is not clear whether depression occurred before the onset of hypertension or as a consequence of hypertension. The prevalence of depression was comparatively higher among females than males, which is similar to the findings from other countries (23.24). It is possible that the higher risk among females is due to biological sex differences such as hormonal fluctuations, higher rates of illness, and a more severe mental burden with regards to women's cultural role and relationships rather than race, culture, diet, education, or other potentially confounding social and economic factors. Also, there is no clear evidence that depression is more frequent in nations where females have a lower socioeconomic status than males (25.26). In our study, when we assessed the pattern of depression according to age, the prevalence was comparatively higher among middle-aged patients, and then it gradually reduced in old age. The majority of previous research shows that depression is comparatively lesser among old people than younger ones (27,28).

Depressive symptomatology (DS) research shows that depression in older individuals is qualitatively different from the young. This difference could be explained on the basis of two classes of DS, namely somatic symptoms and psychological symptoms. Symptoms such as poor appetite, increased fatigue, disturbed sleep come under somatic type and are comparatively reported higher among older adults compared to younger adults. However, psychological symptoms such as feelings of worthlessness, dysphoric mood, loss of interest in usual activities do not show significant age differences (29,30).

The coexistence of depression and hypertension may be explained by the theory that depression may occur as a result of hypertension, or it could be a predisposing factor for developing hypertension, or both of these conditions may have shared pathophysiology that manifests concurrently. However, their temporal and causative link still remains unknown. Furthermore, the relationship between hypertension and depression could be confounded by other factors such as unhealthy practices (e.g., smoking, alcohol, reduced physical activity, obesity), chronic conditions (e.g., diabetes mellitus, dyslipidemia, and inflammation), and these factors should be considered when examining an independent association between hypertension and depression (31,32,33).

Our findings didn't observe an independent association between any of the confounding variables except for the middle-aged hypertensive patients. Many researchers suggest that people who are depressed are at an increased risk of getting hypertension and being prone to stroke and ischemic heart disease (34.35).

In fact, depression may raise a person's risk of cardiovascular disease, stroke, and death. New theories on the pathophysiology of depression have focused on the biogenic amine pathway, which suggests that the condition is attributed to a lack of monoamine neurotransmitters (MNs) such as dopamine, serotonin, and norepinephrine (36). All therapeutic antidepressants, in fact, help to increase the effects of these MNs (34.37). Both depressed and hypertensive individuals have elevated sympathetic tone and release of adrenocorticotropic hormone and cortisol; hence, it is pathophysiologically likely that depression and hypertension interact (34). Depressed people may experience a loss of professional and social role function. It is common for hypertensive people who are depressed to acquire additional psychological distress. Although depression coupled with hypertension may have a subsequent negative impact on an individuals' quality of life, there is still unsatisfactory evidence to demonstrate that screening for depression in hypertensive patients can positively impact clinical symptoms and physical wellness. Another possible reason is that depressive patients may not adhere to proper therapeutic regimens resulting in poor control over their blood pressure (38).

Limitations

The use of data from a single healthcare system is one of the study's shortcomings, potentially restricting the generalizability of our findings. However, this healthcare setting is one of the largest in the Taif region, and some of our findings are consistent with reports from other healthcare systems in other countries [39,40] and other regions of Saudi Arabia [41,42]. Secondly, hypertension and other comorbidities can be misclassified. However, the application of established algorithms might reduce this risk. Thirdly, selection bias may exist as a result of patients with more severe symptoms being excluded due to concurrent usage of different healthcare settings. Finally, there could be a presence of recall bias due to the self-reported nature of the questionnaire. Future studies in this area should include more sample size incorporating many more confounding variables that have a causal link between depression and hypertension.

Conclusion

The study findings showed that more than one quarter of the hypertensive patients had depression where middle age was an independent risk factor. Females had comparatively more prevalence of depression compared to males. The underlying causes of depression must be recognized, and initiatives to increase awareness about the long-term consequences of untreated depression, particularly in hypertensive middle-aged females, must be undertaken.

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Conclusion

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PHC Physicians should be aware of all medications they prescribe for pregnant women attending PHC centers. In order to improve quality of care given to pregnant women during their visits to PHC centers, this study aimed to assess knowledge and practice of PHC physicians toward some of the medications for most common diseases. In addition, physicians were asked about the most common obstacles they face in medication prescribing for pregnant women.

Regarding the knowledge, this study revealed that most of the participants have insufficient knowledge about some of medications they prescribe for pregnant women. Among studied physicians, the most common medications reported by the participants to be safe during pregnancy were: Amoxicillin (86.9%), Levothyroxine (75.6%), Methyldopa (73.8%) and Calcium carbonate (71.4%) and acetaminophen (69%). While the most the most common medications reported to not be safe during pregnancy were: Doxycycline (64.9%), Methotrexate (63.7%) and Warfarin (54.2%). This agrees with a study done in Ethiopia, where 61.8% of the participants chose acetaminophen to be safe during pregnancy (12). This result also agrees with that found in a previous Saudi study, where acetaminophen was considered as being safe for use in pregnant women (13).

In the present study, 45% of the participants chose metformin to be safe during pregnancy. In contrast to an Ethiopian study, only 6.6% knew that budesonide is safe (12). This work revealed that 33% of the participants didn't know about chlorpheniramine \ is a category B antihistamine, 23% reported that it was safe and 28% reported it to be unsafe. The previously mentioned Ethiopian study found that about 18.4% of the study participants knew that chlorpheniramine could be used after weighing risks and benefits for individual patients.

The present study found that 86.9% of the participants reported that amoxicillin is safe during pregnancy which is category B in FDA classification (7,14). This is compared to 64.5% in the Ethiopian study (12).

About 75% (75.6%) of the participants of the present work chose Levothyroxine to be safe, which-is category B (FDA). However, 11.9% didn't know about the medication and 8.9% wrongly answered that it is not safe. Of them, 73.8% chose Methyldopa to be safe, which is category B and 14.3% didn't know about it. And 71.4% of them chose Calcium carbonate to be safe during pregnancy, which is category C and generally regarded as safe. Very few PHC physicians (7%) knew that kaolin and pectin is safe in pregnancy which is category B and a drug used as an antidiarrheal, while, 67%.9 didn't know about the medication. At the same time, 35% of the participants did not know about Dextromethorphan, and 25% and 26% reported it to be safe and not safe respectively. This drug is category C (FDA), and appears to be safe.

Pseudoephedrine was not known by 39% of the participants, however 31% don't know that it is safe and category B (FDA). For Diphenhydramine which belongs to category B, about 32% of participants didn't know about the medication and 31% chose it as safe. Among the most common medications reported by the participants not to be safe during pregnancy, which are category X, were: 63.7% for Methotrexate. This drug is contraindicated and category X (FDA). Around half of the participants (54.2%) knew that Warfarin is not safe. Warfarin is contraindicated and category X (FDA). A similar result was found in the Ethiopian study, where 59.2 % chose Warfarin to not be safe (12).

Of the studied participants, 48.8% knew that statins are not safe, which is category X. 64.9% reported that Doxycycline is not safe which is category D and 29.8% didn't know about medication safety of Valporic acid, which is category D (FDA). 35.1% chose Diazepam not to be safe which is category D (FDA), and 31.5% chose Pseudoephedrine hydrochloride to not be safe which is category B (FDA). For Ranitidine which is category B only 44% knew that it is safe, and 56% chose Aspirin to be safe, however it is considered as category D (FDA). The same doubt about Aspirin was revealed from a previous study (12). In comparison to a previous study, of all medicines prescribed, 17% were included in the foetal risk category C and 5% in category D (15). Compared to a study done in Qatar, the majority of the respondents had average knowledge about medication use in pregnancy (16).

Among studied participants, the most common sources of checking pregnancy safety information for a medicine used were secondary resources: websites or applications (e.g Uptodate, BMJ, Epocrates Micromedex) (82.7%), regulatory agencies websites (Food and Drug Administration [FDA] (55.4%) and Product leaflet/insert (44.6%). A previous study done in Qatar found that Micromedex® was the most used source as a reference to check pregnancy information, followed by Lexicomp® and the Drug and Poison Information Centers (16).

The obstacles faced in prescribing medications to pregnant mothers were assessed in this study. The most common obstacles faced were: Lack of time to read (82.6%), limited information about patient and treatment (60%), pregnant women education level (58.3%), lack of education about pregnancy (57.5%) and no knowledge about pregnancy medicines available resources (53%). Similar results were found in a previous study, where lack of clinical time was the most common obstacle when practicing medications prescription to pregnant mothers (17). In a previous study done in Qatar, lack of available resources and unknown pregnancy status were the main barriers to dispensing medication to pregnant women (16).

Limitations

A limitation of the present study is having a cross-sectional design that could reveal the association between variables but not the causal relationships.

Conclusion

This study found that 78.6% of PHC physicians were facing obstacles in prescribing medication for pregnant women. The most common obstacles were Lack of time to read, limited information about patient and treatment, pregnant women education level and lack of education about pregnancy. The most common medications reported by the participants to be safe during pregnancy were: Amoxicillin (86.9%), Levothyroxine (75.6%), Methyldopa (73.8%), Calcium carbonate (71.4%), Nasal fluticasone (57.1%) and Penicillin G (56.5%). And the most the most common medications reported not to be safe were: Doxycycline (64.9%), Methotrexate (63.7%), Warfarin (54.2%) and Statins. Participants with an age ranging from 25-35 years had a significantly higher percentage of facing lack of time to read as an obstacle in prescribing medication for pregnant women, while GPs had a significant higher percentage of facing the level of education of pregnant women, lack of privacy in a PHC and lack of education regarding pregnancy, as obstacles. There is a need to increase PHC physician's awareness about the FDA guidelines and categories of drug prescribing in pregnancy. Emphasis on the importance of double-checking medicine pregnancy safety information is needed to ensure safe use.

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Patient Awareness about the indications for and complications of sleeve gastrectomy in the western region of Saudi Arabia

Khalid M. Alzahrani
Jamal Amin Faydh
Saad Eidhah Althuwaybi
Saud Saeed Alzahrani
Fayez Dakhil Allah Althobaiti
Bader Abed Althagafi

University of Taif, Saudi Arabia

Corresponding author:
Jamal Faydh
University of Taif
Saudi Arabia
Email: Jamal.a.faydh@gmail.com

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Abstract

Introduction and Research Problem: Obesity can be defined as a BMI of 30 kg/m2 or higher. It has been recognized as the 2nd largest cause of avoidable early mortality in the USA. Bariatric surgery is a weight-loss surgical technique that is mostly suggested for morbidly obese individuals (BMI greater than 40) without comorbidities and BMI 35 with comorbidities.

The goal of the study was to assess patient awareness about the indications for and complications of, sleeve gastrectomy, as there is an insignificant number of studies related to our topic, in Saudi Arabia.

Materials and Methods: An observational cross-sectional study conducted in the western part of Saudi Arabia. The study's population included all patients of sleeve gastrectomy from the Western Region of Saudi Arabia.

The instrument used was an electronic questionnaire, which included questions about knowledge of sleeve gastrectomy indications and complications.

Summary of Results: The questionnaire was sent to 451 patients who underwent sleeve gastrectomy, and about 444 patients gave consent to participate. It was found that the participants who were aware of the indications and complications of sleeve gastrectomy before undergoing the procedure were 313 (70.5%) and 303 (68.2%). female patients had significantly more awareness related to the indications ($p<0.001$) and complications ($p=0.001$).
Patients who had an educational qualification of Masters and above had more awareness regarding indications of SG before surgery than others ($p=0.008$).

Conclusion and Recommendations: According to the findings of our study, knowledge regarding the indications for and complications associated with sleeve gastrectomy is not satisfactory.

There is a need to raise public understanding of the indications for and consequences of, sleeve gastrectomy.

Key words: Patient awareness, indications, complications, sleeve gastrectomy, Saudi Arabia

Introduction

Obesity can be defined as a BMI of 30 kg/m2 or higher, and it can affect people of all ages [1]. Obesity, second only to smoking, has been recognized as the largest cause of avoidable early mortality in the United States[2]. The general population is divided into five groups based on BMI: underweight (BMI 18.5 kg/m2), normal weight (BMI 18.5-24.9 kg/m2), class I obesity-overweight (BMI 25.0-29.9 kg/m2), class II obesity-obesity (BMI 30.0-39.9 kg/m2), and class III obesity-extreme obesity (BMI > 40 kg/m2) [3]. Bariatric surgery is a weight-loss surgical technique that is mostly suggested for morbidly obese individuals (BMI greater than 40) without comorbidities and BMI 35 with comorbidities [4].

Despite the fact that bariatric surgery is the only treatment technique linked with large and quick weight loss, it is a costly procedure and surgeon-specific, and certainly not the solution to the rising obesity pandemic [5]. Roux-en-Y gastric bypass (RYGB) and vertical sleeve gastrectomy (VSG) are the two most prevalent bariatric procedures. In both procedures, the surgeon physically modifies the gastrointestinal tract's natural integrity, shrinking the stomach to a fraction of its original size, between 80 and 120 mL in VSG and 20 to 30 mL in RYGB. The proximal jejunum is also transectioned, the Roux limb is attached to the gastric pouch, and the stomach, duodenum, and proximal jejunum are reattached to the distal jejunum in RYGB [6]. LAGB's popularity has dropped dramatically in recent years as a result of disappointing long-term results and high reoperation rates due to problems (e.g., slippage, pouch dilatation, dysphagia, and erosion). Meanwhile, LSG is becoming increasingly popular [7].

According to the World Health Organization statistics from 2016, around 13% of the world's adult population (male: 11%; female: 15%) was obese [8]. Habib conducted the study in Saudi Arabia in 2013, with the goal of assessing the prevalence of obesity in the Saudi adult population using international standards of body mass index (BMI) and body fat percentage (BF percent). According to the findings, the prevalence of obesity in Saudi adults according to the BMI criteria (30 kg/m2 and above) was 33.8 %, but the prevalence of obesity in Saudi people according to the BF percent criteria (25% for males and 30% for females) was 60 % [9]. Despite its effectiveness, bariatric surgery has been linked to a number of acute problems, including bleeding, leak, pulmonary embolism , intestinal perforation, gastric obstruction, infection, pneumonia, vomiting, dysphagia, reflux, heartburn, and dehydration, which have been recorded in 0.3 percent to 8% of operations [4].

A study was conducted in King Khalid University Hospital, Riyadh, Saudi Arabia in 2017 to assess patient awareness about the indications and complications of sleeve gastrectomy. It revealed that the majority of the participants (59.0%) didn't know about sleeve gastrectomy indications; however, 311 (64.8%) of the participants had heard about the complications of sleeve gastrectomy. All these results are correlated with the educational level of the participants [1]. An internet-based survey was done in 2019 to assess the patient's awareness of potential risks of weight reduction surgery of the surveyed population; 64% reported being aware of acute complications of bariatric surgery. Participants who had previously undergone a bariatric operation had a far better degree of awareness as compared to people who had not undergone a bariatric operation before (80.4% vs. 61.3%). Females had higher awareness compared to males [4]. Research been conducted in Taif City Saudi Arabia in 2020 shows that 32.25% and 42.6% of the participants were very satisfied with the general appearance and weight loss respectively. There was also a huge percentage of reduction of co-morbidities like hypertension and Type 2 diabetes mellitus after the surgery [10]. As a result, the goal of this study is to assess patient awareness about the indications for and complications of sleeve gastrectomy, as there is an insignificant number of studies related to our topic, especially in Saudi Arabia.

Methodology

This was an observational cross-sectional study conducted in the western part of Saudi Arabia. The study's population included all patients of sleeve gastrectomy from the Western Region of Saudi Arabia. Participants were recruited during November 2021 from the general population of Western Region of Saudi Arabia. The number of participants was 384 estimated by sample size calculator, with 95% confidence level and 5% margin of error. The instrument used was an electronic questionnaire in English translated to Arabic, which included questions about knowledge of sleeve gastrectomy indications and complications. This questionnaire was taken from previous research that was conducted at King Khalid University Hospital (KKUH), a tertiary care center in Riyadh, Saudi Arabia. The questionnaire was divided into five main sections: the first section was for research description and participant consent, the second section was for demographic data, the third section consisted of questions assessing the general knowledge of SG, the fourth section contained questions assessing the knowledge of SG indications, and the fifth section consisted of questions assessing the knowledge of SG complications.

Statistics

Statistical analysis was performed using SPSS version 23 (IBM corp. USA). Statistical analysis was performed using the Chi-square test for categorical variables. Patient characteristics and surgical complications were compared using the Chi-square test.

A p-value of less than 0.05 was regarded as statistically significant.

Results

The questionnaire was sent to 451 patients who underwent sleeve gastrectomy, and about 444 patients gave consent to participate. The sociodemographic characteristics of the patients showed that 40.3% were 18-24 years of age, 52% were females, and 57% had bachelor's education [Table 1].

The analysis showed that 347 (78.2%) patients were aware of their own Body Mass Index (BMI). It was found that patients aged 18-24 years, 25-34 years, and 35-44 years were comparatively more aware of their BMI than other age groups ($p<0.001$). There were no statistical gender differences related to awareness of their own BMI ($p=0.560$). Participants with higher educational qualifications such as Masters and above and Bachelors were significantly more aware of their BMI than others ($p=0.005$) [Table 2].

When we assessed the knowledge related to BMI, it was found that 245 participants (55.2%) had correct knowledge. Participants belonging to the age group of 18-24 years, 25-34 years, and 35-44 years significantly had more knowledge related to BMI than other age groups ($p<0.001$). Also, females had significantly better knowledge than males ($p=0.044$). Although participants with educational qualifications of Masters and above had better knowledge, there were no statistically significant differences observed between the other educational qualifications of participants ($p=0.359$). It was found that the participants who were aware of the indications and complications of sleeve gastrectomy before undergoing the procedure were 313 (70.5%) and 303 (68.2%), respectively. The participants' responses related to indications and complications of sleeve gastrectomy are given in Table 4. It was observed that patients who belonged to the age group of 45-54 years and 55-64 years were comparatively more aware of the indications ($p=0.001$) and complications ($p=0.002$) before the procedure than others. Similarly, female patients had significantly more awareness related to the indications ($p<0.001$) and complications ($p=0.001$) before the procedure, than males. Patients who had an educational qualification of Masters and above had more awareness regarding indications of SG before surgery than others ($p=0.008$) [Table 4].

Table 1: baseline characteristics of participants

		Frequency	Percent
Age (years)	<18	11	2.5
	18-24	179	40.3
	25-34	107	24.1
	35-44	96	21.6
	45-54	36	8.1
	55-64	14	3.2
	>65	1	.2
Gender	Female	231	52.0
	Male	213	48.0
Educational Level	Masters and Above	18	4.1
	Bachelors	253	57.0
	Diploma	35	7.9
	High school	123	27.7
	Middle school and lower	15	3.4

Table 2: Relationship between self BMI and baseline characteristics					
			Awareness of self BMI		P value
			No	Yes	
Age	<18	N	7	4	<0.001
		%	63.6%	36.4%	
	18-24	N	35	144	
		%	19.6%	80.4%	
	25-34	N	18	89	
		%	16.8%	83.2%	
	35-44	N	16	80	
		%	16.7%	83.3%	
	45-54	N	14	22	
		%	38.9%	61.1%	
	55-64	N	6	8	
		%	42.9%	57.1%	
	>65	N	1	0	
		%	100.0%	0.0%	
Gender	Female	N	53	178	0.560
		%	22.9%	77.1%	
	Male	N	44	169	
		%	20.7%	79.3%	
Educational level	Masters and Above	N	1	17	0.005
		%	5.6%	94.4%	
	Bachelors	N	47	206	
		%	18.6%	81.4%	
	Diploma	N	8	27	
		%	22.9%	77.1%	
	High school	N	33	90	
		%	26.8%	73.2%	
	Middle school and lower	N	8	7	
		%	53.3%	46.7%	

Table 3: Participants knowledge regarding obesity and their baseline characteristics (Chi-square test)					
			Knowledge related to BMI		P value
			Wrong	Correct	
Age	<18	N	10	1	<0.001
		%	90.9%	9.1%	
	18-24	N	93	86	
		%	52.0%	48.0%	
	25-34	N	37	70	
		%	34.6%	65.4%	
	35-44	N	33	63	
		%	34.4%	65.6%	
	45-54	N	15	21	
		%	41.7%	58.3%	
	55-64	N	10	4	
		%	71.4%	28.6%	
	>65	N	1	0	
		%	100.0%	0.0%	
Gender	Female	N	93	138	0.044
		%	40.3%	59.7%	
	Male	N	106	107	
		%	49.8%	50.2%	
Educational level	Masters and Above	N	6	12	0.359
		%	33.3%	66.7%	
	Bachelors	N	110	143	
		%	43.5%	56.5%	
	Diploma	N	15	20	
		%	42.9%	57.1%	
	High school	N	58	65	
		%	47.2%	52.8%	
	Middle school and lower	N	10	5	
		%	66.7%	33.3%	

Table 4: Responses of participants for indications and complications of sleeve gastrectomy		
		N (%)
Awareness of indications of sleeve gastrectomy before surgery		313 (70.5%)
Indications of Sleeve gastrectomy	Adults with a BMI over 40*	278 (61.5%)
	Adults with a body mass index (BMI) of more than 35 and pre-existing chronic diseases*	256 (56.8%)
	Adults with a body mass index (BMI) of more than 30 and diabetes and cardiovascular disease*	234 (51.9%)
	Adults with a body mass index (BMI) between 18.5-24.9	41 (9.1%)
	Adults with a body mass index (BMI) of 18.5	22 (4.9%)
	Only adults with a body mass index (BMI) <18.5	7 (1.6%)
	For cosmetic purposes*	66 (14.6%)
Awareness of complications of sleeve gastrectomy before surgery		303 (68.2%)
Complications of sleeve gastrectomy	Anemia*	176 (39%)
	Nutritional and mineral deficiencies	184 (40.8%)
	Mental stress	74 (16.4%)
	Internal bleeding*	208 (46.1%)
	Iron deficiency*	232 (51.4%)
	Overweight	58 (12.9%)
	Pulmonary vessel obstruction*	62 (13.7%)
	Stomach leakage*	240 (53.2%)
	Suppuration (pus collection) after surgery*	240 (53.2%)
	Wrapping the stomach around itself	159 (35.3%)

* correct responses

Table 5: Participants knowledge regarding obesity and their baseline characteristics (Chi-square test)

			Awareness of indications of SG before surgery			Awareness of complications of SG before surgery		
			No	Yes	P value	No	Yes	P value
Age	<18	N	4	7	0.001	4	7	0.002
		%	36.4%	63.6%		36.4%	63.6%	
	18-24	N	76	103		71	108	
		%	42.5%	57.5%		39.7%	60.3%	
	25-34	N	22	85		24	83	
		%	20.6%	79.4%		22.4%	77.6%	
	35-44	N	30	66		22	74	
		%	31.3%	68.8%		22.9%	77.1%	
	45-54	N	5	31		5	31	
		%	13.9%	86.1%		13.9%	86.1%	
	55-64	N	3	11		4	10	
		%	21.4%	78.6%		28.6%	71.4%	
	>65	N	1	0		1	0	
		%	100.0%	0.0%		100.0%	0.0%	
Gender	Female	N	53	178	<0.001	52	179	0.001
		%	22.9%	77.1%		22.5%	77.5%	
	Male	N	88	125		79	134	
		%	41.3%	58.7%		37.1%	62.9%	
Educational level	Masters and Above	N	3	15	0.008	2	16	0.213
		%	16.7%	83.3%		11.1%	88.9%	
	Bachelors	N	73	180		76	177	
		%	28.9%	71.1%		30.0%	70.0%	
	Diploma	N	7	28		7	28	
		%	20.0%	80.0%		20.0%	80.0%	
	High school	N	54	69		40	83	
		%	43.9%	56.1%		32.5%	67.5%	
	Middle school and lower	N	4	11		6	9	
		%	26.7%	73.3%		40.0%	60.0%	

Discussion

People who are going to undergo bariatric surgical procedures like sleeve gastrectomy need to have good knowledge related to the procedures. The present study with 444 patients showed that more than three quarters of them were aware of their own BMI. However, the knowledge related to the reference range of obese BMI was not satisfactory among the patients. A similar study conducted in Riyadh showed similar findings where only 16.7% of the participants were aware of the obese BMI [11]. According to a study by Yang et al., the rate of withdrawal from a bariatric surgery program is 25 % due to a variety of factors, including awareness of the surgical risks and complications, post-surgery lifestyle change, and lack of communication with the primary care physician [12]. The ability of physicians to educate patients about their BMI may motivate them to make lifestyle changes after the procedure, thereby assisting the patients in maintaining a normal BMI and reducing complications associated with it [13]. A discussion about BMI may be beneficial in addressing patients' misconceptions about their own weight and weight status. This is supported by our findings where patients with higher educational qualifications had greater BMI knowledge than those with lower educational qualifications. It may be because people with higher educational qualifications may inquire about the need and complications of the body procedures that they are planning to undergo [14]. Despite evidence that low health literacy is associated with poor health outcomes, evidence that it is associated with obesity is inconsistent and insufficient, according to a systematic review by Berkman et al. [15]. In general, it is reported that people are unaware of their own BMI category and have an inaccurate perception of their own weight, with the degree of inaccuracy increasing as BMI rises in the scale [16]. It is reported that secondary healthcare providers who are concerned about some patients' medical and surgical complications after bariatric surgery were reluctant to refer the patients for the same procedure [17].

Sleeve gastrectomy indications are based on BMI and the presence of comorbidity. Patients with a BMI of 40 kg/m2 or greater who do not have any coexisting medical problems and for whom weight loss surgery would not pose an enormous risk should be considered candidates for one of the aforementioned surgeries. BMI >35 kg/m2 with one or more severe obesity-related comorbidities (type 2 diabetes, hypertension, hyperlipidemia, obstructive sleep apnea, gastroesophageal reflux disease, non-alcoholic fatty liver disease, asthma, venous stasis, severe urinary incontinence, debilitating arthritis, or significantly reduced quality of life) would also qualify as surgical candidates. Patients with a BMI of 30 to 34.9 kg/m2 and diabetes or metabolic syndrome may also undergo bariatric surgery, though data on long-term benefits is lacking [18,19]. Candidates' comorbidities put them at risk for complications when done under general anesthesia and having surgery. Bariatric surgery complications can occur during surgery, 1–2 days postoperatively, or even years later. Intraoperative complications include anesthesia-related incidents, intestinal, spleen, liver injury, and blood vessel injuries [20,21]. The most dangerous bariatric complication is an anastomotic leak, which increases overall morbidity by 61% and mortality by 15% [22]. In our study, only 53.6% of the participants selected stomach content leakage as a complication of SG. The present study showed that 70.5% of the participants were aware of the indications of SG before surgery, whereas female patients and those having educational qualifications of Masters and above were more aware of the indications and complications than others. A study conducted in the Qassim region of Saudi Arabia among the general population reported that even though the participants lacked knowledge about BMI, their awareness toward the indications and complications of SG was fair [23]. The patient-physician relationship must be improved, where the physicians need to communicate with the patients before and after surgery in order to increase awareness about SG indications and complications. To achieve desirable weight loss, obesity should be managed through a multidisciplinary team that should include primary care providers, bariatric surgeons, family physicians, and health educators.

Some of the limitations should be considered before generalizing the findings. Firstly, the study was limited to the Taif region of Saudi Arabia, and hence it may not reflect the whole patient population in Saudi Arabia that are ideal candidates for SG. Another possibility is that our study may have called upon social desirability bias in some of the participants due to the fact that there is a tendency to under-report socially undesirable attitudes and behaviors while over-reporting more desirable characteristics.

Conclusion

According to the findings of our study, knowledge regarding the indications for and complications associated with sleeve gastrectomy is not satisfactory. Patients who had higher educational qualifications and female patients were more aware of their Body Mass Index. There is a need to raise public awareness about the indications and complications of sleeve gastrectomy through appropriate community scientific health education programs.

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Prevalence of Obstructive Sleep Apnea among Patients with Cardiovascular Diseases

Reda Abdelmoaty Goweda (1,2), **Mahmoud Elshahat Elsayed** (3), **Asmhan Saadeldin Rady** (4), **Faisal Saleh Alnahdi** (5), **Anas Mohammad Alqurashi** (5), **Turki Talal Alessa** (5), **Bassam Musleh Bin Laswad** (5), **Azzam Musleh Bin Laswad** (5), **Omar Abdulaziz Althobity** (5), **Ammar Safran Alhothali** (5), **Abdullah Khafagy** (2), **Ahmed Metwally** (1), **Wael Zeid** (1)

(1) Department of Family Medicine, Faculty of Medicine, Suez Canal University, Egypt.
(2) Department of Community medicine, Faculty of Medicine, Umm Al-Qura University, Saudi Arabia.
(3) Cardiology department. Faculty of Medicine. Al Azhar University. Egypt
(4) Clinical Pathology Department, Tanta Cancer Center, Ministry of Health, Tanta, Egypt
(5) Medical students, Faculty of Medicine, Umm Al-Qura University, Saudi Arabia.

Corresponding author:
Reda Goweda
Associate professor Department of Community medicine, Faculty of Medicine,
Umm Al-Qura University, Saudi Arabia .
Assistant professor, Family medicine department,
Suez canal University, Egypt
Mobile: 00201003583933, 00966565528216
Email: redagoweda@yahoo.com, rbgoweda@uqu.edu.sa

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Abstract

Background: Obstructive sleep apnea (OSA) is the most common sleep disorder that interrupts respiration during sleep. It is associated with increasing cardiovascular disease risk.

Aim: To screen for OSA among cardiovascular disease patients.

Methods: This is a cross-sectional study that was carried out in Makkah city and 451 patients were recruited. Data of this study was collected using a questionnaire which includes sociodemographic data and STOP-Bang test that consists of 8 questions, and net results of STOP-Bang test scoring was divided into OSA-low risk, OSA-intermediate risk and OSA-high risk.

Results: The majority of studied patients were males 315(69.8%), Saudis 370(82%), married 353(78.3%), diabetic 291(64.5%), and their age between 40 to 59 years. 81.4% of the studied patients have OSA-high risk, 9.3% have OSA-intermediate risk while 9.3% have OSA-low risk. The relationship between OSA risk scores and patients' characteristics shows a statistical significance ($p < 0.05$) in all patients' characteristics except using medications for chronic diseases (p 0.228).

Conclusion: OSA is highly prevalent among cardiovascular disease patients. Physicians' awareness regarding screening, diagnosis, and treatment of OSA is essential to prevent cardiovascular disease risks.

Keywords: Obstructive Sleep Apnea, Cardiovascular disease

Introduction

OSA is characterized by recurrent attack of apnea and hypo-apnea during sleep, resulting from either partial or complete oropharyngeal obstruction, which leads to cessation or decreased airflow for more than 10 seconds, associated with decrease in oxygen saturation or awakening from sleep (1).

OSA affects approximately 17% of the adult population (2), but studies showed that it is a highly unrecognized and undiagnosed pattern (3).

It is characterized by snoring and unrefreshed sleep despite sleeping 7 to 9 hours (4). It is also highly associated in patients with different cardiovascular disease ranges from 30% hypertension to 60% arrhythmia including Atrial Fibrillation, heart failure (HF) and coronary artery diseases (CAD) (5).

In regard to OSA attacks, there is impaired diastolic function and atrial and aortic enlargement due to an increased cardiac load (6).

Sleep apnea and cardiovascular diseases share several risk factors which can be categorized into non modifiable risk factors such as male gender, old age, race and craniofacial or oropharyngeal anatomic abnormalities while the modifiable factors include obesity (7), hypertension, hyperlipidemia, glucose intolerance, alcohol and smoking (8).

Methodology

This is a cross-sectional study that was carried out between 1/3/2020 to 1/6/2020 in Makkah cardiac centers at Al-Noor hospital, King Faisal hospital, King Abdul-Aziz hospital and King Abdullah medical city and UQU medical center.

The patients were recruited using systematic random sampling technique.

The calculated sample size is 369 based on the prevalence of OSA ranges from 30% hypertension to 60% arrhythmia including Atrial Fibrillation, heart failure (HF) and coronary artery diseases (CAD) (5). We selected the higher value of 60% to have sufficient power of study. The total population of Makkah is 2 million. Confidence intervals were taken at 95% and with a 5% margin of error. We added 20% more to the number to accommodate those who refused to participate in the study, hence the total sample size was 451.

All patients above age of 18-years-old, with cardiovascular diseases were included while patients who are known to have other sleep disorders and psychiatric patients were excluded.

Data of this study were collected using a questionnaire which included three sections:

The first section included social demographic data.

The second section was related to the disease: diagnosis, duration, medications, symptoms control, follow up, other sleep disorders and cardiovascular risk factors (diabetes mellitus, dyslipidemia, BMI, physical activity and family history of cardiovascular disease).

The third section was the STOP-Bang test (9) which included 8 questions, one point for each YES answer, and 0 for NO answer. SCORING depends on::

OSA - Low Risk : Yes to 0 - 2 questions
OSA - Intermediate Risk : Yes to 3 - 4 questions
OSA - High Risk : Yes to 5 - 8 questions
or Yes to 2 or more of 4 STOP questions + male gender
or Yes to 2 or more of 4 STOP questions + BMI >35kg/m^2
or Yes to 2 or more of 4 STOP questions + neck circumference 17 inches / 43cm in male or 16 inches / 41cm in female

SPSS software, version 20 was used for performing all statistical analyses. Chi-squared test was used for categorical values.

Ethical approval was obtained from UQU ethical committee, as well as oral consent being taken from all participants.

Results

The socio-demographic characteristics of the 451 patients who were recruited to this study are shown in Table 1. The majority of them were males 315(69.8%), Saudis 370(82%), married 353(78.3%), diabetic 291(64.5%), and their age was between 40 to 59 years.

Regarding Score's results of OSA screening, 367(81.4%) of the studied patients have a OSA-high risk, 42(9.3%) have OSA-intermediate risk, while 42(9.3%) have OSA-low risk (Table 2).

The high probability of having OSA among different cardiovascular diseases is shown in Table 4 while Table 5 studied the relationship between OSA - risk scores and patients' characteristics which shows statistical significance ($p < 0.05$) in all patient's characteristics except using medications for chronic diseases (p 0.228).

Table 1: Description of studied patients

Gender	Male	315(69.8%)
	Female	136(30.2%)
Nationality	Saudi	370(82%)
	Non Saudi	81(18%)
Marital status	Married	353(78.3%)
	Single	41(9.1%)
	Divorced or widow	57(12.6%)
Occupation	Working	270(59.9%)
	Retired	98(21.7%)
	Jobless	83(18.4%)
On medications	Yes	404(89.6%)
	No	47(10.4%)
Diabetic	Yes	291(64.5%)
	No	160(35.5%)
Diagnosed with Dyslipidemia	Yes	362(80.3%)
	No	89(19.7%)
Family history of OSA	Yes	258(57.2%)
	No	193(42.8%)
Age	18 to 39 years	62(13.7%)
	40 to 59 years	227(50.3%)
	≥ 60 years	162(35.9%)
BMI	≥30 kg/m2	394(87.4%)
	<30 kg/m2	57(12.6%)

Table 2: Risk Score of OSA among studied patients

		No (%)
Riskscore	OSA - High Risk	367(81.4%)
	OSA - Intermediate Risk	42(9.3%)
	OSA - Low Risk	42(9.3%)

Table 3: Responses to eight questions of STOP-Bang test

Snoring / Do you Snore loudly?	Yes	362(80.3%)
	No	89(19.7%)
Tired / Do you often feel Tired, Fatigued, or Sleepy during the daytime?	Yes	361(80%)
	No	90(20%)
Observed / Has anyone Observed you Stop Breathing or Choking/Gasping during your sleep?	Yes	276(61.2%)
	No	175(38.8%)
Pressure / Do you have or are being treated for High Blood Pressure?	Yes	421(100.0%)
	No	30(100.0%)
Body Mass Index more than 35 kg/m2?	Yes	295(65.4%)
	No	156(34.6%)
Age older than 50?	Yes	320(71%)
	No	131(29%)
Neck circumference (greater than 40 cm =15.75 inches)?	Yes	317(70.3%)
	No	134(29.7%)
Gender / are you Male?	Yes	315(69.8%)
	No	136(30.2%)

Table 4: OSA risk among different cardiovascular diseases

	Score		
	OSA-High Risk	OSA-Intermediate risk	OSA-Low risk
Hypertension	350(83.1%)	35(8.3%)	36(8.6%)
Heart failure	118(94.4%)	4(3.2%)	3(2.4%)
Ischemic heart disease	132(91.7%)	11(7.6%)	1(0.7%)
Atrial fibrillation	88(93.6%)	4(4.3%)	2(2.1%)
Other arrhythmias	150(89.3%)	12(7.1%)	6(3.6%)
Stroke	91(94.8%)	2(2.1%)	3(3.1%)
Pulmonary hypertension	67(94.4%)	1(1.4%)	3(4.2%)
Peripheral arterial diseases	76 (98.7%)	0 (0.0%)	1(1.3%)

Table 5: Distribution of OSA risk scores according to parents' characteristics

		Score			P
		OSA - High Risk	OSA - Intermediate Risk	OSA - Low Risk	
On medications	Yes	333(82.4%)	36(8.9%)	35(8.7%)	0.228
	No	34(72.3%)	6(12.8%)	7(14.9%)	
Diabetes mellitus	Yes	264(90.7%)	18(6.2%)	9(3.1%)	0.000
	No	103(64.4%)	24(15.0%)	33(20.6%)	
Dyslipidemia	Yes	306(84.5%)	30(8.3%)	26(7.2%)	0.001
	No	61(68.5%)	12(13.5%)	16(18.0%)	
Family history	Yes	227(88.0%)	18(7.0%)	13(5.0%)	0.000
	No	140(72.5%)	24(12.4%)	29(15.0%)	
Gender	Male	262(83.2%)	31(9.8%)	22(7%)	0.033
	Female	105(77.2%)	11(8.1%)	20(14.7%)	
Marital status	Married	279(79%)	41(11.6%)	33(9.3%)	0.029
	Single	38(92.7%)	0(0.0%)	3(7.3%)	
	Divorced or widow	50(87.7%)	1(1.8%)	6(10.5%)	
Job	Working	207(76.7%)	34(12.6%)	29(10.7%)	0.001
	Retired	92(93.9%)	4(4.1%)	2(2.0%)	
	Jobless	68(81.9%)	4(4.8%)	11(13.3%)	
Age	18 to 39 years	48(77.4%)	3(4.8%)	11(17.7%)	0.001
	40 to 59 years	173(76.2%)	28(12.3%)	26(11.5%)	
	≥ 60 years	146(90.1%)	11(6.8%)	5(3.1%)	
BMI	≥30 kg/m2	347(88.1%)	27(6.9%)	20(5.1%)	0.001
	<30 kg/m2	20(35.1%)	15(36.3%)	22(38.6%)	

Discussion

OSA is widespread and mostly underdiagnosed. It affects approximately 17% of the adult population (10). Statistics from the Multi-Ethnic Study of Atherosclerosis found that undiagnosed moderate to severe OSA is 84% to 93% in 2015(11). Studies from the United States found that 82% of males and 93% of females with OSA are undiagnosed (12).

Generally, males are at higher risk for OSA than females (13 ,14). In the present study 83.2% of males have OSA-high risk in comparison with 77.2% of the female patients. Research in Switzerland showed that 50% of males and 23% of females had OSA (15).

Additionally, other studies reported that 24% of males and 9% of females have OSA (16). Another Cohort study found that 10% of males and 3% of females between 30 and 49 years had OSA, while 17% of men and 9% of women between 50 and 70 years had OSA (17).

The present study reported that the risk of OSA increases with age and 90.1% of patients older than 60 have a higher risk for OSA. In another study of men over sixty-five years old, the prevalence of OSA was 23% in men below seventy two years and 30% in men over eighty (18).

OSA is highly prevalent in obese patients and increased weight is one of the major risk factors of OSA progression. The prevalence of OSA in obese individuals is approximately twice that of non-obese persons (19). In our study it was found that 88.1% of obese patients have OSA- high risk score.

OSA is more prevalent in individuals with cardiovascular disease particularly persons with underlying ischemic heart disease and in individuals with cardiovascular risk factors such as DM, hypertension, and HF (20). The prevalence of OSA in patients with CVD ranges from 30% (hypertension) to 60% (stroke, arrhythmia, end-stage renal disease) (21).

In our study we found that 91.7% of ischemic heart disease patients, 93.6% of patients with atrial fibrillation, 98.3% of patients with other arrhythmias, 94.8% of Stroke, 94.4% Pulmonary hypertension and 98.7% of patients with Peripheral arterial diseases have a high risk for OSA.

A study done by Javaheri S et al. reported that 83% of hypertensive patients have mild OSA while 30% of them had moderate to severe OSA; 55% of patients with HF had mild OSA while 12% of them had moderate to severe OSA; 50 % of patients with arrhythmias had mild OSA and 20% of them had moderate to severe OSA. Patients with stroke ranged from 75% to 57%, and patients with ischemic heart disease ranged from 65% of them with mild OSA to 38% of them with moderate to severe OSA (22).
Hypertension is one of the diseases included in metabolic syndrome. OSA is one of the most common conditions associated with resistant hypertension and numerous studies document increased risk and prevalence of hypertension in such persons with OSA (23). The prevalence of OSA increases in patients with hypertension (30–80%), and it could reach 64% to 83% in patients with resistant hypertension (24).

OSA is 30% more common in individuals who had ischemic stroke as reported by The Sleep Heart Health Study (25) which is in agreement with our study.

Arrythmias.
OSA is more common among patients with arrythmias such as AF, non-sustained ventricular tachycardia, and complex ventricular ectopy (26).

Several studies reported a high prevalence of OSA in patients with an acute stroke or TIA; it was 95% in one study (27).

OSA was an independent predictor of IHD. In some studies, the prevalence of OSA in patients with ACS was 40% to 50% (28) which coincides with the results of the present study.

The prevalence of OSA among patients with systolic dysfunction is 11% to 37% and it is 50% of patients with HF with preserved systolic function (29). In parallel with our study many studies found that up to 37% of patients with HF have OSA (30).

A systematic review and meta-analysis showed that prevalence of OSA in diabetic patients was reported to be 54.50% which is in agreement with our study which reported that 90.7% of diabetic patients have a high-risk score for OSA (31).

Conclusion

OSA is highly prevalent among cardiovascular disease patients. Accordingly; screening, early diagnosis, health education, prevention and treatment are essential.

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Efficacy of oral isotretinoin in the treatment of acne vulgaris

Amer Bin Al-Zou (1)
Asia Hassan Abdulla Saleh (1)
Mohamed Saeed Bafadhl (2)
Fathi Elkasah (3)

(1) Associate Professor of Dermatology, Faculty of Medicine, University of Aden, Yemen
(2) Associate Professor, Department of Dermatology, College of Medicine, Hadhramout University, Yemen
(3) Associate Professor, Department of Dermatology, Faculty of Medicine, Sirte University, Libya

Corresponding author:
Dr. Amer Bin Al-Zou
Associate Professor of Dermatology; Faculty of Medicine,
University of Aden, Yemen
Email: amer_zou2009@yahoo.com

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Abstract

Background: Acne vulgaris is a chronic inflammatory disease of pilosebaceous units.

Objective: To assess the presentation of acne vulgaris and to evaluate the efficacy of oral isotretinoin therapy,

Materials and method: This was a retrospective chart review of patients presenting to the dermatology private clinic in Almansoora, Aden, over a 2-year period, who complained of acne vulgaris and were treated with oral isotretinoin.

The collected data were analyzed by SPSS version 17. P-value < 0.05 was considered as statistically significant.

Results: The total study patients were 86 (68.6% females and 31.4% males).

The mean age of patients was 25.6 ± 7.9 years. The difference between means related to sex shows statistically significant (p = 0.006).

The patients of the age group ≥ 20 years were predominant with (70.9%).

The most common side effects were cheilitis (54.7%) followed by dry-skin (12.8%), acne flaring (9.3%), hair loss (7.0%) and the lowest side effect was increased liver enzyme in (1.2%) patients. Papulonodular of acne vulgaris is the most common severity type (36.1%) followed by comedones, papules, pustules (32.5%).

Comedones, papules, pustules are more common in the age group < 20 years of age (24.4%) while papulonodular are more common in the age group ≥ 20 years with (33.7%). The difference between values of severity types of acne vulgaris related to age groups is statistically highly significant (p = 0.000). Complete clearance occurred in (80.2%) patients followed by partial clearance. Partial clearance was found in (16.3%) patients, most of them treated within 16 weeks (12.8%). The difference between values of therapy response of patients in relation to therapy duration is statistically highly significant (p = 0.000).

Conclusion: The results of our study show that isotretinoin is a safe and effective therapy for acne vulgaris with few side effects.

Key words: Efficacy, isotretinoin, treatment, acne vulgaris, Aden

Introduction

Acne vulgaris is a chronic inflammatory disease of pilosebaceous units, characterized by comedones, papules, pustules, nodules, cysts, abscesses and later on sometimes as widespread scarring [1]. Acne is distributed mainly over the face, upper back, chest and upper arms. This disease occurs worldwide and usually starts in adolescence and resolves by the mid-twenties [2]. According to the severity of acne, there are various treatment modalities. They include both topical and systemic therapy. In systemic therapy, the commonly used drugs are oral antibiotics and oral isotretinoin. Isotretinoin (13-cis retinoic acid) represents the single most important advance in acne therapeutics [3].

Isotretinoin has been shown to be useful in controlling acne that does not respond to usual treatments with oral antibiotics and that can produce significant physical or emotional scarring. Dosage of isotretinoin varies; in general 0.5-1.0 mg/kg/day is recommended for acne vulgaris [4]. However, in cases where side effects are not tolerated at the recommended dose, or when used in mild acne with significant psychological distress, low dose and/or intermittent treatment has been advocated in medical literature [2,5,6].

Charakida et al [7] reported that oral isotretinoin has been used to treat moderate-severe acne vulgaris where standard treatment was not effective. Compared to other treatments, isotretinoin has been shown to be more responsive in decreasing the size and secretion of sebaceous glands.

Many researchers have evaluated which isotretinoin dose would have the most efficacy and less adverse events. Recent studies indicated the safety of the oral isotretinoin therapy where the low dose of isotretinoin (< 0.5 mg/kg/day) had no significant effects in metabolic disorders [6,8]. Effective treatment and less severe side effects were found in a study among 638 patients, both male and female, with moderate acne who were treated with isotretinoin at 20 mg/d (approximately 0.3-0.4 mg/kg per day) for 6 months [6]. Another study among 150 Malaysian patients treated with isotretinoin at 10mg on a daily basis until a cumulative dose of 90-110 mg/kg showed that after 24 weeks of treatment, all patients were cleared of acne lesions with a low rate of elevated liver enzymes and serum lipids at 3.3% and 2.7% respectively. There was no case of discontinuation in treatment [9].

Objective

To assess the presentation of acne vulgaris and to evaluate the efficacy of oral isotretinoin in the therapy of acne vulgaris patients in Aden, Yemen.

Materials and Method

We performed a retrospective chart review of all patients presenting to the dermatology private clinic in Almansoora district, Aden, over a 2-year period from January 2020 to December 2021.

Eighty-six patients were diagnosed with acne vulgaris and treated with isotretinoin capsules 0.5-1 mg / kg body weight once or twice daily. All information was obtained from the patients' charts in our private clinics.

The collected data were sex, age, severity of acne vulgaris, duration of therapy, laboratory result, side effects and therapy response.

The collected data were tabulated and statistical analysis was done by estimating rates, means and standard deviations, Fisher test was used and p-value < 0.05 was considered as statistically significant. The statistical software package SPSS version 17 was used.

Results

We enrolled 86 patients in our study who suffered of acne vulgaris and who were treated with isotretinoin. The study patients included 59 (68.6%) females and 27 (31.4%) males with a ratio female to male of 2.2:1.

The mean age of patients was 25.6 ± 7.9 years (range, 15 to 45 years). The mean age of female patients was 26.1 ± 8.5 years and the mean age of male patients was 24.7 ± 6.5 years. The difference between means related to sex shows statistically significant ($p = 0.006$). The patients of the age group ≥ 20 years were predominant with 61 (70.9%) then the age group < 20 years old with 25 (29.1%), as shown in Table 1, Figure 1 and Figure 2.

Table 2 reveals the distribution of side effects and severity of acne vulgaris related to sex. The most common side effects were cheilitis 47 (54.7%) followed by dry-skin 11 (12.8%), acne flaring 8 (9.3%), hair loss 6 (7.0%), back pain, epistaxis and irregular menses, each one in 3 (3.5%) patients.

Onycholysis and visual disturbance found each one in 2 (2.3%) patients and the lowest side effect was increased liver enzyme in 1 (1.2%) patient.

The difference between values of side effects related to sex is statistically not significant ($p > 0.05$). Papulonodular acne vulgaris is the most common severity type of acne vulgaris 31 (36.1%) followed by comedones, papular, pustules 28 (32.5%) and nodulocystic scar 27 (31.4%). Papulonodular and comedones, papules, pustules are most common in female patients 27 (31.4%) and 21 (24.4%) respectively while nodulocystic scar was found in male patients 16 (18.6%). The difference between values of severity types of acne vulgaris related to sex is statistically significant ($p < 0.05$) as shown in Table 2.

