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In this issue, there is still major interest in the Covid issue in the region and a number of papers deal with topics of importance to the health care professional, in addition to a number of interesting cases.

Alzahrani, et al., followed a cross-sectional research design, to investigate the possible adverse effects of COVID-19 vaccinations on menstrual abnormalities in women in their reproductive period. Almost half of participants (48%) reported the incidence of menstrual abnormalities after receiving COVID-19 vaccinations, manifested as changes in frequency, length or quantity of menstruation. Participants received one, two or three doses of either Pfizer-BioNTech or Oxford-AstraZeneca vaccines. Adverse effects of COVID-19 vaccines occurred mainly after the third doses of Pfizer and AstraZeneca (12.5% for both). The authors concluded that Women who receive COVID-19 vaccinations may have menstrual abnormalities. This change mainly occurs after the third dose, regardless of the brand of received vaccine. It is recommended that women be clearly informed after vaccination of the possibility of short-term menstrual abnormality and to seek proper medical advice in such conditions. Further studies are required to investigate the possible mechanisms behind these COVID-19 vaccines' adverse effects.

Atallah et al., looked at the willingness and attitudes of parents of childrens under the age of 12 about the COVID-19 vaccine in Taif city. The goal of this study is to assess parents' attitudes towards COVID-19 vaccines, determine the prevalence of vaccine rejection among parents, and explain the reasons for vaccine rejection and the factors that influence it as there is insignificant number of studies related to our topic especially in Saudi Arabia. The authors concluded that the study showed poor acceptance of COVID-19 vaccine for children among parents. The choice of whether or not to vaccinate a child should be made by the child's parents. Individual benefits of protection against COVID-19 must be weighed against the population merits of pandemic control. Administering vaccines in children and analyzing their efficacy and advantages in terms of minimizing the risk of severe COVID-19 and subsequent consequences is a critical issue that has to be monitored on a regular basis. Whereas Aljaaly, et al., did a cross-sectional study aimed to compare dietary supplements, Prophetic medicine (PM) and herbal/plants (H/P) use among adults in Saudi Arabia before and during the COVID-19 pandemic. 1351 individuals participated in the study via an online survey shared on social media platforms between December 11th, 2021, and March 1st, 2022. The authors concluded that there was a significant increase in consumption of most dietary supplements and Prophetic medicine practices. The government should launch public awareness campaigns and employ regulations to educate about the risks and benefits of self-medicated Prophetic medicine practices and self-prescribed dietary supplements.

Aljohani, et al., reported two cases of morbidly obese patients who presented with recurrent distal catheter migration and pseudocyst formation in the subcutaneous space less than a month following VP shunt placement for the management of hydrocephalus. The authors concluded that special attention must be given when placing a VP shunt in morbidly obese patients. There are various methods to prevent tube migration in such patients, like using a longer catheter tube, tight closure of the peritoneum while placing the catheter between the fat and abdominal muscles, using a hernia patch, and using laparoscopic techniques. We advocate for using different surgical procedures in obese patients prophylactically to avoid VP shunt failure and distal tube migration in patients with associated risk factors.

Buttar & Ahmad, reported a diagnostic surprise of Hodgkin's Lymphoma in a 29-year-old long distance runner. In this case study, an uncommon presentation of classical Hodgkin's Lymphoma, involving bone, in a 29-year-old long distance female runner was reported. Patient initially presented with bony pain without classic type B symptoms and lymphadenopathy. A final diagnosis of classical Hodgkin's lymphoma stage IV was confirmed and PET scan evaluation was also done. Patient started on Escalated BEACOPP regimen and four cycles of chemotherapy were completed in 12 weeks and showed good response post treatment. Albeit, it's rare, primary osseous Hodgkin's Lymphoma should be considered in the diagnosis of bony pain. The absence of classic type B symptoms and any local lymphadenopathy in this case did make the diagnosis challenging.