Table 1: Distribution of variables of the study patients (n=86)

Variables	No	%
Sex:		
Female	59	68.6
Male	27	31.4
Age range (years):	15-45	
Mean age + SD (years):		
Mean age of patients	25.6 ± 7.9	
Mean age of females	26.1 ± 8.5	
Mean age of males	24.7 ± 6.5	
p-value	0.006	
Age groups (years):		
< 20	25	29.1
≥ 20	61	70.9
Severity:		
Comedones, papules, pustules	28	32.6
Papulonodolar	31	36.0
Nodulocystic scar	27	31.4
Duration of therapy (weeks):		
12 weeks	10	11.6
16 weeks	60	69.8
20 weeks	16	18.6

Figure 1: Distribution of study patients related to sex

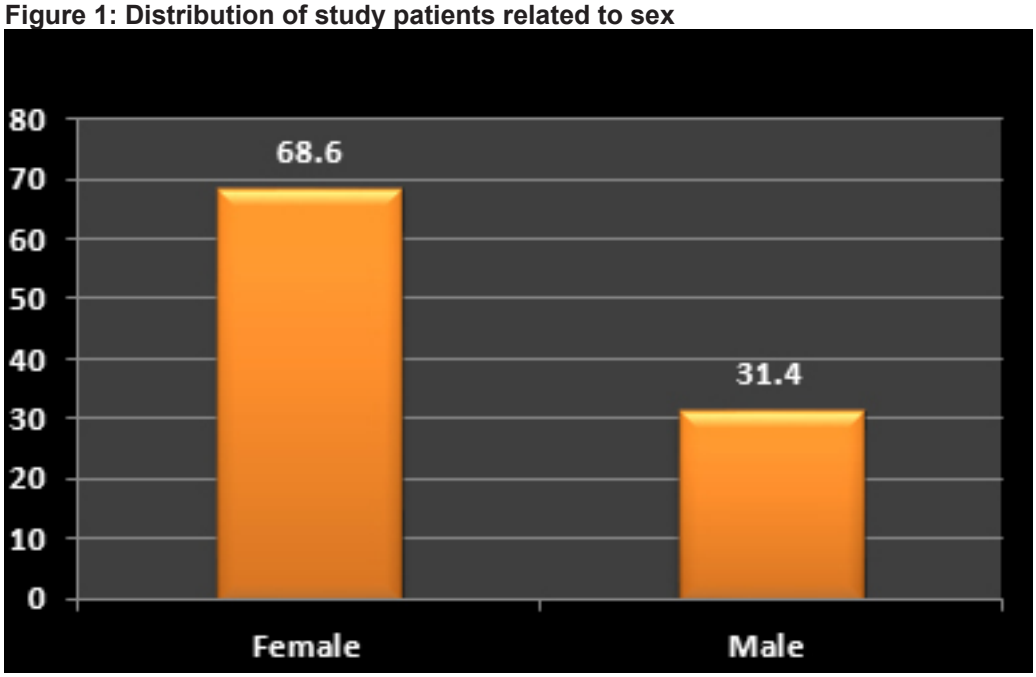

Figure 2: Variables percentage of the study patients

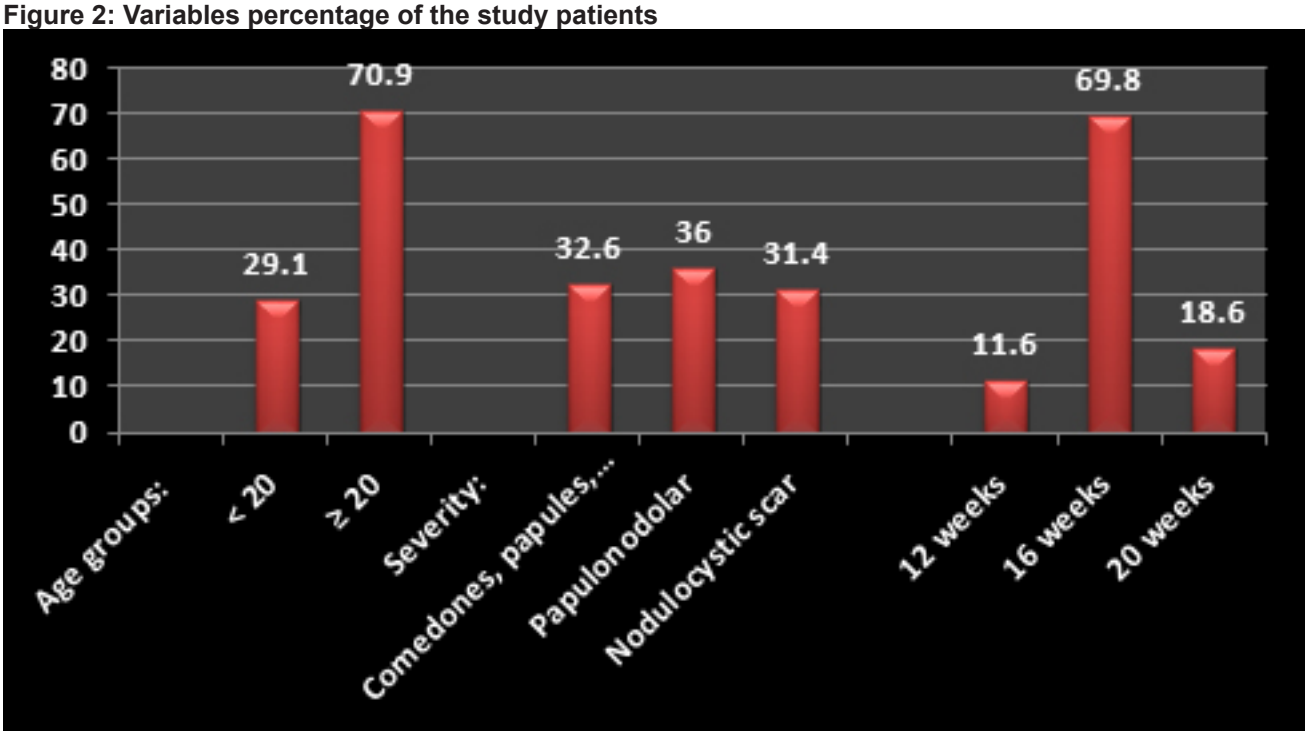

Table 2: Distribution of side effects and severity of acne vulgaris related to sex (n = 86)

Variables	Sex				Total		p-value
	Female		Male				
	No	(%)	No	(%)	No	(%)	
Side effect:							
Cheilitis	33	(38.4)	14	(16.3)	47	(54.7)	
Dry skin	6	(7.0)	5	(5.8)	11	(12.8)	
Acne flaring	5	(5.8)	3	(3.5)	8	(9.3)	
Hair loss	5	(5.8)	1	(1.2)	6	(7.0)	P > 0.05
Back pain	2	(2.3)	1	(1.2)	3	(3.5)	
Epistaxis	1	(1.2)	2	(2.3)	3	(3.5)	
Irregular menses	3	(3.5)	0	(0.0)	3	(3.5)	
Onycholysis	2	(2.3)	0	(0.0)	2	(2.3)	
Visual disturbance	2	(2.3)	0	(0.0)	2	(2.3)	
Increase liver enzyme	0	(0.0)	1	(1.2)	1	(1.2)	
Total	59	(68.6)	27	(31.4)	86	(100)	
Severity:							
Comedones, papules, pustules	21	(24.4)	7	(8.1)	28	(32.5)	P = 0.001
Papulonodular	27	(31.4)	4	(4.7)	31	(36.1)	
Nodulocystic scar	11	(12.8)	16	(18.6)	27	(31.4)	
Total	59	(68.6)	27	(31.4)	86	(100)	

Table 3 reveals the distribution of acne vulgaris severity related to age groups. We determined the patients' ages in two groups, less than 20 years and ≥ 20 years. Comedones, papules, pustules are more common in the age group < 20 years of old 21 (24.4%) while papulonodular was more common in the age group ≥ 20 years with 29 (33.7%) also, nodulocystic scar was more common in the age group ≥ 20 years of old with 25 (29.2%).

The difference between values of severity types of acne vulgaris related to age groups is statistically highly significant (p = 0.000) as shown in Table 3.

Table 3: Distribution of severity related to age groups

Variables	Age group (years)				Total		p-value
	< 20		≥ 20				
	No	(%)	No	(%)	No	(%)	
Severity:							
Comedones, papules, pustules	21	(24.4)	7	(8.1)	28	(32.5)	
Papulonodular	2	(2.3)	29	(33.7)	31	(36.0)	P = 0.000
Nodulocystic scar	2	(2.3)	25	(29.2)	27	(31.5)	
Total	25	(29.1)	61	(70.9)	86	(100)	

Table 4 and Figure 3 show the distribution of therapy response of acne vulgaris. Complete clearance was in 69 (80.2%) patients followed by partial clearance in 14 (16.3%) and no clearance in 3 (3.5%) patients.

Table 4: Distribution of therapy response

Variables	No	%
Therapy response:		
Complete clearance	69	80.2
Partial clearance	14	16.3
No clearance	3	3.5
Total	86	100

Figure 3: Therapy response percentage to oral isotretinoin

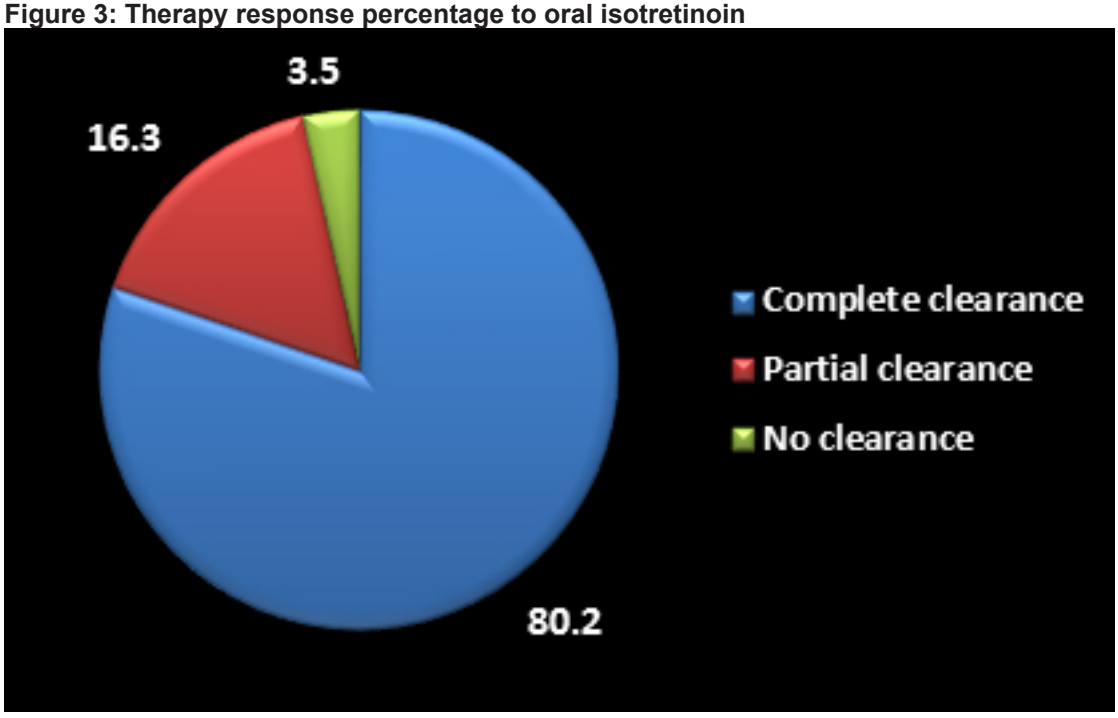

Table 5 illustrates the distribution of therapy-duration related to therapy response. Complete clearance was found in 69 (80.2%) patients, distributed among therapy duration 16 weeks in 49 (57.0%) patients, followed by 20 weeks in 16 (18.6%) patients and 12 weeks in 4 (4.6%) patients. Partial clearance was found in 14 (16.3%) patients, most of them treated within 16 weeks 11 (12.8%). In addition no clearance found in 3 (3.5%) patients treated through 12 weeks. The difference between values of therapy response of patients in relation to therapy duration is statistically highly significant (p = 0.000) as shown in Table 5.

Table 5: Distribution of therapy duration related to therapy response

Variables	Therapy response						Total		p-value
	CC		PC		NC				
	No	(%)	No	(%)	No	(%)	No	(%)	
Therapy duration:									
12 weeks	4	(4.6)	3	(3.5)	3	(3.5)	10	(11.6)	
16 weeks	49	(57.0)	11	(12.8)	0	(0.0)	60	(69.8)	P = 0.000
20 weeks	16	(18.6)	0	(0.0)	0	(0.0)	16	(18.6)	
Total	69	(80.2)	14	(16.3)	3	(3.5)	86	(100)	

CC = Complete clearance; PC = Partial clearance; NC = No clearance.

Before and after 16 weeks of oral isotretinoin

Before and after 20 weeks of oral isotretinoin

Before and after 4 weeks of oral isotretinoin

Before and after 16 weeks of oral isotretinoin

Acne flaring three weeks after taking oral isotretinoin

Cheilitis side effect of oral isotretinoin

Discussion

Acne vulgaris is one of the most common skin diseases in Europe [10], and the most common in the USA [11], affecting more than 80% of adolescents and young adults [10], and persisting for decades in many cases [12]. It is a chronic inflammatory disease of the pilosebaceous unit, presenting with symptoms of inflammation – erythema, swelling, discomfort – with scarring reported in 43% of patients [13]. As often occurs with dermatological conditions [14], such symptoms have inevitable psychological and social repercussions [15].

Our present study found 86 patients with acne vulgaris treated with oral isotretinoin during the 2 years of the study period and they were 59 (68.6%) females and 27 (31.4%) males with a ratio female to male 2.2:1.

Thai-Van et al [16] reported in their study in Vietnam that the majority of patients were females (80.8%) while male patients were (19.2%) with a ratio female to male 4.2:1.

Previous reviews have reported that the prevalence of acne is higher in females than males [17,18]. Similarly, the Global Burden of Disease Study conducted in 2010 estimated that the prevalence of acne was 8.96% in males, lower than the estimated prevalence of 9.81% in females [19]. Lynn et al [18] also noted higher acne prevalence in females at younger ages, possibly due to the earlier onset of puberty in females relative to males.

In our present study, the mean age of patients was 25.6 ± 7.9 years (range, 15 to 45 years). The mean age of female patients was 26.1 ± 8.5 years and the mean age of male patients was 24.7 ± 6.5 years. The difference between means related to sex shows statistically significant ($p = 0.006$). The patients of the age group ≥ 20 years were predominant with 61 (70.9%) then the age group < 20 years old with 25 (29.1%).

A previous study in Saudi Arabia by Alshammari et al [20] reported similar findings to our results. They mentioned that the mean age of patients using isotretinoin was 25.1(±5.2) years; the majority of study patients were females (83.3%).

Algoblan et al [21] reported similar findings to our results. They reported that most of the patients who received isotretinoin were young women.

In the present study we found the predominant side effects were cheilitis (54.7%) followed by dry-skin (12.8%), acne flaring (9.3%), hair loss (7.0%), back pain, epistaxis and irregular menses each one in (3.5%) patients.

Onycholysis and visual disturbance was found each one in (2.3%) patients and the lowest side effect was increased liver enzymes in (1.2%) patient. The difference between values of side effects related to sex is statistically not significant ($p > 0.05$).

A study published by Harfouch et al [22] from Syria reported to some extent similar results as our study results. They mentioned that the most frequent side effect was chapped and dry lips 96.3% and secondly dermatoxerasia 81.6% with no significant relationship with gender. In addition 34.7% of all participants suffered from ophthalmoxerosis.

Also, our results correspond with a previous Indian study where cheilitis was the most common observed adverse effect as a percentage of (98%) of all participants [23].

In a previous Saudi study [24], dryness of the lips and face was on the top of isotretinoin side effects list (64.1%), and in another Saudi study [25], lips dryness percentage was approximately 68%.

Papulonodular acne vulgaris is the most common severity type of acne vulgaris (36.1%) followed by comedones, papules, pustules 28 (32.5%) and nodulocystic scar 27 (31.4%). Papulonodular and comedones, papules, pustules are most common in female patients 27 (31.4%) and 21 (24.4%) respectively while nodulocystic scar was found in male patients 16 (18.6%). The difference between values of severity types of acne vulgaris related to sex is statistically significant ($p < 0.05$).

Williams et al [26] reported that acne patients typically present with comedones, papules and pustules. Comedones can be subdivided into two types – open comedones (blackheads), which are clogged follicles with openings exposing its contents to the air, and closed comedones (white heads), which are clogged follicles without an opening [27]. Papules are raised lesions on the skin that are smaller than 1cm in diameter while pustules are similar to papules but inflamed and filled with pus [27]. In patients with severe acne, nodules and cysts – inflamed, swollen lesions that are at least 5mm large – may be present [26-27]. In addition, other symptoms such as the scars, erythema and hyperpigmentation may be observed in acne patients [27]. Lynn et al [18] found that severe acne is more common in males compared to females.

We found in our study comedones, populos, and pustules are more common in the age group < 20 years of old (24.4%) while papulonodular more common in the age group ≥ 20 years with (33.7%) also, nodulocystic scar was more common in the age group ≥ 20 years of age with 25 (29.2%). The difference between values of severity types of acne vulgaris related to age groups is statistically highly significant ($p = 0.000$).

Acne vulgaris, a chronic, immune-mediated, multifactorial inflammatory disease that affects the pilosebaceous unit is among the three most prevalent dermatoses worldwide [28]. It affects 80% to 90% of the world population at some stage in life, with a peak prevalence between 16–20 years [29,30,31].

In the present study, complete clearance was found in (80.2%) patients, distributed among therapy durations 16 weeks in (57.0%) patients, followed by 20 weeks in (18.6%) patients and 12 weeks in (4.6%). Partial clearance was

found in 14 (16.3%) patients, most of them treated within 16 weeks, 11 (12.8%). The difference between values of therapy response of patients in relation to therapy duration is statistically highly significant (p = 0.000).

Picosse et al [32] reported that the efficacy of oral isotretinoin in the treatment of acne vulgaris has been demonstrated in numerous publications since the 80s, with more than 90% of reduction of inflammatory lesions.

Most patients who receive oral isotretinoin will be free of acne by the end of 16 – 24 weeks of treatment depending on the dose administered [33]. Recent clinical experience suggests that the long-term cure rate may be lower than was initially thought [34].

Similar to our finding was that reported by Layton [33] that 85% of patients who receive a dose of 0.5–1.0 mg/kg/day are virtually clear of their acne by 16 weeks.

Conclusion

The results of our study show that isotretinoin is a safe and effective therapy in the treatment of comedones, papules, pustules, papulonodular and nodulocystic scar acne vulgaris with few side effects. In our study, complete clearance was found in (80.2%) patients and partial clearance found in (16.3%) patients. Our results are in agreement with the findings from the most recent published studies.

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Leakage Management after Laparoscopic Sleeve Gastrectomy: A Tertiary Center Experience in Saudi Arabia

Khalid M. Alzahrani (1)
Tamer M. Abdelrahman (1,2)
Sumayyah A. Jafri (3)
Mohammed Abdo (4)
Khalid A. Alsharif (4)

(1) Surgery Department, College of Medicine, Taif University, Taif, Saudi Arabia
(2) Surgery Department, Benha Teaching Hospital, General Organization of Teaching Hospital and Institutes, Egypt
(3) Department of Surgery, Al Hada Armed Forces Hospital, Taif, Saudi Arabia
(4) Department of Surgery, King Abdul Aziz Specialist Hospital (KAASH), Taif, Saudi Arabia

Corresponding author:
Khalid M. Alzahrani
ORCID: https://orcid.org/0000-0001-8231-4545
Assistant Professor, Department of Surgery, College of Medicine, Taif University
Alseteen Street, Alhaweyia, Al-Taif 21944, Saudi Arabia
Tel: + (966) 27242295 (2476); FAX: + (966) 27250528
Email: dr.k.al_zahrani@tu.edu.sa

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Abstract

Purpose: The goal of this study was to determine the optimal method for treating gastric leaks in terms of resolution rate, complications, admission to the intensive care unit (ICU), conversion to other surgical techniques, and mortality.

Methods: A retrospective analysis of patients treated at King Abdul-Aziz Specialist Hospital between 2017 and 2021 for post-LSG leaks. Age, gender, body mass index (BMI), preoperative comorbidities, leak rate, the interval between surgery and leak, the onset and site of leak, as well as the management lines and outcomes, were collected.

Results: The leak rate following Laparoscopic Sleeve Gastrectomy (LSG) at our hospital was 0.53 percent, and there were no statistically significant differences in the demographic characteristics of patients with and without leaks. Despite the fact that 87.5 percent of patients were women, this was not statistically significant (P-value:0.09). The mean± SD interval between surgery and leak is 14 ±18.4, with early and acute leaks being the most common. Failure of first-line management, stent migration, and esophageal stricture were the most common complications of leak management in our study. The mean length of hospital stays was 42.4 ±17.1 days, and the mortality rate was 12.5%.

Conclusions: Leak after LSG is a drastic complication associated with substantial morbidity and mortality if diagnosis and treatment are delayed. Depending on the patient's condition, location of the leak, and the time of diagnosis,; leak management may involve conservative, endoscopic, or surgical approaches. There are numerous measures that could be taken to reduce the leak incidence rate.

Keywords: Bariatric surgery; Sleeve Gastrectomy; Leak; Treatment; Outcomes

Introduction

Laparoscopic sleeve gastrectomy (LSG) is the most frequently performed bariatric procedure worldwide, accounting for over fifty percent of all primary bariatric procedures. Compared to RYGB or biliopancreatic diversion, the advantages of LSG include a shorter operative time, a low risk of complications, and its technical simplicity [1–3].

One of the most dreaded complications following a sleeve gastrectomy is a leak. According to the 2011 International Sleeve Gastrectomy Expert Panel Consensus Statement, based on data from 12,799 LSG, the leak rate was 1.06% [4]. However, the leak rate can vary from 0.46% to 3% for primary bariatric procedures [5–8] and more than 10% for revisional bariatric surgeries, and its management is very challenging [9–11].

Most frequently, leaks occur at the proximal end of the staple line at the esophagogastric junction (GEJ) or just beyond it [12,13[. Leaks can be classified according to their onset time as acute, early, late, or chronic (within seven days, one to six weeks, six to twelve weeks, and after 12 weeks, respectively) [7].

The clinical presentation can range from asymptomatic, which is only detected through radiological examination, to severe septic shock. The typical clinical manifestations of this condition are abdominal pain, tachycardia, tachypnea, fever, and leukocytosis [14]. It has been reported that tachycardia is the earliest [15], most common, and most significant clinical sign of a gastric leak [16].

Abdominal computed tomography (CT) with intravenous (IV) and oral (PO) water-soluble contrast is regarded as the best non-invasive method for detecting and confirming a gastric leak [17,18. [The management of postoperative leaks is controversial, but early diagnosis and aggressive treatment are necessary to reduce chronic gastric fistula, multiple organ failure, and mortality rates [19].

Therapeutic approaches for postoperative leakage include operative and nonoperative techniques. Nonoperative approaches include NPO, intravenous antibiotics, total parenteral nutrition (TPN), percutaneous drainage of intraabdominal collections, and endoscopic management including partially covered (PSEMS) or fully covered metallic self-expandable stents (FSEMS), clipping of the defect, endoscopic insertion of a pigtail, endoscopic injection of fibrin glue to treat fistula, and suturing devices [20,21].

Operative approach includes laparoscopic lavage, and drainage with or without primary leak repair; conversion of the LSG to a Roux-Y gastric bypass (RYGB), Roux-En-Y Fistulo-Jejunostomy (RYFJ), or in some cases a total gastrectomy with esophagojejunal anastomosis [22-24].
This study aims to determine the best option for managing gastric leaks, taking into account resolution rate, complications, intensive care unit (ICU) admission, conversion to other surgical techniques, and mortality. Furthermore, a management algorithm for post-LSG leaks will be proposed.

Materials and Methods

This study was conducted at the King Abdul-Aziz Specialist Hospital in Taif as a retrospective study. 1,049 patients with morbid obesity underwent bariatric surgery at our center between January 1, 2017 and December 31, 2021, with laparoscopic sleeve gastrectomy accounting for 90.3% (n=947) of these procedures.

Age, sex, BMI, preoperative comorbidities, leak rate, the interval between surgery and leak onset, location of leak, and the management lines and outcomes were collected. All procedures were performed laparoscopically at the King Abdul-Aziz Specialist Hospital in Taif by three bariatric surgeons. The patients were positioned in the reverse Trendelenburg position, with the surgeon standing between their legs. After establishing pneumoperitoneum with a Veress needle in the left upper quadrant, the five-trocar technique was employed. As an optical trocar, the first (12-mm) trocar is placed in the upper abdomen 15–18 cm below the xiphoid. Then, a 12-mm trocar is inserted in the left upper quadrant, while a 5-mm trocar is inserted in the right upper quadrant. A 5-mm trocar is then inserted in the left subcostal anterior axillary line. For the liver retractor, a 5-mm trocar is inserted in the sub-xiphoid. LSG was performed by separating the omentum from the greater gastric curvature using an energy-based device 2 to 4 centimeters proximal to the pylorus and continuing proximally into the angle of His. After completing the dissection of the greater curvature, the camera was moved to the 12 mm trocar in the left upper quadrant. Through the optical trocar, the first and second linear staplers are inserted. The gastric tubulisation started 4-6 cm from the pylorus. After firing the first stapler, a 36 Fr calibration bougie was inserted. The remaining staplers were fired cranially along the stomach's greater curvature with appropriate cartridges based on the stomach's thickness. The Methylene blue test is utilized routinely to detect leaks. Clips are applied to staple lines to ensure adequate hemostasis. A 12-mm trocar in the left upper quadrant is used to remove the resected stomach. No reinforcement of the stapler line is performed routinely. On the first post-operative day, patients were permitted clear fluids. For the next two weeks, they were restricted to a liquid-only diet. In typical circumstances, they were discharged home one day after surgery.

Statistics:
For the entry of data, an Excel spreadsheet was created. SPSS version 25.0 (SPSS Inc., Chicago, IL, USA) was used for all statistical analyses. The numerical data were expressed as the mean ± SD. For categorical variables, we used frequency tables with percentages. A p-value < 0.05 was regarded as statistically significant.

Results

From January 1st, 2018 to December 31st, 2021, 947 morbidly obese patients with a mean BMI of 44.8±6.8 kg/m2 underwent laparoscopic sleeve gastrectomy. The demographic characteristics of the patients are shown in Table 1. 397 (42%) of the patients who underwent LSG were men, while 550 (58%) were women. Participants had a mean age of 38.8±9.0 years. The most prevalent comorbidities were hypertension (7.3%) and diabetes mellitus (6.1%), while around 82.7% of the patients did not have chronic diseases.

Five out of 947 patients who underwent LSG in our hospital developed postoperative leaks (0.53%). Another three patients with staple-line leaks following sleeve gastrectomy were referred from other hospitals. Seven out of eight patients were women (87.5%). The mean BMI was 42.5±1.6 and the mean age was 34.1±7.3 years.

Table 2 displays a range of 5 to 59 days between surgery and leak, with a median ± IQR of 7±54 days. Early leak was the most frequent followed by acute leak (50%, and 37.5%, respectively) and the leak site was at the proximal third of the stomach (GEJ or beyond it) in all patients.

All patients presenting with leaks had abdominal pain, fever, and tachycardia. Three patients were referred from other hospitals with septic shock symptoms including fever, tachycardia, hypotension, abdominal pain, peritonitis, and leukocytosis. Those patients needed an urgent diagnostic laparoscopy with lavage and drainage.

An urgent abdominal and pelvic computed tomography (CT) with IV and PO water-soluble contrast was performed for all hemodynamically stable patients. Computed tomography has demonstrated abdominal collection or free fluid, free abdominal gas, and contrast extravasations into the abdominal cavity.

All stable patients were managed initially conservatively with NPO, fluid resuscitation, broad-spectrum intravenous antibiotics, and percutaneous drainage of the intra-abdominal collection. Except for two patients, who underwent CT-guided percutaneous abscess drainage, all patients underwent laparoscopic abscess drainage (Table 3).

As shown in Table 4, an urgent gastroscopy with insertion of an esophageal mega stent for 6–8 weeks was done in all stable patients (6 out of 8 patients, 75%) as a second-line of management.

After 6-8 weeks of stenting, the leak persisted in five patients, necessitating re-stenting in four (80%) patients and RYFJ in one (20%) patient, as shown in Table 5.

The leaking site has healed in four patients with endoscopic and conservative management. Three patients had persistent leakage despite conservative and endoscopic interventions and were managed by RYFJ (Table 6).
The complications of leak management are shown in Table 7. Two patients (25%) had pulmonary embolism (PE), one patient (12.5%) had transfusion-related acute lung injury (TRALI), one patient (12.5%) developed esophageal strictures, and another patient (12.5%) had stent distal migration and ulceration.

Table 8 demonstrates outcomes of the leak among our patients. Seven patients (87.5%) survived, while one (12.5%) died. One of the patients with septic shock had persistent tachycardia postoperatively and subsequently deteriorated clinically. Despite intensive care, she had multiorgan failure. She passed away on postoperative day 23 due to septic shock caused by intra-abdominal sepsis.

Table 1: The bariatric patients demographic characteristics

Variables	No leak Group (939)	Leak Group (N =8)	P-value
Age in years			
- Mean ±SD	38.8 ±9	34.1 ±7.3	0.139
BMI in Kg/m2			
- Mean ±SD	44.8 ±6.9	42.5 ±1.6	0.337
Sex			
- Men	396 (42.2%)	1(12.5%)	0.090
- Women	543(57.8%)	7 (87.5%)	
Comorbidities, No (%)			
- No Comorbidities	775 (82.5%)	8 (100%)	0.890
- HTN	69 (7.3%)	0	
- DM	58 (6.3%)	0	
- Liver cirrhosis	6 (0.6%)	0	

Values are presented as mean ± SD or number (%).
SD: Standard Deviation; BMI: Body Mass Index

Table 2: The characteristics of the leak.

Variables	Patients (N =8)
Interval between surgery and leak in days	
- Mean ±SD	14 ± 18.4
- Median ±IQR	7 ± 54
Time of Leak, No. (%)	
- Acute	3 (37.5%)
- Early	4 (50%)
- Late	1 (12.5 %)
- Chronic	0
Leak site, No. (%)	
- GEJ	7 (87.5%)
- Beyond GEJ	1 (12.5%)

Values are presented as mean ± SD, median ± IQR, or number (%).
IQR: Interquartile Range; GEJ: Gastroesophageal Junction

Table 3: First-line management of the leak of the included patients

Variables	Patients (N =8)
First-line, No. (%)	
- Laparoscopic abscess drainage	6 (75%)
- CT guided percutaneous drainage	2 (25%)
Failure of first line, No. (%)	
- No	1 (12.5%)
- Yes	(87.5%) 7

Values are presented as number (%).

Table 4: Second-line management of the leak

Variables	Patients (N = 7)
Second-line, No. (%)	
- Esophageal mega stent	7 (100%)
Failure of Second-line, No. (%)	
- No	1 (14.3%)
- Yes	6 (85.7%)

Values are presented as number (%).

Table 5: Third-line management of the leak

Variables	Patients (N = 5)
Third-line, No. (%)	
- Re-stenting	4 (80%)
- Roux-En-Y Fistulo-Jejunostomy	1 (20%)
Failure of Third-line, No. (%)	
- No	3 (60%)
- Yes	2 (40%)

Values are presented as number (%).

Table 6: Fourth-line management of the leak

Variables	Patients (N = 2)
Fourth-line, No. (%)	
- Roux-En-Y Fistulo-Jejunostomy	2

Table 7: Complications of leak management

Variables	Patients (N = 8)
General No. (%)	
PE	2 (25 %)
TRALI	1 (12.5 %)
Local No. (%)	
Failure of conservative and endoscopic management	
Stent migration	1 (12.5 %)
Esophageal stricture	1 (12.5 %)

Values are presented as number (%).
PE: Pulmonary Embolism; TRALI: Transfusion-Related Acute Lung Injury

Table 8: Outcomes of management of leak

Variables	Patients (N=8)
ICU admission, No (%)	3 (37.5%)
Mortality, No (%)	
- Survived	7 (87.5 %)
- Dead	1 (12.5 %)
Interval between diagnosis and leak control in days	
- Mean ±SD	79.1 ± 50.8
- Median ±IQR	60 ±137
Hospital stays in days	
- Mean ±SD	42.4 ± 17.1
- Median ±IQR	41 ±51

Values are presented as mean ± SD, median ± IQR, or number (%).

Discussion

In comparison to non-surgical interventions, bariatric surgery results in greater weight loss and resolution of obesity-related comorbidities, regardless of the procedure type used [25]. Laparoscopic sleeve gastrectomy is the most popular bariatric surgery [1]. It is technically easier to perform and has a lower rate of morbidity and mortality than Roux-en-Y gastric bypass or biliopancreatic diversion [5]. The most dreaded and severe complication of LSG is a gastric leak, which is associated with substantial and protracted morbidity [26]. The UK Surgical Infection Study Group proposed a definition of staple line leak; they define a leak as “the leakage of luminal contents from a surgical join between two hollow viscera.” A second definition suggested by the same group defines a leak as the “outflow of gastrointestinal contents through a suture line surrounding an organ.” Consequently, luminal content can exit through the wall or drain, or collect adjacent to the anastomosis [27].

Chen et al. [28] identified two major causes of staple line leaks: ischemic or mechanical issues [28]. Mechanical disruptions typically occur within the first 48 hours after surgery as a result of stapler misfiring or technical errors, such as improper staple height and stapling maneuvers [28]. It seems that leaks presenting between postoperative day five and seven are a result of ischemia [28]. Patients with distal stenosis caused by gastric body stricture, especially at incisura angularis or torsion are more likely to develop proximal leaks due to impaired gastric emptying and increased intragastric pressure.

Five of our patients, out of 947 LSG cases over a four-year period, had a staple-line leak, and three additional patients were referred to our center from other hospitals. In our study, the majority of patients with leaks were women (86.5%), with a mean BMI of 42.5±1.6 kg/m2 and a mean age of 34.1±1.6 years. This result is comparable to the findings of previous studies where a higher prevalence of leak among women (68-70%) and a mean BMI of (43.13 - 45.4 kg/m2) were identified [19,29].

Early detection of a leak is important because it permits early intervention, which has favorable patient outcomes [30]. A high index of suspicion is essential for diagnosing leaks, and a tachycardia greater than 120 beats per minute is a strong indicator of a leak and systemic compromise [31].

In the current study, the majority (50%) of leaks were diagnosed between one and six weeks; 37.5% were diagnosed within seven days; and 12.5% were diagnosed after six weeks. In our study, the median time between LSG and leak diagnosis was seven days. Similarly, Sakran et al. [19] reported a seven-day median time interval. Others, however, reported a median delay of 4.5 days between LSG and the diagnosis of a leak[32]. At

our center, intraoperative methylene blue test is routinely performed on all LSG patients, but no leaks have been detected intraoperatively. A negative methylene blue test does not however, rule out the possibility of leakage [20]. The GEJ was the most common site of leak in this study (87.5%). Comparable results were reported by Sakran et al. [19] where 75% of the reported leaks occurred near GEJ. This was explained by reduced vascular perfusion of this part of stomach as a result of aggressive dissection, particularly of the posterior attachments of the upper sleeve, or increased intragastric pressure in the gastric tube due to pyloric conservations [33].

The management of leaks following sleeve gastrectomy is difficult and lacks a clear standard algorithm [34]. In addition to NPO, broad-spectrum IV antibiotics, nutritional support, and proton pump inhibitors, laparoscopic abscess drainage was performed on 75% of patients with leaks, and CT-guided percutaneous drainage was performed on another 25%. These interventions were successful in 12.5% of patients but failed in 87.5%.

In this study, 7 (87.5%) of patients were treated with an esophageal mega stent as a second line leak treatment. One (14.3%) leak resolved after 6 weeks of stenting, while one patient died due to septic shock. The leak was persisting in five (71.4%) patients after 6 – 8 weeks of stenting and a stent was reinserted in four (80%) patients and RYFJ was done in one (20%) patient. The leak closure was achieved in 2 out of 4 patients after re-stenting without further treatment but 2 patients needed RYFJ due to persisting chronic leak. The endoscopic stent achieved leak closure in three (37.5%) patients. In concordance with our findings, Puig et al. evaluated the role of endoscopic stents in the treatment of staple line leaks after bariatric surgery and it was successful in only 19% [35]. Despite this, other studies found that 83.3% to 95.0% of patients treated with a stent had their leaks resolved [35-39].

In this study, we also evaluated the median time until healing of the leak, the median duration of hospital stays, the rate of admission to ICU, and the complications of leak management. The median time until healing and the duration of hospital stays were 60±137 and 41±51 days, respectively. The ICU admission rate was 37.5%, and finally, one patient died with a mortality rate of 12.5%. Rebibo et al. [40] reported a 1.2% mortality rate among patients with post-sleeve gastrectomy leaks, with a median healing time of 84 days [40]. The higher mortality rate observed in our series is likely due to the small sample size. The most common complications of leak management in our study were failure of first line management (50%), stent migration (12.5 %), and esophageal stricture (12.5 %).

There are several methods used to decrease the gastric leak after LSG. Meticulous dissection with gentle handling of tissues to reduce bleeding and thermal injury when using ultrasonic energy devices is crucial. The use of a bougie < 32 Fr may increase the risk of complications, while the use of a bougie > 36 Fr may lead to weight loss failure [7]. Adequate haemostasias, avoiding creating a spiral staple-line, and distal stenosis, especially at the level of incisura angularis is vital to avoid leak [7,15]. To reduce ischemic complications and prevent leaks, it is crucial to maintain a distance of at least 1–2 cm from the GE junction during the last firing [7,41].

This study has some limitations, including a small sample size and a single-institution, retrospective design.

Conclusion

Leak after LSG is a serious complication associated with substantial morbidity and mortality if diagnosis and management are delayed. A high index of suspicion and prompt detection is imperative. The management of leaks includes conservative, endoscopic, and surgical approaches based on the patient's condition, the time of diagnosis, and the location of the leak. However, it is associated with a prolonged hospital stay and a high cost.

Several measures, including gentle tissue manipulation, the use of larger bougie sizes, adequate hemostasis, avoiding stenosis, particularly at the incisura angularis, and avoiding the GE junction, could reduce the incidence of leaks.

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Conflict of Interest Statements:
The authors have no conflict of interest.

Algorithm for Management of Post-Sleeve Gastrectomy Leak (opposite page)

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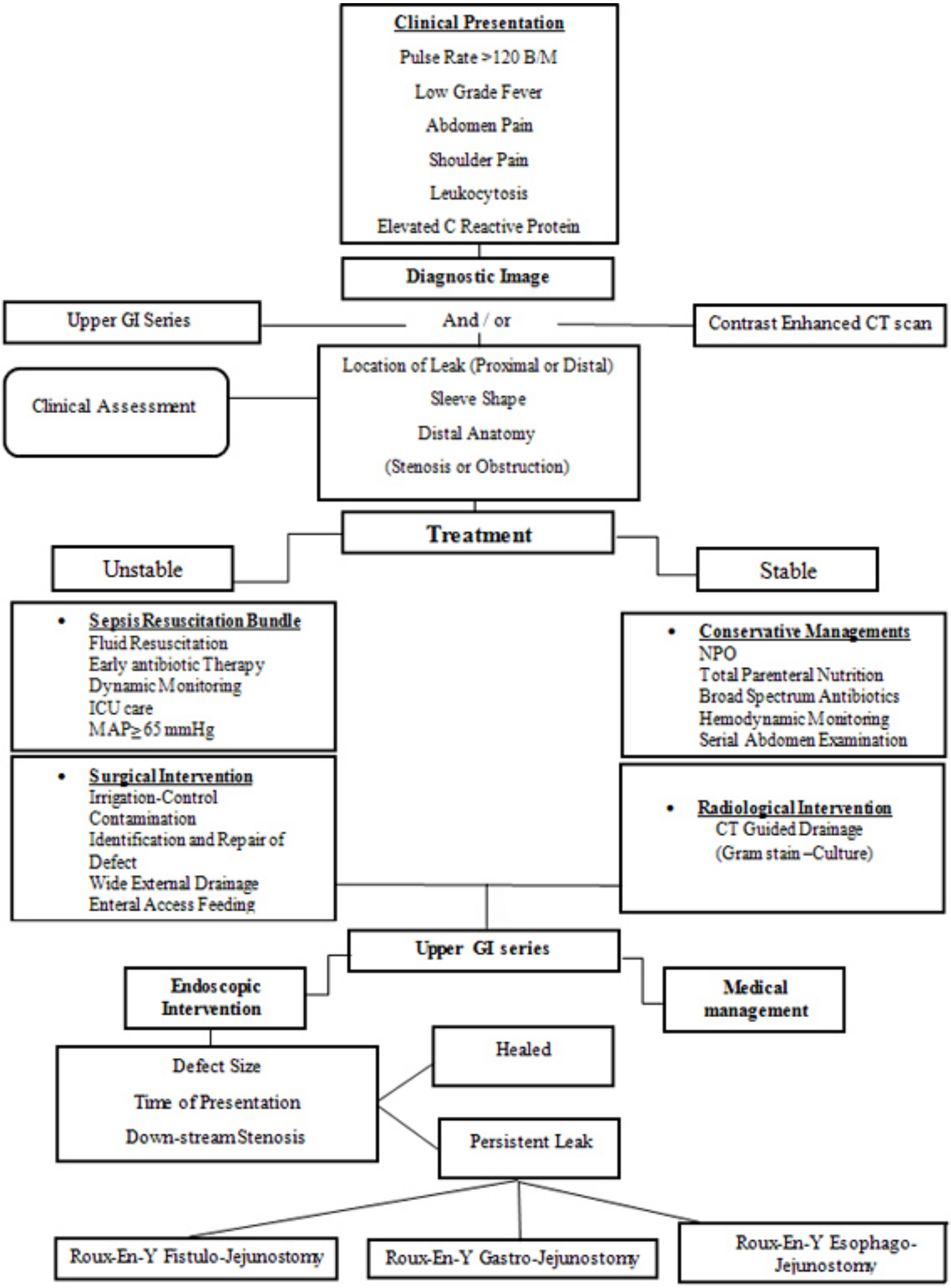
Clinical Presentation
Pulse Rate >120 B/M
Low Grade Fever
Abdomen Pain
Shoulder Pain
Leukocytosis
Elevated C Reactive Protein
Diagnostic Image
Upper GI Series
And / or
Contrast Enhanced CT scan
Clinical Assessment
Location of Leak (Proximal or Distal)
Sleeve Shape
Distal Anatomy
(Stenosis or Obstruction)
Treatment
Unstable
Stable
Sepsis Resuscitation Bundle
Fluid Resuscitation
Early antibiotic Therapy
Dynamic Monitoring
ICU care
MAP≥65 mmHg
Conservative Managements
NPO
Total Parenteral Nutrition
Broad Spectrum Antibiotics
Hemodynamic Monitoring
Serial Abdomen Examination
Surgical Intervention
Irrigation-Control Contamination
Identification and Repair of Defect
Wide External Drainage
Enteral Access Feeding
Radiological Intervention
CT Guided Drainage
(Gram stain –Culture)
Upper GI series
Endoscopic Intervention
Medical management
Defect Size
Time of Presentation
Down-stream Stenosis
Healed
Persistent Leak
Roux-En-Y Fistulo-Jejunostomy
Roux-En-Y Gastro-Jejunostomy
Roux-En-Y Esophago-Jejunostomy

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The monitoring of DOACs in primary care, a quality improvement project

Abdul Muhid
Javed Khan

Consultant Family Medicine, Primary Health Care Corporation, Qatar

Corresponding author:
Dr Abdul Muhid,
Primary Health Corporation,
Qatar
Email: muhid123@gmail.com

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Abstract

Direct acting oral anticoagulation plays a key role in preventing thrombotic stroke and thromboembolism. DOACs require careful drug monitoring to prevent unnecessary strokes and hemorrhage. Quality improvement projects/Audits are necessary to highlight how robust DOAC monitoring is in Primary care.

Keywords: direct acting oral anticoagulation, primary care

Introduction

Direct acting oral anticoagulation (DOAC) has a key and established role in the prevention of stroke, in patients with non-valvular atrial fibrillation (NVAF) (1). DOACs also play an important role in the management of venous thromboembolism (VTE) and more recently in the prophylaxis of VTE after elective hip or knee replacement (1,4). Warfarin has been prescribed for more than 50 years and was the drug of choice before DOACs in the prevention of stroke in patients with established AF (2). Randomized controlled studies have concluded, DOACs reduced the risk of strokes and embolic events compared with warfarin (1). In addition, DOACs as a class of drugs are safer with respect to intracranial bleeding (1,2,5). DOACs do not require regular blood test for international normalized ratio (INR), therefore they are more appealing for patients. In addition to reduced blood test monitoring, DOACs tend to have less drug to drug and food interactions (3). Patient groups considered to benefit from a DOAC include the following:

- poor INR control
- not tolerating warfarin
- recurrent drug changes
- recurrent antibiotic use
- elderly patients with difficult polypharmacy

Warfarin is still indicated in patients with metal prosthetic heart valves and AF with mitral stenosis. Warfarin is also preferred for patients with weight >120kg and those patients with renal and hepatic impairment (7).

The regular monitoring of DOACs in primary care is important to ensure patient safety (5,8). Primary care has now taken a leading role in managing the anticoagulation of patients in the community along with the help of cluster pharmacists (5). All health care providers should be aware of the monitoring requirements for DOACs to ensure safe drug prescribing.

Aims and Objectives

The key aims and objectives of this quality improvement project/audit is to review all current patients at a single GP practice on DOACS to establish the following:

1. The indication of DOAC treatment have been clearly documented
2. The duration of DOAC is clearly documented
3. Documented CHA2DS2VAS and HAS-BLED (6)
4. Patients have had an initiation appointment with specialist pharmacist
5. Initial laboratory investigations
6. Patients are being prescribed the current dose of a DOAC according to the creatinine clearance (CrCl)
7. Appropriate follow up reviews and blood tests (FBC/LFT/U+E/CrCl)
8. Up to date 3, 6 or 12 monthly blood tests according to CrCL
9. Documented weight check

Methodology and Sample

Inclusion criteria: All patients being prescribed DOACs at Skewen Health Center

Exclusion criteria: Nil

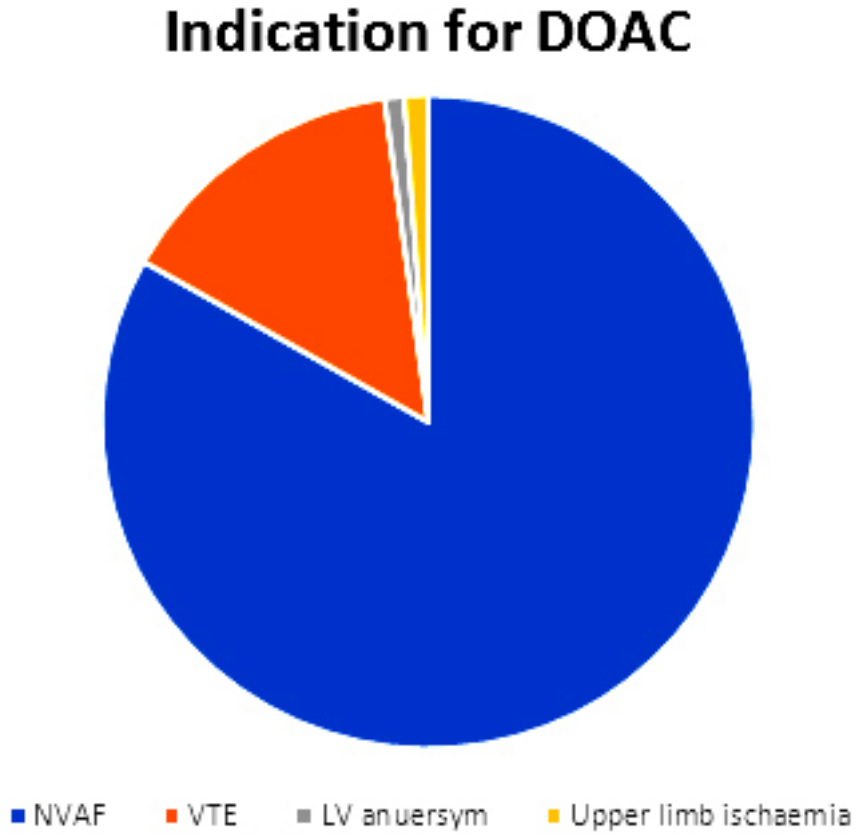
Audit type: Retrospective audit

Sampling: Total of 102 patients who were being prescribed DOACs at Skewen Health Centre. Each patient's records were carefully reviewed to assess if the aims and objectives of the audit were being met.

Date source: Electronic patient records

Results

1. The indication of DOAC treatment has been clearly documented, 100% achieved.



102 patients were being prescribed DAOCs. All 102 patients had a clear indication for DOAC treatment documented in the notes. There were 2 patients who were prescribed DOAC that were outside NICE CKS guidelines. One patient had LV aneurysm with a thrombus and DAOC initiation was by cardiology specialist. One patient was treated for upper limb ischemia; again DOAC initiation was by specialist care.

2. Duration of DOAC clearly documented. All 102 patients had clear documentation on duration of treatment. All patients were taking DOAC lifelong.

3. Documented CHA2DS2VAS and HAS-BLED scores, all 85 patients with NVAF had CHA2DS2VAS recorded, and all 102 patients had HAS-BLED recorded.

4. Patients have had an initiation appointment with specialist pharmacist. All 102 patients had an initiation appointment. The first appointment was mainly on patient education in terms of indications/side effects/ adherence/guidance on missing doses/drug interactions and reporting any unusual symptoms.

5. Initial laboratory investigations which include the following, FBC/LFT/Clotting/Serum creatinine (for creatinine clearance) and U+Es. All 102 patients had initial laboratory investigations.

6. Patients are being prescribed the current dose of a DOAC according to the CrCl. Out of the 102 patients three were identified as not taking the correct dose as per CrCl. Two patients were taking a higher dose of Apixaban, and one patient was taking a higher dose of Rivaroxaban. After reviewing these patients, we identified the dose was increased by hematology team. One patient had a DVT and cancer therefore thrombotic risk was much higher, and the dose of Rivaroxaban was increased. Two patients who were on the lower dose of Apixaban developed a DVT whilst on treatment, hence hematology team favored a higher dose.

Table 1: DOAC dose based on CrCL courtesy of www.coventryrugbygpgateway.nhs.uk

DOAC	Usual Dose	Reduce Dose	Do NOT use
APIXABAN	**5mg TWICE daily**	**Reduced dose 2.5mg bd when CrCl 15-29ml/min** or any two of the following: • Age ≥ 80 years • Weight ≤ 60kg • Serum creatine ≥ 133mmol/L	CrCl<15 ml/min
DABIGATRAN	**150mg TWICE daily**	**Reduced dose 110mg bd:** • Age ≥ 80 years • Co treatment with verapamil **Consider dose reduction when:** • Age 75 – 80 • CrCl 30-50ml/min • Gastritis, oesophagitis or reflux • Increased risk of bleeding	CrCl<30 ml/min
EDOXABAN	**60mg ONCE daily**	**Reduced dose 30mg od:** • CrCl 15-50ml/min • Weight ≤60kg • Co treatment with ciclosporin, dronedarone, erythromycin, ketoconazole	CrCl<15 ml/min
RIVAROXABAN	**20mg ONCE daily**	**Reduced dose 15mg od:** CrCl 15-49ml/min	CrCl<15 ml/min

7. Appropriate follow up reviews and blood test. All patients taking DOACs should have at least annual reviews. Patients that require more frequent reviews include:

• If the person is frail or older than 75 years, monitoring should be repeated every 6 months
• If the person has a creatinine clearance (CrCl) less than 60 mL/minute, the frequency of monitoring (in months) can be guided by the CrCl divided by 10. For example, every 5 months if CrCl is 50 mL/minute
• If the person has an intercurrent illness that may impact renal or hepatic function
• If there is drop in Hb by >1g/dL

All 102 patients were invited for a face-to-face appointment, or telephone review. Four patients did not attend. The ninety-eight patients that were reviewed met the appropriate time frame as per CrCl.

8. Up to date 3, 6 or 12 monthly blood tests according to CrCl. Out of the 102 patients reviewed, all the patients had bloods done at the correct time, even the patients that failed to attend the review appointment.

9. Documented weight, two patients did not have an annual weight check as they were bed bound and a hoist was not available. The previous weight documented in clinical, or hospital records was used. With regards to weight check, three patients were outside the reference range (<50Kg and >120Kg). Two of them were just slightly under 50 Kg, and the other patient's weight was 130kg. This patient did not tolerate warfarin, so DOAC was prescribed. All three cases were discussed with hematology team who advised to continue DOAC at the appropriate dose.

Discussion

DOAC monitoring is clearly needed for safe prescribing, incorrect dosage of DOAC can lead to serious bleeding (if the dose is high) or stroke/VTE (if the dose is low) (9). This quality improvement project/audit highlights the key requirements for good DOAC monitoring in primary care. Safe DOAC monitoring is achieved with a clinical lead, phlebotomist, and specialist pharmacist, when all team members work together high targets can be met as highlighted by this audit (5).

Overall, the monitoring of our patients in terms of indications/ clinical parameters / follow ups has been robust. Patients who were noted to be outside NICE/ESC guidelines were discussed with appropriate specialist for input and management.

A key point to note from the audit is how to manage patients who fall outside the weight category for DOACS. According to NICE and ECS guidelines patients with weights <50kg or >120kg need specialist input to decide on DOAC treatment (1). Warfarin is indicated for patients with weights >120kg but in patients who do not tolerate warfarin; DOACS can be started/continued if agreed with hematology anticoagulation lead (10).

An additional point to discuss is how to manage patients aged >80 with borderline CrCl. As Apixaban is the most common DOAC prescribed we know the dose needs to be reduced if patients meet two criteria out of three (age >80 yrs, weight < 60kg and Cr >133) or if CrCl 15-29 (1,5,11). We had two patients aged over 80 with borderline weights and CrCl. After discussion with hematology anticoagulation lead, we switched DOAC from Apixaban to Rivaroxaban. This was appropriate as Rivaroxaban dose is not dependent on age, weight, or serum creatinine (see Table 1). Another scenario that needed exploring is what dose do we prescribe patients who have borderline CrCl at review appointments. For example, patients may have a CrCl of 28 at one review and 31 at the next review. The question is do we prescribe the patient the lower dose of Apixaban 2.5mg BD or higher dose 5mg BD, bearing in mind the risk of VTE (under prescribing) and bleeding (over prescribing). We discussed these scenarios with hematology anticoagulation lead who advised to switch these patients to Rivaroxaban as there is more leeway on the CrCl (15-49). Similar principles apply to Rivaroxaban when patients have borderline CrCl which dictates the change of dose (CrCl <50). Hematology team have advised Rivaroxaban can be switched to Apixaban.

Monitoring bloods for DOACs include FBC and LFT. It is important to be aware of what to do with patients with abnormal LFTs and FBC results. All four DOACs require hepatic metabolism. DOACs are contraindicated in patients with hepatic impairment. Patients with elevated liver enzymes >2 upper limit need careful review and discussion with hematology team (1,3,4). In terms of FBC any drop of Hb by 1g/dL needs further investigation especially regarding GI bleeds and cancers (1,3). There are no clear guidelines on how often patients with abnormal LFTs or FBC need follow up reviews. It is appropriate to involve specialist care to agree on safe monitoring requirements. We suggest a 3 monthly follow up for these patients.

Conclusion

Regular, up to date DOAC monitoring is fundamental for patient safety. If monitoring requirements are not met there is a risk of preventable stroke or hemorrhage. AF stroke (thromboembolic) is associated with higher rates of morbidity and mortality, also longer hospital stays; therefore preventing this is important (10). Compared to warfarin; DOACs require less monitoring, however regular laboratory investigations, weight checks, BP checks and review appointments are required for correct DOAC dosage (1,5). This quality improvement project/audit highlighted the key monitoring requirements. DOACs are commonly prescribed in primary care so all clinicians should be aware of monitoring requirements. We also suggest discussing all complex cases with hematology anticoagulation leads as these patients may fall outside guidelines and require more specialist input deciding on DOAC treatment and monitoring requirements.

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The level of knowledge and awareness about diabetes and diabetic foot among the Taif general population

Haifa Alotaibi (1)
Areej M. Abdullah (2)
Rawan I. Alqurashi (2)
Kholood S. Althobaiti (2)
Sarah A. Khan (2)
Shumukh G. Althobaiti (2)

(1) Teaching Assistant in At General Surgery department , Taif University, Saudi Arabia
(2) Medical Intern, Taif University, Saudi Arabia

Corresponding Author:
Dr. Shumukh G. Althobaiti
Saudi Arabia
Mobile: 0543081471
Email: Shumookh-ghazy1471@outlook.com

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Abstract

Background: Diabetes mellitus and diabetic foot are increasing worldwide. There is a lack of information about diabetes and diabetic foot in the kingdom of Saudi Arabia.

Objectives: The current study aims to explore the level of knowledge about diabetes and diabetic foot among the general population in Taif city of Saudi Arabia.

Methods: A cross-sectional study was done on diabetic patients in Taif city. A questionnaire was distributed randomly to the general population and their demographic information was recorded after obtaining their consent.

Results: Diabetes Type 1 was the most common type with retinopathy as the most common single complication, where 12.5% had more than one complication. The mean knowledge score was 17.98 ± 4.25. The participants had 46% for good knowledge, 41% and 13% of fair and poor knowledge about diabetes and diabetic foot respectively. No significant relationship was found between the level of the participant's knowledge about diabetes and diabetic foot and their characteristics (except for educational level).

Conclusion: Healthcare providers should devote more time to educating patients and their families about diabetes, particularly the complications.

Keywords: level, knowledge, diabetic, foot, Taif, population

Introduction

Saudi Arabia (SA) is ranked sixth among the top ten countries in terms of diabetes prevalence, and it is expected to maintain a prevalence rate of 20% in people aged 20 to 79 over the next two decades [1].

Diabetes Mellitus (abbreviated "DM") is a group of chronic metabolic diseases characterised by an increase in blood glucose levels. The most common types of diabetes are type 1 and type 2. Diabetes type 1 is defined as an autoimmune-response-based destruction of pancreatic cells responsible for insulin production, resulting in an absolute insulin deficiency. Type 2 diabetes is caused by a combination of genetic predisposing factors as well as long-standing lifestyle and dietary habits such as obesity from overindulgence and a sedentary daily routine, which is more common than type 1 [2,3].

The most common problem in diabetic patients is foot infection, which can range from superficial (e.g., cellulitis) to severe (e.g., gangrene) (eg. Chronic Osteomyelitis). This susceptibility to infection is caused by associated complications in diabetic patients, namely microvascular disease and localised neuropathy, both of which cause a loss of regenerative capability and a lack of sensory awareness of injury or trauma. As a result, patients may be unaware that they have an open wound that requires treatment, or they may lack the natural ability to fight infection and heal the wound before infection sets in [2,3].

A cross-sectional study in Riyadh conducted in 2019 showed that about 282 (76.6 percent) patients were strongly aware about diabetic foot and foot ulcers. Their knowledge came from a diabetic foot care class by 41 (11.1) patients, and 81 (22.0 percent) received diabetic foot care instructions from a doctor and 38 (10.3 percent) from a nurse. Being married, obtaining a secondary and university education, and working for the government all resulted in significantly improved knowledge when compared to others. There were no significant differences in attitudes toward diabetic foot care and diabetic foot care across age groups. Patients who had diabetes for a longer period of time (> 5 years) had a significant increase in diabetic foot care practice [4].

A systematic review was done in Saudi Arabia in 2018 and showed that most studies found a defect in awareness about the risk factors and complications of DM in the population. That review focused on the need for improving awareness and knowledge of DM among the population in SA. The review concluded that the existing healthcare systems and processes unified can help to improve awareness and knowledge of patients, families, and communities about this chronic disease are the ways to improve awareness and knowledge of DM [5]. In the same year, a study in Makkah city, Kingdom of Saudi Arabia showed that about two-thirds of participants assessed the knowledge and awareness of diabetes mellitus in Saudi Arabia as good, a quarter of them assessed it as poor (26.4%), and only (7.3%) thought it was excellent. Participants were asked if they had ever heard about long-term complications of diabetes mellitus if blood sugar was uncontrolled. Nearly (80%) had heard about it. The most recognized complications of diabetes mellitus were as follows: eye disease (72.9%), diabetic foot 71.2%), renal disease (56.2%), peripheral neuropathy (53.8%), sexual impairment (42.5%), heart disease (40.1%), high blood pressure (33.1%), sudden death (20.4%), and cerebrovascular disease (18.7%) [6]. The year before, a cross-sectional study showed that the prevalence of diabetic ulcers ranges from 2%-10%. The rate of lower limb amputation in diabetic foot disease is over 15% and the survival rate for patients undergoing amputation is short. Monthly amputation performed in Riyadh, also found that over 43% didn't do any exercises. However, if we consider resistance to diabetic medication as a risk factor for diabetic complications, we have 30% of diabetic patients who were at risk since they were not compliant [7].

Since diabetes is a very common problem and lack of knowledge and awareness will lead to adverse consequences including amputation to improve the health care systems, we need to measure the knowledge and awareness of the patients and the general population to initiate any interventions. Our study aims to estimate the level of knowledge and awareness about diabetes, diabetic foot, and the relationship between them and the demographic factors through the general population in Taif, Saudi Arabia.

Subjects and Methods

This study was approved by Taif University. A descriptive cross-sectional study was conducted in Taif city, Saudi Arabia. Data collection was from the first November to 30th of March 2021. Both genders, aged 16 years or above were invited to join our study. All responses that provided sufficient information were included in the study. The sample size was 704 participants selected randomly and calculated by the Raosoft calculator [8]. Data were collected via an online questionnaire that was used in previous studies [9,10,11,12], and was translated into the Arabic language. The questionnaire was distributed through social media applications. After we assured confidentiality, the participants were asked to fill in the questionnaire after giving their consent.

The questionnaire consisted of 3 sections:
1. Demographic data which included: Gender (Male, Female), Age, Educational, the living region in Taif city.
2- The second part involved 26 questions.

The first 16 questions were about knowledge of foot care; each answer with yes, we gave one point, and the responses no, and I don't know, were give zero points. The knowledge score was calculated for each participant by summation of all the points. The knowledge score was classified as good if the score was more than 12, acceptable if the score was between 8 and 12, and poor if the score was less than 8.

The other ten questions were from DKT2; for the correct answer we gave one score and zero for an incorrect selection with a total score out of ten.

3- What are the reasons for refusing the amputation by many patients and their relatives when it is offered by the treating physician.

Ethical approval: ethical approval was obtained from the research ethics committee of Taif university.

Data analysis: Data were analyzed using (SPSS) version 24. Qualitative data were expressed as numbers and percentages, and a Chi- squared test ($\chi 2$) was applied to test the relationship between variables. Quantitative data were 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 82.9% of the participants were females, 47.8% had an age ranging from 40-49 years, 67.2% had a university education, and 90.8% had a diabetic relative and 56.2% were primary degree relatives. Diabetes Type 1 was the most common type (57.2%), 55.6% had oral treatment, 45.6% had diabetic complications with retinopathy as the most common single complication (14.1%), 12.5% had more than one complication.

Table 2 shows that according to the response with the right answers on knowledge items about DM, only 18.3% of the participants reported correctly that If the diabetic has the flu he should test blood glucose more often; 48.1% reported that if a diabetic takes rapid-acting insulin, the required time until its secondary effect begins is less than 2 hours; 70% reported that if the participant is starting to have a low blood glucose reaction, he should drink some juice, and 35.9% reported that low blood glucose reaction may be due to too much insulin. Most of the participants (71.7%) reported that if a diabetic does not eat breakfast after taking a dose of insulin, the level of sugar in the blood will be decreased, 49.3% reported that high blood glucose may be due to not enough insulin, 31.6% reported that low blood glucose reaction may be due to heavy exercise, and 39.4% reported that if a diabetic right before lunch remembers that he forgot to take an insulin dose for breakfast, he should check his blood glucose level to decide how much insulin to take. Only 16.1% of the participants reported correctly that a sign of diabetic ketoacidosis (DKA) is vomiting; 62.9% reported that lung problems are not associated with diabetes, and 80.7% agreed that a diabetic should change his socks daily. Most of the participants (83.2% and 85.5%) agreed that a diabetic should dry their feet from between their toes after washing and that diabetics should trim their toenails carefully and straight respectively. Most of the respondents (84.9%) agreed that a diabetic should be seen at the clinic regularly, 42.1% reported that that they have read brochures about proper shoes, 54.9% read pedicures about foot care, and 53.7% reported correctly that in cold weather, diabetics should put their feet on a stove or use hot compresses. Of them, 73.9% correctly thought that diabetics should wash their feet daily, 92% agreed that a diabetic should see a doctor if their foot had redness, blisters, or wounds, 77.9% agreed that diabetics should not walk barefoot and 84.4% agreed that a diabetic should check the inside of the shoe before wearing it. Most of the participants (92%) agreed that diabetics should wear comfortable shoes, 76.9% agreed that diabetics should put lotions or moisturizing creams on feet to prevent dry skin, 64.2% agreed that a diabetic should use lukewarm water to wash their feet and 64.4% agreed that a diabetic should check the sole daily and put a moisturizing cream between their toes (Table 2).

More than half of the participants (53.7%) reported that if they are a diabetic patient or one of their relatives is and his or her condition requires amputation, they will agree to it. For those who refused, the most common reason was a desire to try other treatments, such as a complementary medicine (17.1%), while 15% had more than one reason (Table 2).

Mean knowledge score was 17.98 ± 4.25. Figure 1 illustrates that 46%, 41%, and 13% of the participants had good, fair, and poor knowledge about diabetes and diabetic foot respectively. Figure 2 shows that participants with a master's degree of education had a significantly higher percentage of those who had good knowledge about diabetes and diabetic foot ($\chi 2$=14.58, p-value= 0.006). And participants who had diabetic complications had a significantly higher percentage than those who had good knowledge about diabetes and diabetic foot ($\chi 2$=6.42, p-value= 0.04) (Figure 3).

Table 3 shows that a non-significant relationship was found between the level of the participant's knowledge about diabetes and diabetic foot and their characteristics (except for educational level), being diabetic or having a diabetic relative, DM type, and diabetic treatment (p=> 0.05).

Table 1: Distribution of studied participants according to their characteristics, being diabetic or having a diabetic relative, DM type, treatment and complications (No.: 601)

Variable	No. (%)
Gender	
Male	103 (17.1)
Female	498 (82.9)
Age in years	
18-28	192 (31.9)
29-39	95 (15.8)
40-59	287 (47.8)
60-79	26 (4.3)
≥80	1 (0.2)
Educational level	
Up to secondary	176 (29.3)
University	404 (67.2)
Master	21 (3.5)
Are you diabetic or have a diabetic relative?	
I am a diabetic patient	55 (9.2)
I have a diabetic relative	546 (90.8)
Diabetic relative degree (No. 546)	
Primary	307 (56.2)
Secondary	123 (22.5)
Tertiary	73 (13.4)
Quad	43 (7.9)
Type of diabetes	
Type 1	344 (57.2)
Type 2	257 (42.8)
Type of treatment	
Oral	334 (55.6)
Insulin	267 (44.4)
Presence of diabetic complications	
Yes	274 (45.6)
No	327 (54.4)
If yes, complication type (No.: 274):	
DF	38 (6.3)
Retinopathy	85 (14.1)
Nephropathy	20 (3.3)
Neuropathy	30 (5)
DKA	26 (4.3)
More than one complication	75 (12.5)

Table 2. Distribution of studied participants according to their response to knowledge items about DM (No.: 601)

Variable	No. (%)
Q1 If the diabetic has the flu, should they:	
a. Take less insulin	23 (3.8)
b. Drink fewer liquids	20 (3.3)
c Eat more proteins	18 (3)
d. Test blood glucose more often*	110 (18.3)
e. I don't know	430 (71.5)
Q2: If a diabetic takes rapid-acting insulin, the required time until its second effect begins:	
a. Less than 2 hours*	289 (48.1)
b. 3-5 hours	49 (8.2)
c 6-12 hours	4 (0.7)
d. More than 13 hours	6 (1)
e. I don't know	253 (42.1)
Q3 If you are starting to have a low blood glucose reaction, you should:	
a. exercise	28 (4.7)
b. lie down and rest	16 (2.7)
c drink some juice*	421 (70)
d. take rapid-acting insulin	44 (7.3)
e. I don't know	92 (15.3)
Q4 Low blood glucose reaction may be due to:	
a. too much insulin*	216 (35.9)
b. too little insulin	129 (21.5)
c too much food	55 (9.2)
d. too little exercise	28 (4.7)
e. I don't know	173 (28.8)
Q5- If a diabetic does not eat breakfast after taking a dose of insulin, the level of sugar in the blood will:	
Decrease *	431 (71.7)
Increase	64 (10.6)
No change	15 (2.5)
I don't know	91 (15.1)
Q6 High blood glucose may be due to:	
a. not enough insulin*	296 (49.3)
b. skipping meals	66 (11)
c delaying your snack	59 (9.8)
d. skipping your exercise	37 (6.2)
e. I don't know	143 (23.8)
Q7 Low blood glucose reaction may be due to:	
a. heavy exercise*	190 (31.6)
b. infection	12 (2)
c overeating	58 (9.7)
d. not taking your insulin	136 (22.6)
e. I don't know	205 (34.1)
Q8 If a diabetic right before lunch remembers that he forgot to take an insulin dose for breakfast, what should they do now?	
a. Skip lunch to lower their blood glucose	23 (3.8)
b. Take the insulin that they usually take at breakfast	142 (23.6)
c Take twice as much insulin as they usually take at breakfast	17 (2.8)
d. Check theirr blood glucose level to decide how much insulin to take*	237 (39.4)
e. I don't know	182 (30.3)

Table 2. Distribution of studied participants according to their response to knowledge items about DM (No.: 601) *continued*

Q9 A sign of diabetic ketoacidosis (DKA) is:	
a. shakiness	38 (6.3)
b. sweating	120 (20)
c vomiting*	97 (16.1)
d. low blood glucose	65 (10.8)
e. I don't know	281 (46.8)
Q10 One of the following is not associated with diabetes:	
a. vision problems	38 (6.3)
b. kidney problems	23 (3.8)
c nerve problems	40 (6.7)
d. lung problems*	378 (62.9)
e. I don't know	122 (20.3)
Q11 Do you think that a diabetic should change his socks daily?	
Yes*	485 (80.7)
No	41 (6.8)
I don't know	75 (12.5)
Q12 Do you think that a diabetic should dry their feet from between their toes after washing?	
Yes*	500 (83.2)
No	41 (6.8)
I don't know	60 (10)
Q13- Do you think diabetics should trim their toenails carefully and straight?	
Yes*	514 (85.5)
No	31 (5.2)
I don't know	56 (9.3)
Q14 Do you think that a diabetic should be seen at the clinic regularly?	
Yes*	510 (84.9)
No	29 (4.8)
I don't know	62 (10.3)
Q15 Have you ever read any brochures about proper shoes?	
Yes*	253 (42.1)
No	301 (50.1)
I don't know	47 (7.8)
Q16- Have you ever read any pedicure information about foot care?	
Yes*	330 (54.9)
No	234 (38.9)
I don't know	37 (6.2)
Q17 In cold weather, do you think diabetics should put their feet on a stove or use hot compresses?	
Yes*	323 (53.7)
No	85 (14.1)
I don't know	193 (32.1)
Q18 Do you think diabetics should wash their feet daily?	
Yes*	444 (73.9)
No	44 (7.3)
I don't know	113 (18.8)
Q19 Do you think a diabetic should see a doctor if his foot has redness, blisters or wounds?	
Yes*	553 (92)
No	3 (0.5)
I don't know	45 (7.5)

Table 2. Distribution of studied participants according to their response to knowledge items about DM (No.: 601) *continued*

Q20 Do you think a diabetic should not walk barefoot?	
Yes*	468 (77.9)
No	64 (10.6)
I don't know	69 (11.5)
Q21 Do you think a diabetic should check the inside of the shoe before wearing it?	
Yes*	507 (84.4)
No	27 (4.5)
I don't know	67 (11.1)
Q22 Do you think diabetics should wear comfortable shoes?	
Yes*	553 (92)
No	7 (1.2)
I don't know	41 (6.8)
Q23 Do you think diabetics should put lotions or moisturizing creams on feet to prevent dry skin?	
Yes*	462 (76.9)
No	28 (4.7)
I don't know	111 (18.5)
Q24 Do you think that a diabetic should use lukewarm water to wash his feet?	
Yes*	386 (64.2)
No	58 (9.7)
I don't know	157 (26.1)
Q25 Do you think that a diabetic should check the sole of the foot daily?	
Yes*	411 (68.4)
No	69 (11.5)
I don't know	121 (20.1)
Q26 Do you think a diabetic should put a moisturizing cream between their toes?	
Yes*	387 (64.4)
No	71 (11.8)
I don't know	143 (23.8)
Q27 If you are a diabetic patient or one of his relatives and his or your condition requires amputation, will you agree?	
Yes	323 (53.7)
No	278 (46.3)
If the answer is no, what is the reason for rejection?	
Psychological reasons	54 (9)
Religion and society	4 (0.7)
A desire to try other treatments, such as a complementary medicine	103 (17.1)
Physical disability	21 (3.5)
Cosmetic reasons	6 (1)
More than one answer	90 (15)

N.B.: * = correct answer

Figure 1. Percentage distribution of the participants according to their level of knowledge about diabetes and diabetic foot

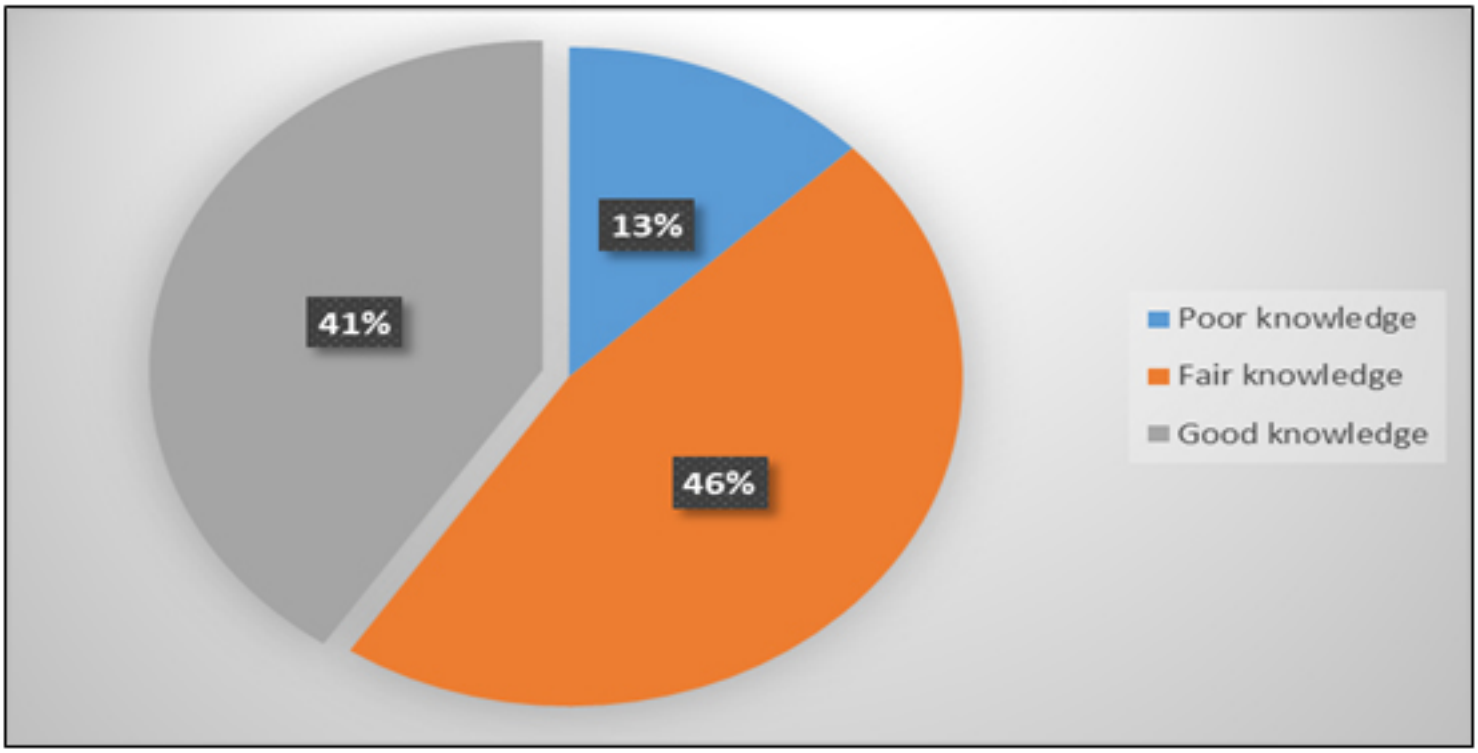
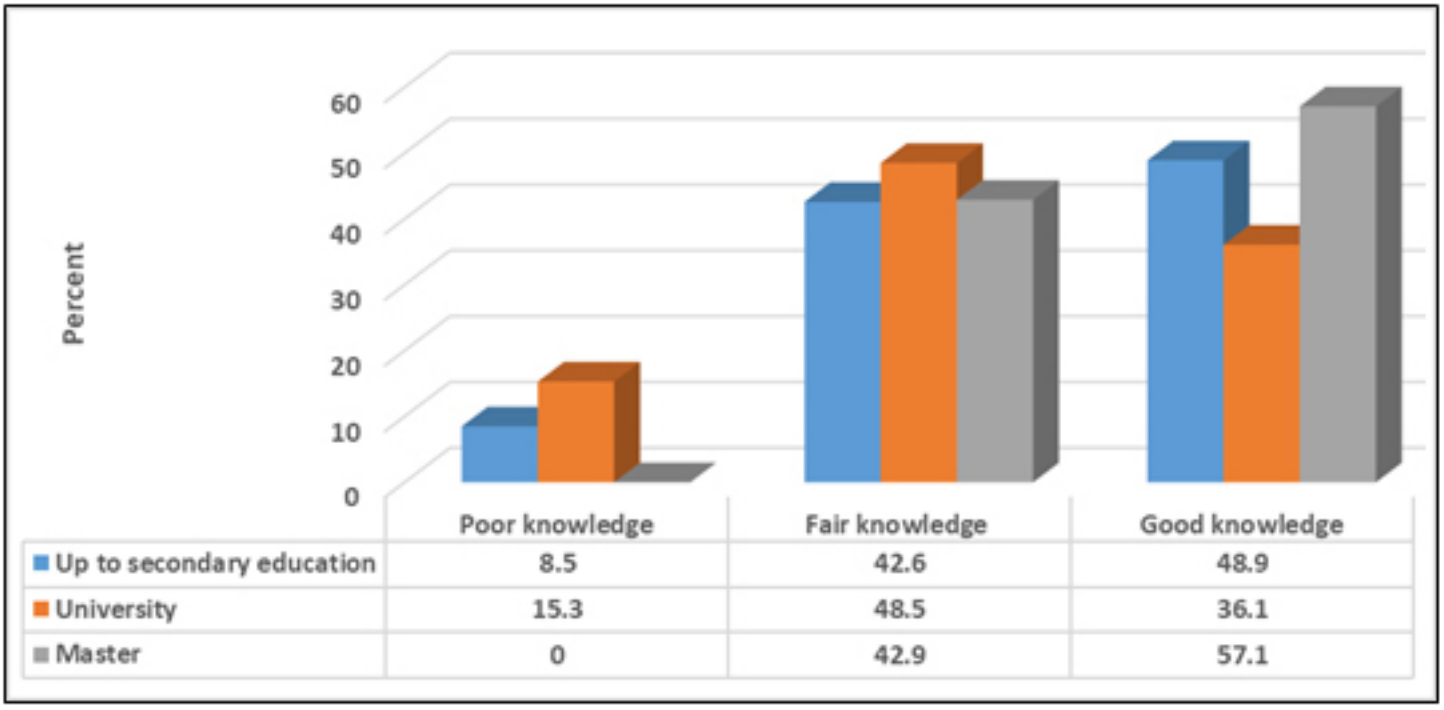


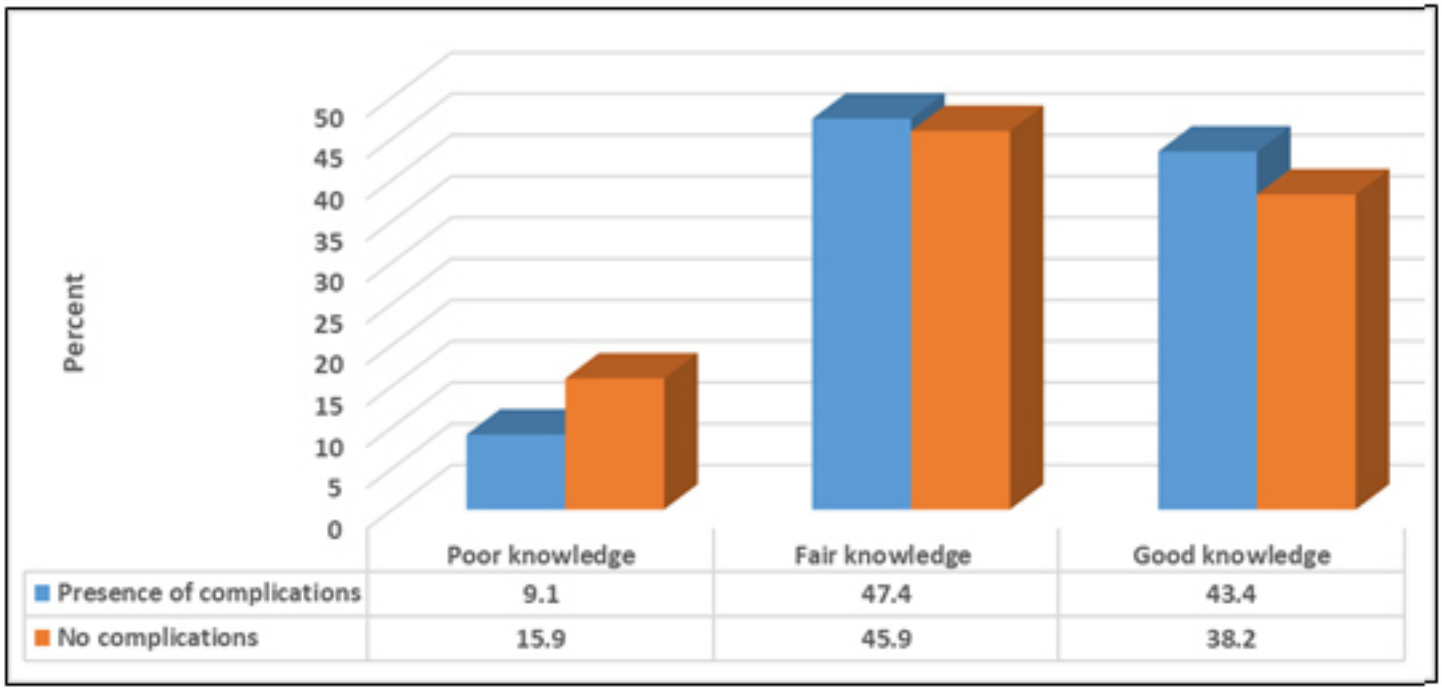
Figure 2. Relationship between level of the participant's knowledge about diabetes and diabetic foot and their educational level (No.: 601)



	Poor knowledge	Fair knowledge	Good knowledge
Up to secondary education	8.5	42.6	48.9
University	15.3	48.5	36.1
Master	0	42.9	57.1

N.B.: (χ^2=14.58, p-value= 0.006)

Figure 3. Relationship between level of the participant's knowledge about diabetes and diabetic foot and presence of diabetic complications (No.: 601)



N.B.: (χ^2=6.42, p-value= 0.04)

Table 3. Relationship between level of the participants knowledge about diabetes and diabetic foot and their characteristics, being diabetic or having a diabetic relative, DM type, treatment and complications (No.: 601)

Variable	Knowledge level			χ^2	p-value
	Poor No. (%)	Fair No. (%)	Good No. (%)		
Gender					
Male	13 (12.6)	44 (42.7)	46 (44.7)	0.9	0.635
Female	64 (12.9)	236 (47.5)	198 (39.8)		
Age in years					
18-28	26 (13.5)	88 (45.8)	78 (40.6)	5.12	0.744
29-39	15 (15.8)	45 (47.4)	35 (36.8)		
40-59	31 (10.8)	137 (47.7)	119 (41.5)		
60-79	5 (19.2)	9 (34.6)	12 (46.2)		
≥ 80	0 (0.0)	1 (100)	0 (0.0)		
Are you Diabetic or have a diabetic relative?					
I am a diabetic patient	9 (16.4)	30 (54.5)	16 (29.1)		
I have a diabetic relative	68 (12.5)	259 (45.8)	228 (41.8)	3.39	0.183
Diabetic relative degree (No. 546)					
Primary	36 (11.7)	139 (45.3)	132 (43)	5.5	0.481
Secondary	22 (17.9)	54 (43.9)	47 (38.2)		
Tertiary	6 (8.2)	35 (47.9)	32 (43.8)		
Quad	4 (9.3)	22 (51.2)	17 (39.5)		
Type of diabetes					
Type 1	48 (14)	161 (46.8)	135 (39.2)	1.19	0.552
Type 2	29 (11.3)	119 (46.3)	109 (42.4)		
Type of treatment					
Oral	46 (13.8)	146 (43.7)	142 (42.5)	2.55	0.278
Insulin	31 (11.6)	134 (50.2)	102 (38.2)		

Discussion

Patients with Diabetes are at a huge risk of developing neuropathic foot that often causes skin problems, deformity, and other limb-threatening complications. Most of these factors are modifiable and are entirely preventable or treatable. Current trends show that the incidence and prevalence of Diabetes Mellitus (DM) are increasing in Saudi Arabia at a huge pace, and Type 1 DM has become a soaring epidemic in the Kingdom [13,14]. Self-management education among diabetic patients is crucial in preventing complications related to Diabetes, as it would help them perform self-care and make necessary lifestyle modifications [15,16].

The level of awareness and education regarding diabetic foot and its risk factors are of utmost importance in seeking timely advice and treatment. This study's findings showed that the knowledge regarding Diabetes and diabetic foot was moderate in these patients. During the assessment of knowledge related to Diabetes, we found that only 35.9% knew the reasons for hypoglycemia. The hypoglycemic symptoms vary between patients and may be nonspecific, and their intensity may decrease with age. When a patient experiences hypoglycemia, the common symptoms may not always be the first to appear. To avoid severe complications, it is essential to recognize and identify these symptoms at their early stages to take appropriate, timely medical care [17].

A study done by Shriram et al. among type 2 diabetic Mellitus patients reported that 66.1% of the participants had good knowledge regarding the most common symptoms of hypoglycemia [18]. In our study, most patients (70%) knew about the immediate management of hypoglycemia. Patients who have hypoglycemia could manage the condition by immediately taking oral or intravenous glucose or drinks rich in glucose sugars and/or immediately taken to hospital for taking intramuscular glucagon injection in case the patient is unable to take oral agents [19,20].
The knowledge about the mechanism of action of rapid-acting insulin among these patients was not that satisfactory. Understanding the mechanism of action of insulin analogues requires knowledge of normal human insulin action. Our study findings showed that 44.4% were on analogue insulin and remain on oral hypoglycemic drugs. Insulin therapy is commonly given to the majority of patients with Type 1 DM and some with Type 2DM [21,22].

Type 1 DM results from lack of endogenous insulin secretion and autoimmune destruction of β-cells in the pancreas [23]. To minimize the burden for the health care providers, hospitals, and patients, it is essential that these diabetic patients need to know about insulin self-administration. The likelihood of making errors during self-injection of insulin is high among patients, and it demands sound knowledge and a good attitude toward self-administration [24].

Studies conducted in different countries like India [25], Turkey [26], Egypt [27], and United Arab Emirates [28] have reported good knowledge regarding insulin self-administration among diabetes patients. It is crucial to have the proper knowledge and attitude regarding self-management of Diabetes to reduce the morbidity and mortality associated with it, thereby improving the quality of life.

Diabetic ketoacidosis (DKA) is a life-threatening condition resulting from an uncontrolled increase in blood glucose levels, increased ketone concentration in the body, and metabolic acidosis, which is seen more in Type 1 DM patients compared to Type 2 DM [29].

Patients experiencing DKA may present with a myriad of symptoms, including nausea, vomiting, anorexia, abdominal pain, increased thirst, polyuria, and weight loss, and on physical examination, signs of tachycardia and tachypnea are seen [30]. The current study findings showed that knowledge regarding signs of DKA was poor among the participants. Self-monitoring of blood glucose and ketone bodies by diabetes patients could provide essential and complementary information on the metabolic state. Patients could utilize home-based self-monitoring devices for blood glucose and ketone estimation, which is paramount in preventing DKA development [31].

The knowledge regarding self-care of diabetic foot was excellent among the study population. Another study conducted by Desalu et al. in Ghana reported poor knowledge and practices on foot care among diabetic patients [32]. Diabetic foot lesion is one of the major complications resulting from peripheral vascular disease and neuropathy [33]. This lesion is highly preventable in most diabetic patients, and poor knowledge regarding foot care might lead to foot ulcers and other lower extremity complications, and amputation [34]. Patients should be educated about foot care practices such as daily foot washing and drying, appropriate nail care, compatible footwear, and daily foot examination. The control of diet is crucial in the management of DM, and self-dietary management is a key step to control the blood glucose level among diabetes patients. A study done in Saudi Arabia has reported that poor dietary knowledge increases the risk of getting Type 2 DM [35], and similar findings have been reported by many authors worldwide [36,37,38,39].

Limitations
The cross-sectional nature of the study design could reveal the associations between studied variables without concluding the causal relationships.

Conclusion

This study found that participants who had diabetic complications had a significantly higher percentage of those who had good knowledge about diabetes and diabetic foot. No significant relationship between the level of the participant's knowledge about diabetes and diabetic foot and their characteristics (except for educational level)

was found. Fortunately, most of the respondents (84.9%) agreed that a diabetic should be seen at the clinic regularly. Based on the results of this study, healthcare providers should give more time to educate the patients and their relatives about DM especially the complications before they happen. Also, more Public awareness campaigns should be started and clinics must involve patients in making decisions about the management.

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Hypertensive and Diabetic Patients' Knowledge of Myocardial Ischemia and Stroke Symptoms in Al-Ahsa, Saudi Arabia

Abdullah Al Ali (1)
Fatimah Aledili (2)
Fatimah Albahrani (3)
Heba Albisher (4)
Fatimah Bomouzah (2)
Fatimah Aleliwi (5)
Ghadeer Alghasham (2)
Laila Alalawi (2)

(1) Cardiology consultant, King Fahad Hospital, Al-Ahsa, Saudi Arabia.
(2) Medical intern, College of Medicine, King Faisal University, Al-Ahsa, Saudi Arabia.
(3) Medical student, College of Medicine, King Faisal University, Al-Ahsa, Saudi Arabia.
(4) Medical student, College of Medicine, Arabian Gulf University, Manama, Bahranin.
(5) Clinical Neurophysiology Technologist, King Abdulaziz Medical City, Riyadh, Saudi Arabia.

Correspondence :
Fatimah Albahrani
Email: Fatimah.albahrani1@gmail.com

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Abstract

Background: The level of knowledge about ischemic heart disease (IHD) and stroke symptoms varies between different studies. Early recognition of symptoms is crucial for timely receipt of care and to improve outcomes. This study aims to assess the level of knowledge of IHD and stroke symptoms among diabetic and hypertensive patients in Al Ahsa, Saudi Arabia.

Methods: A questionnaire-based cross-sectional survey conducted in outpatient clinics in several hospitals and primary care centers. We enrolled 339 participants who had diabetes, hypertension or both. Data were collected between October 2020 and June 2021. A score of 1 was given for each correct answer. A total score of ≥ 5 was considered excellent, between 2-4 adequate, and ≤ 1 poor.

Results: Poor knowledge score of IHD symptoms showed in 24.8% of participants and 26.3% had poor knowledge score of stroke symptoms. Chest pain was recognized as the most common symptom of IHD by 31%. When facing an emergency situation, 42% responded by taking the patient to the hospital and 45% by calling the emergency phone number A higher degree of education, higher income, and previously received information were correlated with a higher knowledge score, while history of IHD in the participants was not correlated with a better score.

Conclusions: Knowledge of IHD and stroke symptoms was poor in a quarter of at-risk patients in Al Ahsa, Saudi Arabia. The history of IHD in the participants did not correlate with a better knowledge score. Our findings call for more efforts to establish and expand the awareness campaign.

Keywords: Awareness, knowledge, stroke symptoms, ischemic heart disease symptoms, diabetes, hypertension.

Introduction

Heart disease is the leading cause of death and disability worldwide (1). Ischemic heart diseases (IHDs) are serious medical emergencies and significant contributors to heart disease, with an annual incidence of 750,000 cases in the United States (2). Symptoms of IHD include chest pain, which can radiate to the left side of the neck or left arm, sweating, shortness of breath, palpitations, and fatigue (3). Hypertension and diabetes are considered some of the main risk factors for IHDs (4).

Improving IHD awareness and knowledge among at high-risk hypertensive and diabetic patients remains an important goal, as it is integral to prevent diseases and promote healthy lifestyles (5).

Barriers to increased awareness include living in rural areas, having low health literacy, aging, having shortcomings in clinicians and public health education, having failed to continue education beyond high school, not owning insurance, and having a yearly income of less than $50,000 (5,6). Furthermore, identifying IHD symptoms by patients to take immediate action by calling emergency services is crucial to ensure the timely receipt of emergency care that improves the chance of survival (2).

The level of knowledge about the manifestations of IHD varies between distinct studies. The highest reported level of knowledge was seen among the residents of North Carolina and revealed that 80% of middle-aged and high school educated people recognized the IHD symptoms. The authors noted that the knowledge of IHD symptoms decreased as the cardiovascular risk increased (6). In a sample from New York-Presbyterian Hospital, Columbia University, a study reported that 67% had a background of IHD symptoms and that the rest did not know about the manifestations of IHD, possibly due to lower education, being Hispanic, and ranking from average to high in the Framingham risk score for coronary heart disease (5). In addition, comparable numbers were reported in Singapore, and the score of knowledge for the common symptoms of IHD was 57.8% among Singapore residents (7). Furthermore, a striking low level of knowledge was found in Asian and African populations. Only 16% of the Tanzanian participants identified IHD manifestations and only 7.4% of the participants knew the entire correct IHD symptoms in Beijing (8,9). In Saudi Arabia, a study conducted in Riyadh revealed that 38.4% of the general public did not know that weakness, lightheadedness, or fainting are common symptoms of having IHD, and that 67.2% of them had poor awareness of the clinical picture of cardiovascular diseases (10).

In regard to stroke symptom knowledge, a study on the public in the United States validated that at least 94.1% of the public were able to identify at least one stroke symptom, with the most commonly identified symptom being sudden numbness or weakness of the face, arm, or leg (11). Meanwhile, in Saudi Arabia, it has been confirmed that 63.3% of Riyadh's population had a moderate level of awareness of the signs and symptoms of stroke (12).

Information on the level of knowledge about IHD and stroke symptoms is still limited in other regions of Saudi Arabia. Therefore, this study aimed to assess the level of knowledge about IHD and stroke symptoms among diabetic and/or hypertensive patients in Al Ahsa, Saudi Arabia.

Materials and Methods

This cross-sectional study was conducted in Al Ahsa, eastern province of Saudi Arabia, from October 2020 to June 2021. The target population was Saudi adult patients who have hypertension (HTN), diabetes mellitus (DM), or both. Non-Saudi participants or those below the age of 18 years were excluded. The questionnaire comprised the following 3 sections: (1) sociodemographic and background data, (2) knowledge about IHD symptom assessment, and (3) knowledge about stroke symptom assessment. Additionally, an electronic Google form survey and paper questionnaires were used. The electronic Google form survey was distributed on various social media platforms such as WhatsApp, Twitter, and Telegram. Paper questionnaires were distributed in the outpatient clinics of King Fahd Hospital, Prince Saud Bin Jalawy Hospital Al Omran General Hospital, and Al Yahya and Al Sheba Primary Healthcare Centers. All available patients during the data creened and, if eligible, included in the study after obtaining informed consent.

Further, the data were coded, entered, and analyzed using the Statistical Package for Social Science version 26 (IBMR. USA). Descriptive statistics using frequencies and percentages were used to present categorical variables, and mean and standard deviation for continuous variables.

The scoring system to measure the knowledge about IHD and stroke symptoms was evaluated separately by giving a score of 1 for each correct answer. If the total score was ≥ to 5, the result was considered excellent, if it was between 2-4, it was considered adequate, and if it was ≤ 1, it was considered poor knowledge.

The association between categorical variables was analyzed using the chi-square test, and a p value of < 0.05 was considered statistically significant.

Results

A total of 339 participants were included in the study (Figure 1). The age distribution displayed that 48.1% were between 36 and 55 years old. Women comprised 57.5% of the participants, and 80.2% are married. Regarding education, 53% held a diploma or higher, and the majority (46%) earn less than 5,000 SR a month. DM is present in 34.5% and HTN in 42.5%, and both are present in 23% (Table 1).

Figure 1: Enrollment process of participants in the study

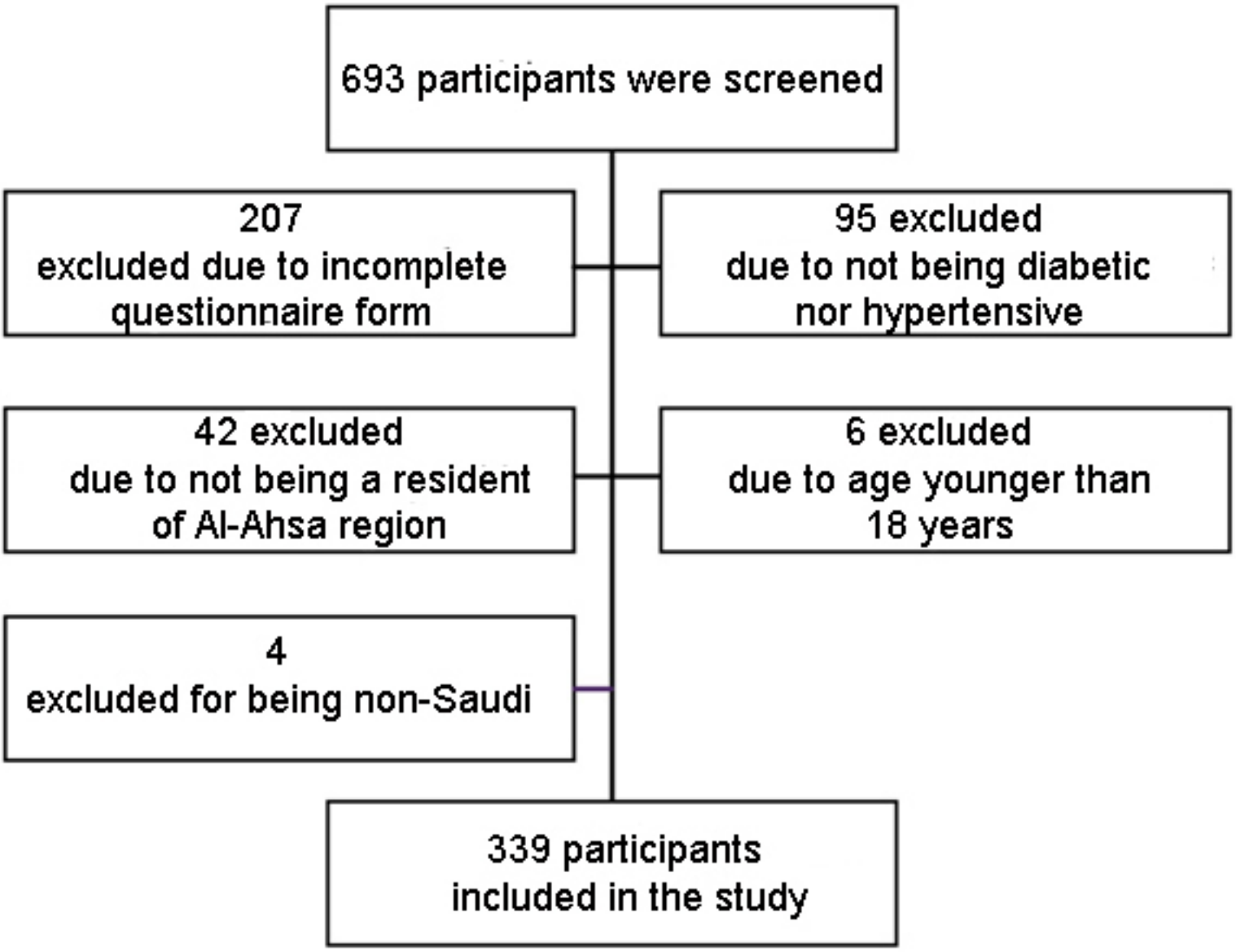

Table 1: Demographics and characteristics of participants

Variables	Total number of participants (n=339), n (%)					
Gender	Male			Female		
	144 (42.5 %)			195 (57.5%)		
Educational level	Illiterate	Elementary school	Intermediate school	High school	Diploma	Bachelor degree or higher
	29 (8.6%)	38 (11.2%)	26 (7.7%)	66 (19.5%)	58 (17.1%)	122 (35.9%)
Social state	Single		Married		Missing	
	66 (19.5%)		272 (80.2%)		1 (0.3%)	
Age group	18-35 years old		36-55 years old		More than 55 years old	
	101 (29.8%)		163 (48.1%)		75 (22.1%)	
Income level	Less than 5000 SR / month	5000-10000 SR / month		More than 10000 SR / month		Missing
	157 (46.3%)	79 (23.3%)		100 (29.5%)		3 (0.9%)
Current occupation	Student	House-wife	Unemployed	Office-job	Non-office job	Retired
	34 (10%)	98 (28.9%)	26 (7.7%)	66 (19.5%)	70 (20.7%)	45 (13.3%)
Having DM or HTN	HTN		DM		Both	
	144 (42.5%)		117 (34.5%)		78 (23%)	

Score of knowledge about IHD symptoms

The maximum score of knowledge about IHD symptoms was 7; the minimum score was 0, and the mean score was 2.7 ±1.6. Eighty-four participants (24.8%) scored poor; 202 (59.6%) scored adequate; and 53 (15.6%) scored excellent. Table 2 and Figure 2 illustrate the awareness of the participants about symptoms of IHD.