Fageeh, et al., did a cross-sectional survey was conducted among medical students in clinical years in the Saudi Arabia who studied ENT module. Participating students completed an online questionnaire that included questions related to ENT module. The purpose of this study is to assess medical students' basic otolaryngology knowledge. The authors concluded that Saudi medical students have appropriate knowledge of basic otolaryngology. With a significant proportion of ENT complaints in general practice, it is critical that all graduating medical students, not just those entering ENT, are adequately trained in basic ENT to perform competently and be confident enough to manage or refer these patients.

Pandeya., et al., did a case-control study among the patients visiting the outpatient department (OPD) of BP Koirala Institute of Health Sciences, Dharan Nepal in which forty seven

newly diagnosed hypertensives as cases and fifty age and sex matched healthy normotensives as controls were enrolled in the study with the prior informed consent. hs-CRP, nitric oxide (NO) and lipid profile were estimated in both the cases and controls. The authors concluded that the levels of hs-CRP which is thought to be a marker of inflammation is significantly raised in hypertensives. Moreover, majority of hypertensives are dyslipidemic suggesting hypertensives to be at an increased risk for the development of cardiovascular disease (CVD).

Dr Khan, report a case of middle age man with gastroparesis. Dyspepsia and complaints related to upper gastro intestinal disorders are very common in primary care. Different disorders can present with similar symptoms with only subtle differences. Full evaluation of such patients is essential for the optimal management of disease. This case is about a middle age man with delayed gastric emptying or gastroparesis with chief complain of nausea and bloating. Although the incidence of gastroparesis is small but many patients could be misdiagnosed due to lack of awareness amongst physician and limited investigations. Gastroparesis should be kept in mind in patients presenting with upper gastrointestinal symptoms and disease specific management should be given.

Adel M et al., did a cross sectional study that was conducted among patients with CKD who underwent kidney transplantation in the last 10 years Jeddah region, Saudi Arabia using self-reported questionnaire which was distributed online among the patients. The questionnaire included the instrument of the World Health Organization, World Health Organization Quality of Life (WHOQOL-Bref), composed of 26 questions, of these two questions assess the overall perception of QOL and general health, and the others are divided into four domains: physical, psychological, social relationships and environment. The authors concluded that patients who underwent kidney transplantation showed good QoL and physical health when compared to the literature review of patients on hemodialysis. Higher educational level, living with family, having higher income and not need for hemodialysis after the surgery were associated significantly with better QoL

Ahmad & Buttar, looked at the role of Ipratropium bromide in management of Thunderstorm asthma. Epidemic thunderstorm asthma has been reported to have occurred around twenty times over the past three decades in locations around the world. Thunderstorm asthma (TA) typically presents during an aeroallergen season in individuals, sensitized to perennial rye grass pollen (RGP) in Australia, in combination with meteorological factors such as thunderstorms and lightning activity. Short acting beta agonist (SABA) only treatment is sub-optimal therapy for prevention of asthma exacerbations. The combined treatment includes inhaled corticosteroids (ICS) and SABA but found to be contentious. So the present review focuses on suitable alternative, short acting muscarinic antagonist (SAMA), Ipratropium bromide and its efficacy on the management of allergic asthma. Salbutamol induces bronchodilation rapidly but it elicits profound cardiovascular event as the side effects. Meanwhile, ipratropium also have equivalent effect of salbutamol with low side effect profile. Ipratropium also minifies the asthmatic response to grass pollen, allergen induced bronchoconstriction. Further, it also reduces allergen induced early and late asthmatic response and also inhibits the response towards histamine inhalation. So this regard, ipratropium may be considered as suitable agent in the management of thunderstorm asthma and future trials are highly warranted.

Sako et al., Investigating the awareness of breast cancer among female pharmacy students in the Makkah region, Saudi Arabia. Previous studies have shown a recent dramatic increase in BC cases in Saudi Arabia. Therefore, the demand is high for measuring the level of awareness among young Saudi females about BC and its causes. This study is designed to assess the awareness level of female pharmacy students in the Faculty of Pharmacy, Umm Al-Qura University, Makkah region, Saudi Arabia about the general information regarding BC, as pharmacists are the health practitioners most accessible to the public. The data in this study were collected using a modified online questionnaire delivered to 217 participants in the college of pharmacy. Our results showed a sufficient awareness level among future female pharmacists, which may help in spreading their knowledge to society.