Score of knowledge about stroke symptoms

The maximum score of knowledge of stroke symptoms was 7; the minimum score was 0, and the mean score was 2.6 ±1.5. Eighty-nine participants (26.3%) scored poor; 216 (63.7%) scored adequate; and 34 (10%) scored excellent. Table 3 and Figure 2 depict the awareness of the participants about stroke symptoms.

Figure 2: Awareness level of IHD and stroke symptoms

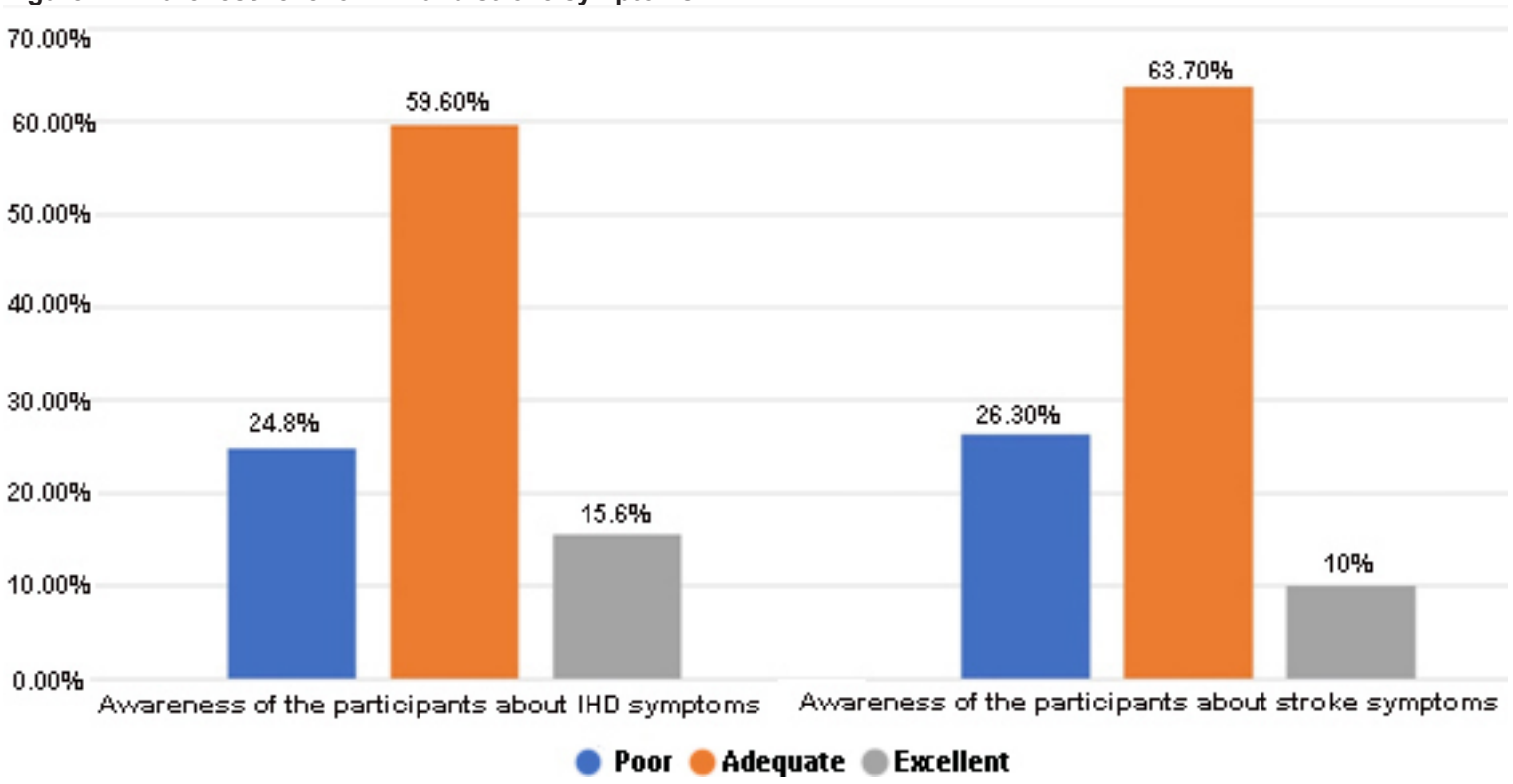

Table 2: Awareness of participants towards IHD symptoms

Questions	Yes, n (%)	No, n (%)	Not sure, n (%)	Missing, n (%)
Previously received information regarding symptoms of IHD?	129 (38%)	210 (62%)	0	0
Pain or discomfort in the jaw, neck, or back is a symptom of IHD	72 (21.2%)	124 (36.6%)	143 (42.2%)	0
Feeling weak, dizzy, or faint are symptoms of IHD	98 (28.9%)	109 (32.2%)	131 (38.6%)	1 (0.3%)
Chest pain or discomfort is a symptom of IHD	176 (52%)	52 (15.3%)	111 (32.7%)	0
Unclear vision in one or both eyes is a symptom of IHD	82 (24.2%)	127 (37.5%)	130 (38.4%)	0
Pain or discomfort in the arms or shoulder is a symptom of IHD	137 (40.4%)	101 (29.8%)	100 (29.5%)	1 (0.3%)
Shortness of breath is a symptom of IHD	172 (50.7%)	67 (19.8%)	100 (29.5%)	0
What is the single most common symptom of IHD?				
Pain or discomfort in the arms or shoulder	Shortness of breath	Dizziness and fainting	chest pain or discomfort	Sudden difficulty seeing in one or both eyes	Pain/ discomfort in the jaw, neck or back	I don't know
45 (13.3%)	75 (22.1%)	28 (8.3%)	105 (31%)	9 (2.7%)	13 (3.8%)	64 (18.9%)

Table 3: Awareness of participants toward stroke symptoms

Questions	Yes, n (%)	No, n (%)	Not sure, n (%)	Missing, n (%)
Have you received information about stroke symptoms?	105 (31%)	233 (68.7%)	0	1 (0.3%)
Sudden confusion or difficulty speaking are symptoms of a stroke?	156 (46%)	81 (23.9%)	101 (29.8%)	1 (0.3%)
Sudden numbness or weakness of the face, arm, or leg, especially on one side, is a symptom of stroke?	155 (45.7%)	81 (23.9%)	102 (30.1%)	1 (0.3%)
Sudden difficulty seeing in one or both eyes is a symptom of stroke?	94 (27.7%)	106 (31.3%)	138 (40.7%)	1 (0.3%)
Sudden chest pain or discomfort is symptoms of a stroke?	97 (28.6%)	117 (34.5%)	124 (36.6%)	1 (0.3%)
Sudden trouble walking, dizziness, or losses of balance are symptoms of a stroke?	137 (40.4%)	91 (26.8%)	108 (31.9%)	3 (0.9%)
Severe headache with no known cause is a symptom of a stroke?	115 (33.9%)	102 (30.1%)	120 (35.4%)	2 (0.6%)

If you thought someone was having IHD or a stroke, what would be the first thing you would do?						
Bring them to the hospital	Tell them to call their doctor	Call emergency number	Call their spouse or a family member	Don't know/ Not sure	Give Aspirin	Perform CPR
142 (41.9%)	6 (1.8%)	152 (44.8%)	11 (3.2%)	18 (5.3%)	2 (0.6%)	8 (2.4%)

Relationship between knowledge about IHD symptom scores and biodemographic data

There was a significant relationship between knowledge about IHD symptom scores and the following variables: previously received information on the symptoms of ischemic heart disease ($p = 0.000$), higher educational and income levels ($p = 0.001$ for both), employment status ($p = 0.038$), and a history of stroke ($p = 0.019$). The participants who did not have a history of cardiac catheterization or cardiac surgery had a higher score of knowledge ($p = 0.002$).

Contrarily, there was no significant relationship between the score of knowledge about IHD symptoms and the age group; gender; social status; and a history of IHD, DM, or HTN. Table 4 presents the relationship between knowledge about IHD symptom scores and bio-demographical data of the participants.

Relationship between knowledge about stroke symptom scores and biodemographic data

There was a significant relationship between knowledge about stroke symptom scores and the following variables: previously received information regarding symptoms of stroke ($p = 0.002$), higher educational and income levels ($p = 0.003$ for both), and employment status ($p = 0.019$). the participants who did not have a history of cardiac catheterization or cardiac surgery had a higher score of knowledge ($p = 0.015$).

Conversely, there was no significant relationship between knowledge about stroke symptom scores and age group; gender; social status; and a history of IHD, stroke, DM, or HTN. Table 5 shows the relationship between knowledge about stroke symptom scores and bio-demographical data of the participants.

Table 4: The relationship between demographic information of participants and their awareness score of IHD symptoms

Factors		Poor	Adequate	Excellent	p-value§
Age group	18-35 years old	23 (25.8%)	66 (30.6%)	12 (35.3%)	0.825
	36-55 years old	44 (49.4%)	103 (47.7%)	16 (47.1%)	
	More than 55 years old	22 (24.7%)	47 (21.8%)	6 (17.7%)	
Gender	Male	36 (40.5%)	94 (43.5%)	14 (41.2%)	0.874
	Female	53 (59.6%)	122 (56.5%)	20 (58.8%)	
Social status	Single	17 (19.1%)	43 (19.9%)	6 (18.2%)	0.966
	Married	72 (80.9%)	173 (80.1%)	27 (81.8%)	
Educational level	Illiterate	9 (10.1%)	20 (9.3%)	0	0.003*
	Elementary school	13 (14.6%)	21 (9.7%)	4 (11.8%)	
	Intermediate school	8 (9%)	17 (7.9%)	1 (2.9%)	
	High school	23 (25.8%)	42 (19.4%)	1 (2.9%)	
	Diploma	10 (11.2%)	40 (18.5%)	8 (23.5%)	
	Bachelor degree or higher	26 (29.2%)	76 (35.2%)	20 (58.8%)	
Current occupation	Student	8 (9%)	24 (11.1%)	2 (5.9%)	0.019*
	House wife	31 (34.8%)	62 (28.7%)	5 (14.7%)	
	Unemployed	10 (11.2%)	16 (7.4%)	0	
	Office job	16 (18%)	42 (19.4%)	8 (23.5%)	
	Non-office job	12 (13.5%)	43 (19.9%)	15 (44.1%)	
	Retired	12 (13.5%)	29 (13.4%)	4 (11.8%)	
Income level	Less than 5000 SR per month	49 (55.7%)	102 (47.7%)	6 (17.7%)	0.003*
	5000 - 10000 SR per month	16 (18.2%)	52 (24.3%)	11 (32.4%)	
	More than 10000 SR per month	23 (26.1%)	60 (28%)	17 (50%)	
Have DM or HTN	HTN	39 (43.8%)	89 (41.2%)	16 (47.1%)	0.170
	DM	26 (29.2%)	76 (35.2%)	15 (44.1%)	
	Both	24 (27%)	51 (23.6%)	3 (8.8%)	
History of IHD	Yes	8 (9%)	8 (3.7%)	1 (2.9%)	0.496
	No	81 (91%)	207 (95.8%)	33 (97.1%)	
	I don't know	0	1 (0.5%)	0	
History of stroke	Yes	4 (4.5%)	6 (2.8%)	0	0.463*
	No	85 (95.5%)	209 (96.8%)	34 (100%)	
	I don't know	0	1 (0.5%)	0	
Have you had cardiac catheterization or surgery to diagnose or treat cardiovascular disease?	No	73 (82%)	198 (91.7%)	33 (97.1%)	0.015*
	I don't know	16 (18%)	18 (8.3%)	1 (2.9%)	
Have you received information regarding symptoms of stroke?	Yes	23 (25.8%)	86 (39.8%)	20 (58.8%)	0.002*
	No	66 (74.2%)	130 (60.2%)	14 (41.2%)	

Table 5: The relationship between demographic information of participants and their awareness score of stroke symptoms

Factors		Poor	Adequate	Excellent	p-value§
Age group	18-35 years old	23 (25.8%)	66 (30.6%)	12 (35.3%)	0.825
	36-55 years old	44 (49.4%)	103 (47.7%)	16 (47.1%)	
	More than 55 years old	22 (24.7%)	47 (21.8%)	6 (17.7%)	
Gender	Male	36 (40.5%)	94 (43.5%)	14 (41.2%)	0.874
	Female	53 (59.6%)	122 (56.5%)	20 (58.8%)	
Social status	Single	17 (19.1%)	43 (19.9%)	6 (18.2%)	0.966
	Married	72 (80.9%)	173 (80.1%)	27 (81.8%)	
Educational level	Illiterate	9 (10.1%)	20 (9.3%)	0	0.003*
	Elementary school	13 (14.6%)	21 (9.7%)	4 (11.8%)	
	Intermediate school	8 (9%)	17 (7.9%)	1 (2.9%)	
	High school	23 (25.8%)	42 (19.4%)	1 (2.9%)	
	Diploma	10 (11.2%)	40 (18.5%)	8 (23.5%)	
	Bachelor degree or higher	26 (29.2%)	76 (35.2%)	20 (58.8%)	
Current occupation	Student	8 (9%)	24 (11.1%)	2 (5.9%)	0.019*
	House wife	31 (34.8%)	62 (28.7%)	5 (14.7%)	
	Unemployed	10 (11.2%)	16 (7.4%)	0	
	Office job	16 (18%)	42 (19.4%)	8 (23.5%)	
	Non-office job	12 (13.5%)	43 (19.9%)	15 (44.1%)	
	Retired	12 (13.5%)	29 (13.4%)	4 (11.8%)	
Income level	Less than 5000 SR per month	49 (55.7%)	102 (47.7%)	6 (17.7%)	0.003*
	5000 - 10000 SR per month	16 (18.2%)	52 (24.3%)	11 (32.4%)	
	More than 10000 SR per month	23 (26.1%)	60 (28%)	17 (50%)	
Have DM or HTN	HTN	39 (43.8%)	89 (41.2%)	16 (47.1%)	0.170
	DM	26 (29.2%)	76 (35.2%)	15 (44.1%)	
	Both	24 (27%)	51 (23.6%)	3 (8.8%)	
History of IHD	Yes	8 (9%)	8 (3.7%)	1 (2.9%)	0.496
	No	81 (91%)	207 (95.8%)	33 (97.1%)	
	I don't know	0	1 (0.5%)	0	
History of stroke	Yes	4 (4.5%)	6 (2.8%)	0	0.463*
	No	85 (95.5%)	209 (96.8%)	34 (100%)	
	I don't know	0	1 (0.5%)	0	
Have you had cardiac catheterization or surgery to diagnose or treat cardiovascular disease?	No	73 (82%)	198 (91.7%)	33 (97.1%)	0.015*
	I don't know	16 (18%)	18 (8.3%)	1 (2.9%)	
Have you received information regarding symptoms of stroke?	Yes	23 (25.8%)	86 (39.8%)	20 (58.8%)	0.002*
	No	66 (74.2%)	130 (60.2%)	14 (41.2%)	

§ P-value has been calculated using chi-square test. * Significant at $p < 0.05$ level.

Discussion

This study affirmed that approximately a quarter of the hypertensive and/or diabetic patients in Al Ahsa had poor knowledge about IHD and stroke symptoms. Regarding IHD, the most identified symptom was chest pain or discomfort. These findings are consistent with those of other studies in different parts of the world [13-16]. In current study, 22.6% identified pain or discomfort in the jaw, neck, or back as one of the symptoms of IHD, which is lower than what Alabdali et al. reported at a higher rate of 36.9 % in their population in the western region of KSA [17]. Although the lack of awareness of IHD symptoms results in postponed treatment and higher morbidity and mortality [18], approximately 60% of our participants did not receive any information regarding IHD symptoms despite being at risk of developing such a disease. The lack of information was reflected in marking a wrong answer or "I do not know " in 60% of the time. We found that patients who had previously received information on disease symptoms had a satisfactory level of knowledge compared with those who had not, which is consistent with other reports [19]. This indicates the importance of establishing electronic and in-person health-care campaigns to raise awareness of IHD and stroke. Individuals with a personal history of heart disease and those with a history of IHD in a family member were more aware of the complexity of IHD symptoms than people without such exposures [20]. Consistent with the findings of Rashmi Kothari et al., we found that 44% of the participants will call the emergency phone number for answer to "If you thought someone had a heart attack or stroke, then what would be the first thing you would do?" [21]. Educational campaigns must focus not only on awareness of IHD and stroke symptoms and signs, but also on the proper response by calling emergency lines immediately if experiencing any symptoms or facing any person with IHD or stroke signs.

Although others had reported a gender difference in regard to awareness of IHD and stroke symptoms, our study did not detect any difference. It had been postulated that women have more knowledge about IHD compared with men, which could be due to greater exposure to social media, such as television and newspapers, and due to shorter working hours compared with men, thus; women become more aware of the symptoms of IHD. Interestingly, this was not found in the knowledge level of stroke symptoms, probably reflecting less coverage in these media [22]. Conversely, another study has asserted that males had higher knowledge regarding IHD symptoms, because they are aware that their gender contributes as a risk factor for having IHD [23]. As expected, greater knowledge about IHD was observed among patients with higher levels of education, which is probably due to exposure to diverse health information through their higher education levels [24]. Furthermore, subjects who have higher levels of education can understand health information and apply it compared with those with lower education [7,25]. Consistent with what has been reported, the present research confirmed that unemployment remains correlated with less knowledge about the symptoms of the disease. This is likely reflecting lower levels of education and income in these people [26, 27]. Moreover, this study detected a worrying signal that patients who have had either cardiac catheterization or surgery to diagnose or treat cardiovascular disease are less knowledgeable about IHD symptoms than those who had not. This raises the suspicion that the opportunity was not used during that encounter to educate them. This observation was reported earlier in 2008 and unfortunately persisted until the time of our study [28].

The majority of the patients relied on personal or family history as their primary source of stroke knowledge. These interpersonal contacts remain to be a highly effective means of disseminating medical information [29]. Satisfactory knowledge regarding CVS was reported among 70.8% of the patients who received information about stroke symptoms from others in comparison with 64.1% of others who did not receive any information from others, but had adequate knowledge. Our study further validated that 65% of the patients who had DM or both DM and HTN had satisfactory knowledge compared with 31.1% of those who were hypertensive only.

Conclusions

Knowledge about IHD and stroke symptoms was poor in approximately a quarter of at-risk patients in Al Ahsa, Saudi Arabia. A history of IHD in the participants did not correlate with a better knowledge score. Our findings call for more efforts in establishing and expanding the awareness campaign. Additional effort is crucial to establish and expand the awareness campaign among the at-risk population of the Al Ahsa region in the community and during visits to primary care centers, outpatient clinics, and during admission to hospitals. Various education methods and tools must be utilized to match the age, and education level of patients and the time allowed.

List of abbreviations

IHD Ischemic Heart Disease
DM Diabetes Mellitus
HTN Hypertension

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Consent of patients
Informed consent was obtained from the participants.

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Appendices

Appendix 1: English Version of Hypertensive and Diabetic Patients Knowledge of Heart Attack Symptoms Questionnaire.

Section 1 (biographical data):

* Are you a hypertensive or diabetic patient?
1. Hypertensive.
2. Diabetic.
3. Both.

* Your gender is:
1. Male.
2. Female.

* Your nationality is:
1. Saudi.
2. non-Saudi.

* Living:
1. In Al-Ahsa.
2. Outside Al-Ahsa.

* Your age group (years) is:
1. 18-35.
2. 36-55.
3. Older than 55.

* Marital status:
1. Single.
2. Married.

* Your level of education is:
1. Non educated.
2. Primary school.
3. Intermediate school.
4. High school.
5. University.

* Income (monthly):
1. Less than 5000.
2. 5000-10000.
3. More than 10000.

* Current work:
1. unemployed.
2. Housewife.
3. Office-based job.
4. Non-office base job.
5. Retired.
6. Student.

*Have you ever had a previous heart attack?
1. Yes.
2. No.

*Have you ever had a percutaneous coronary intervention or cardiovascular surgery?
1. Yes.
2. No.

*Have you ever had a previous stroke?
1. Yes.
2. No.

Section 2 (knowledge of heart attack symptoms)
:

1. Have you ever received any information related to heart attack by others?
1. Yes.
2. No.

2. (Do you think) pain or discomfort in the jaw, neck, or back are symptoms of heart attack?

1. Yes.
2. No.
3. I don't know / I am not sure.

3. (Do you think) feeling weak, lightheaded, or faint are symptoms of heart attack?
1. Yes.
2. No.
3. I don't know / I am not sure.

4. (Do you think) chest pain or discomfort are symptoms of heart attack?
1. Yes.
2. No.
3. I don't know / I am not sure.

5. (Do you think) sudden trouble seeing in one or both eyes are a symptom of heart attack?
1. Yes.
2. No.
3. I don't know / I am not sure.

6. (Do you think) pain or discomfort in the arms or shoulder are symptoms of heart attack?
1. Yes.
2. No.
3. I don't know / I am not sure.

7. (Do you think) shortness of breath is a symptom of heart attack?
1. Yes.
2. No.
3. I don't know / I am not sure.

8. In your opinion, what is the single most common symptom of heart attack?
1- Pain or discomfort in the jaw, neck, or back.
2- Feeling weak, lightheaded, or faint.
3- Chest pain or discomfort.
4- Sudden trouble seeing in one or both eyes.
5- Pain or discomfort in the arms or shoulder.
6- Shortness of breath.
7- Other .... which is (.....).
8- I don't know.

Section 3 (knowledge of Stroke symptoms):
1. Have you ever received any information related to Stroke from others?
1- Yes
2- No

2. (Do you think) sudden confusion or trouble speaking are symptoms of a stroke?
1. Yes
2. No
3. I don't know / I am not sure

3. (Do you think) sudden numbness or weakness of the face, arm, or leg, especially on one side, are symptoms of a stroke?
1. Yes
2. No
3. I don't know / I am not sure

4. (Do you think) sudden trouble seeing in one or both eyes is a symptom of a stroke?
1. Yes
2. No
3. I don't know / I am not sure

5. (Do you think) sudden chest pain or discomfort are symptoms of a stroke?
1. Yes
2. No
3. I don't know / I am not sure

6. (Do you think) sudden trouble walking, dizziness, or loss of balance are symptoms of a stroke?
1. Yes
2. No
3. I don't know / I am not sure

7. (Do you think) severe headache with no known cause is a symptom of a stroke?
1. Yes
2. No
3. I don't know / I am not sure

8. If you thought someone was having a heart attack or a stroke, what is the first thing you would do?
1. Take them to the hospital
2. Tell them to call their doctor
3. Call 997
4. Call their spouse or a family member
5. Do something else
6. I don't know / I am not sure

Appendix 2: Informed Consent Form:
We are students from the Colleges of Medicine and Surgery and Applied Medical Sciences. We are conducting this research study to determine the levels of knowledge about ischemic heart disease and stroke among diabetic and hypertensive patients in Saudi Arabia's Al-Ahsa region.

The approval of the research and ethics committee was obtained from King Fahd Hospital in Al-Ahsa.
Your participation in this study is completely voluntary. You have the right to withdraw from the study at any time without any consequences.

We pledge to maintain patient privacy and data confidentiality, as no identification data will be collected to ensure that the patient's identity is not disclosed and the confidentiality of his information is not misused or circulated, and we confirm our commitment to ethical and professional rules to ensure the patient's personal safety.

Agreement: I got a detailed explanation of the study, its objectives and procedures, its benefits, and the complete freedom to participate. I agree to participate in this study voluntarily and without any kind of coercion or pressure. I understand that I have the right to withdraw from the study at any time without any consequences.

Date:……. Signature: :……

Health-related behaviors of undergraduate medical students of public sector university, Karachi 2022

Sahar Aijaz (1)
Ali Jawwad Karim (1)
Fatima Abid (2)
Aarfa Azhar (3)
Maha Noor (1)
Summaiya Ali Muhammad (1)

(1) Undergraduate medical student, Sindh Medical College, Jinnah Sindh Medical University, Karachi, Pakistan.
(2) Assistant Professor, Physiology Department, Sindh Medical College, Jinnah Sindh Medical University, Karachi, Pakistan.
(3) Department of Biological and Biomedical Sciences, Aga Khan University Hospital, Karachi, Pakistan

Corresponding author:
Dr. Fatima Abid
Assistant Professor, Physiology Department, Sindh Medical College,
Jinnah Sindh Medical University,
Karachi, Pakistan
Email: Dr.fatimaabid@gmail.com

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Abstract

Objective: to study health-related behaviours of undergraduate medical students of the public sector university of Karachi by analyzing the following aspects :
1. Daily water intake and its importance.
2. Refractive errors and the importance of their correction
3. Sun protection.

Study Design: Cross-sectional randomized study

Methodology: From April 2022 to June 2022, a cross-sectional study was conducted at Jinnah Sindh Medical University considering all ethical values. A sample size of 316, was calculated with an open epi calculator. We collected data through online Google forms and hard copies. SPSS 22 was utilized for data analysis, where the confidence interval was 95% with an error margin of 5%, and a 0.05 p-value.

Results:
Daily Water Intake:
63.9% of participants marked the correct daily water requirement which is 2 liters (8 glasses). Only 50.3% of pupils fall under the category that were consuming the standard daily water intake. The most difficult part of fulfilling the daily water requirement was that they could not remember drinking water.

Refractive errors and the importance of their correction:
94.6% of participants wore spectacles for far vision, highlighting the prevalence of myopia. 81% of pupils had a range of refractive errors between 1-5, reflecting that error ranges are not high. A positive response was recorded busting the myth that spectacles weaken the eyesight when 70.6% of people negated it.

Sun protection:
62.3% of pupils considered UV light harmful. 54.4% stated that their outdoor hours were from 2 to 4 hours. When asked if they check the UV light index before spending a long day outdoors, 78.5% said no. The application of sunscreen when going out was acknowledged by 61.7%. 90.2% responded that they agree to the fact that sunscreens are effective against sun protection.

Abstract
(continued)

Conclusion: With an aspiration to become a nobility amongst doctors, medical students must recognize their responsibility in being the representatives of right and wrong. Thus, the participation of the students in this study provides valuable insight into their health related behaviors portrayed against the risks of sun exposure and the benefits of using sunscreen as a protective measure, along with corrective measures chosen against poor sight such as spectacles, and determining the daily water requirements and their benefits. Findings in this study portray that although it is reassuring that a majority of the medical students know the harmful effects of prolonged sun exposure, a lot still needs to be done on the part of our future doctors in the effective method of application of sunscreens. This study has also shown a generally correct direction towards early treatment and whether wearing spectacles continuously further deteriorates sight. However, there is a considerable notion of dependency upon a certain apparatus ergo a dependent lifestyle comprising issues such as lowered confidence and negative affect on wedding proposals. Further studies should be done with focus on the society's role in adhering to early wearing of spectacles and the issues associated with the habit of wearing them such as rashes, nose spots, headaches and dark circles. This study has also made it significantly apparent that the majority of the medical students still do not have the correct knowledge regarding daily water requirements and their benefits, which needs to be addressed. This will help them learn better habits about drinking water that will benefit their personal and academic lives. They will be able to treat their patients with the correct information as well.

Keywords: health behaviors, medical students, water intake, refractive errors, sun protection.

Introduction

Water intake

Three quarters of the human body is comprised of water, which is necessary for metabolic functions and keeping a homeostatic environment (4). Statistically speaking, the human brain and heart are 73% water, lungs are 83%, skin 64%, muscles and kidneys are 79%, and 31% is bone (7). Therefore, daily consumption and maintaining body water levels is essential for good bodily health (7). Deficiency of required water intake leads to dehydration where the body loses water, not being compensated by intake (1). Clinical symptoms based on the severity of water deficiency are classified as mild, moderate and severe. 1-5% deficiency is mild and causes thirst, tastelessness, dryness, dizziness, the body is warm to touch, passes scanty urine, feels nauseous and unwell, has the inability to focus on work and control emotions. Rising temperature, tachycardia, heavy and difficult breathing, slurred speech, and syncope occur when dehydration reaches 5-10%. More than 10% of water loss is severe, causing CNS symptoms like seizures, delusions, and systemic symptoms such as renal failure, low blood pressure, and low cardiac output (1). Dehydration has been recorded to cause pressure ulcers and thromboembolic events such as stroke in bedridden patients (2). A loss of water of more than 8% can lead to death (8). Impact of water consumption on students is significant. Its inadequacy affects academic performances and cognition (1). Adequate water improves performance in exams (9). WHO defines some baseline terminologies to keep track of water intake and its status in the body, entitled as hydration, which is the standard body water content Hypohydration refers to lower, and hyperhydration means more than required water intake values (6). Apart from decreased water consumption, dehydration can also be triggered by heavy exercises, stress, heat, sweating and taking diuretics (10). Hypohydration seems to be more of a challenge than hyperhydration and simply resolving a single issue could save £0.95 billion English pounds (2). though standards for ranges vary across the globe and from person to person. The European Food Safety Authority (EFSA) recommends 2.0-2.5L of water per day for women and men (2). These ranges originate from research conducted to relate fluid intake and urine osmolality (3). More than fifty percent of children, 40% of men, and 60% of women failed to meet EFSA adequate intake criteria in a study in both developed and developing countries (3). Childhood obesity is on the verge of impacting water concentration in the body. Dehydration in children has increased since the past due to more fat content in the body composition (5). Malaysian adults have found to be obese according to Global Burden of Disease study. Children and adolescents are also following the same trend and adequate water consumption helps in weight reduction (19). Standard water requirement for adults is at 1L per 1000 Kcal of energy expenditure (18). When dehydrated, there are signs of no urine or dark urine, dry mouth, thirst, fatigue or no tears (17). There are many advantages like calorie control, energetic muscles, good looking skin and detoxification (17). Adequate consumption also reduces incidence of urinary tract infection and hyperglycemia (16). Children have more fluid requirements than adults. Therefore, they have more intensity of thirst (15). Total water intake also involves food moisture (14). Water loss occurs through lungs, kidneys, skin, and gastrointestinal tract (13). Mild dehydration having an effect on cognitive performances is an aspect still left to be researched (12). Athletic performance also enhances with adequate hydration and enables recovery from exercise.(11).

Refractive errors

The capacity to see works by light reflected from the environment, and the brain perceiving it into meaningful details. Any damage to this pathway and the individual cannot see, and perform routine functions (23). The fundamental reason for developing refractive error is that the focus of light does not coincide with the fovea of the retina, which can be due to multiple reasons (25). Refractive errors are very common and if left uncorrected, can lead to blindness. However, 80% of blindness worldwide can be prevented by cost-effective means. To alleviate this, the United Nations formed the VISION 2020: The Right to Sight program aiming to obtain information about the epidemiology of eye health care globally for a root cause analysis (34). However, with 6.6 million people deemed blind, and 101.2 million people visually impaired because of uncorrected refractive error, as stated by the Global Burden of Diseases study, the population of Pakistan has yet to benefit from this program (20). Epidemiologically, all ages with equal male and female distribution and all socio-economic classes are involved (20). Topographically, the Chinese adult population prevails (21). Prevalence rates of the refractive errors in adults recorded by National Blindness and Visual Impairment Survey in Pakistan are stated as 36.5% myopic, 27.1% hypermetropic and 37% as astigmatic (26). Research also states that more than 90% of students in universities are myopes (27). More than 80% of medical students in Singapore have been recorded to have myopia (30). Myopia is an endemic in many Asian countries (31). Migration of academic and official activities towards digital media has played a significant role in increasing ocular impairment (24). Any visual impairment can affect the academic performance of students in the field of medicine where book reading is a major component of study strategies. It also impairs the quality of life and results in frustration (20). Social stigmata are the reason why students do not wear their spectacles which leads to the worsening of defects. Misconceptions about this stigma are that the spectacles might break and inflict damage, parents do not like their child wearing spectacles and getting bullied by fellows, and forgetting to wear spectacles regularly (20). These stigmata are affecting the psychological development of children (28). Though opposite to the stigma, wearing spectacles has shown to increase the educational capacity of students and makes it easier for them to learn, showing better academic results (22). Contact lenses provide a refractive correction without affecting the physical aesthetics of the face and, they are more preferred among the young generation in recent years (29). Medical students are an asset to the state, and increasing refractive error among them adds to the economic burden. It is imperative that a thorough search for the risk factors be conducted, that people are educated, and plans to eliminate the risk factors are constructed (30). Females are more affected than men by psychological and social stress in wearing spectacles (32). Presenting oneself as handicapped also makes an individual conscious about wearing spectacles (33). People wearing spectacles also think that their chances of getting married have reduced because they are visually impaired (33). At this young age, the styles of spectacles frames have become a viable concern. Correct numbers are also related to compliance of patients in wearing spectacles. Affordability and expense of spectacle frames are also important. These frames are not expensive, yet, in some parts of the world they are not affordable to date (33).

UV Radiation

New genetic mutations are discovered daily, and the phenomenon of global warming, a direct cause of increased exposure to UV radiation is a major culprit in causing these mutations (44). Topographically, the extreme latitudes are still safer than the hot and humid southern population equatorial latitudes (44). It ought to be mentioned that this discussion concerns the effects of excessive sunlight exposure. Adequate sunlight exposure helps keep a focused mindset by releasing endorphins in the body (35). Vit D3 deficiency causes a heavy burden of structural and functional morbidities, extreme to endemic in some parts of the world (41). The list of risk factors of skin cancers mentions excessive sun exposure at the top, which is an avoidable cause (45). 5.4 million non-melanoma cancers were recorded in the United States in 2017; 75% of all cancers in Australia were skin cancers; 9,730 people died in the USA due to skin cancer; and each year 100,000 new cases of skin cancers are growing throughout Europe (36). The chemical compound in UV light causing these cancer mutations is a cyclobutane pyramid, a dimer produced in the body in response to a radiation of 320nm to 420nm in wavelength (39).The most common variants of skin tumours are titled basal cell carcinoma which penetrates to the basement membranes (48); squamous cell carcinoma which only damages the superficial epidermis, and melanoma which increases melanin production, respectively (42). WHO guidelines mention some measures to prevent sun exposure like covering bodies with light-coloured clothes, use of broad hats, avoiding tanning culture and by keeping ourselves under roofs during peak sunshine hours from noon to afternoon (45). The most effective recommendation is applying sunscreens that have a high SPF score (45). Age is an essential factor as it has been studied that individuals at the highest risk of skin cancers are children and adolescents (35). Statistically one-fifth of sunlight is absorbed during childhood (46). Adding to the irony is that this age group is found not to use any sun protection method (35). If an individual suffers from blistering sunburns more than 5 times in their adult life, they are at two times the risk of developing skin cancer than those who do not (43). The developed habits of adult life such as smoking, alcohol consumption, sedentary lifestyle, obesity, and stress are additional environmental factors in developing cancers (43). The ingredient used in sunscreens, which is TiO2, works as a UV filter (38) and makes them effective in reducing the incidence of skin cancers (37). The culture of skin tanning, and counting it as a beauty standard has caused some severe sunburn lesions and avoidance needs to be counselled (47). Medical students as future physicians must have firm and convincing knowledge about sun protection methods, to be able to convey it to their patients, effectively (40) and also to their colleagues during educational events and through social media (45).

Objective

To study health-related behaviors of undergraduate medical students of the public sector university of Karachi by analyzing the following aspects:
1, Daily water intake and its importance.
2, Refractive errors and the importance of their correction
3, Sun protection.

Methodology

From April 2022 to June 2022, a cross-sectional study was conducted at Jinnah Sindh Medical University considering all ethical values. A sample size of 316, was calculated with an open epi calculator. We collected data through online Google forms and hard copies. SPSS 22 was utilized for data analysis, where the confidence interval was 95% with an error margin of 5%, and a 0.05 p-value.

Results

BIO DATA:
Ages of participating students were, 50%(n=158) in 18-21 years, 45.6%(n=144) in 22-24 years and 4.4% (n=14) in 25-27 years.

Gender distribution found to be females was 83.5%(n=264) and males were 15.8%(n=50) whereas 0.6%(n=2) preferred not to mention their gender.

All five years of MBBS participated according to the ratios of 11.7% (n=37) from 1st year, 14.6% (n=46) from 2nd year, 21.5% (n=68) from 3rd year, 44.3% (n=140) from 4th year and 7.9% (n=25) from final year.

91.8%(n=290) students lived at home and 8.2% (n=26) lived at a hostel.

Financial sources of students were stated as 82.3% (n= 260) were totally dependent on family, 13.3% (n=42) were family + self-dependent and 4.4% (n=14) were totally self-dependent.

Daily Water Intake:
When participants were asked about if they know about the standard daily water requirements of an adult, 8.2% (n= 26) marked 1 liter (4 glasses), 63.9%(n=202) marked 2 liters (8 glasses), 20.3% (n=64) marked 3 liters (12 glasses), 5.7% (n=18) marked 4 liters (16 glasses), 1.3%(n=4) marked 5 liters (20 glasses) and 0.6% (n= 2) said they do not know.

Answering about their own daily intake of water, 28.8% (n= 91) responded 0.5-1 liters, 50.3% (n=159) responded 1-2liters, 14.9% (n=47) responded 2-3 liters, 3.2% responded 3-4 liters and 2.8% (n=9) responded 4.5 liters.

Figure 1

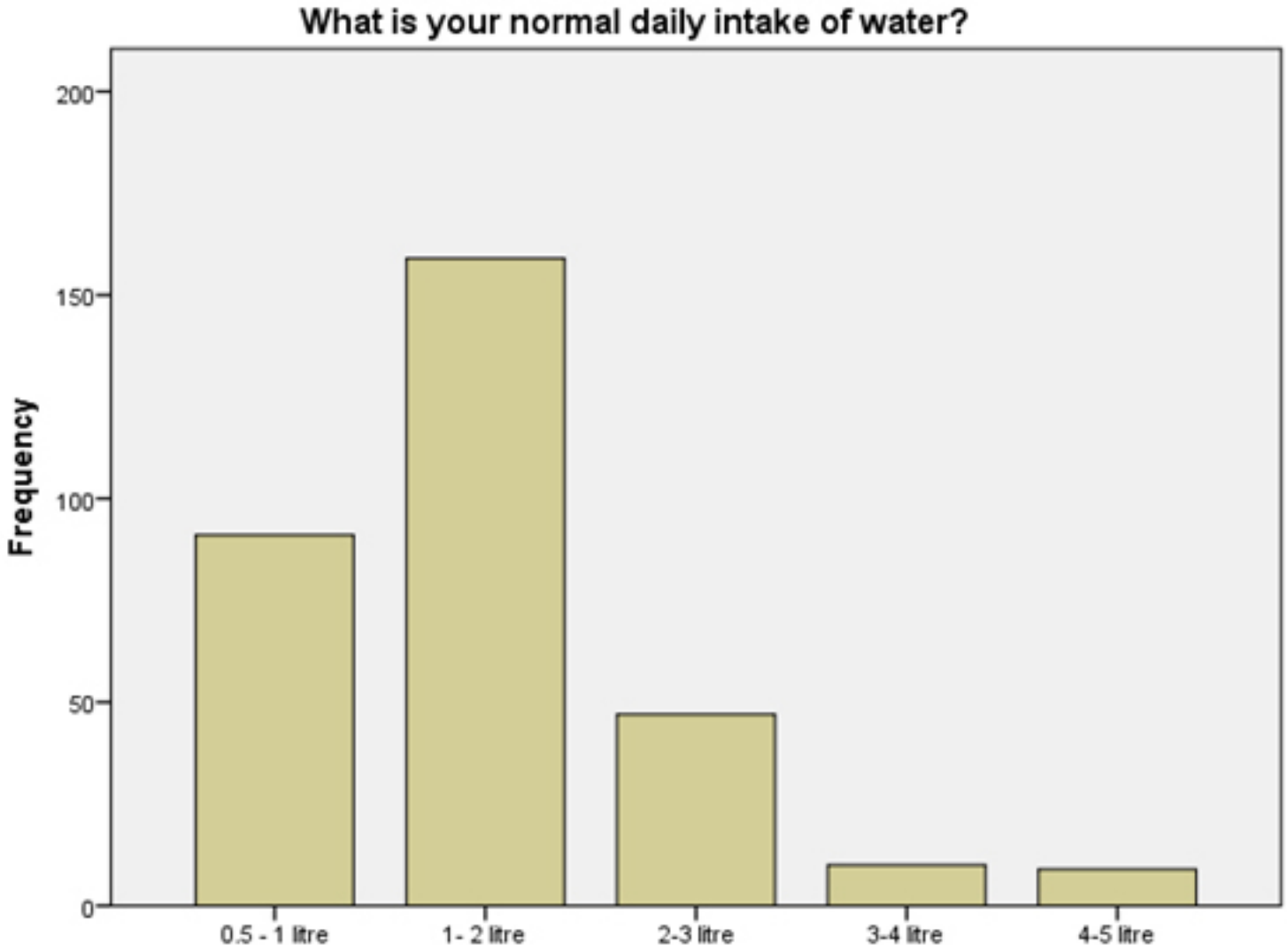

Figure 1 shows 28.8% (n= 91) responded 0.5-1 liters, 50.3% (n=159) responded 1-2litres, 14.9% (n=47) responded 2-3 liters, 3.2% responded 3-4 liters and 2.8% (n=9) responded 4.5 liters as their daily water intake

The most difficult part in taking daily water requirements came out as 23.4%(n= 74) said carrying the water bottle everywhere, 3.8% (n=12) said they always want cold water, 4.7% (n=15) said they cannot drink much water, 37.3% (n = 118) said they do not remember drinking water, 19.9% (n=63) said they need to urinate often, and 10.8%(n=34) said they do not face any problems at all.

50.6%(n=160) participants claimed that they take most of their water in the afternoon, 26.6(n=83) claimed to be consuming most water in the evening and 22.8% (n=72) claimed that they take most of their water in the morning.

People prefer different beverages on a daily basis. Participants were given multiple options to choose about their preferred drinks and 91.8% (n=291) responded that they prefer plain water, 22.3%(n=71) responded that they also prefer milk daily, 29.5% (n=94) included juices in their preference, 15.3%(n=49) included soda and 2.1%(n=7) preferred diet soda too.

If students believe that daily water intake has any effect on their academic performances, 19.0% (n=60) responded no, and 81.0%(n=256) responded yes.

Figure 2

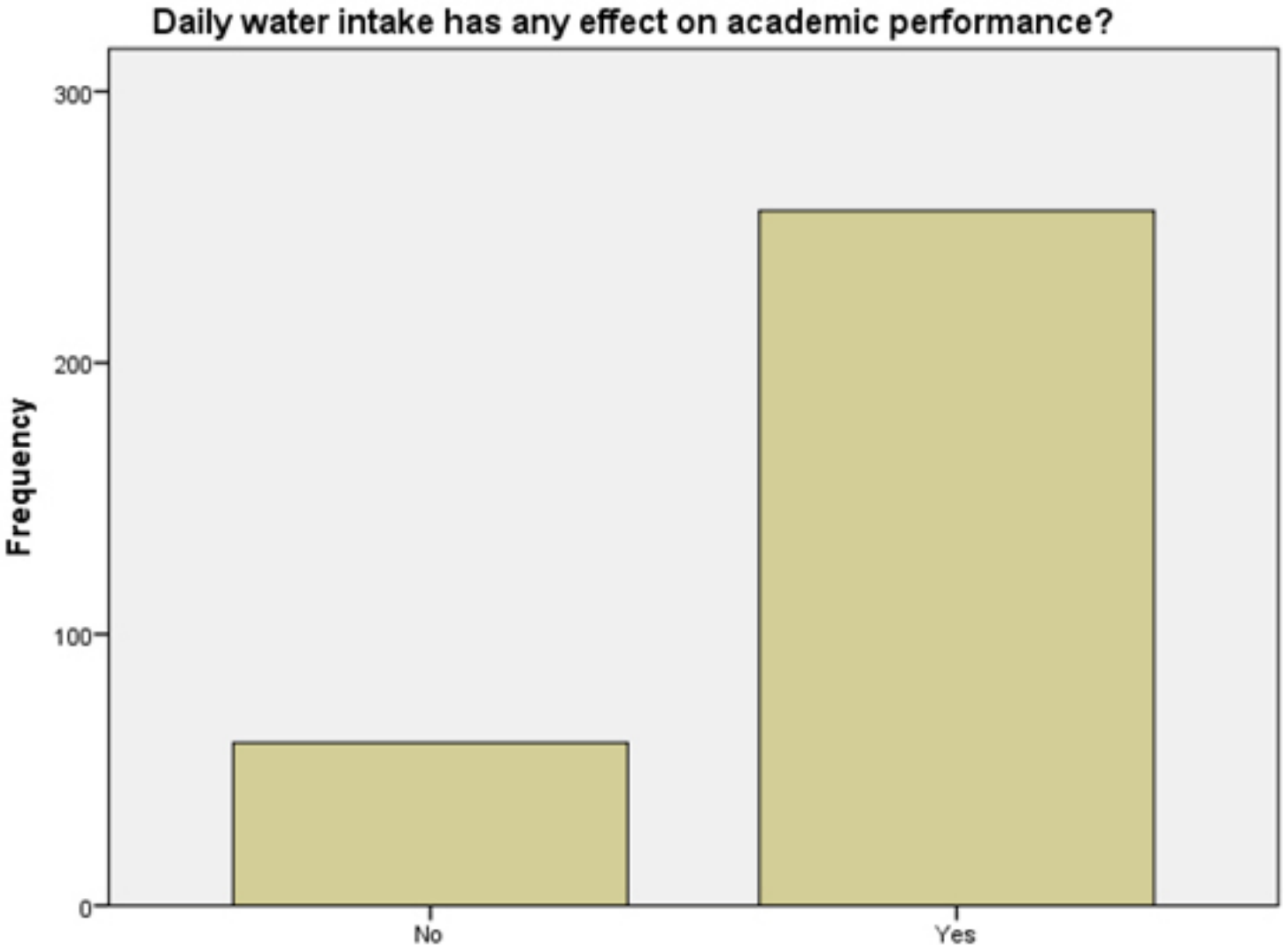

Figure 2 shows the response of participants when asked about daily water intake has any effects on their academic performances, 19.0% (n=60) responded no, and 81.0%(n=256) responded yes.

There are different sources of drinking water in our status quo, the most common among students was 41.5%(n=131) mineral water, 5.1%(n= 16) tap water, 35.8(n=113) filtered water, 17.1%(n=54) boiled water and 0.6%(n=2) alum water.

Most of the students, 72.8%(n=230), said that they do not add any refreshments to their daily drinking water like lemons and mints while 27.2%(n=86) said they add refreshments.

When questioned about the benefits of water, 67.5% (n=214) replied that it eliminates toxins, 65.7% (n=208) thought it is needed for homeostasis, 83.4%(n=264) stated it keeps the skin healthy, 50.5%(n=160) said that it provides electrolytes, 74.8%(n= 238) replied it prevents kidney stones and 34.2%(n= 109) said that it reduces hunger.

In the end after filling out the questionnaires, participants had a positive response that 77.2% (n=244) were motivated to keep a record of daily water intake and 22.8%(n=72) responded negatively that they were not motivated.

Refractive Errors and the Importance of their Correction:
Out of the 316 participants, 7.3%(n=23) of the students belonged to the range of 1-5 years of age with respect to the age they began wearing spectacles, 25.6%(n=81) students were from the 5-10 years of age range, 33.2%(n=105) were from the 10-15 years of age range, and 29.4%(n=93) belonged to the range of 20-25 years of age.

Precisely 94.6 %(n=299) wore spectacles for far vision, compared to only 4.3%(n=13) and 1.3%(n=4) students wore spectacles for near vision and other reasons respectively.

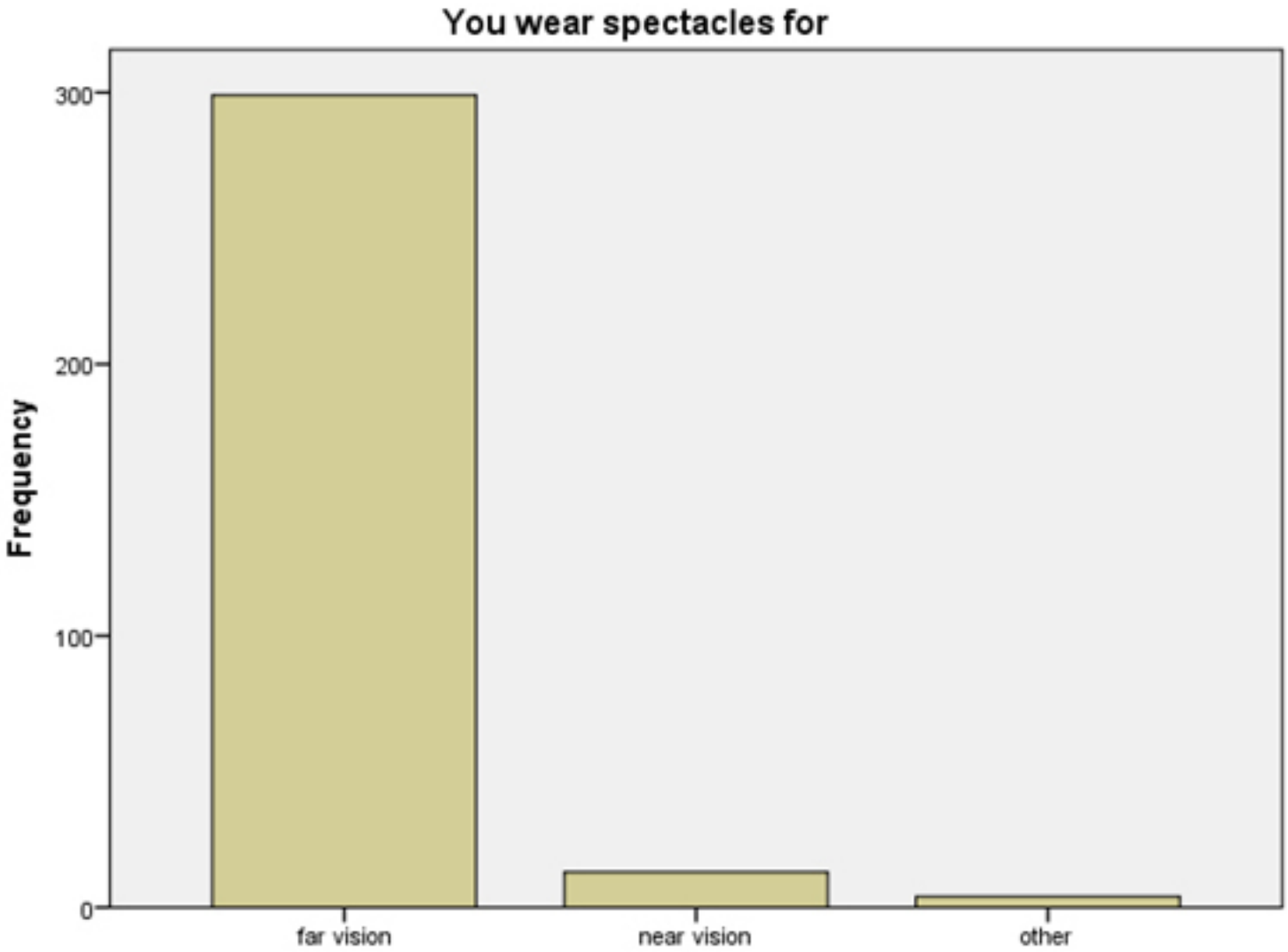

Figure 3 shows that 94.6 %(n=299) wore spectacles for far vision, compared to only 4.3%(n=13) and 1.3%(n=4) students who wore spectacles for near vision and other reasons respectively.

To understand the ranges of spectacle numbers in the 316 participants, it came to be that 81.0%(n=256) had spectacles of numbers ranging from 1-5, 17.75(n=56) wore spectacles of numbers ranging from 5-10, and only 1.3%(n=4) of the students owned spectacles of numbers ranging from 10-15.

Major differences were seen in the time of day chosen by these participants to wear spectacles, specifically, 75.6%(n=239) students had the habit of wearing them all the time, while 11.4(n=36) wore them only during the time they spent out of the house, 2.5%(n=8) wore them when doing any fine work, and 10.4%(n=33) wore them while reading or writing only.

With regards to the presumption whether wearing spectacles further weakens the eyesight, 10.4%(n=33) of the participants chose the answer as “I’m not sure”, whereas 70.6%(n=223) chose “No”, and 19.0%(n=60) chose “Yes”.

A disparity emerged between students when the question of confidence arose, where 76.3%(n=241) felt less confident and 23.7%(n=75) felt otherwise.

Those who chose “Yes” as their answer to the aforementioned query, were further required to choose from an open multiple choice question all the reasons as to why they felt less confident, in which 9.1%(n=31) answers inclined towards “I fear that it will break”, 13.1%(n=42) responses were “I have to clean it again and again”, 4.5%(n=15) were “cannot put eye makeup”, 5.8%(n=18) were “my eyes look smaller”, 10.1%(n=28) were “I feel dependent”, 4.3%(n=14) were “I feel disabled”, and 19.7%(n= 44) were “it changes my facial features”.

Owing to the question of whether wearing spectacles affects the possibility of getting wedding proposals, 13.3%(n=42) of the students were not sure, 73.1%(n=231) selected “No”, and 13.6%(n=43) chose “Yes”.

To investigate the students’ beliefs in the relation between getting early spectacles and stopping eyesight from getting worse, 21.2%(n=67) students were not sure, 16.8%(n=53) students selected “No” as their answer while 62.0%(n=196) students believed “Yes” to be the answer.

In elaboration of the previous question, students were asked to mark all answers relevant to the issues faced by them when they wore spectacles in an open multiple choice question. To which their answers sided towards “dark circles” by 32.3%(n=110), “headaches” by 36.2%(n=114), “rash around the ears” by 26.9%(n=93), “nose spots” by 65.2%(n=214).

With the intention to rule out a family history, students were asked if their family members also shared weak eyesight, to which 15.8%(n=50) of the students responded No”. In contrast, 84.2%(n=266) of the students confirmed as “Yes”.

As a solution to their weakened eyesight, the students were offered multiple corrective measures from which 13.0%(n=41) participants chose “contact lenses”, while 36.7%(n=116) chose “laser surgery” and 50.3%(n=159) chose “spectacles”.

Finally, our society’s attitude towards spectacle wearers was studied on the participants out of whom 15.8%(n=50) believe that “it is a fashion statement” while 16.8%(n=53) believed that “it is a serious disability” and 67.4%(n=213) believe that “it is not that significant”.

Figure 4

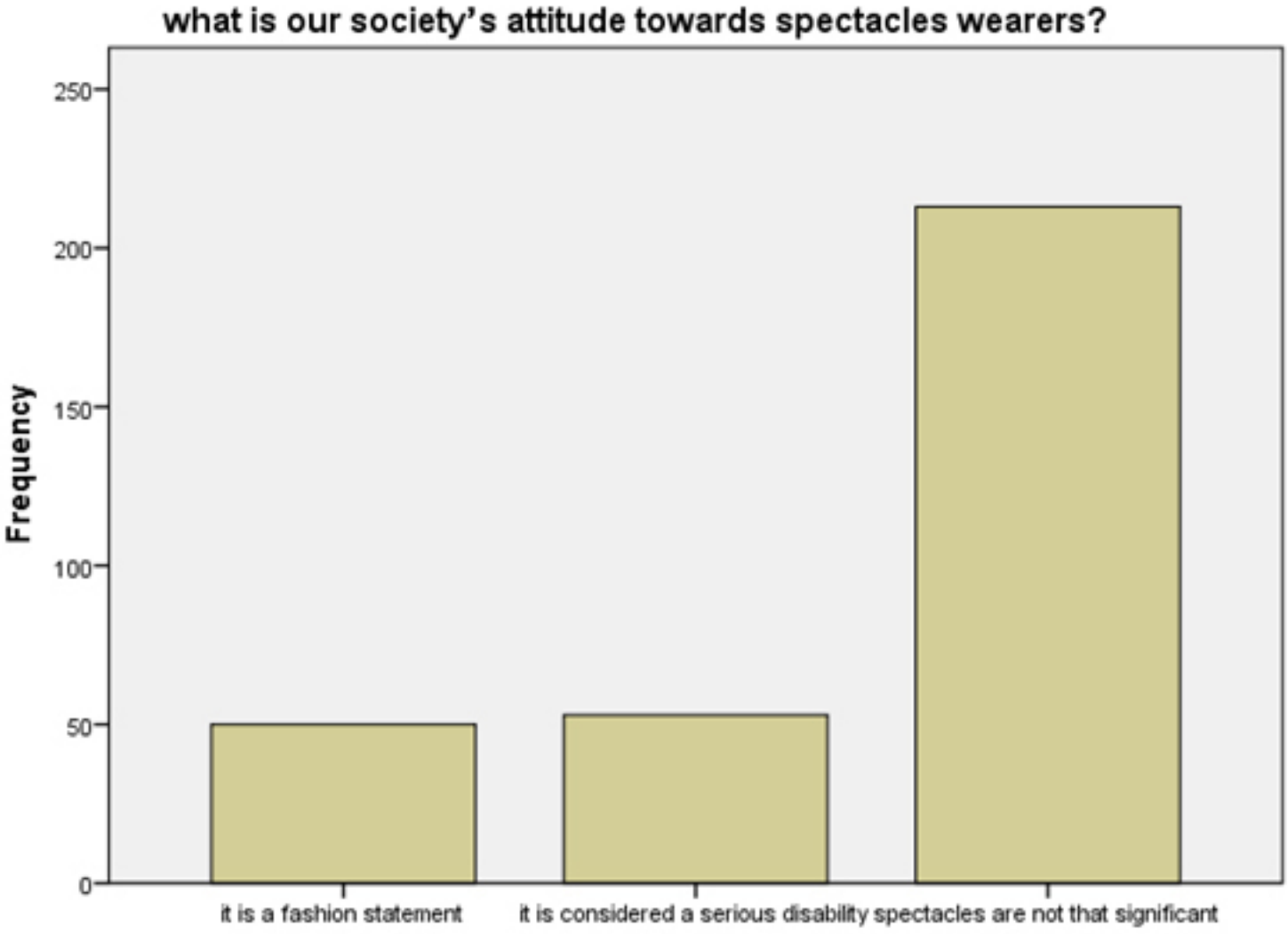

Figure 4 shows our society’s attitude towards spectacle wearers wherein 15.8%(n=50) of the participants believe that “it is a fashion statement” while 16.8%(n=53) believed that “it is a serious disability” and 67.4%(n=213) believe that “it is not that significant”.

Sun Protection:
An interesting variation was seen in the number of hours spent outdoors since 54.4%(n=172) mentioned spending 2 to 4 hours' outdoors, 37.3%(n=118) spent 4 to 8 hours, 7.9%(n=25) spent a time period of 8 to 12 hours, while 0.3%(n=1) of the participants mentioned more than 12 hours spent outdoors.

Knowledge about the range of UV light considered as harmful was represented by 37.7%(n=119) of them responding with "No", and 62.3%(n=197) responding with "Yes".

Inquiring about attention to UV index levels on local weather forecasts before spending long hours on a typical summer day revealed that 78.5%(n=248) responded with a "No" while 21.5%(n=68) responded with a "Yes".

Regarding whether their skin burns easily, out of the 316 participants, 35.4%(n=112) stated that it depends on the weather, while 32.6%(n=103) responded with a "No" and 32.0%(n=101) responded with a "Yes".

38.3%(n=121) said "No" while 61.7%(n=195) said "Yes" concerning if they used sunscreen before going outdoors or not.

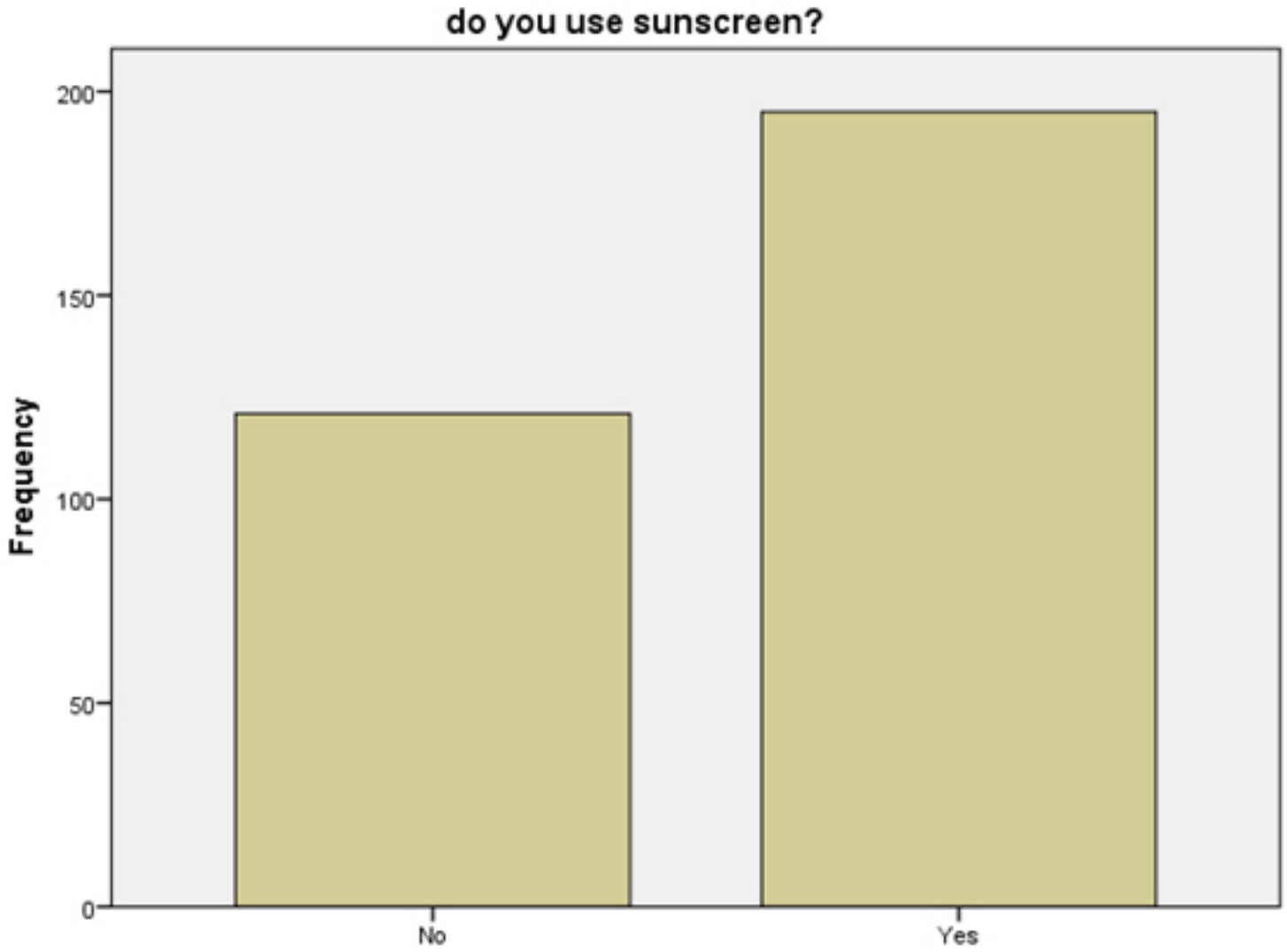

Figure 5 describes the results when the participants were asked if they use sunscreens, 38.3%(n=121) said "No" while 61.7%(n=195) said "Yes".

Furthermore, in response to the most important reason as to why they use sunscreens, 2.5%(n=8) stated that the reason is to avoid wrinkles, 18.0%(n=57) stated that the reason is to avoid premature aging, while 79.4%(n=251) stated the reason is to avoid sunburns.

With the climate conditions in which to apply sunscreen in mind, students were asked when sunscreens are needed, to which 30.4%(n=96) of the participants said that it is needed all the time, 36.4%(n=115) responded that it is needed when going out, 23.1%(n=73) said it is needed when it is very sunny, 10.1%(n=32) said that it is needed when going for sports or beaches.

About the most important factor considered whilst choosing a sunscreen, 5.4%(n=17) of the participants, chose conventional(price), 11.4%(n=36) chose format (cream, powder. lotion, gel), 14.6%(n=46) had no particular preference, and 68.7%(n=217) chose the SPF range of the sunscreen.

The question of reading labels on the sunscreens before their purchase resulted in 22.2%(n=70) of the 316 participants mentioning that they did not use sunscreen, 14.6%(n=46) mentioning “No”, and 63.3%(n=200) mentioning “Yes”.

Investigation of knowledge regarding the method of applying sunscreen has shown that 53.5%(n=169) chose “I don’t know”, 12.3%(n=39) chose “No” and 34.2%(n=108) chose “Yes”.

Lastly, they were asked whether they think sunscreens work or not, to which 9.8%(n=31) responded with “No” whereas 90.2%(n=285) responded with “Yes”.

Figure 6

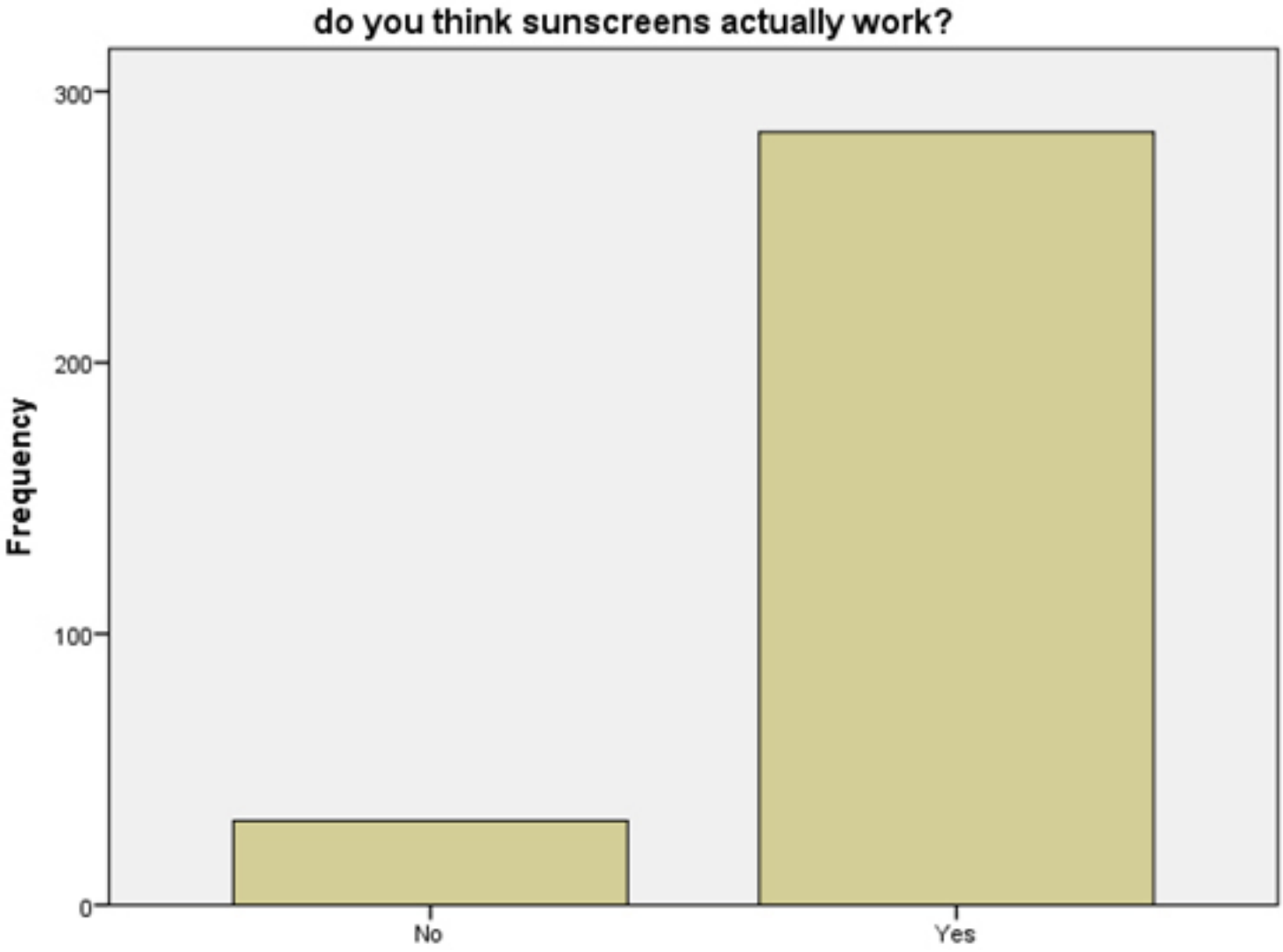

Figure 6 describes results in which the participants were asked whether they think sunscreens work or not, and 9.8%(n=31) responded with “No” whereas 90.2%(n=285) responded with “Yes”.

Discussion

According to a study done among medical students at the University of Benghazi, Libya, 40% of students were taking 0.25-1liters of milk daily which is double the ratio of our study where only 22.3% of students preferred to have milk in their daily life [7]. Included within the same study was the fact that 88% of total fluid intake was plain water, similarly, 91.8% of pupils at Jinnah Sindh Medical University preferred plain water as well [7].

Medical students of Palembang Indonesia have been noted to drink water daily on an average scale of 1,789ml i.e. 1.7 liters, akin to the daily water consumption of the students of JSMU, i.e. 50% of students take 1-2liters of water daily [1].

The standard recommended value for the daily consumption of water as 2 litres was known by only 63.9% of pupils in this cross sectional study, just as 67% of primary physicians in the UK, portrayed unsatisfactory rates of knowledge in both countries [3].

Multiple studies have expressed valuable insight unto the relation between body composition changing along with water intake; they have also depicted a major deficit in the knowledge of the general population of this fact, as comprehensively mentioned in our study that only 50% of the participating students in Karachi were meeting the standard criteria, which is alarming as low water intake is associated with obesity [10].

A study was done among school children in Cairo in which 68% of them were found to be dehydrated. One of the main reasons contributing to the percentage was the water structure of the school. The school had one large basin with three fountain taps which is an architectural design inviting over-crowdedness. This large basin was in close proximity to a washroom, a contaminated environment not meant to be next to a drinking water source ideally. Comparing this to our study, in which participants were adults, the major reason for the difficulty in water consumption was to remember to drink water and carry the water bottle everywhere [9].

81% of the participants agreed that hypohydration has deteriorating effects on academics which is slightly lower than the percentage found in Cambridgeshire among physicians which was 96% [3].

As supported by multiple studies worldwide, such as one in rural China, 56.0% of adolescents who wore spectacles held the attitude that visual acuity worsens with the use of spectacles. Such is the result presented in our study where 19.0% participants chose “Yes’’ as the answer to whether visual acuity weakens with spectacles use or not (21).

The overall prevalence of myopes provides an interesting insight into the refractive errors leading to reduced visual acuity as our study clearly defines as 94.6% of our participants having the aforementioned refractive error. This is consistent with studies conducted in Nepal as well where the rate of simple myopia was 64.81% and that of high myopia was 3.7% (31).

Fortunately, it is widespread knowledge that wearing spectacles early in time preludes better improvement of visual acuity, as 62.0% of our students believe so, just as 55.0% of the various high-school students and their parents in the state of South Darfur, Sudan (32).

A growing awareness of the medical sciences seems to be apparent as 73.1% of our participants believe that wearing spectacles does not affect the possibility of getting wedding proposals. However, there still is a strong interplay of societal norms into the medical sciences in the Pakistani and Indian populations, affecting many households nationwide. This is evident unfortunately amongst 13.3% of the students who were not sure of the answer to the aforementioned query and 13.6% students agreed. Parents are key role-players in building such societal norms as is shown by the same study in Bangalore, India stating that 11.4% female participants and 4.2% male participants did not wear spectacles due to parent disapproval with the fear of affecting their children’s marriages (20).

Owing to such limitations, students of our study were offered to choose between alternative methods of vision correction or sticking to the spectacles they currently wore, from which 13.0% participants chose contact lenses, while 36.7% chose laser surgery and 50.3% chose to stick to spectacles. The close proximity of students choosing laser surgery and sticking to spectacles is reflected in the quality of life assessed in myopic patients who in a study conducted by Shams Nastaran et al showed a standard deviation of 86.98 ± 4.73 in those who underwent refractive surgery and a standard deviation of 78.30 ± 9.21 in those who used spectacles and contact lenses (23).

As family history plays a fundamental role in early age spectacle owners, such as adolescents in schools and medical students, our study displays congruence with a study in 2020 by Sushree Priyadarsini Satapathy et al where 66.92% had a parental history of refractive errors, shared by 84.2% of our medical students at Jinnah Sindh Medical University (30).

It is apparent that a majority of the participants have expressed the correct prior knowledge as to why sunscreen is mostly used. More precisely, 2.5% of the participants stated that the reason is to avoid wrinkles, 18.0% stated that the reason is to avoid premature aging, while 79.4% stated the reason is to avoid sunburn, as was the consensus of the first-year medical students from a Peruvian university in September 2016 wherein 97.0% of the participants knew about the relationship between sun exposure and skin cancer (35).

The SPF range of each sunscreen product seems to be the single most important factor before its purchase around the world since our study shows 5.4% of the participants chose conventional (price), 11.4% chose format (cream, powder, lotion, gel), 14.6% had no particular preference,

and 68.7% chose the SPF range of the sunscreen, as is the case with medical undergraduates at the International Islamic University Malaysia where 33% of medical students chose their sunscreens based on the SPF value (39).

Reassuringly enough, there is a dichotomy between medical students across the world such as in a university in the south-eastern United States, and medical students of JSMU concerning the fact that there is a greater perception of the benefits of applying sunscreens. More accurately, 9.8% responded with "No" whereas 90.2% responded with "Yes" when asked if they think sunscreens work or not. This would suggest a high likelihood of adopting sun-protective behaviors amongst medical students who spend a major period of their day outdoors (6).

A contradictory detail was noted in this study regarding the frequency of sunburn where out of the 316 participants, 35.4% stated that it depends on the weather, while 32.6% responded with a "No" and 32.0% responded with a "Yes". This reflects a spectrum of weather conditions in Pakistan which is a major determinant of sunburn occurrence, resulting in a majority of the respondents not experiencing a sunburn despite the long hours of exposure whereas amongst 5th, 8th, and 11th grade students from the 18 public schools in La Chaux-de-Fonds, the third biggest city in western (French-speaking) Switzerland, 60.2% of children reported at least one episode of sunburn, 30.1% at least two, 11.2% at least three and 43.2% at least one occurrence of severe sunburn over the preceding year (2013) (13).

There is a major misunderstanding around the use of sunscreens in various weather conditions. Although 36.4% of our participants did answer correctly that it is needed when going out, 30.4% of the participants said that it is needed all the time, 23.1% said it is needed when it is very sunny, and 10.1% said that it is needed when going for sports or beaches, contrasting with Peruvian University students where only 23.1% students said that it is needed on a cloudy day, 5.7% did not know, and 71.2% responded with "No". (1)

Conclusion

With an aspiration to become a nobility amongst doctors, medical students must recognize their responsibility in being the representatives of right and wrong. Thus, the participation of the students in this study provides valuable insight into their health related behaviors portrayed against the risks of sun exposure and the benefits of using sunscreen as a protective measure, along with corrective measures chosen against poor sight such as spectacles, and determining the daily water requirements and their benefits. Findings in this study portray that although it is reassuring that a majority of the medical students know the harmful effects of prolonged sun exposure, a lot still needs to be done on the part of our future doctors in the effective method of application of sunscreens. This study has also shown a generally correct direction towards early treatment and whether wearing spectacles continuously further deteriorates sight. However, there is a considerable notion of dependency upon a certain apparatus ergo a dependent lifestyle comprising issues such as lowered confidence and negative affect on wedding proposals. Further studies should be done with focus on the society's role in adhering to early wearing of spectacles and the issues associated with the habit of wearing itself such as rashes, nose spots, headaches and dark circles. This study has also made it significantly apparent that the majority of the medical students still do not have the correct knowledge regarding daily water requirements and their benefits, which needs to be addressed. This will help them obtain better habits about drinking water that will benefit their personal and academic lives. They will be able to treat their patients with the correct information as well.

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Awareness of benign paroxysmal positional vertigo among the population of Taif city

Mohammed A. Basurrah (1)**, Yahya A.Fageeh** (1), **Sultan H. Alziyadi** (2), **Abdulsalam M. Alshehri** (2), **Waleed Khalid Alrabie** (2)**, Meshari M. Alruways** (2), **Ahmad S. Alosaimi** (2), **Faisal M. Alfadli (**2)

(1) ENT consultant, College of medicine, Taif University, Kingdom of Saudi Arabia
(2) Medical intern, College of medicine, Taif University, Kingdom of Saudi Arabia

Corresponding author:
Dr. Sultan H. Alziyadi
College of medicine, Taif University, Kingdom of Saudi Arabia
Taif city, Saudi Arabia
Tel.: +966548555798
Email: Salziyadi77@gmail.com

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Abstract

Background: Benign paroxysmal positional vertigo (BPPV) is the most common cause of peripheral vestibular vertigo worldwide.

Objectives: to evaluate overall knowledge and perception about the disease among the different demographics of the population in Taif city.

Methods: a cross-sectional community-based study was done and data was collected via a self-administered Google form questionnaire in Taif city, Saudi Arabia. Data about demographics, knowledge about symptoms of BPPV and how to improve this knowledge were collected.

Results: The study included 290 participants; 43.1% were females, 48.3% of them were (18 – 25) years old and 67.6% were university educated. Most (85.9%) of our participants had a history of chronic diseases, 75.9 % of our participants felt dizzy before, 24.1% had a history of Otitis media, and 1.7 % had a history of benign paroxysmal positional vertigo (BPPV). Participants agreed that vertigo is a serious illness, an infectious disease, a rare disease, caused by head trauma, caused by vitamin deficiency, is idiopathic, and lasts from seconds to minutes with a percent of (19.7%, 17.6%, 37.2%, 13.1%, 16.2%, 14.1%, 8.6%, 5.2%) respectively. From the participants' point of view, awareness can be improved by health practitioners, social media, spreading awareness in companies, spreading awareness in schools, the television, by parents with percentage of (23.6%,28.0%, 11.6%, 20.2%, 16.4%, 0.1%) respectively.

Conclusion: A low level of knowledge about vertigo was found among the studied sample. Education level was associated with knowledge level, thus awareness campaigns should be done to raise awareness about BPPV.

Keywords: Awareness, benign, paroxysmal, positional, vertigo, Taif

Introduction

Benign paroxysmal positional vertigo (BPPV) is a peripheral vestibular disorder that affects the semi-circular canals of the vestibulocochlear system (1). It was discovered by Róbert Bárány in the 1920s (2).

BPPV is characterized by intermittent attacks of vertigo, as a consequence of a change in head position (3). It is not associated with hearing loss or neurological deficit. It is the most common cause of peripheral vestibular vertigo worldwide, with a prevalence of 2.4%, a 1-year prevalence of 1.6%, and a 1-year incidence of 0.6% (4).

The majority of patients don't have a known etiology of the condition. Some patients had previous head trauma or middle ear infections. Otoconial debris (canaliths) which are calcium carbonate crystals poisoned in the utricular or saccular macula can dislodge and float in the endolymph of the semicircular canals resulting in a transient gyratory sensation that is accompanied by distinctive nystagmus (Bergenius, Qing and Maoli, 2014). Other risk factors include: age, female gender, HTN, hyperlipidemia, DM, osteopenia, and osteoporosis (5).

A study conducted in Israel showed that BPPV is still an under-recognized entity. The study was conducted by reviewing patients' referral letters who had been diagnosed with BPPV. The referral diagnoses can generally be categorized into these groups: idiopathic causes of vertigo (36.6%), BPPV (25.6%), dizziness (27.5%), and others (10%). BPPV was diagnosed more frequently by ENT doctors than by other specialists. The results of this study showed that BPPV is still considered an under-recognized disease (6).

Another cross-sectional descriptive study conducted in Saudi Arabia showed that BPPV is still largely unrecognized by ordinary individuals. However, diagnosis with the illness and education level was generally associated with knowledge of the different aspects of the disease (7).

Because BPPV is considered one of the most common causes of vertigo we aim to evaluate overall knowledge and perception about the disease among the different demographics of the population in Taif city. We assumed that the population of Taif city didn't have sufficient knowledge about the disease. Many individuals may suffer from it without knowing the cause or seeking medical advice. Misconception about the symptoms is highly suspected among the population that we are targeting.

Subjects and Methods

In this descriptive cross-sectional community-based study, we collected the data using a self-administered questionnaire. The target sample was the population of Taif city in Saudi Arabia.

The sample size aimed for was 385 persons from a total population of 993,000, with a confidence level of 95% and a margin of error 5%. The study included both genders, and we excluded any incomplete forms. The consent was built-in into the form. No private information was collected from the participants. The questionnaire was taken from a previous study conducted in 2020 by Alotaibi et al., 2020 (7).

The questionnaire had four parts, including 6 demographic and personal questions, 3 questions about the Symptoms of BPPV, 15 Likert questions measuring the awareness, and 2 questions about how to improve BPPV knowledge. The questionnaire was on Google forms and distributed through social media networks. Data collection was done approximately between April 2022 to May 2022. The data were analyzed by SPSS version 26.

Study tool: The questionnaire consisted of 5 parts. The 1st part was consent to participate. The 2nd part consisted of personal questions including gender, age, region, educational level, occupation, and medical conditions. The 3rd part consisted of yes or no questions related to BPPV such as; did you feel dizzy? have you had a Middle ear infection? have you ever been diagnosed with BPPV? The 4th part had an agree/disagree answer to questions such as; BPPV is a serious disease? BPPV is a common disease? The final part was a suggestion question about improving awareness of the disease.

Results

Table 1 shows the socio-demographic data of the participants. We included a total of 290 participants who filled out our questionnaire according to the inclusion criteria. Most of our participants (56.9%) were males and 43.1% of them were females. Only 7% of the participants were less than 18 years old; 48.3% of them were between 18 and 25 years old and 31% were between 40and 60 years old. Most of our participants (67.6%) were university educated, 35% were secondary educated, and only 7.2% were postgraduate educated. 53.8% of our participants didn't have work.

Table 2 shows 85.9% of our participants had a history of chronic diseases, 75.9 % of our participants had felt dizzy before, 24.1% had a history of Otitis media, and 1.7 % had a history of benign paroxysmal positional vertigo (BPPV). Most of our study population didn't know vertigo is common; only 12.1% of the participants agreed about how common the disease is. Table 3 shows the attitude of participants toward vertigo. Participants agreed that vertigo is a serious illness, a common disease, an infectious disease, a rare disease, caused by head trauma, caused by vitamin deficiency, is idiopathic, last from seconds to minutes with a percentage of (19.7%, 17.6%, 37.2%, 13.1%, 16.2%, 14.1%, 8.6%, 5.2%) respectively.

Table 4 shows awareness can be improved by health practitioners, social media, spreading awareness in companies, spreading awareness in schools, the television, and by parents with a percentage of (23.6%,28.0%, 11.6%, 20.2%, 16.4%, 0.1%) respectively.

Table 1: Sociodemographic characteristics of participants (n=290)

Parameter		No.	%
Gender	Male	165	56.9
	Female	125	43.1
Age	Less than 18	2	0.7
	18 - 25 years old	140	48.3
	26 - 30 years old	28	9.7
	31 - 39 years old	21	7.2
	40 - 60 years old	90	31
	60 more than	9	3.1
Social status	Single	152	52.4
	Married	125	43.1
	Divorced/ widowed	13	4.5
Nationality	Saudi	288	99.3
	Non-Saudi	2	0.7
Educational level	less than secondary	7	2.4
	secondary	35	12.1
	Bachelor's (University Student)	196	67.6
	Diploma	31	10.7
	Postgraduate	21	7.2
Occupational status	Work	134	46.2
	No work	156	53.8

Table 2: History of chronic diseases, dizziness, Otitis media, and benign paroxysmal positional vertigo among the participants (n=290).

Parameter		No.	%
History of chronic diseases	Yes	41	14.1
	No	249	85.9
Felt dizzy before	Yes	220	75.9
	No	70	24.1
History of Otitis media	Yes	70	24.1
	No	154	53.1
	I do not know	66	22.8
History of benign paroxysmal positional vertigo (BPPV)	Yes	5	1.7
	No	285	98.3

Table 3: Attitude of participants toward vertigo (n=290)

Variable	Agreed No. (%)	Disagree No. (%)	Don't know No. (%)
Vertigo is a serious illness	28 (9.7%)	57 (19.7%)	205 (70.7%)
Vertigo is a common disease	35 (12.1%)	51 (17.6%)	204 (70.3%)
Vertigo is an infectious disease	5 (1.7%)	108 (37.2%)	177 (61.0%)
Vertigo is a rare disease	59 (20.3%)	38 (13.1%)	193 (66.6%)
Vertigo is caused by head trauma	46 (15.9%)	47 (16.2%)	197 (67.9%)
Vertigo is caused by vitamin deficiency	48 (16.6%)	41 (14.1%)	201 (69.3%)
Vertigo is idiopathic	71 (24.5%)	25 (8.6%)	194 (66.9%)
Symptoms last from seconds to minutes	110 (37.9%)	15 (5.2%)	165 (56.9%)
Symptoms last minutes to hours	29 (10.0%)	66 (22.8%)	195 (67.2%)
Symptoms last hours to days	23 (7.9%)	72 (24.8%)	195 (67.2%)
Vertigo is diagnosed by radiography	70 (24.1%)	46 (15.9%)	174 (60.0%)
Vertigo is diagnosed clinically	86 (29.7%)	17 (5.9%)	187 (64.5%)
Vertigo is treated with antibiotics	52 (17.9%)	55 (19.0%)	183 (63.1%)
Vertigo is treated with a change in eating pattern	71 (24.5%)	36 (12.4%)	183 (63.1%)
Vertigo is treated with clinical exercises	85 (29.3%)	13 (4.5%)	192 (66.2%)

Table 4: Opinion of participants toward improving the awareness about vertigo (n=290)

Parameter		No.	%
Awareness can be improved by	Health practitioners	197	23.6
	Social media	234	28.0
	Spreading awareness in companies	97	11.6
	Spreading awareness in schools	169	20.2
	The television	137	16.4
	By parents	1	0.1

Discussion

This cross-sectional study aimed to evaluate overall knowledge and perception about Benign Paroxysmal Positional Vertigo (BPPV) among the different demographics of the population in Taif city. In this study, about 14% of the participants had a history of at least one or more chronic diseases which is less than the findings of Alotaibi et al. (2020), who recorded the prevalence of chronic disease as approximately 20% (7). This also agrees with the findings of Alqurashi et al. 2011 (8).

Most of our participants (75.9%) felt dizzy before, however, only 1.7% of the participants were positively diagnosed with (BPPV) which indicates that it has a relatively low prevalence, making it relatively unknown among the masses, which clearly shows that BPPV is still an under-recognized entity.

About 40% of BPPV patients had an audiogram and BERA before being seen at the dizziness clinic. These audiological tests are cheap, but redundant for establishing the diagnosis of BPPV (6).

We assume that the main reason for the under-diagnosis of BPPV among general physicians (specialists in family or internal medicine) is the lack of familiarity with this entity. The benign course and spontaneous remissions could be other contributory factors to the relative unawareness of BPPV among community doctors (9,10). In another study, by Alotaibi. et al. 2020, a higher percentage of BPPV (6.9%) was detected, but this result is still low generally (7).

In this study, the awareness level regarding BPPV is not good, as most of the participants had no information about the disease which is clear in Table 3. A large number of our participants (from 60% to 70%) answered "I don't know" to most of the questions. 12.1% of our participants thought that this disease is common while 70.3% of them didn't know about it at all. In another study, more than 20% of their participants agreed that vertigo is a common disease and less than 50% were neutral. 7.9% of the sample respondents thought that an episode of BPPV takes hours to days, whereas 67.2% were not sure. This result was different than Alotaibi. et al. (2020), who reported that 19.4% of the participants thought that an episode of BPPV takes days, and 53.5% were not sure (7).

Interestingly, the knowledge of the diagnosis of BPPV appeared also not good, as 24.1% of the participants thought that vertigo was diagnosed by radiography, and 29.7% thought vertigo is diagnosed clinically. These variations may be a result of the different educational levels among the participants as recorded by Alotaibi. et al. (2020). The knowledge of the diagnosis of BPPV in their participants appeared not only significantly different across the levels of gender, but also across the standards of education and the condition of mid-ear infection (7).

The suggestion of radiology as a method of diagnosis may be attributed to the differences across the different groups. This is possible because when the same respondents were asked whether antibiotics could be used to treat BPPV, 21.5% of them agreed and 54.1% had no information; also there was no significant difference across the levels of gender and education level. These results were unlike our results. 17.9% of our participants thought that antibiotics are an effective way to treat vertigo, 24.5% thought it changes with the eating pattern, and 29.3% thought that clinical exercise is the right form of treatment.

Conclusion

In the current study, we estimated a low level of knowledge and awareness about vertigo among the population targeted. This may be because of the low awareness level about the disease which made it harder for ordinary individuals to know about the ailment. The awareness level is highly affected by many factors and education level was generally associated with knowledge of the different aspects of the disease. Also, education in the form of lectures, courses, or demonstration seminars, could improve the knowledge of the pathogenesis, the tendency for recurrence, and diagnostic tools for BPPV in this large group of first-line physicians to make the disease easier to diagnose

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Ethical considerations: an ethical approval for the study was obtained from the research ethics committee of Taif University, Saudi Arabia.

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Knowledge, Attitude, and Practice of Pregnant Women Regarding the Possible Effects of Obesity on Maternal and Fetal Health

Sahar Ali Sari (1)
Yahia Mater Al-Khaldi (1)
Amal Mohammed Surrati (2)
Ajaeb Meshal Alharbi (3)

(1) Family Medicine Consultant, Ministry of Health, Abha, Saudi Arabia,
(2) Associate Professor, Family & Community Medicine Department, College of Medicine, Taibah University, Saudi Arabia
(3) Consultant Family Medicine, Madina Health Affairs, Ministry of Health, Saudi Arabia

Corresponding author
Dr. Sahar Ali Sari
Email: dr.sari.s@hotmail.com

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Abstract

Background: Obesity is a common health problem among females in reproductive age. Obesity is associated with fetal and maternal complications. The aim of this study is to assess the knowledge, attitude and practice of pregnant women regarding obesity and its negative impact on maternal and fetal health.

Methods: This study was conducted among 218 pregnant women who attended one primary care center in Abha City, KSA during 2018. The participants were interviewed during their visit to the antenatal clinic using a valid questionnaire which included many questions exploring the knowledge, attitude and practice regarding obesity during pregnancy. Data were entered and analyzed through SPSS. Relevant statistical tests were used accordingly, p-values were considered significant if less than 5%.

Results: The prevalence rates of overweight and obesity were 37.6% and 24% respectively; more than half of the participants did not know the expected average weight increase during pregnancy and more than half were unable to classify their actual weight correctly. Knowledge regarding harmful effect of obesity on maternal and fetal health during pregnancy was poor. Pregnant women also have false beliefs about dietary habits and physical activities which may lead to gaining of extra weight during pregnancy and worsen the outcomes.

Conclusion: The prevalence rates of overweight and obesity among many pregnant women were high. Knowledge related to obesity and its maternal and fetal risk were inadequate. False beliefs regarding lifestyle during pregnancy were evident. A preconception structured health education program to upgrade knowledge, change attitude, improve practice and to correct misbeliefs regarding obesity during pregnancy, is mandatory.

Keywords: obesity, overweight, Knowledge, Attitude, Practice, Pregnancy.

Introduction

Overweight and obesity are hot public health issues in Saudi Arabia. The increasing prevalence of obesity represents a cost burden on the community and healthcare system (1). Globally, the incidence of obesity is increasing (2). In the United States, 28.7% of women were obese (3). In Saudi Arabia, one study showed that 20.5% of single females were overweight, 9.12% were obese and 0.97% had morbid obesity, while prevalence of overweight was 43.0% and for obesity and morbid obesity were 29% and 3.75%, respectively (4).

Maternal obesity and excessive gestational weight gain in particular have been linked to many obstetrics complications, including preeclampsia, fetal macrosomia and increased cesarean delivery (5). Also, maternal obesity is considered as a modifiable factor in stillbirth in developed countries (6). In Al-Hassa Region, Saudi Arabia, overweight and obese women were at increased risk for pregnancy outcome related complications (7).

To the best of our current knowledge, published studies regarding the knowledge of pregnant women, concerning weight status and its effect on maternal and fetal health during pregnancy is limited. Only one study discussed this issue and concluded that improving the knowledge of pregnant women about obesity and gestational weight gain may lead to improving perinatal outcomes in pregnant women (8). However, pregnant women should be aware of their weight and the extent of weight gain during pregnancy since underestimation of their weight leads to more weight gain in pregnancy (9).

The objective of this study was to assess the knowledge, attitude and practice of pregnant women regarding obesity and its negative impact on maternal and fetal health.

Methodology

This cross-sectional study was conducted in AlNumais primary healthcare center, which was selected by simple random sampling. It lies in Abha City, Aseer region, Saudi Arabia, and it currently serves 7,083 citizens, including 502 females in their reproductive age, who represent about 7% of the total registered population at Al-Numais PHCC.

The sample size of participants for the current study was determined to be 218 according to Dahiru et al. (10), with Z=1.96, an assumed prevalence among the study sample of 50%, and a 0.05 margin of error.

A study questionnaire was adapted from a previous study that was conducted in a maternity hospital in Australia (8). The questionnaire consisted of four parts as follows:

- The first part contained 12 questions about simple demographic information, a question to the pregnant women to classify themselves as they perceive as being underweight, normal weight, overweight or very overweight and then they were asked about their knowledge regarding the proper healthy weight gain during pregnancy for themselves.
- The second part contained 17 questions that focused on the risk of excessive gestational weight gain on the pregnancy outcome and on the baby.
- The third part was about dietary and exercises practice during pregnancy.
- The fourth part contained 16 questions about dietary practices and safe methods to gain weight during pregnancy.

The Australian guide to healthy eating (11) and the Institute of Medicine (IOM) guidelines for weight gain during pregnancy (12) were taken as standards for evaluating the responses of participants as “True” or “False”. Participants’ levels of knowledge were considered as “good” if their total percentage score was ≥60%.

After completion of the questionnaire, all women were given information on their body mass index (BMI) and the recommended weight gain during pregnancy.

Before start of data collection, the study questionnaire was piloted on 10 pregnant women whose data were excluded from the study. Research ethical approval from the Regional Committee of Research Ethics was obtained under the following number (REC#2018-06-14) and then the investigators conducted direct interviews with consecutively selected participants.

Data were analyzed using the appropriate despcriptive and inferential statistical tests using the Statistical Package for Social Sciences (IBM, SPSS) version 22.

Results

This study included 218 participants, whose personal profile is shown in Table (1). Their mean age was 28.7±5.5 years (range 17-40 years). Most participants (61.9%) were multigravida. Participants’ mean gestational age at the time of the interview was 22 weeks. Moreover, almost half of participants (47.2%) were university educated.

Figure (1) shows that most participants (76.1%) did not know the normal weight gain during pregnancy.

Table (2) shows that 39% and 24.3% were overweight or obese, respectively. Regarding body image, 31.7% described themselves to have ideal weight while 48.6% and 3.2% described themselves as overweight or obese, respectively. Most participants of normal weight and overweight women correctly identified themselves as such (52.2% and 64.7%).

Table (3) depicts participants’ knowledge regarding the negative effects of maternal obesity on their health and on fetal health. More than half of the participants could correctly identify the negative effect of obesity on maternal health; such as back pain (52.3%), difficulties in movement (56%) and lower limb edema (54.1%).

However, their knowledge about other risks was poor. Moreover, knowledge regarding the negative effect of obesity on fetal heatlh was poor in most of the items. Their mean knowledge score regarding the negative effects of obesity on maternal and fetal health were poor (3.7 and 1.4 points, respectively).

Table (4) shows lifestyles of pregnant women during pregnancy. Regarding the number of meals eaten per day, 8.7% had one meal per day, 33% had two meals, while 56.4% had three meals daily. Only 15.6% of participants perform regular exercise, mainly walking (14.7%), <3 times daily (13.3%), while the others did not perform physical activity due to several barriers, mainly fear of abortion, having no time or suitable place (45%, 19.7% and 10.1%, respectively).

Table (5) shows participants' responses regarding their dietary approach and behavior to control weight during pregnancy, as compared with experts' answers. Most participants had misbeliefs which may lead to gaining extra weight during pregnancy.