Aboalam, et al., followed a retrospective research to assess the prevalence of genetic and infectious diseases that could be identified through premarital screening in Aseer Region during 2021. The authors concluded that Sickle cell disease, and hepatitis B, are commonly identified by premarital examination in Aseer Region. Males are more frequently affected than females. Health education regarding the negative impact of consanguinity is highly needed. Vaccination against hepatitis B should be enforced. Prospective couples whose offspring is at risk of hereditary diseases should be strongly convinced to comply to marriage cancellations.

Khalil Mahmoud, et al., followed a retrospective design looking into outcome of Antenatal Renal Pelvic Dilatation. Data were collected from the medical records of infants born between 2019 and 2021, with dilated fetal renal pelvic in Armed Forces Hospital, Southern Region, Saudi Arabia. Among patients with RPD, 43.5% had mild dilatation while 33.3% had moderate hydronephrosis and 23.2% had severe hydronephrosis. There was no significant difference in incidence of RPD between mothers of different ages (P=0.302). The authors concluded that males infants have higher risk for developing RPD, although gender is not a predictor for severity or outcomes. Among patients with RPD, most patients have good outcomes.

Evaluation of physical performance and quality of life among patients with previous kidney transplantation: A Cross-sectional study

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Abstract

Background: While patients with kidney conditions have been reported to predominantly have concerns about their quality of life, most of the studies comparing the different kidney replacement therapy alternatives have been focused on patients and graft survival while patient reported QoL outcomes are either underreported or completely ignored in patients with kidney transplantation. It is important to have a full understanding of the post-transplantation QoL and physical performance changes over time. Therefore, the aims of this study are to assess the physical performance of patients after kidney transplantation as well as their perceived quality of life.

Methodology: This is a cross sectional study that was conducted among patients with CKD who underwent kidney transplantation in the last 10 years in Jeddah region, Saudi Arabia using a self-reported questionnaire which was distributed online among the patients. The questionnaire included the instrument of the World Health Organization, World Health Organization Quality of Life (WHOQOL-Bref), composed of 26 questions. Of these, two questions assess the overall perception of QOL and general health, and the others are divided into four domains: physical, psychological, social relationships and environment.

Results: In this study, we were able to collect data from 67 patients who reported undergoing kidney transplantation during the last ten years. Among the patients, 56.7 % of them were males while 37.3 % of the patients were older than 50 years old and 7.5 % were younger than 30 years old. According to WHOQOL-BREF used in this study, we found that the mean score of the overall QoL was 13.15 and physical health domain was 13.09 (out of 20). Moreover, the higher the educational level of the patients, the better the quality of life they reported, significantly (P=0.004), and the same considering monthly income where those with higher monthly income reported better scores (P=0.001). Living with family also has a significant positive impact on the scores of QoL with mean score of 13.9 compared with 12.3 in those living alone (P=0.001).

Conclusion: This study showed that patients who underwent kidney transplantation showed good QoL and physical health when compared to the literature review of patients on hemodialysis. Higher educational level, living with family, having higher income and no need for hemodialysis after the surgery were associated significantly with better QoL.

Key words: physical performance, QOL, kidney transplantation

Introduction

Chronic kidney disease (CKD) is one of the causes of an early loss of physical and mental performance which is associated with self-perceived poor quality of life (QoL) [1]. CKD is characterized by increasing the levels of urea and creatinine in the blood which mainly cause hypertension, diabetes mellitus and glomerulonephritis [2,3]. In the end stage of the disease, main treatment strategies usually include hemodialysis (HD), peritoneal dialysis and kidney transplant [3]. Renal transplant is considered the best therapeutic expectation for uremic patients and it is associated with significant improvement of patients QoL with a reduction in pain and general increase in functional capacities [4,5]. However, this modality of management of CKD leads the person to a condition of chronicity which generates a great uncertainty. These patients require continuous nursing care from the pre-transplant to the post-transplant stages to maintain the capacity for personal fulfilment [6].