Table 1: Personal characteristics of participants

Personal characteristics	No.	%
Age		
• <25 years	68	31.2
• 25-35 years	110	50.5
• >35 years	40	18.3
• Age (Mean±SD)	28.7±5.5 years	
• Age (range)	17-40 years	
Gravidity		
• Primigravida	83	38.1
• Multigravida	135	61.9
Educational level		
• Less than university educated	115	52.8
• University educated	103	47.2
Knowledge regarding expected weight gain during pregnancy		
• Correct	26	11.9
• Incorrect	26	11.9
• Do not know	166	76.1

Table 2: Body image as described by participants versus class of obesity

Personal body Image	Grades of obesity according to body mass index									
	Underweight		Normal		Overweight		Obese		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Skinny	11	84.6	20	29.9	4	4.7	1	1.9	36	16.5
Ideal	2	15.4	35	52.2	26	30.6	6	11.3	69	31.7
Overweight	0	0.0	11	16.4	55	64.7	40	75.5	106	48.6
Obese	0	0.0	1	1.5	0	0.0	6	11.3	7	3.2
Total	13	6.0	67	30.7	85	39.0	53	24.3	218	100.0

P<0.001

Figure 1: Participants' knowledge regarding physiological weight gain during pregnancy

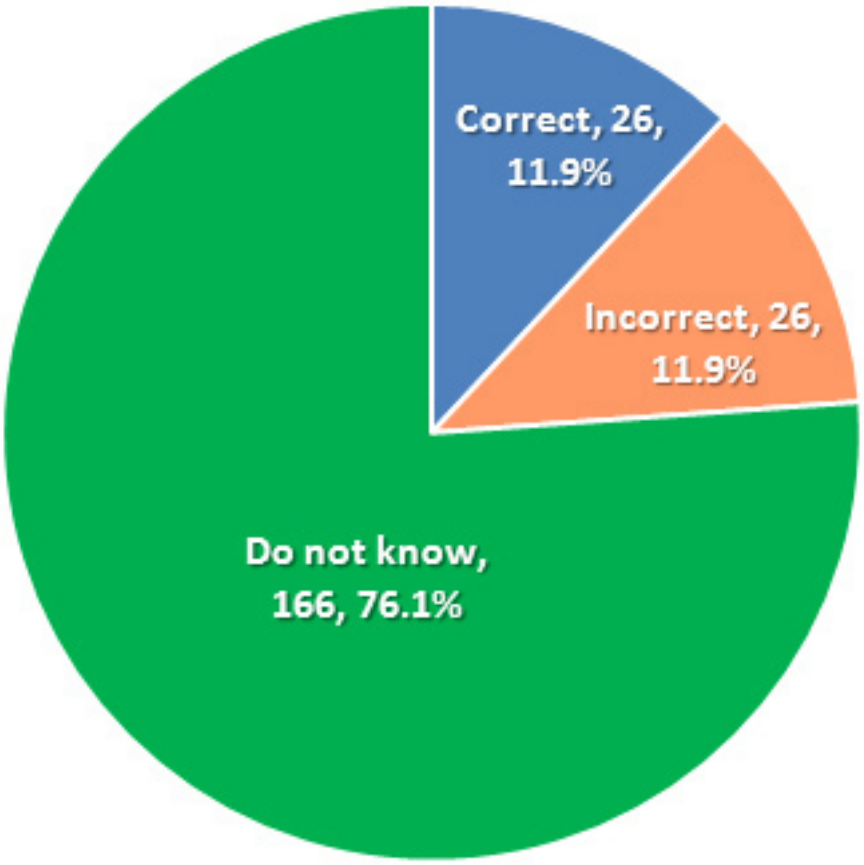

Table 3: Participants' knowledge regarding harmful effects of obesity on maternal and fetal health

Harmful Effects	Correct		Incorrect		Do not know	
	No.	%	No.	%	No.	%
Mother:						
• Increased blood pressure	82	37.6	45	20.6	91	41.7
• Gestational diabetes	96	44.0	55	25.2	67	30.7
• Pre-term labor	39	17.9	71	32.6	108	49.5
• Post-term labor	37	17.0	59	27.1	122	56.0
• Cesarean section	67	30.7	72	33.0	79	36.2
• Increased weight after labor	77	35.3	52	23.9	89	40.8
• Difficult breast feeding	50	22.9	75	34.4	93	42.7
• Back pain	114	52.3	48	22.0	56	25.7
• Difficult in movement	122	56.0	45	20.6	51	23.4
• Lower limb edema	118	54.1	46	21.1	54	24.8
Mean knowledge score (out of 10)	3.7±2.9					
Fetus:	82	37.6	45	20.6	91	41.7
• Macrosomia	64	29.4	59	27.1	95	43.6
• birth trauma	29	13.3	69	31.7	120	55.0
• hypoglycemia	31	14.2	62	28.4	125	57.3
• Jaundice	46	21.1	51	23.4	121	55.5
• childhood obesity	48	22.0	55	25.2	115	52.8
• Fetal death	28	12.8	63	28.9	127	58.3
• Baby nursery	50	22.9	45	20.6	123	56.4
Mean knowledge score (out of 7)	1.4±1.9					

Table 4: Patterns of participants' lifestyle

Patterns of lifestyle	No.	%
Number of meals per day		
• One	19	8.7
• Two	72	33.0
• Three	123	56.4
• More than three	4	1.8
Practice of exercise during pregnancy	34	15.6
• Walking	32	14.7
• Swimming	4	1.8
• Yoga	2	0.9
Frequency of exercise per week		
• ≤3	29	13.3
• 4-5	5	2.3
• >5	1	0.5
Barriers against performing physical activity		
• Fear of abortion	98	45.0
• No time	43	19.7
• No suitable place	22	10.1
• Lack of knowledge on benefits of physical activity	14	6.4
• Disease barriers	9	4.1

Table 5: Participant' beliefs about safe and effective management of weight gain during pregnancy

Beliefs	Expert Opinion	Correct answers	
		No.	%
Dietary behavior			
• Skip meals	No	111	50.9
• Remove fat from meat	Yes	168	77.1
• Finish everything on your plate	No	73	33.5
• Stop eating after 8:00 pm	No	95	43.6
Dietary approaches			
• Choose low fat milk and dairy products	Yes	153	70.2
• Eat less cakes and chocolate	Yes	177	81.2
• Eat a gluten free diet	No	109	50.0
• Drink less soft drinks	Yes	196	89.9
• Drink more fruit juice	No	164	75.2
• Eat plenty of fruit and vegetables	Yes	170	78.0
• Eat less fast foods	Yes	183	83.9
• Eat less fried foods	Yes	182	83.5
• Eat low carbohydrate diets	No	61	28.0
Exercise			
• Exercise 3 or more times each week	Yes	126	57.8
• Avoid exercise	No	120	55.0

Discussion

The aim of this study was to explore the weight status and knowledge regarding the effect of obesity on the health of the mother and the fetus during pregnancy. This study found that the prevalence of overweight and obesity were 39% and 24.3%, respectively, which is lower than that reported among adult females in Aseer Region by Al-Saleem et al. (44%) (13) and Al-Asmari et al. (36%) (14). A similar figure was reported among Australian pregnant ladies (24%) (8), and lower than that found in Canada (10%) (15).

It was noted that participant pregnant women had low awareness regarding most of the complications associated with excess weight on maternal and fetal health. Such findings were similar to those reported in Australia by Shub et al. (8). This can be due to pregnant women not given sufficient appropriate health education during antenatal visits about obesity and its related problems. Better awareness of these complications could lead to good control in weight gain during pregnancy.

Other gaps of knowledge identified in this study were about weight gain during pregnancy, proper categorization of actual weight and weight management strategies, which may lead to ineffective interventions to control excessive weight gain during pregnancy.

Good knowledge about diet can help women to control weight gain during pregnancy. In our study, it was found that such knowledge was insufficient regarding dietary approach to control weight gain during pregnancy. This area was inadequately investigated as only one study was done in primary care that assessed the food habits in pregnant women relating to food craving and pica (16).

Despite the importance of physical activity for pregnant women, it was found that the majority of the participants were not doing even light and ordinary physical activities, such as walking, which may contribute to excess weight during pregnancy. In this regard, the most common barrier against physical activity during pregnancy was fear of losing the fetus. This finding indicates the urgent need to provide proper education about the importance of exercise and appropriate type and timing of physical activity for pregnant women. The other barriers were lack of time and lack of suitable place for performing exercise, which were commonly identified in previous studies (17,18).

This study found that most pregnant women had inappropriate dietary behaviors, such as intake of few meals (33% intake two meals and 9% intake one meal daily) , which may affect the daily nutritional requirements during pregnancy. Other improper dietary behaviors included skipping meals, intake of many soft drinks, eating less fruit and vegetables, and excessive intake of simple carbohydrates. Therefore, it is suggested that pregnant women should receive adequate and specific nutritional counseling before pregnancy and during the initial antenatal visit in order to correct misconceptions in knowledge, behavior and practice related to diet.

Conclusion and recommendations

This study revealed that overweight and obesity among pregnant women in Aseer Region are high, most probably due to unhealthy lifestyles. Their knowledge regarding the harmful effects of obesity on maternal and fetal health is quite poor, and their practice of healthy lifestyles is suboptimal, which necessitates putting in more effort before and during pregnancy through well-structured and focused health education and promotion programs directed to females in their productive age.

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Assessment of satisfaction level among patients toward services provided by dental clinics: A cross-sectional study

Nada Fahad Saleh Al Ateeq (1)
Budur Abdullah Mohammad Aljalban (2)
Nawal Fahad Saleh Alazmi (2)
Ashwaq Abdullah Mohammad Aljalban (2)
Talal Awad A Alharbi (3)
Mona Rubayyi R Alanazi (2)

(1) Dental Assistant, King Fahad Medical city
(2) Dental assistant, Al Nakheel Medical Center
(3) Preventive Medicine Director, Al Nakheel Medical Center

Corresponding author:
Nada Fahad Saleh Al Ateeq
Dental Assistant, King Fahad Medical city
Email: nalateeq@kfmc.med.sa

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Abstract

Background: Although, patient satisfaction is an important factor of the quality of health care, few studies have been conducted in Saudi Arabia to assess the satisfaction of patients toward health care services in dental clinics. Thus, in this study we aim to assess patient satisfaction with healthcare services in the dental clinics in Saudi Arabia using The Patient Satisfaction Questionnaire Short-Form (PSQ-18).

Methodology: This is a cross-sectional study that was conducted among patients who were admitted to dental clinics in order to assess the satisfaction level toward health services using The Patient Satisfaction Questionnaire (PSQ-18) that was distributed among the participants using online Google sheets.

Results: In this study, we were able to collect data from 300 patients who went to private and governmental dental clinics and who agreed to participate in this study. Among the participants, 37.3 % were younger than 30 years old and 71.0 % of the participants were females and 96.3 % of the participants were Saudi Arabian. In general, 54.3 % of the participants were satisfied with the health service provided by the dental clinics. The results of the study showed that age was a significant factor affecting the satisfaction level of the participants (P=0.001) while there is no significant difference between genders considering satisfaction (55.42 vs 54.35). Furthermore, higher education of the participants was associated with higher level of satisfaction (P=0.002) where housewives reported the lowest level of satisfaction and students had the highest level of satisfaction (P=0.005). There is no significant difference in satisfaction between participants depending on type of clinics (P=0.963), type of the visit (P=0.841), waiting time (P=0.45), distance of the dentist (P=0.082) or location (P=0.124).

Conclusion: This study showed slightly more than half of the patients of dental clinics were satisfied with health services provided by the clinics especially considering technical aspects. Older patients, non-Saudi patients, less educated patients, and those with lower income showed lower level of satisfaction.

Keywords: satisfaction, dental clinics, Saudi Arabia

Introduction

Patient satisfaction is a match of expectation of individuals with their experiences during the process of treatment [1]. Satisfaction of the patients has become one of the important indicators and is commonly associated with measurement of the quality of health care [2]. Patient satisfaction is defined as a patients' response to a significant aspect of his/her healthcare experience [3]. It correlates with direct correlation with clinical outcomes, patient loyalty, increased personal, profession satisfaction, improved patient retention and reduced risk of medical malpractice claims [2]. Donabedian showed that patient satisfaction is considered one of the essential measures of quality of care as it provides information considering success of the service provider in meeting the patients' values and expectations, based on the issues on which patients value. This satisfaction can be assessed according to the work process, user satisfaction, structure and results [4–6]. In general, satisfaction of the patients is a very important and effective indicator to measure the success of the doctors and hospitals [2]. Patient satisfaction with healthcare services can be assessed from different dimensions including general satisfaction, interpersonal aspects, financial, communication, technical quality, time spent in the clinics and access/convenience [7].

In the dental clinics, satisfaction of the patients is considered an important indicator of the quality of services as it could affect the pattern of service utilization [8]. Fulfillment of the demands of the patients, positive assurance, resolving confusion and doubts of the patients, and good response to the patients could provide better satisfaction and lead to future return of patients in order to receive subsequent good quality of treatment [9].

Good and effective dentist-patient communication is considered a central factor in the therapeutic physician-patient relationship which is the art and heart of medicine [10]. Most of the complaints represented by dissatisfied patients are because of the breakdown in the doctor-patient relationship [10]. However, most of the doctors and dentists tend to overestimate their ability to communicate with their patients [10]. Although, patient satisfaction is an important factor of the quality of health care, few studies have been conducted in Saudi Arabia to assess the satisfaction of patients toward health care services in dental clinics. Thus, in this study, we aim to assess patient satisfaction with healthcare services in the dental clinics in Saudi Arabia using The Patient Satisfaction Questionnaire Short-Form (PSQ-18).

Methodology

Study design:
This is a cross-sectional study that was conducted among patients admitted to dental clinics, in order to assess the satisfaction level toward health services using The Patient Satisfaction Questionnaire (PSQ-18) that was distributed among the participants using online Google sheets.

Sample Size Calculation
The sample size was calculated using the formula of N= Z2 α.p.q/ L2 where p = patients' overall satisfaction, q = 100–p, Z α = confidence factor for type I error α = 5% = 1.96; L = allowable error, i.e., 10% of p, Where p = 60%, then q = 100–60 = 40%, Z α = 1.96, L = 10% of p = 6 then (1.96)2 X 60 X 40 /62 = 256 subjects. The maximum sample size was attained from overall patient satisfaction and hence, rounded off to 300.

Inclusion Criteria:
- Patient who finished their treatment and voluntarily agreed to participate in the study
- Patient above the age of eighteen years
- Of both genders

Exclusion Criteria
- Patient who was not willing to participate in the study and unable to give informed consent.

Survey Instrument:
The study depended on a validated questionnaire which was developed to assess the level of patient satisfaction called the short-form of The Patient Satisfaction Questionnaire (PSQ-18) which was used in previous studies [11,12]. The study included information of demographic factors including gender, age, education level, and occupation as well as visit factors as type, waiting time, location and distance. The short PSQ-18 questionnaire included 18 statements which focus on the quality of the provided healthcare service. Each statement is provided with a five-point Likert scale ranging from strongly agree to strongly disagree. Some of PSQ-18 statements are worded so that the agreement reflects satisfaction with medical care while others are worded so that the disagreement reflects satisfaction with medical care. Therefore, all statements should be scored so that high scores reflect higher satisfaction with medical care. Statements are divided into 7 subscales: General satisfaction (Q3 and Q17); technical quality (Q2, Q4, Q6, and Q14); Interpersonal aspects (Q10 and Q11); Communications (Q1 and Q13); Financials aspects (Q5 and Q7); Time spent with the doctor (Q12 and Q15); Access/convenience (Q8, Q9, Q16, and Q18). Based on the results of the class interval calculation found that the level of satisfaction ranged to not satisfied (18-54) and satisfied (55-90).

Statistical Analysis:
MS Excel was used for data entry, cleaning and coding while SPSS version 26 was used for data analysis. Frequency and percent were used for describing of the categorical variables while mean and standard deviation were used for describing of the ongoing variables. T test, chi test and ANOVA were used when appropriate for connecting between different variables. P value of 0.05 or lower was considered significant.

Results

In this study, we were able to collect data from 300 patients who went to private and governmental dental clinics and who agreed to participate in this study. Among the participants, 37.3 % were: younger than 30 years old while 29.7 % were between 41-50 years old and 20.3 % were between 31-40 years old. Moreover, 71.0 % of the participants were females and 96.3 % of the participants were Saudi Arabian. Considering educational level of the participants, we found that 84.3 % of them had high school or college while 10.3 % had primary school. Moreover, 31.0 % of the participants reported being private employees while 27.0 % of them were still students and 18.7 % were housewives. Furthermore, 68 % of the participants reported being married while 28 % were singles. Considering monthly income, 54.7 % of the participants reported having income between 10,000 and 20,000 SR and 29 % having lower than 10,000 SR and 16.3 % having higher than 20,000 SR (Table 1). Moreover, 54.3 % of the responses were from private clinics while 45.7 % were from governmental clinics. Most of the participants were visiting the clinics for the first time (74.0 %) and 52.0 % reported that they had on waiting time while 37.3 % reported that they had waiting time. Moreover, 60.7 % reported having a near distance to the dentist and 63.0 % of the responses were from urban regions (Table 2).

Table 1: The demographic factors of the participants (N=300).

Variables		Count	Percent
Age (years)	Less than 30	112	37.3%
	31–40	61	20.3%
	41–50	89	29.7%
	51–60	27	9.0%
	Greater than 60	11	3.7%
Gender	Male	87	29.0%
	Female	213	71.0%
Nationality:	Saudi	289	96.3%
	Non-Saudi	11	3.7%
Educational level	No schooling	4	1.3%
	Primary School	31	10.3%
	High School or College	253	84.3%
	Master and above	12	4.0%
Occupation:	Student/University Student	81	27.0%
	Government Employee/Police/Pensioners	53	17.7%
	Private Employee	93	31.0%
	Entrepreneur	12	4.0%
	Housewives	56	18.7%
	Others	5	1.7%
Marital status:	Married	204	68.0%
	Single	84	28.0%
	Divorced/ Widow	12	4.0%
Monthly income:	< 10,000 SR	87	29.0%
	10,000 -20,000 SR	164	54.7%
	> 20,000 ST	49	16.3%

According to PSQ-18 among the participants, the highest satisfaction score was reported in the technical quality while score of time spent was 6.81 (out of 10), financial (6.51 out of 10) and interpersonal aspect (6.61 out of 10). In total, the mean score was 55.14 (SD=12.52) (Table 3). In general, 54.3 % of the participants were satisfied with the health service provided by the dental clinics (Figure 1). The results of the study showed that age was a significant factor affecting the satisfaction level of the participants (P=0.001) where older participants had the lowest satisfaction level (50.89, 18.2 % were satisfied) in comparison with those who were younger than 30 years (56.63, 64.3 % were satisfied). However, females reported slightly higher level of satisfaction. There was no significant difference between genders considering satisfaction (55.42 vs 54.35). Moreover, we found that Saudi participants reported higher level of satisfaction than non-Saudi participants (57.32 vs 53.31). Furthermore, higher education of the participants was associated with higher level of satisfaction (P=0.002) where housewives reported the lowest level of the satisfaction and students had the highest

level of satisfaction (P=0.005). Moreover, higher monthly income had reported a higher level of satisfaction (P=0.012). There was no significant difference in satisfaction between participants depending on type of clinics (P=0.963), type of the visit (P=0.841), waiting time (P=0.45), distance of the dentist (P=0.082) or location (P=0.124) (Table 4).

Table 2:

Type of clinic:	Private	163	54.3%
	Governmental	137	45.7%
Type of Visit:	First Visit	78	26.0%
	Not First Visit	222	74.0%
Waiting Time	Faster	32	10.7%
	On Time	156	52.0%
	Late	112	37.3%
Distance to the Dentist	Far	32	10.7%
	Moderate	86	28.7%
	Near	182	60.7%
Location	Urban	189	63.0%
	Rural	111	37.0%

Table 3: The scores of the subscales of PSQ-18

	Mean	Standard deviation
General Satisfaction	4.11	1.753
Technical Quality	13.04	2.926
Interpersonal Aspect	6.61	1.638
Communication	5.8	1.305
Financial	6.51	1.471
Time Spent	6.81	1.316
Access/Comfort	12.26	2.116
Total	55.14	12.525

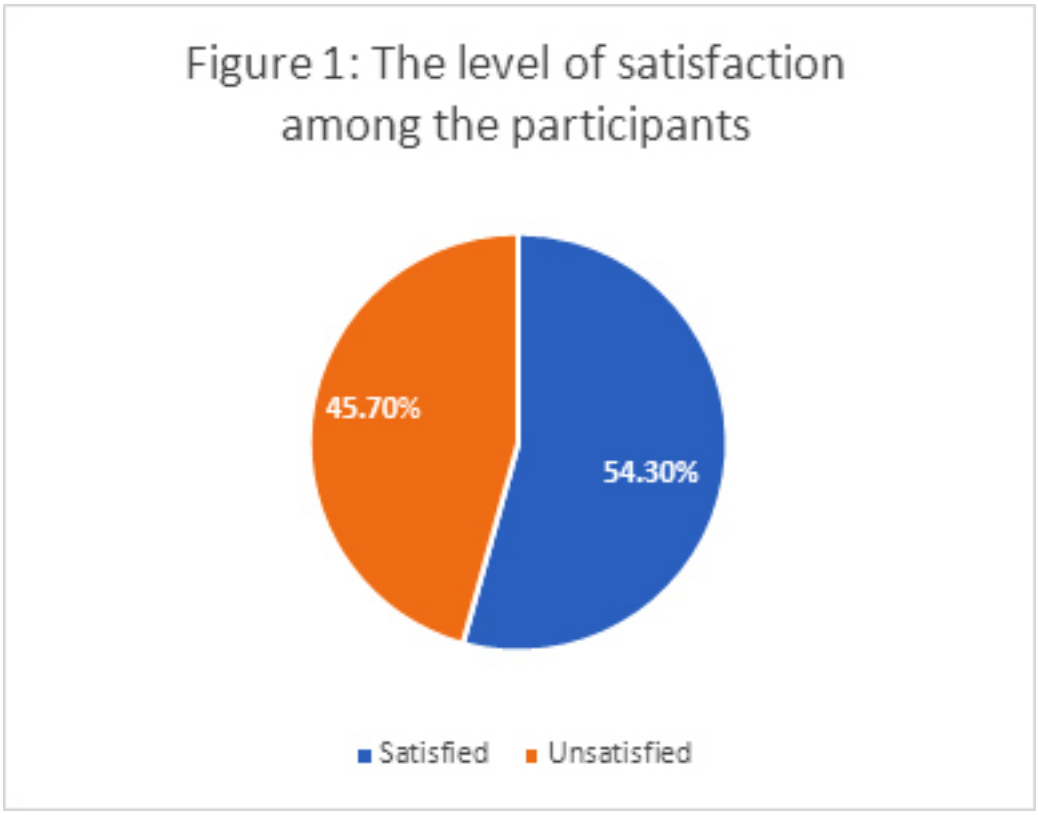

Table 4: The relation between satisfaction level of the patients and their demographic factors

Variables		Mean	Satisfied		Unsatisfied		
			N	N %	N	N %	P-value
Age (years)	Less than 30	56.63	72	64.3%	40	35.7%	0.001*
	31–40	54.23	35	57.4%	26	42.6%	
	41–50	53.25	42	47.2%	47	52.8%	
	51–60	53.01	12	44.4%	15	55.6%	
	Greater than 60	50.89	2	18.2%	9	81.8%	
Gender	Male	54.35	47	54.02%	40	45.98%	0.402
	Female	55.42	116	54.46%	97	45.54%	
Nationality:	Saudi	57.32	158	54.7%	131	45.3%	0.001*
	Non-Saudi	53.31	5	45.5%	6	54.5%	
Educational level	No schooling	51.15	1	25.0%	3	75.0%	0.002*
	Primary School	53.5	12	38.7%	19	61.3%	
	High School or College	55.6	142	56.1%	111	43.9%	
	Master and above	56.3	8	66.7%	4	33.3%	
Occupation:	Student/University Student	57.45	50	61.7%	31	38.3%	0.005*
	Government Employee/Police/Pensioners	53.44	29	54.7%	24	45.3%	
	Private Employee	53.86	53	57.0%	40	43.0%	
	Entrepreneur	54.71	6	50.0%	6	50.0%	
	Housewives	51.07	23	41.1%	33	58.9%	
	Others	53.4	2	40.0%	3	60.0%	
Monthly income:	< 10,000 SR	51.03	29	33.3%	58	66.7%	0.012*
	10,000 -20,000 SR	53.36	102	62.2%	62	37.8%	
	> 20,000 ST	55.56	32	65.3%	17	34.7%	
Type of clinic:	Private	55.35	89	54.6%	74	45.4%	0.963
	Governmental	55.12	74	54.0%	63	46.0%	
Type of Visit:	First Visit	55.02	42	53.8%	36	46.2%	0.841
	Not First Visit	55.25	121	54.5%	101	45.5%	
Waiting Time	Faster	55.43	17	53.1%	15	46.9%	0.45
	On Time	55.84	87	55.8%	69	44.2%	
	Late	54.09	59	52.7%	53	47.3%	
Distance to the Dentist	Far	55.75	18	56.3%	14	43.8%	0.082
	Moderate	55.84	49	57.0%	37	43.0%	
	Near	52.76	96	52.7%	86	47.3%	
Location	Urban	54.66	96	50.8%	93	49.2%	0.124
	Rural	56.73	67	60.4%	44	39.6%	

Discussion

Quality of health services is a major concern of health care providers around the world. Assessment of patient satisfaction with the provided services is one of the important element of the quality of health [13]. Patient satisfaction has been investigated in many studies in different countries. It is important to identify weaknesses in the service system using patient's opinions to improve the quality of health care. This can be conducted using The Patients Satisfaction questionnaire short form (PSQ-18), which is a validated tool that can be applied to different situations and can compare interventions [12].

In this study, we found that 54.3 % of the patients of dental clinics in Saudi Arabia were satisfied with the services provided by these clinics. This is lower than reported in the study of Khan et al who reported that 89 % of the patients reported being satisfied with the overall services provided by the orthodontic department [6], study of Mohammed E et al, who reported that patients' level of satisfaction was 82 % [7] and the study of Subait AA et al, who reported that 77.8 % of the participants were satisfied with services provided by dental clinics [14]. In Egypt, Ehab A. et al showed that 55.9 % of the participants were satisfied with services provided by dental clinics [15]. This is near to the results of study of Al Sakkak et al in Saudi Arabia which showed that 64.2 % of the patients were satisfied [16], and the study of Metwally in Egypt which showed the prevalence of satisfaction was different among different cities and ranged between 46 % and 68 % [17]. Moreover, Al-Azmi et al in Kuwait reported that nearly one fifth of the participants were highly satisfied while 43 % were satisfied with the services provided by dental clinics and 38 % were dissatisfied [18]. The mean score of the PSQ-18 in this study was 55.14 (SD=12.525) which is similar to the results of Akbar F et al [19]. A previous study conducted by Samohyl M et al among patients of dental clinics in the Slovak Republic showed a mean of PSQ-18 total score of 48.51 [20]. This score is low when compared with scores of PSQ-18 reported in other health specialties other than dental clinics. In a previous study conducted by Ahmad E and Itrat M, the authors reported that the overall mean patient satisfaction score among patients admitted to Unani Medicine Hospital, Bengaluru was 86.76 [21]. The study of Saginela S et al, among patients of a general hospital in India showed that the mean total score of PSQ-18 was 71.5 [22] and the study of Poudel L et al, among 94 outpatients at a tertiary care center showed that the mean score of PSQ-18 was 67.3 [23]. This difference could be explained by the fact that these studies dealt with different patient samples, however it shows that more work in improving the services provided by dental clinics in Saudi Arabia should be conducted.

Among subscales of the PSQ-18, the highest value of the health service satisfaction found in this study was in the technical quality subscale. Technical quality includes the competencies of service providers and adherence to high standard of diagnosis and treatment. This result was consistent with the results of other studies including study of Akbar F et al [19] and the study of Ziaei H et [24]. Moreover, the results of this study showed that the lowest satisfaction score was found in the subscale of the general satisfaction and communication. Communication errors between the dentists and the patients may lead to some medical failures which affect the patient's condition. Therefore, communication-centered strategies between service providers and patients are considered a good strategy in creating relationships between patients and physicians and are considered a key to improving the quality of the provided health services. These results were similar to other studies including the study of Samohyl M et al [20] and Akbar F et al [19].

Considering the factors affecting the satisfaction of the patients toward health services of dental clinics, we found that the satisfaction of female patients was slightly higher than men however, there was no significant difference between gender. This is similar to some previous studies including the study of Ahmad E and Itrat M who reported no significant difference between the genders considering satisfaction score [21]. However, many previous studies showed that females had a higher level of satisfaction than males significantly where women are more conscientious about appearance while men do not care about it [11,15,20,25,26].

Moreover, this study showed that older patients had lower satisfaction level with the service than younger participants which is similar to the results of Akbar et al [19]. This is in disagreement with the results of other studies. Previous studies had shown that older patients have a higher level of satisfaction than younger participants [25,27]. In the study of Abo-Ali et al., the authors found that older age groups reported that they were more satisfied compared with younger ones [15] which was also reported in the study of Al-Sakkak et al in Al Riyadh [16], Alshammari in Hail city, Saudi Arabia [28]. These results may be associated with lower expectations of service quality among older patients. The current study showed that higher education was associated with better satisfaction. This may occur because patients with higher education may be more understandable of the conditions in the clinics. However, this is in disagreement with previous studies which showed that lower educated patients were more satisfied with health services [4,19].

Moreover, in this study, there was no significant difference between patients with first and second visits in their satisfaction level. This result is similar to the results of other studies which showed that there is no significant difference [3,4,6,29,30]. Furthermore, our results showed that waiting time did not significantly affect the satisfaction level of the patients however, those who reported services were on time showed slightly better satisfaction. Previous studies showed that long waiting time for treatment is one of the most considered problems for patient dissatisfaction [31]. Waiting time in the examination room has also more significant negative impact on patient satisfaction than the time spent in the waiting room as reported in study of Arain M et al [32]. Most importantly, longer waiting times can reduce the patient's perception of the ability of physicians and reduce the confidence in the provided care [33]. Moreover, in this study, we did not find a significant difference between those from rural and urban regions which is similar to previous studies [19,34].

This study had some limitations including depending on self-reported questionnaire. However, the used tool is validated and assessed the risk for personal bias is found where some patients may not answer all questions honestly. Moreover, this questionnaire was distributed using online mean which may lead to some bias toward younger participants and the more educated population.

In conclusion, this study showed slightly more than half of the patients of dental clinics were satisfied with health services provided by the clinics especially considering technical aspects. Older patients, non-Saudi patients, less educated patients, and those with lower income showed lower level of satisfaction. More improvement especially considering communication between patients and dentist should be conducted in order to improve the health services provided by dental clinics in Saudi Arabia.

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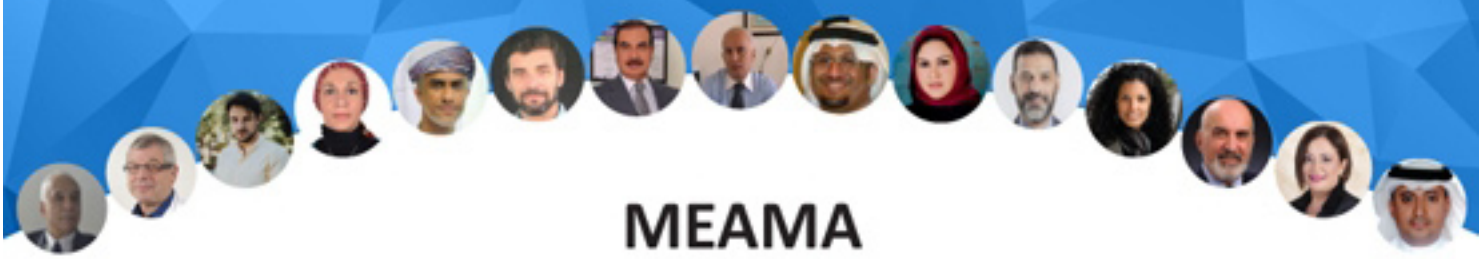

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Concomitant COVID 19 Infection And NTDS: 68 Patient Case Series

Sarab K. Abedalrahman (1)
Fatima K. Khalid (2)
Mahabad. S. Ali (3)
Sheelan MS. Hasan (4)

(1) Cancer Speciality Center, Salahadeen health directorate,
(2) M.B.ch.B, C.A.B.O.G. College of Medicine, University of Zakho
(3) D.O.G Erbil Maternity Teaching Hospital
(4) High diploma of radiology- Duhok University

Corresponding author:
Sarab K.Abedalrahman
Cancer Speciality Center, Salahadeen health directorate
Email: sara.k.abed@gmail.com

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Abstract

Introduction: Documented articles have determined that viral illness during early pregnancy and several antiviral drugs are associated with an increased risk for neurodevelopmental congenital anomalies of the newborn. These include NTDs, the most common and severe malformations of spinal cord (spina bifida) or brain (anencephaly, encephalocele, hydrocephalus), which develop within 6 weeks of pregnancy with an incidence of one in 1000 neonates worldwide and they cause lifelong neurological complications. The aim of this study is to describe the clinical characteristics of simultaneous cases of COVID 19 in pregnant women with neural tube defects in their newborns.

Patient and methods: This is descriptive study case series including cases of Neural Tube Defects when their mothers were affected with COVID-19 infection that was reported in Zahko Maternity hospital. Those in the labour unit were enrolled in this study and the cases was collected during the period 1st January 2020 and 1st January 2022. The information collected through direct interview with the mothers through questionnaire includes the information about the socio-demographic, obstetrical history and history of COVID 19 infection, severity presence of fever and type of medication received.

Results: Regarding the general and obstetrical history of the patients, the current study revealed that the affected age group of mothers was as follows; 28 (41.2%) of them (26-30 years), and 15 (22.1) of them (> 35). Anemia and fever in the 1st trimester were found in 54 (79.4%) of them. Alcohol intake was reported in 2 (2.9%) of them, consanguinity in 19 (27.9%) of them, female newborns constituted 38 (55.9%), gestational diabetes mellitus in 1 (1.5%), diabetes mellitus in 6 (8.8%), and hypertension in 5 (7.4%). The drugs received during pregnancy, were as follows; antibiotics; all patients 100%; antihypertensive drugs received by 14 (20.6%), antipyretics 29 (42.6%), antacids 21 (30.9%), and antifungals 16 (23.5%).

Conclusions: the COVID19 infection may be blamed as a cause of NTDs, and further research about the pathophysiology is needed.

Keywords: Concomitant COVID 19 & Neural Tube Defects, Case Series of COVID 19 & Neural Tube Defects

Introduction

The coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), represents a global public health emergency with considerable morbidity and mortality. As of end of July 2022, 567 million people have already been infected globally by SARS-CoV-2 with more than 6.38 million death cases. [1]

It is greatly obvious that SARS-CoV-2 has infected both females and males in almost similar proportions. Epidemiological statistics reveal that comparatively more female have been infected with COVID in their active reproductive age (between 20 years to 49 years) [2].

Members of the coronavirus family are known to be responsible for severe complications during pregnancy, such as miscarriage, fetal growth restriction and congenital anomalies [3]. Only a few studies to date have reported, relatively higher rates of adverse birth outcomes in women affected by SARS-CoV-2 at late pregnancy [3]. Documented articles have determined that viral illness during early pregnancy and several antiviral drugs are associated with an increased risk for neurodevelopmental congenital anomalies of newborn [4]. These include NTDs, the most common and severe malformations of spinal cord (spina bifida) or brain (anencephaly, encephalocele, hydrocephalus), which develop within 6 weeks of pregnancy with an incidence of one in 1000 neonates worldwide and cause lifelong neurological complications [5]. The aim of this study is to describe the clinical characteristics of simultaneous cases of COVID 19 in pregnant women with neural tube defects in their newborns.

Patients and Methods

This study is a case series study of 68 cases of NTDs with COVID-19 infection. The study was conducted in Zakho Maternity hospital of 100 beds including the obstetrics and gynecology department, and daily number of outpatients in the gynecology and obstetrics was 120 patients and about 25-30 deliveries per day in the labour room. The hospital serves the population of Zahko with a 450 thousands population and 250,000 internally displaced persons from the Shinkal and Mousel cities and from Syria. The cases of NTDs where their mothers were affected with COVID-19 infection that were reported in Zahko hospital labour unit were enrolled in this study. The cases' data was collected during the period 1st Jan. 2020 to 1st Jan. 2022. The information was collected through direct interview with the mothers through questionnaires including the information about the sociodemographic, obstetrical history and history of COVID 19 infection, severity, presence of fever, and type of medication received. Verbal consent was taken from every mother enrolled in the study and they were informed about the aim and objectives of the study. Statistical analysis of the data was done using the Social Science Software package (SPSS) version 25. The data is presented using frequency and percentage; median and interquartile range was calculated and presented as the quartile percentile in a line graph.

Results

Table 1 shows the general and obstetrical history of the patients. the current study revealed that the affected age group of mothers was as follows; 28 (41.2%) of them (26-30 years), 15 (22.1) of them (> 35). Anemia and fever in the 1st trimester were found in 54 (79.4%) of them. Alcohol intake was reported in 2 (2.9%) of them, consanguinity in 19 (27.9%) of them. Female newborns constituted 38 (55.9%), with GDM in 1 (1.5%), DM in 6 (8.8%), and Hypertension in 5 (7.4%).

The drugs received during pregnancy, are as follows; Antibiotics, all patients 100%, Antihypertensive drugs were received by 14 (20.6%), Antipyretics 29 (42.6%), Antacid 21 (30.9%), and Antifungal 16 (23.5%), as in Table 2.

The current study revealed that vaccination status of 6 (8.8%), infection in 2nd trimester in 30 (44.1%), infection in 1st trimester 29 (42.6%). It also revealed mild infection occurred in 51 (75%), moderate in 15 (22.1%), and severe in 2 (2.9%) as in Table 3.

The median (interquartile range (IQR)) of hemoglobin level was 10 (9.55-10.65), the median (IQR) of CRP was 19(9.45-81.5). The median (IQR) of D-Dimer was 300 (208.5- 700), the median (IQR) of S. Ferritin was 301(134-416.5), and median (IQR) of blood sugar was 118(99-143.5), as shown in Table 4.

Table 1. The general and obstetrical history of the patients

		Frequency	Percent
Age	<20 years	6	8.8
	21-25	10	14.7
	26-30	28	41.2
	31-35	9	13.2
	> 35	15	22.1
Anemia	Yes	54	79.4
	No	14	20.6
Fever in 1st Trimester	Yes	54	79.4
	No	14	20.6
Alcohol Intake	Yes	2	2.9
	No	66	97.1
Consanguinity	Yes	19	27.9
	No	49	72.1
Gestational Diabetes Mellitus	Yes	1	1.5
	No	67	98.5
Baby Sex	Male	30	44.1
	Female	38	55.9
Diabetes Mellitus	Yes	6	8.8
	No	62	91.2
Hypertension	Yes	5	7.4
	No	63	92.6

Table 2. The Drugs received during pregnancy

		Frequency	Percent
Antihypertensive drug	Yes	14	20.6
	No	54	79.4
Drug for febrile illness	Yes	29	42.6
	No	39	57.4
Antacid	Yes	21	30.9
	No	47	69.1
Antibiotic	Yes	68	100
Antifungal	Yes	16	23.5
	No	52	76.5
	Total	68	100

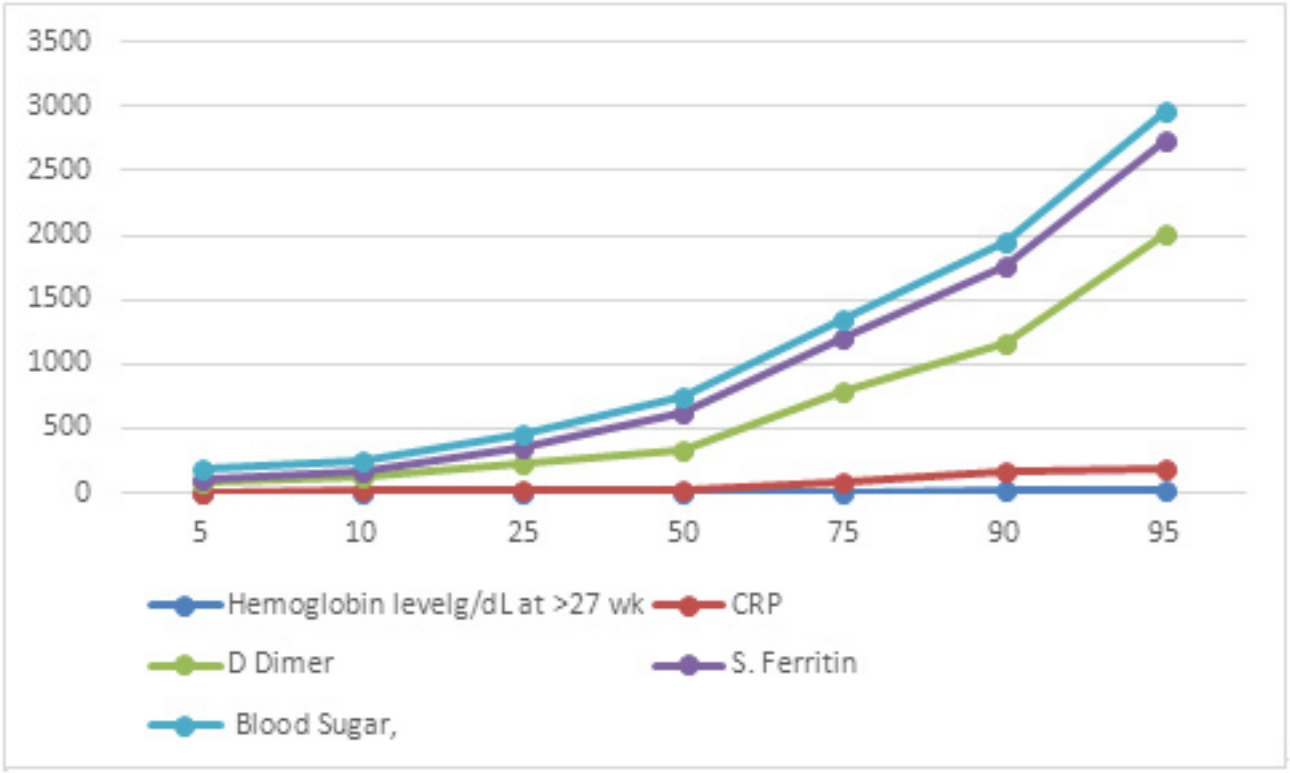
Table 3. The COVID 19 infection characteristics

COVID 19 Characteristics		Frequency	Percent
Vaccination Status	Yes	6	8.8
	No	62	91.2
Trimester of Infection	1st Trimester	29	42.6
	2nd Trimester	30	44.1
	3rd Trimester	9	13.2
Severity of COVID	Mild	51	75
	Moderate	15	22.1
	Severe	2	2.9

Table 4. The biochemical and hematological findings of COVID-19 patients with NTD

	Median (IQR)
Hemoglobin level g/dL at >27 wk	10 (9.55-10.65)
CRP	19 (9.45-81.5)
D Dimer	300 (208.5- 700)
S. Ferritin	301 (134-416.5)
Blood Sugar	118 (99-143.5)

Figure 1. The percentile distribution of biochemical and hematological markers of the COVID-19 affected pregnant women with NTD.



Discussion

The current study revealed that the affected age group of mothers is as follows; 28 (41.2%) of them were 26-30 years, 15 (22.1%) of them were > 35, and there was consanguinity in 19 (27.9%) of them. Kitova in 2013 found that the prenatal ultrasound diagnosis of NTDs with risk factors such as maternal age >35 years, and consanguinity should be targeted in the search for lower-than-normal fetal weight and abnormalities of the excretory tract and the adrenal glands [6]. According to Hamamy H et al, Al-Ani ZR, & Murshid W R, the Middle East Arab countries reveal some of the highest rates of consanguineous marriages in the world with first cousin marriages being more prevalent (25-30%) of all marriages. Among Arabs and other Middle East countries, due to consanguinity there are adverse reproductive outcomes and increase in rates of congenital malformations [7,8]. In the Middle East and Saudi Arabia increased consanguinity resulted in the appearance of spina bifida, anencephaly and hydrocephalous offspring [9].

The current study revealed that the anemia and fever in the 1st trimester were found in 54 (79.4%) of them. Molloy AM et al 2014 directly investigated the impact of iron and with mixed results [10].

The current study found that hypertension was found in 7.4%. This is lower than the study of Mazur L et al in 2011 that revealed that 41.5% patients were hypertensive [11]. Mpembeni R et al found that maternal hypertension and maternal fever during pregnancy were identified as risk factors for NTDs [12].

The current study revealed that DM was found in 8.8%. This is supported by Mary R. Loeken who found that maternal diabetes increases the risk for neural tube, and other, structural defects. The mother may have either type 1 or type 2 diabetes, but the diabetes must be existing at the earliest stages of pregnancy, during which organogenesis occurs [13]. This was also explained by Salbaum JM, 2010, who found that maternal diabetes during pregnancy is a well-known teratogen that increases the risk for birth defects, such as neural tube defects (NTDs) [14]. Schaefer Graf et al., 2000 found that the incidence and severity of diabetic pregnancy induced malformations are

correlated with poor glycemic control [15]. Ray, J.G et al 2007 found that there is a higher associated risk of NTD in the presence of features of maternal obesity and pre-pregnancy diabetes mellitus. In the presence of at least one feature of metabolic syndrome (maternal obesity and pre-pregnancy diabetes mellitus) in pregnancy, the risk of NTD was nearly doubled. In the presence of two or more features, it was six times higher. Inclusion of hsCRP as a metabolic syndrome feature attenuated these risk estimates considerably [16].

As the current study revealed that antipyretics 29 (42.6%), and alcohol intake was reported in 2 (2.9%) of them, the affected age groups of mothers are as follows; 28 (41.2%) of them (26-30 years), 15 (22.1) of them (> 35), and fever found in 79.4% of mothers. This goes with Abay Mulu, et al who found that alcohol consumption, maternal lack of education, maternal hyperthermia and disease, maternal antipyretic use, maternal age <20 and 31-35, were associated with tincreasing the risk of NTDs [17]. The current study revealed that antibiotics were taken by all patients 100%; this indicates habitual and misuse of antibiotics. Ailes EC, et al found that peri-conceptional exposure to some antibiotics might increase the risk for certain birth defects [18].

The current study found that female newborns constituted 55.9%. This is similar to results of Edris Y et al 2020 found that female newborns constituted 53.1% of all the NTDs. Edris Y et al 2020 also found that mothers of more than 35 years constituted 8.8% of the sample which is lower than our study results [19]. The current study found that consanguinity in (27.9%) of the sample which is lower than Nuzhat Nauman et al in 2016 who found that 60 % of couples were consanguineous with a neural tube pregnancy as compared to 45% in controls [20].

The current study found that all 68 newborns of mothers were affected by COVID 19 during pregnancy during the first 2 years of the pandemic. This is supported by Mrudula Phadke, et al who found that COVID-19 disease produced devastating effects on many aspects of women's health. COVID-19 disease has a direct effect by itself, treatment used, and indirect effects on women and offspring. Lockdowns, loss of jobs, decrease in salaries, migration, supply chain disruption, inadequacy and inaccessibility of foods, inadequate distribution of iron folic acid tablets to antenatal women will all possibly influence women [21]. Documented articles have determined that any viral illness during early pregnancy and several antiviral drugs are associated with an increased risk for neurodevelopmental congenital anomalies of new-born [22,23]. Muzumdar D et al reported 26 cases of NTDs during this COVID 19 period [24]. This is supported by a study of Khan MSI, et al. who found that COVID-19 may result in long-lasting congenital anomalies of infants either by infection or by therapeutic maneuver [25]. Blakeway et al, 2022, found no significant difference in rates of adverse pregnancy outcomes in vaccinated and unvaccinated pregnant women were observed [26]. Furthermore, an article done by Ruderman et al. found no association between COVID-19 vaccination during early pregnancy and congenital fetal abnormalities [27]. Published literature determined the developing body of evidence suggesting that COVID-19 vaccination in pregnancy does not alter perinatal outcomes [28–35].

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Psychoneurotic symptoms among COVID infected patients; case series study

Mohammed Khalil Ibraheem (1)
Sarab K. Abedalrahman (2)
Ashoor R Sarhat (3)

(1) High diploma of internal medicine specialist –Salahadeen health directorate,
(2) M.B.Ch.B, I.B.M.S.CM, Cancer Screening Fellowship, Epidemiologist, Oncology Center, Salahdeen Health Directorate, Iraq
(3) Tikrit University -College of Nursing

Corresponding author:
Sarab K.Abedalrahman
Cancer Speciality Center, Salahadeen health directorate
Email: sara.k.abed@gmail.com

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Abstract

Introduction: After the initial COVID-19 outbreaks, caused by the SARS-CoV-2 virus, prolonged multiple post-infectious symptoms have continued to develop. Those who initially recovered from SARS-CoV-2 virus continue to experience a worsening life quality and a delayed return to work, which leads to great burden on the health care system. Up to date research reveals that psychiatric illness is both a risk factor for, and consequence of, COVID-19. The aim of this study is to describe the psychoneurotic symptoms among COVID infected patients.

Patients and methods: A case series study of 101 patients infected with COVID virus of different severity of the disease in Tikrit city during 2020-2022. The patients were followed for 3 months. Information regarding age, gender other diseases, signs and symptoms, and psychoneurotic symptoms also were documented. Lung involvement percentage was assessed by CT. The SPO2% was reported for the patient at resting sitting position. The blood fasting sugar was tested; for all patients diastolic and systolic blood pressure were examined.

Results: The reported cases with neuropsychiatric symptoms was 101. Case sleeplessness was reported among 60 (59%), tremor among 31(31%), and hallucination was reported among 10 (10%). The auditory hallucinations were reported among 4(40%), olfactory hallucinations reported among 5(50%), and visual hallucinations among 1(10%). Males were more affected than females regarding hallucinations 7(70%), and 3(30%) respectively, and tremor 17(54.8%), 14(45.2%). Sleeplessness was higher among females than males, 33(55%), 27(45%) respectively. The age groups 21-30 years and ≥ 61 years had the highest percentages of hallucination 3(30%), 3(30%), while age group 31-40 years had the higher percentage of sleeplessness 16(26.7%) and tremor was high among those aged ≥ 61 years, 11(35.5%). These relations were statistically significant.

Conclusions: Neuropsychiatric symptoms were reported as follows; sleeplessness, tremor, and hallucination. Hallucinations mainly affected males, while tremor and sleeplessness mainly occured in females. The patients who had hallucinations had high lung involvement measured by CT of the chest. The patients eho had hyperglycemia had higher percentages of sleeplessness, and hallucinations. COVID 19 vaccinated persons had lower percentages of sleeplessness, hallucinations and tremor.

Keywords: Psychoneurotic symptoms in COVID patients, COVID 19 Psychoneurotic symptoms

Introduction

The still ongoing global COVID-19 pandemic (public health crisis) has had a great and very serious effects on all sides of daily life of patients [1]. The whole effect of this COVID-19 pandemic catastrophe most likely will not be fully evaluated for years. In the early periods of this pandemic, medical attention was mostly directed towards the acute COVID-19 associated mortality and morbidity. After several months into the pandemic, emerging reports described persistent neuropsychiatric and physical complications in the aftermath of SARS-CoV-2 infection. Literature also described persistent or residual neuropsychiatric symptoms in critically ill survivors following admission to an intensive care unit (ICU). Follow-up research of post-COVID-19 shows that asymptomatic and also mild infection may cause the following; "cognitive impairment, delirium, extreme fatigue, and clinically relevant mood symptoms" [2, 3]. Up to date research reveals that psychiatric illness is both a risk factor for, and consequence of COVID-19. An electronic health record (EHR)-based cohort research of over 60,000 COVID-19 cases, of a documented psychiatric diagnosis in the prior year was associated with a 65% increased risk of COVID-19 when compared with a matched cohort of patients with physical health issues without psychiatric diagnoses [4]. Additionally, over the 3 months after COVID-19 infection diagnosis, 18% of patients were diagnosed with a psychiatric illnesses, with around 6% of them reported as a new case diagnosis (e.g., dementia, anxiety, and insomnia). Similar increases in incidental psychiatric diagnoses among US adults with COVID-19 were reported by Czeisler et al. [5]. Also the sleep disorders which include sleep patterns, and sleep quality have all been affected in profound and somewhat unexpected ways in COVID 19 infected patients [6]. The aim of this study is to describe the psychoneurotic symptoms among COVID infected patients.

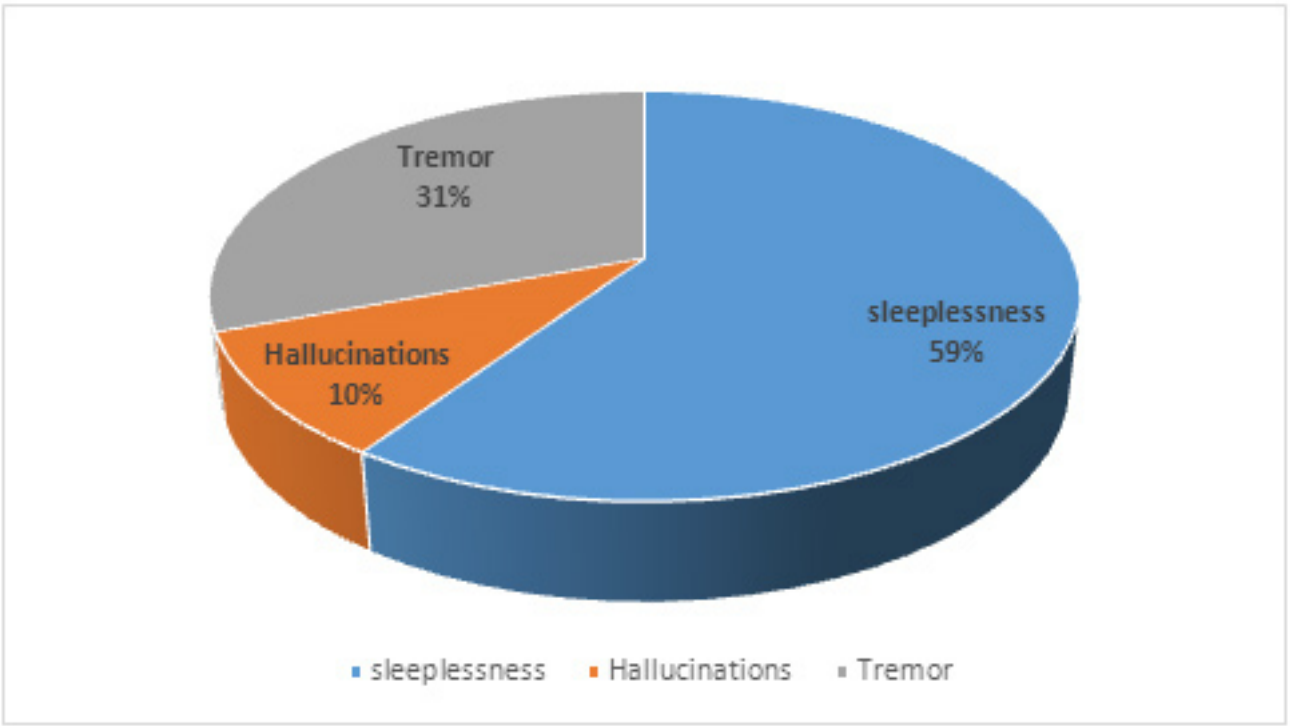
Patients and Methods

A case series study of 101 patients infected with COVID virus in Tikrit city during 2020-2022. The reported patients had different severity of the disease. The patients were followed for 3 months. Information regarding age, gender, other diseases, signs and symptoms, and psychoneurotic symptoms also were documented. Lung involvement percentage was assessed by CT. The SPO2% was reported for the patients at resting sitting position. The blood fasting sugar was tested for all patients and diastolic and systolic blood pressure was examined. All the patients were free of psychoneurotic symptoms during the follow up of the patients and 2 patients needed neurological assessment. Patient agreement was taken before enrollment in the study, after full explanation about the study and the procedure used. Data was analyzed and interpreted using SPSS program.

Results

The reported cases with neuro–psychotic symptoms was sleeplessness reported among 60(59%), tremor among 31(31%), and hallucination was reported among 10(10%), as shown in Figure 1.

Figure 1: The neuro-psychotic symptoms among reported cases



The auditory hallucinations were reported among 4(40%), olfactory hallucinations reported among 5(50%), and visual hallucinations among 1(10%) as shown in Table 1.

Table 1. The type of hallucination reported among patients

Hallucinations	Frequency	Percentage
Auditory Hallucinations	4	40.0
Olfactory Hallucinations	5	50.0
Visual hallucinations	1	10.0
Total	10	100.0

Males were more affected than females regarding hallucinations 7(70%), and 3(30%) respectively, and tremor 17(54.8%), 14(45.2%), sleeplessness was higher among females than males 33(55%), 27(45%) respectively. The age groups 21-30 years and ≥ 61 years had the highest percentages of hallucination 3(30%), 3(30%), while age group 31-40 years had higher percentage of sleeplessness 16(26.7%) and tremor was high among those aged ≥ 61 years 11(35.5%). These relations were statistically significant as shown in Table 2. The vaccinated persons had lower percentages of sleeplessness, hallucinations and tremor 14(23.3%), 1(10%), and 3(9.7%) respectively; this relation was not statistically significant. The patients who had hyperglycemia had higher percentages of sleeplessness, hallucinations and tremor 24(40%), 7(70%), and 18(58.1%) respectively; this relation was not statistically significant. The patients who had hallucinations had high lung involvement measured by CT of the chest (13± 10.4), the SPO2 of those who had hallucinations was (92.3±5.4).

Table 2. The risk factors associated with neuro-psychotic symptoms

		Sleeplessness	Hallucination	Tremor	P value
		F (%)	F (%)	F (%)	
Sex	Male	27(45%)	7(70%)	17(54.8%)	
	Female	33(55%)	3(30%)	14(45.2%)	0.28
Age	21-30	10(16.7%)	3(30%)	1(3.2%)	
	31-40	16(26.7%)	1(10%)	8(25.8%)	
	41-50	18(30%)	2(20%)	6(19.4%)	
	51-60	10(16.7%)	1(10%)	5(16.1%)	
	≥61	6(10%)	3(30%)	11(35.5%)	0.02
VaccinationStatus	Yes	14(23.3%)	1(10%)	3(9.7%)	
	No	46(76.7%)	9(90%)	28(90.3%)	0.21
Hyperglycemia	Yes	24(40%)	7(70%)	18(58.1%)	
	No	36(60%)	3(30%)	13(41.9%)	0.09
CT chest		8.5 ±12.8	13±10.4	11.6±15.5	0.4
SPO2		93.1±4.1	92.3±5.4	91.6±4.7	0.3
Diastolic BP		54±12.9	54±16.5	48.4±11	0.1
Systolic BP		89.7±18.5	94±20.7	85.8±16.3	0.4

Discussion

This study revealed that symptoms in the form of sleeplessness were reported among (59%), tremor among (31%), and hallucination was reported among (10%). Coronasomnia or COVID-somnia are colloquial terms that have been suggested to include the group of symptoms of sleep dysfunction like the followings "as insomnia, disrupted sleep continuity, changes in sleep-wake cycle, feelings of non-restorative sleep and decreased sleep quality arising either due to stresses related to fear of the virus itself or the psychosocial impact on daily living (like as loss of job, financial effects, social isolation, or the actual psychological and medical complications of being infected with COVID-19". [7] Recently, a great number of published articles associating changes in sleep among various patients in the context of the pandemic COVID-19.[6] Goldstein C.A., et al found that the prevalence of insomnia was 11% [8]. Wesselius H.M., et al found that poor sleep is associated with greater susceptibility to COVID-19 infection and worse clinical course among hospitalized patients, however, the cause-and-effect relationship remains undefined [9].

Multiple articles revealed that patients with movement disorders, experienced a worsening of their symptoms, e.g., tremor, bradykinesia, and gait disturbances, after severe COVID-19 [10]. The transient or permanent movement disorders development following viral infection is a well-known fact that has also been documented after SARS-CoV-2 infection [11]. Pre-infection neurological status represents a major issue in understanding whether a direct link exists between infection and neurological changes [12].

Mirfazeli, F.S., et al found that (75.1%) showed at least one neuropsychiatric symptom amd found anosmia (33.8%) among them [13]. These findings are almost in line with previous articles, however in Ling Mao et al's research, fewer patients (36.4%) were reported to show neuropsychiatric complications. [14] Mirfazeli, F.S., et al found around 11% of their patients reported visual or auditory hallucinations which could be secondary to delirium, or neuro-inflammation [13], both of which are possible based on previous literature [15, 16].

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Clinical Aspects of Breast Cancer

Hani Raka Karrar (1), **Mahmoud Ismail Nouh (**1,2), **Badriah Mohammed Alanazi** (3), **Amro Othman Ahmed Hakami** (4), **Wejdan Jamaan S Alzahrani** (5), **Waleed Khalid Aldoweirah** (6), **Waleed Salman Alanazi** (7), **Nasser Emad Alshammari** (8), **Bassam Mohammed Alanazi** (9), **Rahaf abed Alharbi** (10), **Njood Hamad Alshammari** (11), **Hadeel Saleh Alzahrani** (12), **Abdullah Salem A Alghamdi** (13), **Fahad Wadi Alanazi** (14)

(1) Pharmaceutical Care Department, General Network for Healthcare Providers Hospital, Jeddah, Makkah, Saudi Arabia.
(2) General Pharmacist (GNP In-Patient Pharmacy). General Network for healthcare providers, Jeddah, Saudi Arabia. HTTPS://ORCID.ORG/0000-0002-6264-6996
(3) Internal Medicine Assistant Consultant, King Fahad Medical City, Riyadh, Saudi Arabia.
(4) Clinical Dietitian, Ministry of Health, Saudi Arabia.
(5) King Fahad General Hospital, Ministry of Health, Jeddah, Saudi Arabia.
(6) AstraZeneca - Biopharmaceutical Company, Saudi Arabia.
(7) Ocean Company, Northern Border Region, Saudi Arabia.
(8) Johns Hopkins Aramco Healthcare, Dhahran, Saudi Arabia.
(9) Abbott Company, Northern Border Region, Saudi Arabia.
(10) College of Medicine, Batterjee Medical College, Jeddah, Makkah, Saudi Arabia.
(11) Security Forces Hospital, Saudi Arabia.
(12) King Abdulaziz University, Jeddah, Saudi Arabia.
(13) Al-Dwaa Pharmacy, Saudi Arabia.
(14) College of Medicine, Northern Border University, Northern Border Region, Saudi Arabia.

Corresponding author:
Hani Raka Karrar
Pharmaceutical Care Department, General Network for Healthcare Providers Hospital, Jeddah, Makkah, Saudi Arabia
Email: hanywell2006m@hotmail.com

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Abstract

Breast cancer is considered one of the major healthcare problems and one of the top biomedical research priorities among all biomedical research. Breast cancer is a common but extremely complex disease. The incidence of breast cancer becoming more aggressive is increasing, with around one million and seven hundred thousand new cases that get worse yearly, and this incidence is expected to increase significantly in the next 5–10 years. These rates are suggestive of the slow progress of this disease. Worldwide, Breast cancer is the most common cancer affecting women. The mortality rates for women who are already diagnosed with breast cancer have improved, but even then, the median survival in the metastatic stage is low, around 24 months. For the treatment, chemotherapy is the gold-standard approach for most cancer types and the modest improvement in both survival rates and toxicity reduction. Every newly diagnosed breast cancer should be presented at a multidisciplinary conference to ensure optimal management by all specialties involved. A careful history of a woman's risk and symptoms and a thorough physical examination are important in the evaluation of breast problems and appropriately timed imaging and diagnostic studies are also important. Early detection of breast cancer at a stage when it is potentially curable and there is the possibility of saving a breast should be the goal of all health care professionals. Also, careful consideration should be given to the unique nature of each tumor and patient. This article aims to provide a brief introduction and the clinical picture of the disease, Etiology, Pathophysiology, Epidemiology, Nutrition, Prevention, and good practice management advice.

Keywords: Breast Cancer, BRCA1 gene, BRCA2 gene, Type one Diabetes mullites.
Type Two Diabetes Mellites.

Introduction

Breast cancer is considered one of the major healthcare problems and one of the top biomedical research priorities among all biomedical research. The incidence of breast cancer becoming more aggressive is increasing, with around one million and seven hundred thousand new cases that get worse yearly, and this incidence is expected to increase significantly in the next 5–10 years. These rates are suggestive of the slow progress of this disease (1-3). Breast cancer evolves silently, and most disease is discovered on routine screening while other patients may present with an accidentally discovered breast lump, change of breast shape or size, or nipple discharge. Worldwide, breast cancer is the most common cancer affecting women. The mortality rates for women who are already diagnosed with breast cancer have improved, but even then, the median survival in the metastatic stage is low, around 24 months (3). For the treatment, chemotherapy is the gold-standard approach for most cancer types and the modest improvement in both survival rates and toxicity reduction (4, 5). This article aims to provide a brief introduction and the clinical picture of the disease, Etiology, Pathophysiology, Epidemiology, Nutrition, Prevention, and good practice management advice.

Epidemiology

Breast cancer is considered the most common malignancy in women. The incidence of breast cancer varies between countries. Breast Cancer is considered one of the three most common cancers worldwide, along with lung and colon cancer. In 2012, around one million and seven hundred thousand females were diagnosed with breast cancer worldwide, and around five hundred thousand people died from this disease (6, 7). 1 in 8-10 women will get breast cancer during their lifetime. The mortality rate in North America and Europe has decreased, and this has decreased because of the early detection and proper therapies (6, 8). In 2016, There was a drop of eight percent in the mortality rate from breast cancer in Europe (8). Despite the remarkable drop-in mortality rate in Europe and North America, breast cancer cases are growing, and still, it is considered the most common cause of death from cancer in less developed countries such as South America, Africa, and Asia. The cause for this increase is related to the lack of good diagnosis, screening, and therapy (7).

Diagnosis

Breast cancer is mainly diagnosed through either screening or a symptom such as pain or a palpable mass (9). But imaging methods are the primary diagnostic approaches that can offer useful information on patients' breast cancer among the various diagnosis platforms. It has been demonstrated that several imaging techniques, including mammography, MRI, PET, CT, and single-photon emission computed tomography (SPECT), can be used to diagnose and track patients with breast cancer at different stages. Employing biochemical biomarkers including proteins, DNA, mRNAs, and microRNAs in addition to imaging techniques could be used to develop new diagnostic and treatment approaches for patients with breast cancer (10). Mammography screening can help identify breast cancer at an earlier stage, which is associated with reduced mortality. According to a recent systematic review of screening program studies, screening decreased breast cancer mortality for women who were invited to the program by around 23% and by about 40% for regular participants. Most screening programs have switched from two-dimensional (2D) analog mammography to full-field digital mammography (FFDM) within the past ten years. The effectiveness of screening programs is projected to rise as a result of digital mammography (DM), which is linked to modest increases in detection rates and decreases in false positives. It serves as the comparison in this evaluation and is the current standard for the majority of mammography programs (11). According to randomized controlled trials, screening mammography reduces breast cancer mortality by 30%. Mammography does have its limitations, though, with a sensitivity of only 70%. Cancers may not show up on mammography, especially in women with dense breasts. Magnetic resonance imaging (MRI) of the breast is undisputedly the most sensitive of imaging methods to detect cancer, with a higher cancer detection rate than mammography, digital breast tomosynthesis, and ultrasound. Its present limitations include its relatively expensive costs, prolonged examination, and reading times, which prevent it from being used widely as a screening tool for women with an average risk of breast cancer (12). For axillary staging, sentinel node biopsy is still the preferred method over PET/CT, which is not advised for initial diagnosis. However, PET/CT can give important insights into several histological characteristics of the primary tumor, although its value and possible implications are not yet fully understood (13). The use of different imaging techniques has several disadvantages, including cost, a lack of sensitivity, and a lack of specificity. Therefore, it would appear that developing novel biomarkers that could overcome the constraints of imaging techniques is needed. One of the key components of diagnosing and monitoring breast cancer patients is the use of various biomarkers. The right biomarkers could help us improve our knowledge of the cellular and molecular mechanisms underlying the pathogenesis of breast cancer. These findings may be used to develop efficient therapy strategies and track treatment responses in breast cancer patients (10).

Risk Factors

Some factors help increase the development and progression of breast cancer. Several well-established risk factors are associated with the development of breast cancer which include: Age, while the percentage of breast cancer increases with age, the female sex has more chance to develop breast cancer than the male, and early menarche women have a high risk to develop breast cancer than others, and women with a family history of breast cancer in a first-degree relative (mother, sister, daughter) are highly suspected to get breast cancer more than other women especially if cancer has been diagnosed pre-menopausally. Women who have pre-menopausal first-degree relatives with breast cancer have a three- to fourfold increased risk of developing breast cancer than women who do not (14).

Signs and Symptoms

1. Breast mass

Detection of a breast mass is considered one of the most common breast signs for which women seek medical advice. Mainly breast masses are caused by benign lesions. Smooth and rubbery masses related to fibroadenoma in ladies in their 20s and 30s or cysts in ladies in their 30s and 40s (15-17).

2. Breast pain

Breast pain is usually related to cystic changes in premenopausal ladies and rarely comes with breast cancer. Breast pain is mainly associated with Postmenopausal women because of the effect of estrogen replacement therapy due to the effect of fibrocystic changes (18, 19).

3. Other

Other symptoms such as erythema, Edema, nipple discharge, and retraction of the skin are highly associated with malignancies (17, 19).

Management

1. Goal of therapy

The main goal of terapy is to decrease morbidity, mortality, and the economic cost of breast cancer. The treatment of breast cancer is multidisciplinary and can include surgery, radiation, and chemotherapy (20).

2. Surgical therapy

During the beginning of the 20th century, women diagnosed with breast cancer were treated with radical therapy, mastectomy, or Breast conservation surgery (21, 22). Nowadays, the primary treatment for local lesions of breast cancer is surgical intervention (23-25).

3. Chemotherapy

Adjuvant chemotherapy after surgery is recommended for patients at high risk of recurrence. Also, chemotherapy may be needed in a patient with one of the following criteria: Estrogen receptor negative tumor, Progesterone receptor negative tumor, HER2 gene negative tumor, HER2 gene positive tumor, larger tumor size, and positive lymph nodes. Mainly the decision to use chemotherapy should be based on a balance of survival benefits and risk for complications (26, 27).

4. Radiotherapy

Radiation therapy is an important integral part of the treatment of breast cancers from preinvasive to metastatic stages (28, 29). The role of radiation treatment in breast cancer in women with early diagnosis has been long established. Postmastectomy radiation has been a matter of contention for decades (30-32).

Prevention

One of the important roles in modern medicine is to enhance the efficacy of health prevention through conducting research that focuses mainly on primary prevention, risk factors modification to early detection of the disease, and quick beginning of treatment (secondary prevention) (20).

1. Primary Prevention

Primary prevention includes the main causes leading to the disease occurrence, and increasing or enhancing the immune system in the population (33).

1.1 Diet

World Cancer Research Fund and American Institute for Cancer Research recommended a healthy diet as the primary prevention for breast cancer and that helps to maintain proper body weight. A healthy diet includes vegetables, fruits, cereals, and legumes, with little red meat and a little salt. Also, they recommended avoiding sweet beverages, high calorie food, and alcoholic beverages (33).

1.2 Obesity

There is a strong relationship between obesity and increasing the risk of breast cancer. The main cause is high-calorie meals which lead to weight gain and eventually obesity (34, 35). Body Mass Index (BMI) is commonly used to determine underweight, overweight, and obesity, which is calculated by dividing body weight in kilograms by the square of height in meters (kg/m2). BMI range include: BMI range include: <18.50 (underweight), 18.5–24.99 (normal body weight), ≥25.00 (overweight), ≥30.00 (obesity) (36).

1.3 Alcohol

Increasing alcohol consumption will increase the risk of cancer, Also, ethanol and its metabolism substance and acetaldehyde play a role in increasing the risk of cancer (37-39).

1.4 Physical Activity

The relationship between breast cancer and physical activity is stronger among women who have undergone menopause. Physical activity has a positive impact on mental health among patients suffering from malign tumors (40, 41).

2. Secondary Prevention

Secondary prevention aims at terminating the process of disease development before its full symptoms are diagnosed, which may prevent the development of a malign tumor. Secondary prevention includes Mammography (MMG), Ultrasonography (USG), Magnetic Resonance Imaging (MRI), and Breast Self-Examination (BSE). Mainly, these screening types are targeted at specified groups characterized by a greater risk of malignancy (42, 43).

2.1 Mammography

Mainly mammographic screening is used for asymptomatic women. Also, it is used as a diagnostic for women with signs or symptoms of breast cancer. Any sign of breast cancer should be communicated to the radiologist with the referral for a diagnostic mammogram. National Cancer Institution and American Cancer Society recommend screening mammograms every year for asymptomatic women 40 years and older (10, 44, 45). Mammography screening works by testing mammary gland cancer, and it is conducted on women in the age group 50–69 (46).

2.2 DIGITAL MAMMOGRAPHY [DONE]

Digital mammography is similar to standard mammography but the main advantage of this device is that images can be stored digitally, enhance the brightness or contrast, and be transmitted by mobile phones for remote consultation (46, 47).

2.3 Ultrasonography

Ultrasonographic screening is used to differentiate between solid and cystic breast masses when a palpable mass is not well seen on a mammogram (48). The main advantage of ultrasonography is it is safe, has no ionizing radiation, and is non-invasive. It's mainly used as a complement to other diagnostic examinations, and also, used to conduct biopsies under ultrasonography control. But still, the low specificity is the main disadvantage of this device (43).

2.4 Magnetic Resonance Imaging

Magnetic Resonance Imaging works by testing the mammary gland by magnetic resonance. It is very similar to ultrasonography. It is safe, has no ionizing radiation, and is non-invasive. It works complementary to mammography by increasing the detection of malignant lesions (43, 49).

2.5 Breast Self-Examination

Breast Self-Examination is a self-method. It has an important role in detecting cancer at an early stage. The main advantage of this test is it has no cost,, it is available, can be done at home, and does not need technical training. But still, it is not sufficient to confirm the detection of cancer (50, 51).

2.6 Biopsy

Fine-needle aspiration (FNA) biopsy is generally used to obtain samples from a solid mass for cytology (52, 53).

3. Special Cases

3.1 Pregnancy

Since mammography is not performed in pregnant patients, the signs and symptoms during pregnancy are usually a suspicious palpable non-painful lump in the breast. In pregnancy the breast may undergo changes because of the normal physiological changes of the breast enlargement during pregnancy and the diagnosis tends to be delayed, leading to a worse prognosis in pregnant women. It is strongly advised that suspicious or palpable mass persisting > 2 weeks during pregnancy are investigated, even though 80% of breast lesions during pregnancy will be benign (54-56).

3.2 Male

Carcinoma of the male breast is a rare condition that accounts for less than 1% of all cases of cancer in men. Breast cancer occurs at a very low incidence in males, while the whole world's focus is on female breast cancer (57).

3.3 Black Population

Breast cancer makes up 30% of all types of cancer found in women. Before then lung cancer was the leading cause of cancer deaths in black women but that has changed. Nowadays about 12% of black women get breast cancer during their lifetime. black women have the highest rates of breast cancer compared to other races (58).

4. Nutrition and Breast Cancer

General diet characteristics and individual dietary factors play an important role both in the development and the prevention of breast cancer. A healthy lifestyle, including weight management and a high-quality diet such as one that includes omega three fatty acids, natural antioxidants, and fibers are strongly related to better breast cancer outcomes, while unhealthy lifestyle, obesity, and poor dietary habits characterized by excessive intake of high-caloric foods which are rich in sugar and saturated fats will lead to an increase in the risk of postmenopausal breast cancer, recurrence, and mortality rate (59, 60).

5. Follow-Up

The American Society of Clinical Oncology recommends to do one mammogram screening annually, and one visit every 3 to 6 months for the first 3 years, one visit every 6 to 12 months in 4 and 5 years, then annually in patients who have undergone breast-conserving surgery with radiation. (61).

Conclusion

Breast cancer is a common but extremely complex disease. Every newly diagnosed breast cancer should be presented at a multidisciplinary conference to ensure optimal management by all specialties involved. A careful history of a woman's risks and symptoms and a thorough physical examination are important in the evaluation of breast problems, and appropriately timed imaging and diagnostic studies are also important. Early detection of breast cancer at a stage when it is potentially curable and there is the possibility of saving a breast should be the goal of all health care professionals. Also, careful consideration should be given to the unique nature of each tumor and patient.

DEFINITIONS, ACRONYMS, ABBREVIATIONS

BC; BREAST CANCER.
BRCA1; BREAST CANCER GENE 1.
BRCA2; BREAST CANCER GENE 2.
BSE: BREAST SELF-EXAMINATION.
MMG: MAMMOGRAPHY.
USG: ULTRASONOGRAPHY.
MRI: MAGNETIC RESONANCE IMAGING.

Authors' Contributions

'H. Karrar' supervised the team and direct the research. 'M. Nouh' wrote the introduction, epidemiology, complication, and Conclusion paragraph. 'B. Alanazi' wrote the special cases. 'W. Aldoweirah' wrote the introduction. 'A. Hakami' wrote the relation between breast cancer and nutrition. 'R. Alharbi' wrote the diagnosis. 'B. Alanazi' wrote the special cases. 'W. Alanazi' wrote the introduction. 'W. Alzahrani' wrote the treatment. 'F. Alanazi' wrote the epidemiology. 'N. E. Alshammari' wrote the special population. 'N. H. Alshammari' wrote the Risk Factors. 'H. Alzahrani' wrote the risk factors. 'A. Alghamdi' wrote the Sign and symptom. The authors had full access to the data and take full responsibility for the integrity of the data. All the authors gave their approval for the submission of the final manuscript.

Ethical Approval

An ethical approval statement is not applicable, because this study is based exclusively on published literature.

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Over time prevalence of illicit substance use in Saudi Arabia

Abdulrahman Alfaifi (1)
Maged El-Setouhy (2)

(1) Training resident, Saudi board of preventive medicine program, Jazan, Saudi Arabia
(2) Department of Family and Community Medicine, Faculty of Medicine, Jazan University, Jazan, Saudi Arabia

Corresponding author:
Abdulrahman Alfaifi; MBBS
Training resident, Saudi board of preventive medicine program,
Jazan, Saudi Arabia
Email: Abalfaify1@gmail.com
ORCID ID: 0000-0003-3855-1361

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Abstract

Illicit substance use disorder is a chronic brain disease. This disease can lead to many negative health outcomes or even death. Recently, Saudi Arabia's rank was among the top of the world in amphetamine seizures. Drug smuggling as well as conflicts and wars in the surrounding countries might play a role in that. The current paper aimed to review the over time prevalence of illicit substance use in Saudi Arabia. To achieve that, we searched through different databases. We also looked over the United Nations Office on Drugs and Crime (UNODC) reports. The current review found a few articles talking about illicit substance use prevalence in Saudi Arabia; much of that work was about Khat substance. In the end, we concluded that there is a considerable need for further research in this field.

Keywords: Khat, amphetamine, cannabis, drug abuse, illicit substance abuse

Introduction

Illicit substance use disorder is a complex brain disease. It is manifested by a compulsive desire to take the illicit substance despite its harmful effects (1). This disorder can lead to negative health effects which increase with duration (2,3).

Globally, there was an increase in illicit substance use by 30% last decade. In 2017, 5.3 percent of the global population was affected by these substances. The number of deaths related to them was 585,000 deaths. Moreover, 35 million people suffered from illicit substance use disorders that need treatment services (4).

Cannabis is the most abused substance worldwide (5). Unfortunately, Saudi Arabia suffers from many types of illicit substances, in particular the amphetamine (Captagon). It was ranked first globally for amphetamine seizures (6). These massive seizures emphasize the need for more research.

It is worth mentioning that Saudi Arabia is located in the southwest corner of Asia (7). By 2020, the total Saudi population was of 35,013,414 million, 38.79% of them were non-Saudi. The majority of the population is under the age of 65 years and those aged 65 years and more constitute only 3% of the total population (8).

Despite the huge efforts to face this problem, there is still a gap in illicit substance use research, and the large epidemiological studies that address the substance use prevalence in Saudi Arabia were sparse, (9,10) and the study that addresses the ability to monitor illicit substance use in Saudi Arabia is stated to be of high priority (10). Furthermore, enhancing the nation's immunity toward illicit substance use is a part of the 2030 vision (11). Therefore, this study aimed to know the overtime prevalence of illicit substance use in Saudi Arabia. At the end of the current review, we hope that we can end up with advice and recommendations which help to face this problem.

Methods

We conducted this review between June 2021 and May 2022. We aimed to identify all published articles and UNODC reports that address the topic of illicit substance use prevalence in Saudi Arabia. By synthesizing the previous works, we had a look at the overtime prevalence of illicit substance use in Saudi Arabia. We used the PubMed search engine. Also, we searched the SCFHS e-Library that had access to (Jama Network, ClinicalKey, DynaMed Plus, CINAHL, EBSCO Health, and American Academy of Pediatrics databases). Also, we went through the Cochrane library as well. Furthermore, we restricted the synthesis of the current review to the English articles published in Web of Science indexed journals. The following Mesh terms were placed in the PubMed's advanced search bar (*"Substance-Related Disorders"[MeSH Terms] OR ("Catha"[MeSH Terms] OR "cathinone"[Supplement ary Concept])) AND "Saudi Arabia"[MeSH Terms*]. Also, we searched the Saudi commission for health specialties electronic library (SCFHS e-Library) for substance abuse in Saudi Arabia. Then, we searched the Cochrane Library to find any article on this topic; (substance use disorder or substance abuse) in Saudi Arabia was placed in the advanced search bar. Moreover, we searched the reference lists of the eligible studies and Google Scholar to find more articles. The duplicated articles were identified and then deleted using the reference management software. Figure 1 shows the article selection process; 36 articles have been included in this review. Finally, we reviewed all United Nations Office on Drugs and Crime reports (UNODC) from 1997 to 2021, and all Global Illicit Drug Trends reports from 1999 to 2003 to collect more information related to the illicit substance use prevalence in Saudi Arabia.

Inclusion criteria

We included articles that showed substance use prevalence among the general population. Also, we added those that addressed the different substances, such as amphetamine, methamphetamine, Khat, cannabis (hashish and marijuana), alcohol, cocaine, opiates (e.g., heroin), or inhalants, to the current review. Moreover, we included the articles that presented the percentage of different substances used by drug abusers who sought treatment in health care facilities.

Exclusion criteria

We excluded articles on smartphone and/or video game addiction, smoking tobacco and/or electronic cigarette, postmortem studies, doping substances, research on animal, and plant studies. Also, we excluded, case reports, case series, case-control, abstracts, reviews, qualitative research, and experimental studies from this review. We ended up with 36 articles, which we used in the current review.

Results

This review included 36 articles and 4 UNODC reports. 31 articles were published after the year 2000, and about a third of all published articles was on Khat use percentage and/or prevalence (n=13). The rest of the published research was about other illicit substance use (n=23); 13 articles showed the rates of illicit substance use among the studied individuals, and 10 articles were about the percentages of different drugs used among those who sought treatment for substance use problems. Two articles from Saudi National Mental Health Survey (SNMHS) were included as well.

The qualities of the included studies

To find an answer to our research question "what is the overtime prevalence of illicit substance use in Saudi Arabia?", and not to miss any important article, we had to broaden our search to find all related articles in different databases. We only reviewed those published in Web of Science indexed journals to ensure the relative quality of the included studies.

Figure 1. Flow diagram of the literature review and study selection process

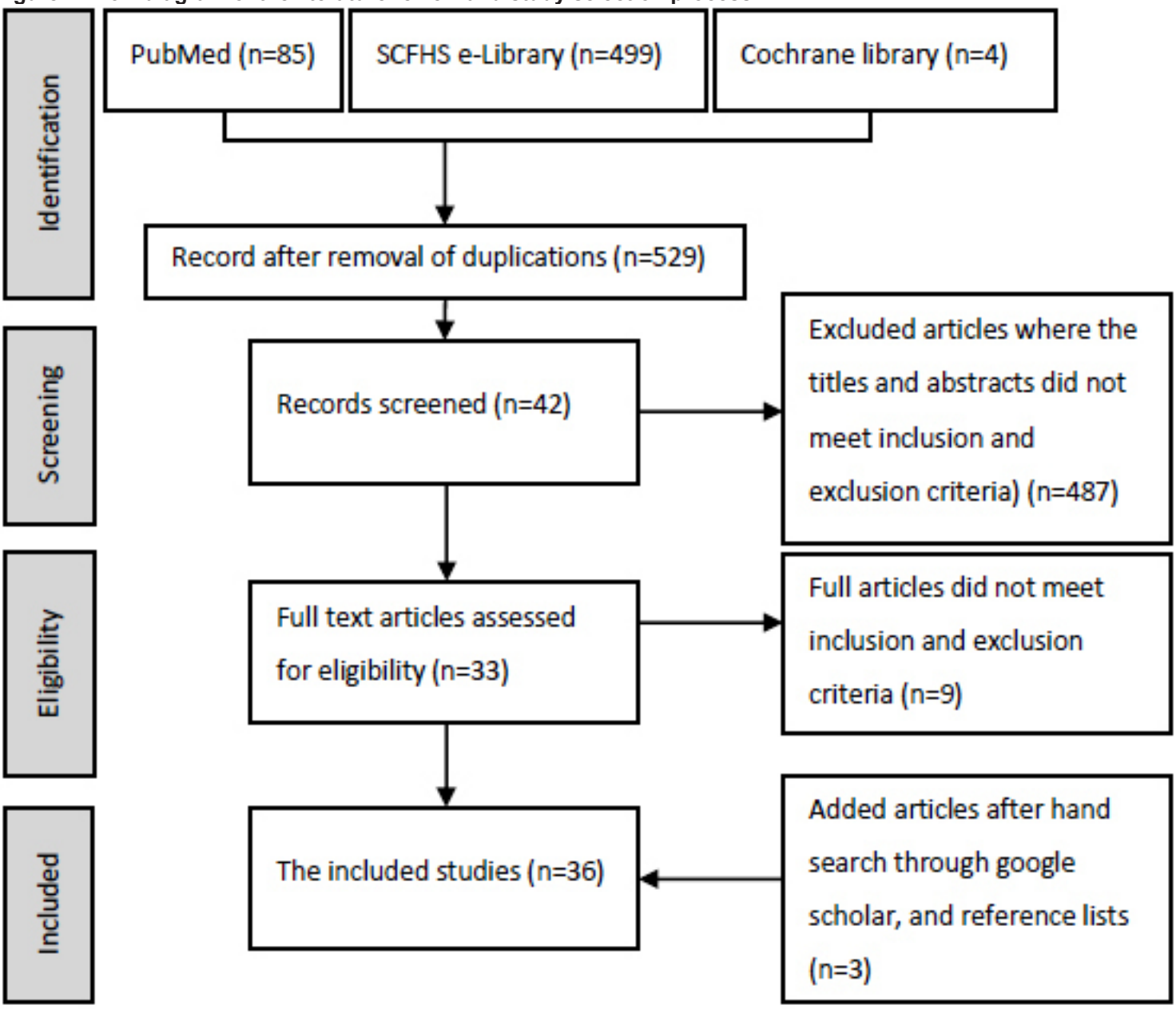

Figure 2. Primary substance abuse among persons treated for drug problems in Saudi Arabia in the years 2001 and 2006. Sources: World Drug Reports 2005 and 2009 (12,13)

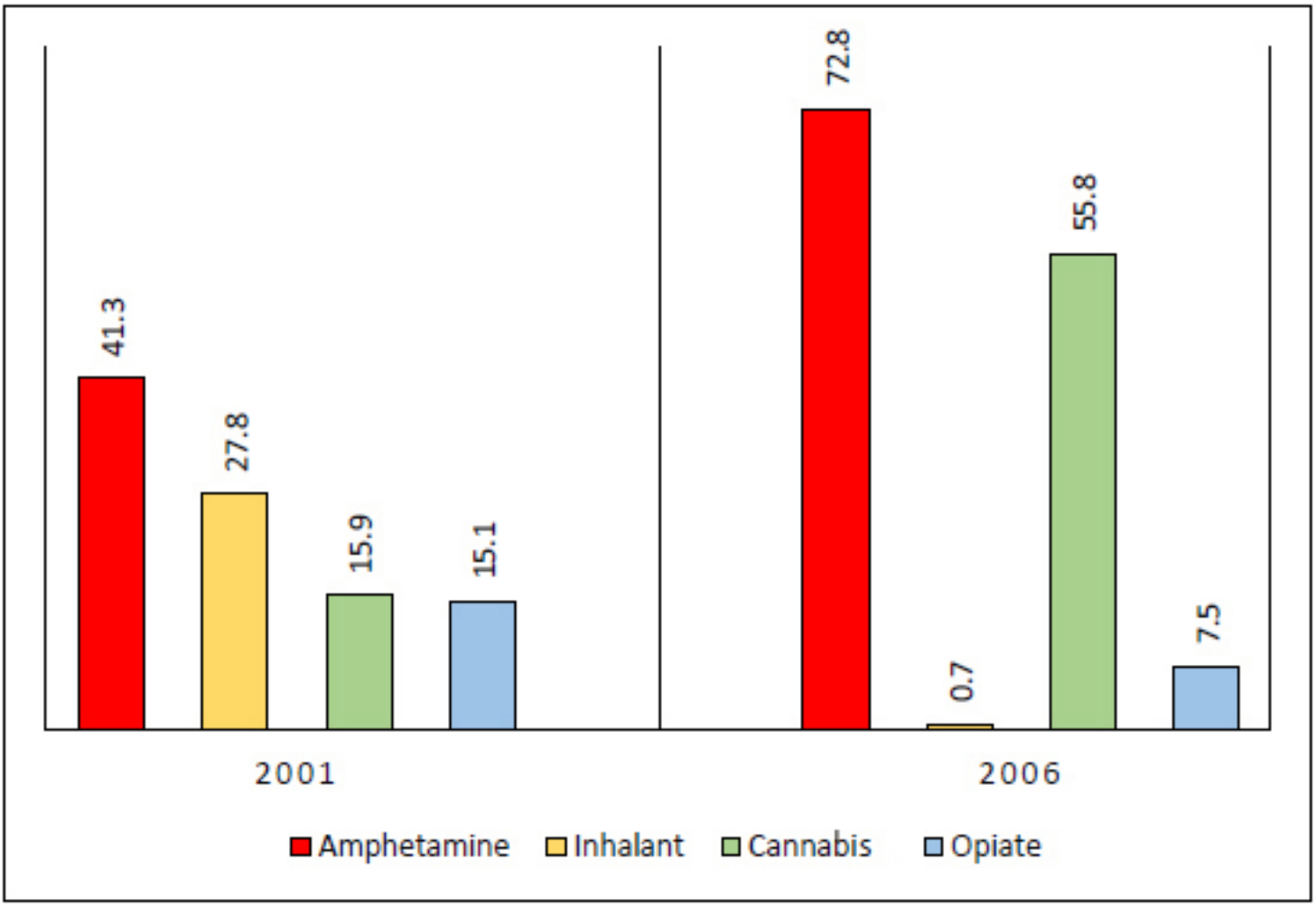

Table 1. Percentages of different drugs used among those seeking treatment for illicit substance use problem

Author(s)	No. (study year/s)	Amphetamine /stimulants (%)	Alcohol (%)	Cannabis (%)	Heroin (%)	Sedatives (%)	Volatile/ glue (%)	Notes
Osman[14]	485 (1988-1989)	5.2	16.1	NA	43.5	NA	NA	NA
Hafeiz[15]	116 (1995)**	10	31.2	26	83.6	1.8	0.9	One patient abused cocaine
Iqbal.[16]	799 (1995)	4	11	0.88	63	0.5	5	Two patients on Khat and one on cocaine
Iqbal.[17]	302 (1997)	4.30**	21.52	NA	68.21	NA	6.95*	**single substance dependence
Al-Nahedh.[18]	160 (1998)	NA	23.75	10.63	18.75	23.12	9.38	NA
Bassiony.[19]	101 (2002)	71.3	NA	60.4	24.8	7.8	NA	2% cocaine
AbuMadini et al.[20]	12,743 (1986–2006)	34.7	26.2	35.7	33.1	10.2	3.8	Overtime increase in amphetamine, alcohol, cannabis, and sedative use And decrease in heroin and volatile use
Alzahrani et al.[3]	165 (2012-2013)	72.2	49.1	40	46.1	NA	55.8	Polysubstance abusers were 74.5%
Ibrahim et al.[21]	612 (2016)	24	9	≈ 4	NA	NA	NA	Polysubstance abusers were 62%
Almarhabi et al.[22]	101 (2016)	38.6	6.9	24.8	7.9	NA	NA	NA

Abbreviation: NA, not available; No, number of study individuals.
Note: * we wrote the published date because we did not find the study date.

Table 2. Rates of illicit substance use among individuals in the reviewed studies

Author(s)	No. (study year/s)	Characteristics of study participants	Substance use (%)	Amphetamine/ stimulants (%)	Heroin (%)	Alcohol (%)	Cannabis (%)	Khat (%)	Volatile (%)
Al-Umran et al.[23]	27,916 (1988)	Male students	NA	NA	NA	NA	NA	NA	5.3
Elsayed et al.[24]	100 (2010)*	Mentally ill offenders	56	39	NA	9	4	4	NA
Ginawi.[25]	451 (2012)	Volunteers	NA	NA	NA	7.5	NA	NA	NA
Hafsa et al.[26]	225 (2012)*	Men (15–20 years)	8	NA	NA	NA	NA	NA	NA
Almuneef et al.[27]	10,156 (2013)	National study participants	8	NA	NA	8	NA	NA	NA
Alosaimi et al.[28]	406 (2013-2014)	Patients attending infertility clinics	3	NA	NA	NA	NA	NA	NA
Beaver et al.[29]	494 (2014)	School students	3	NA	NA	2.6	NA	NA	NA
Al Buhairan et al.[30]	11,361 (2015)*	School students	NA	1.5	NA	1.4	1	NA	16.2
Hakami.[31]	746 (2013-2016)	Schizophrenic patients in the adult psychiatry clinic	NA	29.2	NA	NA	10.3	22.5	NA
Ahmad et al.[32]	157 (2015-2017)	Youth with repeated suicidal attempts	6.4	NA	NA	NA	NA	NA	NA
Alrakaf et al.[33]	1,177 (2019)	Medical students	2.46**	NA	NA	NA	NA	NA	NA

Abbreviations: NA, not available; No, number of study individuals.
Notes: * we wrote the published date because we did not find the study date; ** Illicit use.

Table 3. Percentages of Khat use in Jazan, Saudi Arabia

Author(s)	Study year	Study sitting	Sample size	Age	Percentages	Male (%)	Female (%)
Ageely.[34]	2006	Colleges and secondary schools	10000	15-25 years	21.4	37.7	3.8
Alsanosy et al.[35]	2011	Intermediate and upper secondary schools	3923	10-20+ years	20.5	33.1	4.3
Alsanosy et al.[36]	2011-2012	Higher education students	4100	20-24+ years	23.1	38.5	2.1
Mahfouz et al.[37]	2012	Primary health care centers	4,500	>12 years	28.7	36.9	8.7
Peeran et al.[38]	2013	Selected population around the university	1766	15-34 years	18.3	NA	NA
Awadalla et al.[39]	2015	Recruited drivers from transport stations	215	22-89 years	47.4	NA	NA
Quadri et al.[40]	2015	University colleges	500	NA	52	NA	NA
Hakami et al.[41]	2016	Schizophrenia patients on antipsychotic monotherapy at psychiatric Hospital	1007	18-64 years	48	59.9	1.6
Darraj et al.[42]	2017-2018	Diabetic patients at primary health care centers	307	≥18 years	18.2	32.1	3.4
Albahhawi et al.[43]	2018	University students	642	22.14±1.7 years	15.3	24.7	5.4
Badedi et al.[44]	2020	Type 2 diabetic patients at primary health care centers	472	Older than 18 years	14.19	NA	NA
Alkhormi et al.[45]	2022	Type 2 diabetic patients at diabetic center	375	18 years and above	20	NA	NA

Abbreviation: NA, not available.

Discussion

Illicit substance use in Saudi Arabia

Saudi Arabia is a higher income country located in southwest Asia (46). This country is near areas suffering from poverty, conflicts, and wars (47). Such surrounding problems in those areas creates an opportunity for the illegal drugs to be abused and produced without control (48). Hence, Saudi Arabia has a major problem, and many seizures of different substances have been recorded over the years (12,49,50).

Between 2011 and 2016, Saudi National Mental Health Survey (SNMHS) was conducted and showed that the 12-months prevalence of substance use disorders in Saudi Arabia was 1.9%; 0.2% were for alcohol abuse, 1.4% for drug abuse, and 0.5% for drug dependence (51). On the other hand, the same survey showed that the lifetime prevalence of substance use disorders was 4%; 0.6 for alcohol abuse, 2.7% for drug abuse, and 0.8% for drug dependence (52). This was lower than the median lifetime prevalence of substance use in 18 countries, of which it was 7%. Moreover, the alcohol abuse among the Saudi population was far lower than those who abused it in other countries (53). This could be due to the banning of Alcohol in Saudi Arabia (54,30).

Over time prevalence of different illicit substances in Saudi Arabia

Amphetamine is the most abused drug in Saudi Arabia. It is a stimulant drug that leads to higher levels of euphoria and an altered mental state for a while. This substance can lead to an addiction and negative physical, psychological, and social problems (55). Apart from UNODC reports, no study was found to know the prevalence of amphetamine use among the general population. UNODC reports showed that the prevalence of amphetamine use among the Saudi Arabian population has risen dramatically. This prevalence was 0.01%, 0.002%, and 0.4% in the years 1998, 2000, and 2006, respectively. At the same time, the prevalence of opiate use rose from 0.01% in 2000 to 0.06% in 2006 (56-58). One specialist hospital in the treatment of drug addiction problems in Saudi Arabia found that there was a nine fold increase in amphetamine use treatment admissions between 1998 and 2006. Also, it found a three times increase in the number of amphetamine treatment admissions as compared to other admissions (20). The second most abused substance in Saudi Arabia was cannabis. Its prevalence in 2006 was 0.3% among those between 15-64 years (6).

From the above, it is obvious that the most abused substances among the general population in 2006 were amphetamines followed by cannabis. This can be seen in the drug addictions treatment centers where amphetamine users present more frequently than others. Then, they were followed by cannabis users as seen in Figure 2. Moreover, this figure showed an overtime increase in amphetamine and cannabis use and a decrease in opiate and inhalant use. Similarly, Table 1 showed an over time increase in the percentage of amphetamine use and a decrease in heroin use. One Saudi study found such a pattern (20). This was seen in Australia and Finland as well (59,60). The increasing trend of amphetamine use and seizures in Saudi Arabia over the last decade could be attributed to the geographical closeness to areas that produce amphetamine substances and the closeness to the drug trafficking routes (13,60). Another contributing factor to such an increase is the easiness of amphetamine production and abuse (61). Another possible contributing factor is drug relapse which is defined as the returning of the individual to the previous state of addictive behavior (62). One review in 2013 showed that the prevalence of substance use relapse in Saudi Arabia was around 50 percent or more (5).

Interestingly, an increase in amphetamine and cannabis use over time was seen in many studies (59,60,63-65). Our study also confirmed that. On the other hand, Table 2 shows the rate of substance use among different individuals. The rate was lowest (2.46%) among medical students and highest (56%) among mentally ill offenders. One report in Canada showed an association between offending and substance use. It stated that around 42% of crimes might not occur if the offender was not under the influence of the substances or seeking them (66). Moreover, different studies found a positive relationship between substance use prevalence and mental illness (59,67). This will raise our attention to the association between illicit substance use and psychological problems and give us a clue to the possibility of benefit from any preventive or treatment strategies that focus on this relationship.

Khat use

According to our research, an amphetamine-like substance named Khat was widely consumed in the southwest region of Saudi Arabia. This psychoactive drug contains cathinone (β-keto analog of amphetamine).

The Khat leaves are chewable and used in the southwest Arabian peninsula and east of Africa. Those who take Khat feel higher for a while (68). Many studies have been done in Saudi Arabia regarding this plant. In our research we found that this plant is socially acceptable among some populations despite its negative impact. The Kingdom of Saudi Arabia bans this plant and there were many efforts to decrease its use. An example of such an effort was the incentives given to those who replace it with any other crops and/or remove it from their lands (34-36,43,69).

In this review, we tried to collect all articles that address the topic of Khat use prevalence in Saudi Arabia and we found that most of the work was done in Jazan city. This city is the most affected by this plant. One reason is the smuggling from Yemen where the Khat is cultivated. Another reason is that some areas in the Jazan region cultivate this plant as well (70).

By reviewing all available articles that address the percentages of Khat use among the different populations in the Jazan region, we found that the Khat use percentages were widely varied and ranged from 14% to 52%. One of

the most affected groups by this plant was the students. As seen in Table 3, many researchers found that around one-quarter of the Jazan students were Khat users. A similar percentage was seen among the Ethiopian students as well (71). It is obvious that this phenomenon affects males mainly but does not exclude females (36). Table 3 shows that the trend of Khat use among the university students in the Jazan region tends to decrease over time from 23.1% in 2011 to 15.3% in 2018. Similarly, it showed an overtime decreasing trend among those attending primary health care and diabetic centers from 28.7% in 2012 to 20% in 2022. This decrease in the Khat use trend could be attributed to the efforts done by the Saudi government to control this substance (70). On the other hand, around half of schizophrenic patients, drivers, and students in 2015-2016 were using Khat. No explanations were found here as these results were far away from the other studies' results. Although, it was known that Khat could exacerbate a preexisting psychiatric problem, there is no clear evidence of the causal link between Khat use and the development of mental illness (72).