After kidney transplantation, the patient presents early physiological results which appear as the immediate function of the graft as well as creating high expectations at personal, social and family levels. However, the process is also associated with some risks, concerns and dependence on pharmacological treatment and a high social and economic impact [7]. Thus, however, the advantages of the kidney transplantation of improving the QoL [8–10], life after kidney transplantation may have some negative as well as positive aspects. QoL is one of the terms of the highest multifactorial expressions which have different definitions however, in our study, we use the definition of quality of life proposed by the World Health Organization (WHO) which defined QoL as the individual's perception about his/her position in life within the context of cultures and values which is associated with his/her goals, expectations, concerns and standards [11]. In general, the measurement instruments for QoL are evaluated from the following domains including psychological, environment, physical and social aspects [12]. The physical domain of QoL includes the perception of the patients considering their physical pain, fatigue, daily activities, work capacity, sleep and treatment dependence [11].

Disability is particularly severe in patients who are undergoing hemodialysis or peritoneal dialysis which is associated with increase in the prevalence of unemployment, pain, depression, low sleep quality and increased risk for malnutrition, anemia and inflammation [13–15]. In those with defective physical performance, it is common to have protein-energy wasting and abnormal body composition which could lead to increased hospitalization and mortality [16]. There is a strong correlation between physical performance and clinical, social and mental outcomes [17–19].

The evaluation of QoL in patients with chronic non-communicable diseases such as CKD enables the identification of aspects that affect the perception of these individuals about their own existence and about their perception of modifications imposed by the disease and by treatment [20,21]. Considering CKD, successful kidney transplantation is considered a therapeutic strategy that increases the chances of returning the patients to their routine of life before the onset of the disease [22]. The measurement of QoL is an important parameter in order to evaluate the real benefit of the available therapies in patients with CKD, considering that the transplant is not considered a cure for these patients who remain in this stage classified as chronic kidney disease patients [12]. However, patients with kidney conditions have been reported to have predominantly concerns about their quality of life [22]. Most of the studies comparing the different kidney replacement therapy alternatives have been focused on patients and graft survival while patient reported QoL outcomes are either underreported or completely ignored in patients with kidney transplantation [23]. Moreover, results of QoL could help as prognostic markers where poor scores indicate the increased risk for worse outcomes [24]. Considering the scarcity of kidneys, transplants should primarily be allocated to patients who are expected to take full advantage of transplantation [25]. Thus, it is important to have full understanding of the post-transplantation QoL and physical performance changes over time. Therefore, the aims of this study are to assess the physical performance of patients after kidney transplantation as well as their perceived quality of life.

Methodology

Study design:
This is a cross sectional study that was conducted among patients with CKD who underwent kidney transplantation in the last 10 years in Jeddah region, Saudi Arabia.

Study sample:
- Sample size:
Sample size of the study was calculated using software of Calculator.net using confidence interval of 95 %, margin of error of 5 % and population of 746 patients according to a study conducted in Jeddah in 2005. According to these data, sample size was calculated to be 67 participants.

- Subjects:
In this study, we included the participants according to the following inclusion and exclusion criteria.

Inclusion criteria:
- Patients with CKD
- Treated with kidney transplantation
- Underwent the surgery in the last 10 years
- Both genders
- Any age

Exclusion criteria:
- Having any injury that affects the physical performance or quality of life, other than CKD.
- Patients who are unable to give the authors consent

- Sampling strategy:
A simple random sampling system was used to collect the sample size.
- Study instrument:
In this study, we depended on self-reported questionnaire which was distributed online among the patients. The questionnaire started with agreement to consent as well as questions as to if the participants have had kidney transplantation in order to apply the inclusion and exclusion criteria. Then the questionnaire included the instrument of the World Health Organization, World Health

Organization Quality of Life (WHOQOL-Bref), composed of 26 questions. Of these two questions assess the overall perception of QOL and general health, and the others are divided into four domains: physical, psychological, social relationships and environment. The answers were filled in using a Likert scale, ranging from 1 to 5, with 1being the negative extreme and 5 the positive extreme. Thus, the higher the scores, the better the quality of life [11]. Moreover, the questionnaire also included questions considering the demographic features of the participants.