Furthermore, the war in Yemen may have a role in the fluctuating Khat prices that might affect its consumption. One study found that Khat substance is price elastic which means any price change will change the consumption amount, and the relationship was negative. This phenomenon may help the policymakers in the affected countries to control the Khat use habit (73). Similar findings happen when tobacco product prices increase. The WHO Framework Convention on Tobacco Control stated that the single and most effective strategy to encourage tobacco users to decrease consumption or even quit is to raise tobacco retail prices through increasing taxes(74).

Although Khat use is banned in the Kingdom of Saudi Arabia and other countries, it is still used. It is known that the addiction potential of Khat is low and the main problem of its use is social and financial (75). Hence, we proposed an MPOWER-like strategy for Khat control that might help to decrease its consumption rate in the future. The MPOWER package consists of a set of six keys which is the most effective strategy for fighting the global tobacco epidemic(76). Table 4 illustrates the MPOWER strategy as well as the proposed one. Applying such a strategy to the affected regions around the world could be a helpful tool for controlling the Khat epidemic.

Recommendations

By the end of this study, we found that illicit substance use research in Saudi Arabia is still small, and there is a huge need to do more. Besides the other substances abused, special attention must be tailored to amphetamine, cannabis, and Khat as they were the most abused in Saudi Arabia. Moreover, we encourage applying more research regarding the proposed MPOWER-like strategy among the affected population around the world to evaluate its effectiveness in controlling the Khat use habit.

Limitations

This review included the published studies only. Therefore, searching gray literature could give us another view of the substance use prevalence in Saudi Arabia. Moreover, this work is a narrative review. The included studies were heterogeneous in their setting, aim, and sample. Hence, upon the availability of more and strong illicit substance use prevalence studies, a systematic review will give us a trusted result.

Conclusion

We conclude that there is an illicit substance use problem in Saudi Arabia. The most abused substance found in Saudi Arabia was amphetamine. Khat use was seen more frequently in the Jazan region. The number of articles that measure the prevalence of substance use inside the Kingdom of Saudi Arabia was low and many of them were about Khat prevalence. Finally, an MPOWER-like strategy for controlling Khat substance was proposed.

Table 4. Proposed MPOWER-like strategy for Khat control in comparison to the original strategy for tobacco control

MPOWER package for tobacco control	MPOWER-like package for Khat control
1) Monitoring tobacco consumption and the effectiveness of preventive measures	1) Monitoring Khat consumption and the effectiveness of preventive measures
2) Protect people from tobacco smoke	2) Protect people from Khat chewing
3) Offer help to quit tobacco use	3) Offer help to quit Khat chewing
4) Warn about the dangers of tobacco	4) Warn about the dangers of Khat chewing
5) Enforce bans on tobacco advertising, promotion, and sponsorship	5) Enforce bans on Khat advertising, promotion, and sponsorship*
6) Raise taxes on tobacco	6) Applying taxes on those who buy, sell, or cultivate Khat*

*Note: It might not be applicable in countries where Khat is completely banned.

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Osteoid osteoma of the proximal femur: A case report

Ameena Khalid Bughamar (1)
Noora Hamad Alaazmi (2)
Fahad Alkhalifa (3)

(1) Obstetrics and gynecology department, BDF hospital, Kingdom of Bahrain
(2) Internal medicine department, BDF hospital, Kingdom of Bahrain
(3) Orthopedics department , BDF hospital, Kingdom of Bahrain

Corresponding author:
Dr. Ameena Khalid Bughamar
Obstetrics and gynecology department, BDF hospital,
Kingdom of Bahrain
Email: ameenakhalid._@hotmail.com

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Abstract

Background : Osteoid osteoma “OO” is a benign bone tumor that has a potential to become malignant. It can affect people of all ages, but is most commonly seen in children and young adults. It commonly involves long bones such as femur and tibia. Patients often present with pain that is worse at night and relieved by non-steroidal anti-inflammatory drugs (NSAIDs). Osteoid osteoma can be diagnosed by imaging studies such as X-rays, a Computed tomography (CT) scan and MRI as it classically consists of a central vascularized nidus that represents the neoplastic tissue which can be identified on a CT scan. Many different options are being used in the management of osteoid osteoma ranging from analgesics and physiotherapy to surgical intervention if the conservative management failed to relieve the pain.

Case report: We are presenting a case of a 12 year old male with Proximal femoral OO who was managed conservatively in the beginning and then treated using X-Ray Guided percutaneous Drilling of the lesion with good postoperative clinical outcome. In this Report we are discussing the surgical steps as well as the prognosis compared to other treatment options.

Conclusion: A delay of the diagnosis can occur due to the majority of differential diagnoses and the difficult interpretation of the diagnostic imaging, so a high clinical suspicion and early interventions using more advanced imaging modalities allows earlier diagnosis of ‘’OO’’ and therefore quicker treatment and relief of patient symptoms.

Keywords:
“OO” osteiod osteoma .
“NSAIDS” by non-steroidal anti-inflammatory drugs.
“CT” Computed tomography .
“MRI” Magnetic resonance imaging.

Introduction

Osteoid osteoma [OO] is a benign osteoblastic tumor, that usually measures less than 2 cm in size and consists of a central vascularized nidus that represents the neoplastic tissue which can be identified on a CT scan [1,2,3] . OO accounts for around 5% of all bone tumors and 11% of benign bone tumors affecting males [1]. It commonly involves long bones such as the femur and tibia [1]. OO classically causes nocturnal pain that is alleviated by NSAIDs [1, 2]. This is a case report of a patient who presented to the Bahrain Defense Force hospital - Royal Medical Services [BDF –RMS] with a diagnosis of an "OO" of the upper femur treated using percutaneous drilling technique.

Case Presentation

A 12 year old male, not known to have any medical problems, presented to the BDF hospital with a history of a progressive left lower limb pain of 6 months duration. The patient described the pain to be dull in nature, scaling 7 out of 10 in pain severity, worsening at night and alleviated by analgesics. He also gave a history of limping over the right side while walking due to the pain. Patient denies any history of trauma or limp injury.

Examination revealed a conscious, alert , vitally stable patient with mild localized tenderness affecting left anterior proximal femur, mainly over the groin region. Overlying skin was normal with no erythema nor ecchymosis and no warmth over the affected area. Patient was having normal motor power and muscle tone with good painless full range of motion of both the hip and knee. Distal neurovascular function was intact as well.

As part of investigations: X-Ray was requested which showed a small radiolucent area affecting proximal femur and part of the neck. CT scan of upper femur was then requested and was followed by MRI which confirmed the diagnosis.

After the radiological diagnosis of "OO", the patient and his family were advised for surgical excision of the lesion which they agreed to and patient enderwent Surgical C-Arm Guided percutaneous Drilling Excision of the OO lesion as planned.

Intraoperative, localization of the tumor was done using C arm guidance. A guide wire was inserted under guidance and was drilled through the target lesion [Figure 3 arrow] aided by Multiplane X-rays. A size 4.5 Cannulated Drill, was then used over the guide wire for drilling of the target lesion which was then followed by a size 6.5 cannulated drill to ensure complete excision (Figures 4, 5]. Bone tissue samples were obtained from the Drill bit and were sent for histopathological examination [Figure 6]. Final confirmation of complete excision was done using C arm. Post operatively, the patient was mobilized with full weight bearing over left LL. With aid of Physiotherapy the patient was then discharged in a stable condition and followed up in Outpatient clinic. At two weeks follow-up at the clinic, patient reported complete resolution of the symptoms including night pain and antalgic Gait. Patient continued to follow up with physiotherapy for muscular rehabilitation. He was followed up in the clinic over a period of 6 months where he showed complete recovery with no recurring symptoms or complaints.

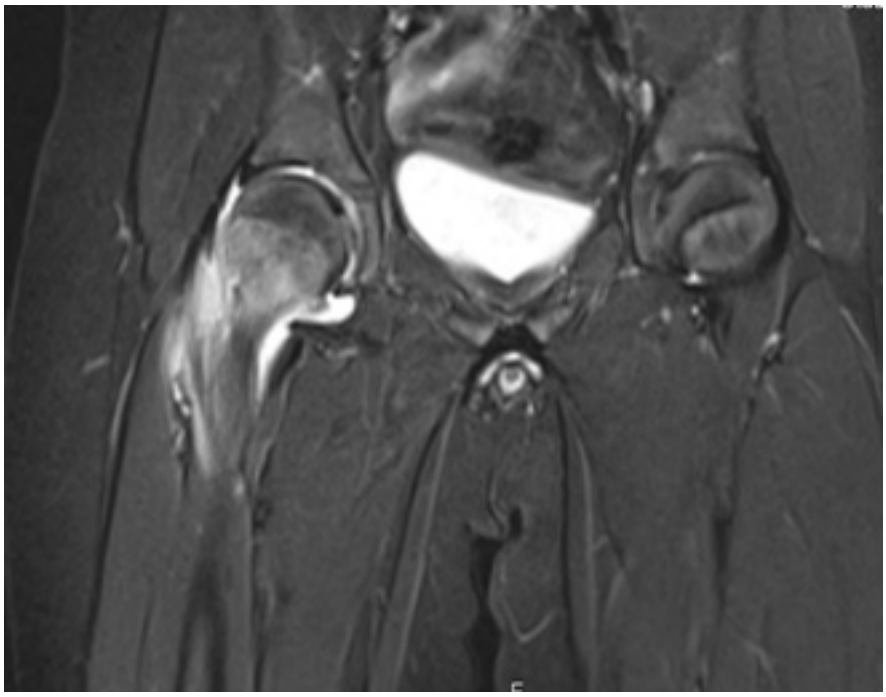

Figure 1: Contrast coronal CT of the upper femur

Figure 2: Coronal MRI of the upper femur

Figure 3: A Guide wire was inserted under guidance and was drilled through target lesion.

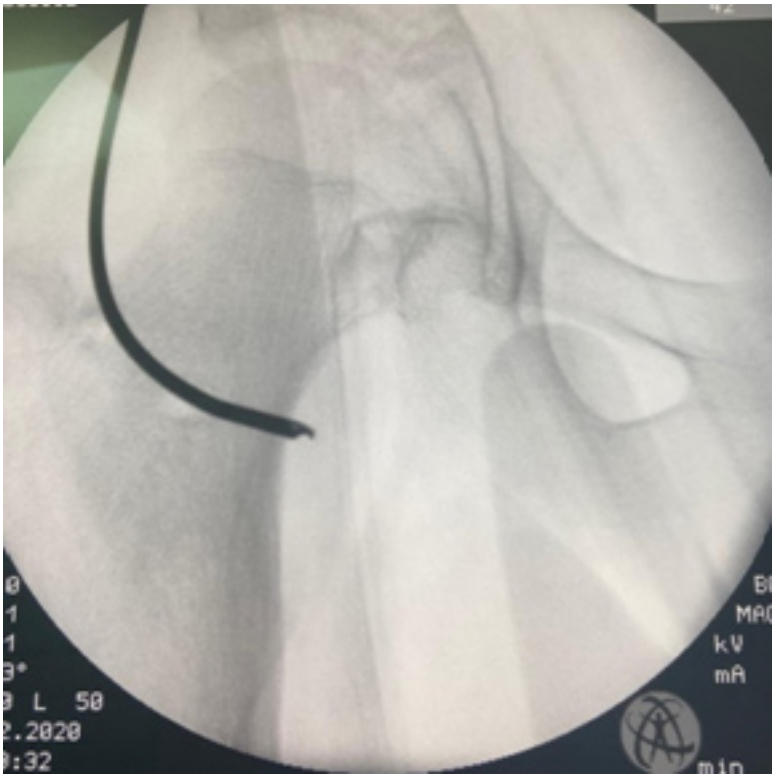

Figure 4: Size 6.5 cumulated drill to ensure complete excision.

Figure 5 : Bone tissue samples were obtained from the Drill bit and were sent for histopathological examination.

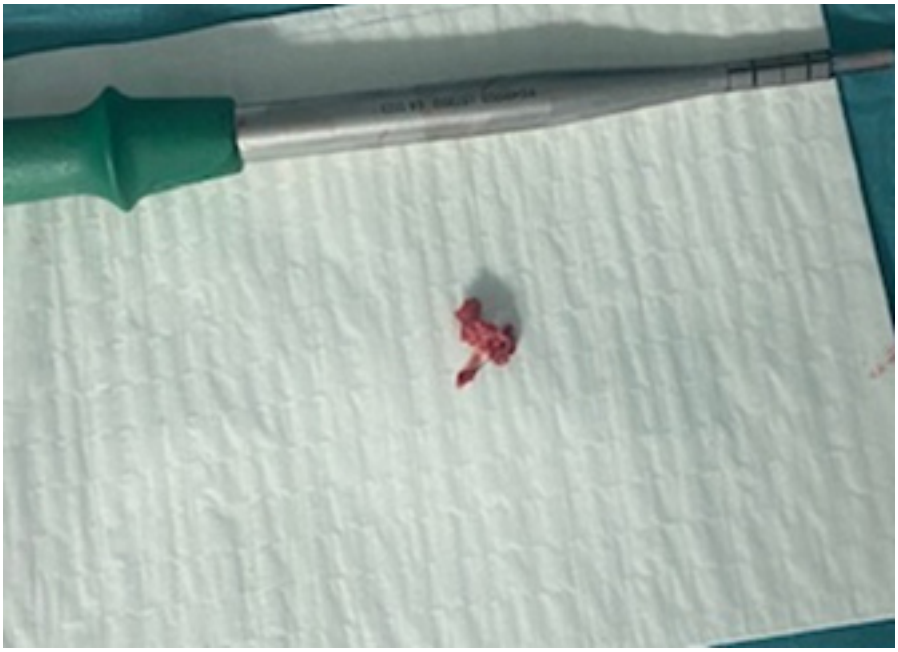

Figure 6 : Final confirmation of complete excision was done using c arm.

Case Discussion

Osteoid osteoma is a benign bone tumor.with "OO" makingf up to 10% as per the literature [2].

People with ages between 5 and 25 are considered the age group in which "OO" is usually found, with a male gender predominance as they are 3 times more affected than female gender [1,3].
"OO" is subdivided into 3 variants as per the literature; cortical , cancellous, or subperiosteal, out of which cortical lesions were considered the most common variant .

Patients with "OO" are usually presenting with nocturnal pain that is progressive and dull in character and which relived by NSAIDs .
Our patient was complaining as well from the night pain which was relieved by the analgesics given to him and this presentation support that osteoid osteoma is one of the top differential diagnosis .

Plain radiography is the initial investigation of choice in any other bone tumors [1].

The appearance of an osteoid osteoma on a plain radiograph is a classically small, round, radiolucent nidus with surrounding sclerosis and this was the finding in our patient X-Ray as it was the first modality of investigation that was done for him as discussed above.

The nidus itself may contain an area of calcification.

The double density sign is a characteristic of OO that is seen in three phase bone scintigraphy in which there is intense focal uptake centrally and an area of less uptake in the peripheral area or in other words the area surrounding the dense central uptake.
A CT scan is considered the radiological imaging of choice in "OO" as it can clearly identify the characteristic central target shaped nidus [1,2,3,4].

Our patient was ordered to do a CT scan and MRI to confirm the diagnosis and it reported the presence of a well-defined cortical thickening in the anterior side of the proximal femoral metadiaphysis extending to lower side of neck of femur [figures 1, 2], as well as a small area of radiolucency in the anterior side of the lower neck of femur with a small central nidus that goes with the diagnosis of OO.

However bone marrow edema shown on MRI can mask the typical features of the tumor, so MRI is less useful than CT for the evaluation and the diagnosing of "OO". It is however more accurate than CT in diagnosing cancellous lesions [1,2,3,4].

Treatment options for " OO'' can be divided into two types; the first one is operative and the second is non-operative management [1].
Non-operative treatments include medication such as administration of aspirin or other NSAIDs to relieve the pain [2]. However, operative treatments are also considered as an option especially in patients with failure of medical treatments or those with high risk of renal and gastrointestinal complications due to the chronic used of NSAIDs [1].

However, there are many surgical options such as : en bloc resection, CT-assisted percutaneous radiofrequency, CT-assisted percutaneous en-bloc excision, CT-assisted percutaneous thermocoagulation, open intra-lesional curettage, CT-assisted percutaneous radiofrequency ablation, CT-assisted percutaneous en bloc excision and CT-assisted percutaneous laser photocoagulation [3,4].

The Radio frequency ablation is used whereby the nidus is located by the guidance of CT scan and burned by radio frequency waves through a needle placed inside the nidus [1,2]. However there are other approaches including the en bloc resection in which the entire nidus is removed surgically [1,3].

Our patient was given a trial of analgesics and physiotherapy for 6 months. However this line of management failed and surgery was warrant, so our patient underwent Surgical C-Arm Guided percutaneous Drilling Excision of the OO lesion as discussed above.

Conclusion

Our patient had a satisfactory outcome from the surgery and was able to mobilize immediately after the surgery with complete resolution of symptoms and that is all in favour of the early interventions using more advanced imaging modalities such as CT scan and MRI which allows earlier diagnosis of ''OO'' and therefore quicker treatment and relief of patient symptoms.

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Consent:
Written and signed Consent from the patient has been obtained.

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HEADACHE – Common symptom with Rare Diagnosis in UK Primary Care – A Case report

Syed Mohsin Raza (1)
Syed Shahinul Haque (2)

(1) Dr Syed Mohsin Raza, MBBS, MRCGP UK, General Practitioner, Manchester UK
(2) Dr Syed Shahinul Haque, MBBS, MRCGP UK, General Practitioner, Birmingham UK

Corresponding author:
Dr Syed Mohsin Raza, MBBS, MRCGP UK, General Practitioner,
Manchester UK
Email: dr_smraza@hotmail.com

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Abstract

Headache is a common presenting symptom in Primary Care with a wide list of differential diagnoses and important red flag symptoms.

It is vital in Primary Care to undertake a comprehensive history, careful examination and appropriate investigations when patients present with any of these symptoms. Clinicians should be mindful of the differential diagnoses and red flag symptoms in order to appropriately manage patients. It is also crucial to recognise when to get help from secondary care colleagues when faced with rare and complex cases that may need hospital admission for further investigations, management and monitoring.

This case highlighted the importance of being aware of different, including rare, differentials when confronted with a common presenting symptom.

Keywords: headache, rare diagnosis, Reversible Cerebral Vasoconstriction Syndrome (RCVS).

Headache prevalence

• Headache is a common symptom in Primary care.

o A cross-sectional study using structured questionnaires (n = 8,271 from 10 European countries including Austria, France, Germany, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Spain and United Kingdom) found the lifetime prevalence of headache to be 91.3% and the annual prevalence 78.6% [Steiner, 2014].

• Most patients self-manage their headaches, yet it still remains one of the commonest reasons for consulting in Primary Care.

o An analysis of records from 253 UK General Practices found that approximately 4% of adults consult their GP for headache each year (6.4% per year in women and 2.5% per year in men) [Latinovic, 2006].

o Approximately 2% of people seen in General Practice with headache are referred to a neurologist [Latinovic, 2006].

• The majority of headaches are primary (approximately 90%).

o The three most common types of primary headache are tension-type headache (40%), migraine (10%) and cluster headache (1%) [Hainer, 2013; Hale, 2014].

Headache – with rare diagnosis – A Case report from UK Primary Care

A 41 year old lady presented with a one day history of sudden onset severe headache, described as the "worst ever", which intensified over a few minutes. This is a description in keeping with a "Thunderclap Headache"; a well known red flag symptom.

It was associated with photophobia and nausea.

She denied any neck stiffness, loss of consciousness, fits, weakness of upper or lower limbs, slurring of speech, visual disturbance or dizziness.

She had no significant past medical history or previous history of headache and she was not taking any regular medication.

She was an ex-smoker. She did not drink alcohol.

On examination, the cardiorespiratory systems and Peripheral neurological examinations were normal. Cranial nerves were intact. Fundoscopy was normal and, in particular, no papilloedema was noted. ENT examination was also normal.

Observations were unremarkable: BP 143/79; Pulse 88 and regular; Temp 36.7 degrees Celsius; Oxygen Saturation 98 % on air.

She was referred to the hospital and admitted by the on call medical team. She was examined, underwent blood tests and received a CT head scan; all of which were reported as normal. She was thus discharged home with a provisional diagnosis of Migraine or Tension type headache with appropriate safety netting advice.

She presented to the Emergency Department three days later with the same severe headache but now occurring in episodes described as "worst ever" and lasting for a few minutes to a couple of hours each time. Furthermore, she now had associated vomiting with the episodes and generally felt unwell. She was readmitted to the medical ward. A repeat CT head scan showed bilateral Parietal Parenchymal Haemorrhage and a Subarachnoid Haemorrhage.

To further evaluate these findings she had a CT angiogram (CTA) which showed multi focal narrowing on the Pericallosal arteries as well as the middle cerebral and vertebral arteries, features suggestive of Reversible Cerebral Vasoconstriction Syndrome (RCVS).

A follow up MR Angiogram confirmed multi-vessel narrowing without focal wall enhancement, again suggestive of RCVS. The subarachnoid and left hemisphere Parenchymal haemorrhages showed the expected evolution.

MR Cervical Spine and Echocardiogram were both reported as normal.

She was treated with Nimodipine 60mg three times daily and discharged. On review by the neurologist at 4 weeks post discharge she reported feeling much better. The patient remains under the care of the neurologist with a plan to discontinue the medication if she remains symptom free, and, if follow up imaging, planned at 12 weeks post discharge, is normal.

Discussion

This case was both interesting as well as challenging due to the initial normal examination and investigations, including a normal CT scan of the head. This is often the case in RCVS. It served as a reminder that even common presentations such as headache may on occasion be symptomatic of rarer or more complex pathology as is the case in RCVS. Hence clinicians should adopt an open minded approach, particularly if the patient's symptoms are not resolving, and be prepared to reconsider the initial diagnosis.

In summary, the key learning points from this case were:

• Specifically, be aware of RCVS as a potential differential diagnosis in patients with headache.

• More generally, to re-evaluate and reconsider the diagnosis if the patient continues to have symptoms despite normal initial investigations.

• To recognise red flag symptoms in primary care and act accordingly and in a timely fashion. For example, a first presentation of thunder clap headache should prompt immediate referral to hospital for same day specialist assessment.

What is Reversible Cerebral Vasoconstriction Syndrome (RCVS)

Reversible cerebral vasoconstriction syndrome (RCVS) is a relatively recently described condition characterised by sudden, severe ('thunderclap') headache; with or without other acute neurological symptoms and diffuse segmental constriction of cerebral arteries that resolves spontaneously within 3 months.

Reversible cerebral vasoconstriction syndromes are clinically important because they affect young persons and can be complicated by ischaemic or haemorrhagic strokes. The differential diagnosis of RCVS includes conditions associated with thunderclap headache and conditions that cause irreversible or progressive cerebral artery narrowing, such as intracranial atherosclerosis and cerebral vasculitis. Misdiagnosis as primary cerebral vasculitis and aneurysmal subarachnoid haemorrhage is common because of overlapping clinical and angiographic features. However, unlike these more ominous conditions, RCVS is usually self-limiting: resolution of headaches and vasoconstriction occurs over a period of days to weeks.
More than half the cases are seen in the post-partum period or after exposure to adrenergic or serotonergic agents. It affects all ages, mean age of onset is 42 years, and women are affected more than men.

RCVS is thought to be responsible for the majority of benign thunderclap headaches.

History and etymology

Case studies of the condition first appeared in the 1960s, but it was not then recognised as a distinct entity. In 1983, French researchers published a case series of 11 patients, terming the condition acute benign cerebral angiopathy. Gregory Call and Marie Fleming were the first two authors of a report in which doctors from Massachusetts General Hospital, led by C. Miller Fisher, described 4 patients, alongside 12 previous case studies, with the characteristic symptoms and abnormal cerebral angiogram findings. The name Call-Fleming syndrome refers to these researchers.

A 2007 review by Leonard Calabrese and colleagues proposed the name reversible cerebral vasoconstriction syndrome, which has since gained widespread acceptance. This name merges various conditions that were previously treated as distinct entities, including Call-Fleming syndrome, postpartum angiopathy, and drug-induced angiopathy. Other names may still be used for particular forms of the condition.

Clinical Features of RCVS

The condition is usually acute and self-limiting without the appearance of new symptoms after one month. RCVS may present as a thunderclap headache (TCH) in isolation or as TCH with associated neurologic symptoms.

Headaches remain the main and often the only manifestation in these patients.

- Presents with acute headaches - thunderclap headaches.
- Pain may last for a few minutes to a few hours.
- Typically bilateral (but can be unilateral), with posterior onset followed by diffuse pain.
- Screaming, crying, agitation, confusion and collapse are common due to the severity of the pain.
- Nausea, vomiting, photophobia, and phonophobia is frequently seen.
- Multiple episodes of thunderclap headaches are seen which recur approximately every day for a few days up to four weeks (but a single attack is also possible).
- Between exacerbations the patient may complain of a persistent moderate headache.
- In about a third of patients, a surge in blood pressure can be observed during acute headaches.

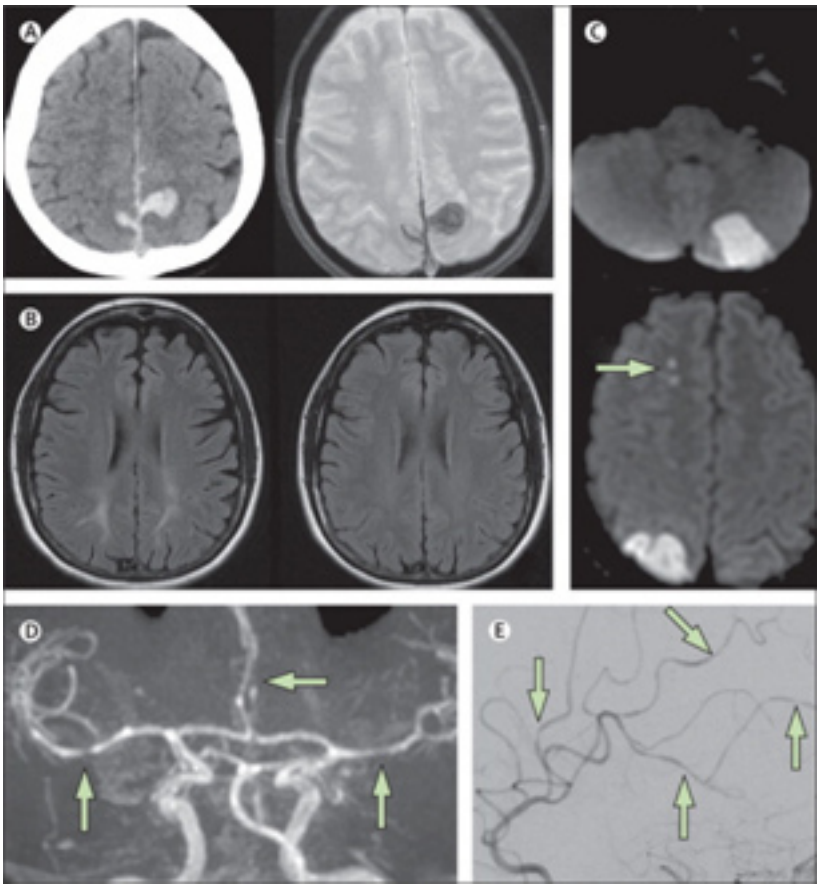
Precipitants of Reversible Cerebral Vasoconstriction Syndrome

- Post-partum period
- Vasoactive drugs
    - o illicit drugs e.g., cannabis, cocaine
    - o Antidepressants e.g., selective serotonin reuptake inhibitors, serotonin-noradrenaline reuptake inhibitors
    - o Sympathomimetics e.g., nasal decongestants (phenylpropanolamine, pseudoephedrine, ephedrine), norepinephrine
    - o Binge drinking
- Catecholamine-secreting tumours e.g., Phaeochromocytoma, bronchial carcinoid tumour
- Immunosuppressants or blood products e.g. - intravenous immunoglobulin, red-blood-cell transfusion, interferon alfa
- Miscellaneous e.g. - hypercalcaemia, porphyria, head trauma, neurosurgery, subdural spinal haematoma, carotid endarterectomy, cerebral venous thrombosis, CSF hypotension

Neuroimaging for RCVS

RCVS with isolated headache will show a normal plain CT brain. However, as the condition progresses the presence of segmental narrowing and dilatation ('string of beads') of one or more cerebral arteries, seen on magnetic resonance angiography (MRA) or CT angiography (CTA), becomes diagnostic of RCVS.

Figure: Lesions in patients with reversible cerebral vasoconstriction syndrome



Proposed diagnostic criteria for reversible cerebral vasoconstriction syndrome:

• Acute and severe headache (often thunderclap) with or without focal deficits or seizures.
• Uniphasic course without new symptoms more than one month after clinical onset.
• Segmental vasoconstriction of cerebral arteries shown by indirect (e.g., magnetic resonance or CT) or direct catheter angiography.
• No evidence of aneurysmal subarachnoid haemorrhage.
• Normal or near-normal CSF (protein concentrations <100 mg/dL, <15 white blood cells per µL).
• Complete or substantial normalisation of arteries shown by follow-up indirect or direct angiography within 12 weeks of clinical onset.

Other causes of thunderclap headaches should be considered in the differential diagnosis.

Note:

• Clinicians should note that early investigations (MRA, CTA, and even catheter angiography) may be normal up to six or seven days after headache onset in patients who are ultimately shown to have RCVS on repeat angiography.
• Haemorrhagic and ischaemic stroke can occur, sometimes after a few days of isolated headaches in patients with initial normal brain imaging.

Management of RCVS

There is no evidence-based treatment for RCVS. Early recognition of the syndrome is important to manage symptoms.

Spontaneous resolution usually occurs, with improvement in angiographic findings within three months. The natural history of the condition has not however been well characterised. Complete long-term resolution of the symptoms with no neurological deficit is the most common outcome in up to 90% of patients.

• Remove any precipitating or aggravating factors
    o Patients should be advised to rest (some patients need bed rest in hospital for two weeks) and to avoid sexual activity, physical exertion, Valsalva manoeuvres, and other triggers for a few days to a few weeks (depending on the initial severity).
    o Vasoactive drugs should be discontinued (avoided even after disease resolves).

• Drug treatment to relieve vasospasm:
o Nimodipine, Verapamil and Magnesium sulphate have been used. Although no randomised controlled trials are available, treatment with calcium channel blockers seems to be efficacious and are thought to be a reasonable first-line therapy. Short course glucocorticoid therapy has also been advocated.

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Necrotizing Fasciitis of Spine: The knowledge of physicians in Saudi Arabia toward this rare condition

Alshehri A. Mohammed

Orthopedic Resident, College of Medicine, Umm Al Qura University, Department of Surgery/Orthopedic Section Surgery, King Abdullah Medical City,Makkah, Saudi Arabia.

Correspondence:
Alshehri A. Mohammed
Alqadi street, Batha Quraish,
Makkah, Saudi Arabia
Tel: 966558020403
Email: Ned330100@gmail.com

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Abstract

Background: Necrotizing fasciitis (NF) is an emergency condition which is rare and characterized by the rapid progressive infection of the soft tissue. This condition is mainly occurred at limb however, spine NF is rare and life- threating condition. Adequate knowledge about these rare conditions could be helpful in earlier diagnosis and commencement of management which could reduce the complications of this disease and reduce its mortality rate. Thus, the aim of this study is to assess the level of knowledge of physicians in Saudi Arabia toward necrotizing fasciitis of the spine.

Methodology: This is cross-sectional study that was conducted among physicians of different regions of Saudi Arabia. This study depended on self-reported questionnaire that was distributed online through Google sheets over social platforms such as Facebook and WhatsApp. Online means of distribution was used in order to achieve a big sample from different regions of Saudi Arabia. The questionnaire was self-designed according to literature review.

Results: This study was conducted among 161 physicians where 59 % of them were males while 53.4 % of the participants were younger than 35-years-old. In general, 47.2 % of the physicians in this study had adequate knowledge considering NF. Age was a significant factor affecting the level of knowledge among the physicians (P=0.0003) where 62.7 % of the participants older than 35 years old had adequate knowledge compared with 33.7 % of those younger than 35 years old. Specialty of the physicians is another significant factor affecting knowledge of the participants (P=0.0001) where those who were surgeons had the highest level of knowledge. Furthermore, in this study, we found that 34.8 % of the physicians reported seeing a case with NF before with those who reported seeing a case with NF showing higher level of knowledge significantly (P=0.0001).

Conclusion: We found that there is higher percentage of physicians who have inadequate knowledge regarding NF including spinal symptoms, especially among general practitioners. Urgent need to improve the awareness of physicians toward NF and other rare conditions is important in order to improve the early diagnosis of these conditions and starting medical intervention in earlier stages.

Keywords: Necrotizing fasciitis, knowledge, Saudi Arabia

Introduction

Necrotizing fasciitis (NF) is a condition that is a surgical diagnosis which is characterized by the rapid progressive infection of the soft tissue causing widespread tissue necrosis as well as related systemic disease and symptoms [1–3]. NF is one of the fatal soft-tissue infections that were reported with a high mortality rate that reached 76 % in some studies [4]. The surgical characteristics of the diagnosis of NF include superficial fascia, absence of pus and dishwater-gray exudate [3]. Because the infection has a rapid progression, early recognition and application of aggressive surgical debridement are critical in order to reduce the mortality [5]. NF is shown in different bodily regions especially at extremities, and spine involvement is an extremely rare condition [5]. It is difficult to diagnose NF in early stages because the symptoms of this stage include pain at the site without evidence of infection. Thus, patients who have been treated with chronic pain at the same site may develop a differential diagnosis after disease progression [4].

NF is a limb related condition and considered one of the life-threatening surgical emergencies that requires emergent and aggressive medical care where most of these patients are managed in the intensive care unit [6]. Different terminologies are used to describe the condition of NF including hospital gangrene, acute dermal gangrene, streptococcal gangrene, Fournier's gangrene suppurative fasciitis and synergistic necrotizing cellulitis [7].

NF has been known as a terrible disease since the time of Hippocrates. By the end of the eighteenth century, Fournier reported a necrotic infection of the perineum and genital area which is known as Fournier gangrene. In 1952, Wilson described the condition as necrotizing fasciitis which is the preferred terminology in our days because it describes the most consistent and key features of the condition, the fascial necrosis. In general, necrosis means the death of a portion of the tissue while fascia is fibrous tissue that encloses the muscle [8].

Reasons for the emergency state of NF is its high morbidity and mortality where early debridement will have a significant favorable outcome. Therefore, NF is considered as a surgical emergency. Among patients with NF, 90 % of them will need intensive care and organ supportive therapy and up to 46 % of NF patients at extremities need limb amputation [6].

Risk factors associated with NF include diabetes mellitus which is considered the commonest risk factor. In a previous study, the authors reported that up to 57 % of patients with NF had diabetes mellitus [6]. Moreover, in another study, the authors found that 53 % of the patients with NF were diabetic patients, while other risk factors include hypertensive disorders in 25 % of the patients, cardiac diseases (15 %), chronic airway disease and brachial asthma in less than 10 % of the patients with NF [9]. Moreover, use of non-steroidal anti-inflammatory (NSAID) medications seems to have a significant correlation with development of NF where a previous study showed a significant association between NF and use of NSAID (OR= 31.4, 95 % CI 6.4-15.3) [10]. Furthermore, another study showed that 50 % of patients diagnosed with NF had received NSAIDs before presenting to the hospital [9]. NSAIDs medications are known to suppress the cytoprotective effect of prostaglandins however, these medications are used for reducing the pain which prevents the patients from going to hospitals while the disease process is continued which results in late presentation to the hospital [9]. In this study, we aimed to assess the level of knowledge of physicians in Saudi Arabia toward necrotizing fasciitis of the spine.

Methodology

Study design and setting:
This is cross-sectional study that was conducted among physicians of different regions of Saudi Arabia. The study was conducted using a self-reported questionnaire which was distributed online.

Subjects:
- Inclusion criteria:
• In this study, we included all physicians working in Saudi Arabia
• Of both genders
• And agree to participate in this study
- Exclusion criteria:
• In this study, we excluded students, residents and other medical staff such as nurses
• University staff such as professors and students were excluded
• Those who did not agree to consent were excluded from the study

Tools and procedures of the study:
This study depended on self-reported questionnaire that was distributed online through Google sheets over social platforms such as Facebook and WhatsApp. Online means of distribution was used in order to achieve big sample from different regions of Saudi Arabia. The questionnaire was self-designed according to literature review. It consisted of three parts; part one was designed to assess the demographic factors of the participants such as age, gender, region, specialty, and experience. The second part consisted of questions that assessed the knowledge of the participants regarding the condition. For each question, one correct answer was provided as (Yes, No, I do not know). Correct answer was coded as 1 while incorrect answer and I do not know answers were coded as 0 and the score of the questionnaire was determined by summing the score of questions. The higher the score, the better the knowledge. Then, the participants were categorized as low knowledge and high knowledge where answering 60 % of questions or more was assessed as high knowledge. The third part was used to assess the prevalence of necrotizing Fasciitis of Spine by asking the participants if they had dealt with patients diagnosed with this condition. In order to assess the validity of the questionnaire, a pilot study among twenty participants was conducted.

Statistical analysis:
MS Excel was used for data entry, cleaning and coding of the data while SPSS version 26 was used for data analysis. Frequency and percent were used for describing of categorical variables while mean and standard deviation were used for ongoing variables. t test and chi test were used to assess the relation between knowledge and demographic factors. All statements were considered significant if p value is lower or equal to 0.05.

Results

In this study, we were able to collect data from 191 physicians who agreed to participate in this study however, 30 responses were excluded because of incomplete questionnaires, thus the final sample was 161 participants. Among the sample, 59 % of them were males while 53.4 % of the participants were younger than 35-years-old. Moreover, 22.4 % of the participants were from the northern region while 21.1 % were from the southern region. Furthermore, we found that 39.1 % of the participants were surgeons while 35.4 % were orthopedic physicians and 25.5 % were general practitioners. Among the participants 41.6 % of the physicians had experience of more than 10 years and 41.6 % had experience lower than 5 years (Table 1).

Among physicians in this study, 63.35 % of them knew the main definition of necrotizing fasciitis (NF) as rapid progressing, inflammatory infection of the fascia with the secondary involvement of skin, subcutaneous tissues and muscle. Moreover, 47.83 % of the participants did not know that the majority of NF is seen in extremities while spine involvement is extremely rare. Furthermore, 86.96 % of the physicians knew that NF is a life-threatening condition however, 32.3 % of them did not know that NF is a surgical emergency. Moreover, 67.7 % of the physicians knew that NF is associated with pain in the back and thus, the differentiation from back pain is difficult. Only 65.84 % of the physicians knew that diabetes is a risk factor for developing NF and 55.9 % knew that patients with NF present with systemic disorders while almost 70 % have a knowledge considering LRINEC score. Moreover, 64.6 % of the physicians knew that imaging techniques are important in diagnosis of NF while 67.7 % knew that bold early surgical debridement is essential for treating of NF (Table 2).

In general, 47.2 % of the physicians in this study had adequate knowledge considering NF with ability to recognize more than 60 % of the questions correctly while 52.8 % of the participants had inadequate knowledge considering NF (Figure 1).

In this study, we did not find any significant difference between genders considering level of knowledge (P=0.962) where 47.4 % of male and 47.0 % of female participants had adequate knowledge. Age was a significant factor affecting the level of knowledge among the physicians (P=0.0003) where 62.7 % of the participants older than 35 years old had adequate knowledge compared with 33.7 % of those younger than 35 years old. Specialty of the physicians is another significant factor affecting knowledge of the participants (P=0.0001) where those who were surgeons had the highest level of knowledge (65.1 % of them had adequate knowledge) followed by orthopedic physicians (50.9 % of them had adequate knowledge) while only 14.6 % of general practitioners had adequate knowledge. The more years of experience was significantly associated with better knowledge (P=0.0001), where 74.6 % of those with experience of more than 10 years had adequate knowledge compared with 57.1 % of those with 5-10 years of experience and 14.9 % of those with less than 5 years of experience (Table 3).

Furthermore, in this study, we found that 34.8 % of the physicians reported seeing a case with NF before while 26.7 % of the participants reported seeing less than two cases and 8.1 % 2-5 cases with NF. Those who reported seeing a case with NF showed a higher level of knowledge significantly (P=0.0001) and the more cases dealt with by the physicians, the higher the level of knowledge they had. Finally, 88.8 % of the participants reported that thought that they are able to deal with case of NF and those showed a higher level of knowledge (Table 3).

Table 1: The demographic factors of the participating physicians

Gender	Male	95	59.0 %
	Female	66	41.0 %
Age	< 35	86	53.4 %
	> 35	75	46.6 %
Residency	Northern region	36	22.4 %
	Western region	32	19.9 %
	Southern region	34	21.1 %
	Central region	29	18.0 %
	Eastern region	30	18.6 %
Specialty:	General practitioner	41	25.5 %
	Surgeon	63	39.1 %
	Orthopedic physicians	57	35.4 %
Experience:	< 5 years	67	41.6 %
	5-10 years	28	17.4 %
	> 10 years	67	41.6 %

Table 2: The knowledge of the physicians considering necrotizing fasciitis

Item	TRUE		Wrong/I do not know	
	Count	Percent	Count	Percent
Necrotizing fasciitis (NF) is a rapidly progressing, inflammatory infection of the fascia with the secondary involvement of skin, subcutaneous tissues and muscle	102	63.35 %	59	36.65 %
The majority of NF is seen in extremities. Spine involvement is extremely rare	84	52.17 %	77	47.83 %
NF is life- threating condition	140	86.96 %	21	13.04 %
NF needs surgical emergency	109	67.70 %	52	32.30 %
NF is not associated with pain at the back and could be differentiated from back pain	109	67.70 %	52	32.30 %
Diabetic patients have higher risk of development of NF	106	65.84 %	55	34.16 %
Patients with NF will be presented with systemic disorders	90	55.90 %	71	44.10 %
Do you know about LRINEC score?	112	69.57 %	49	30.43 %
Imaging technique is not important in diagnosis of NF	104	64.60 %	57	35.40 %
Bold early surgical debridement is not essential for treatment of NF	109	67.70 %	52	32.30 %

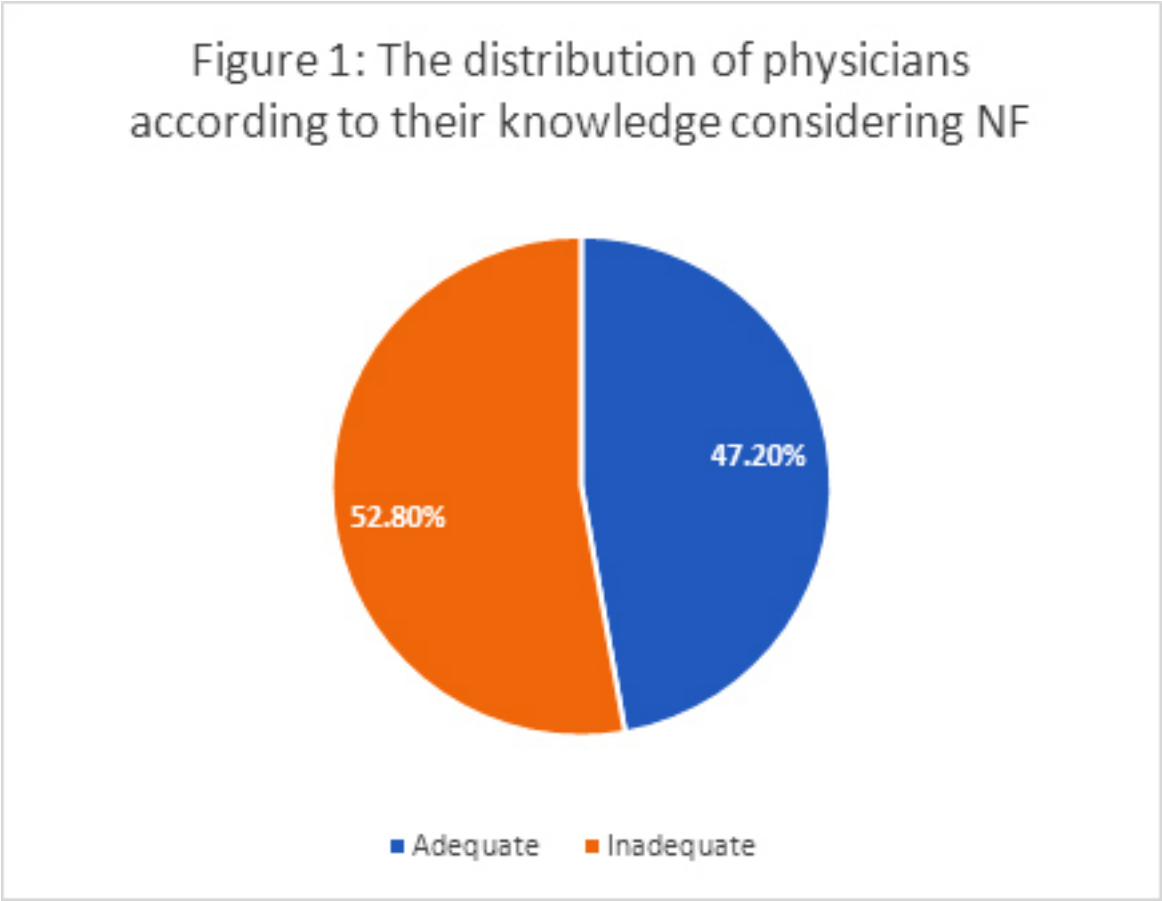

Table 3: The relation between demographic factors and level of knowledge

Item		Adequate		Inadequate		P-value
		Count	Percent	Count	Percent	
Gender	Male	45	47.4	50	52.6	0.962
	Female	31	47.0	35	53.0	
Age	< 35	29	33.7	57	66.3	0.0003*
	> 35	47	62.7	28	37.3	
Residency	Northern region	17	47.2	19	52.8	0.316
	Western region	15	46.9	17	53.1	
	Southern region	16	47.1	18	52.9	
	Central region	14	48.3	15	51.7	
	Eastern region	14	46.7	16	53.3	
Specialty:	General practitioner	6	14.6	35	85.4	0.0001*
	Surgeon	41	65.1	22	34.9	
	Orthopedic physicians	29	50.9	28	49.1	
Experience:	< 5 years	10	14.9	57	85.1	0.0001*
	5-10 years	16	57.1	12	42.9	
	> 10 years	50	74.6	17	25.4	
Do you see a case with NF before?	Yes	49	87.5	7	12.5	0.0001*
	No	27	25.7	78	74.3	
How many cases of NF, have you ever deal with?	0	27	25.7	78	74.3	0.0001*
	< 2	37	86.0	6	14.0	
	2--5	12	92.3	1	7.7	
Do you think that you are able to deal with case of NF?	Yes	74	51.7	69	48.3	0.000*
	No	2	11.1	16	88.9	

Discussion

Necrotizing fasciitis is a rare surgical emergency. However, antibiotics, resuscitation and critical care are important; surgical debridement remains the life saving therapy. Delay in the diagnosis and surgical management of these infections increases the mortality significantly [11–13]. Assessment of knowledge of physicians of rare conditions is important. Adequate knowledge about these rare conditions could be helpful in earlier diagnosis and starting of the management which could reduce the complications of these diseases and reduce its mortality. This is important as in our condition under investigation, early diagnosis and treatment are critical. Up to our knowledge, there is no previous study that was conducted to assess the knowledge of physicians toward such rare condition. There is a huge gap in our understanding regarding the knowledge of physicians about necrotizing fasciitis of spine. Thus, the aim of this study was to assess the level of knowledge of physicians in Saudi Arabia regarding necrotizing fasciitis of spine.

Many previous studies showed that physicians had lower knowledge and inadequate awareness of rare diseases which are not presented frequently among them [14–17]. Rare medical conditions are generally defined as serious, life-threatening and chronic conditions which affect a small percentage of the general population [18]. However, each rare condition is associated with varied problems experienced by the patients, their families and caregivers. One of the most common issues associated with these rare conditions that prevent the patients from achieving better quality of management and quality of life is the difficulty in the diagnosis [15,19]. Misdiagnosis or delayed diagnosis can result in the deterioration of the symptoms and progression of the rare disease which results in inappropriate medical intervention and additional medical costs [14,15,19]. Our results confirm this fact where only 47.2 % of the physicians in this study had adequate level of knowledge regarding NF of the spine. This indicates the importance of increasing interest in providing the physicians with improved information of the rare conditions including NF in order to improve the ability of these physicians in correct and timely diagnosis of these conditions. Most of the previous studies considering rare conditions, reported that dealing with these rare conditions is associated with higher knowledge among the physicians where dealing with patients with difficult and persistent symptoms require the physicians to search for new information considering these symptoms [15–17,20]. This is confirmed using our data which showed that physicians who reported dealing with previous cases reported the highest level of knowledge where increasing the rate of the condition is associated with even better knowledge. One recommended solution of inadequate knowledge of NF and other rare conditions is good communication between the physicians themselves, in the hospital and within different hospitals which will help in facilitating the process of transferring information between doctors, especially those who have faced these cases of patients with rare diseases, with recommendations on how to diagnose, and treat and the consequences.

NF is surgical condition; thus, it is not surprising that surgeons had a higher level of knowledge considering NF than other specialties. However, our data showed shocking information considering that only 14.6 % of general practitioners had adequate knowledge. General practitioners were the first physicians who deal with patients in emergency departments [21–23] and low level of knowledge indicates that the delay in diagnosis is highly possible.

This study included some limitations including depending on self-reported questionnaire which may lead to some personal bias where some participants may not be very honest in completing the questionnaire. Moreover, depending on online means of distributing of the questionnaire may lead to some sampling bias toward younger participants. On the other hand, this study was able to provide a validated tool to assess the knowledge of the physicians considering one of the rare conditions of NF with Cronbach's alpha of 0.735 which is considered a good score and considered a reliable questionnaire.
In conclusion, we found that there is higher percentage of physicians who have inadequate knowledge considering NF including spinal symptoms, especially among general practitioners. Urgent need to improve the awareness of physicians toward NF and other rare conditions is important in order to improve the early diagnosis of these conditions and starting of medical intervention in earlier stages.

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