- Statistical analysis:
MS Excel was used for data entry as well as cleaning and coding, while data analysis was conducted using SPSS version 26. Frequency and percent were used to describe the categorical variables while mean and standard deviation described the ongoing categories. Chi test, t test and ANOVA test were used to assess the relation between variables. 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 67 patients who reported undergoing kidney transplantation during the last ten years. Different demographic factors of the patients were assessed and are presented in Table 1. Among the patients, 56.7 % of them were males while 37.3 % of the patients were older than 50 years old and 7.5 % were younger than 30 years old. Moreover, almost all of the sample population were Saudi Arabian (95.5 %) while 31.3 % reported having monthly income of more than 20,000 SR (Saudi Riyal) and 22.4 % reported having less than 5,000 SR as monthly income. Considering the educational level, we found that 64.2 % reported having secondary education or below while 35.8 % had university education level. Moreover, 73.1 % of the patients were married and 97 % were living with family. Furthermore, 64.2 % reported having the transplantation during the last five years while 35.8 % reported having it from 5-10 years ago. Moreover, 11.9 % of the patients reported the need for dialysis after the surgery.

According to WHOQOL-BREF used in this study, we found that the mean score of the overall QoL was 13.15 (out of 20). The highest score was reported in the social relationship domain with 13.89 (out of 20), followed by psychological domain with 13.53 (out of 20), physical domain with 13.09 (out of 20) while the environmental health domain had the lowest score of 12.1 (out of 20). Considering patients' perception of quality of life, the mean score was 3.49 which indicated that most of the patients reported good quality of life while the mean perception of general health was 3.49 which indicated satisfaction (Table 2).

In Table 3, we assessed the relation between demographic factors of the patients and their quality of life. There is no significant difference between patients with different age categories considering the quality of life (P=0.113) however, we found that older patients had higher scores than younger participants (14.00 in those > 50 years and 12.92 in those 18-30 years old). Moreover, males reported higher scores than females (13.24 vs 12.91) however this difference is not significant (0.267). Saudi patients reported a significantly higher level of quality of life than non-Saudi patients (13.32 vs 12.5, p= 0.023). Moreover, the higher the educational level of the patients, the better the quality of life they reported significantly (P=0.004), and the same considering monthly income where those with higher monthly income reported better scores (P=0.001). Living with family also has a significant positive impact on the scores of QoL with mean score of 13.9 compared with 12.3 in those living alone (P=0.001). The duration of the condition had no significant impact on the quality of life as reported by patients however, having dialysis after the surgery reduced significantly the quality of life to 11.7 compared with 14.6 in those who reported no need for dialysis after the surgery.

Table 1: The demographic factors of patients who underwent kidney transplantation during the last 10 years (N=67)			
Variable		Count	Percent
Gender	Male	38	56.7%
	Female	29	43.3%
Age	18-30	5	7.5%
	31-40	20	29.9%
	41-50	17	25.4%
	>50	25	37.3%
Nationality	Saudi Arabian	64	95.5%
	Non-Saudi Arabian	3	4.5%
Monthly income:	< 5,000 SR	15	22.4%
	5,000 -10,000	13	19.4%
	10,000 – 20,000	18	26.9%
	> 20,000	21	31.3%
Educational level:	Secondary school or below	43	64.2%
	University or above	24	35.8%
Marital status:	Single	11	16.4%
	Married	49	73.1%
	Widow/ divorced	7	10.4%
Living with:	Alone	2	3.0%
	With family	65	97.0%
When have you had the transplantation surgery?	1 -5 years ago	43	64.2%
	5 – 10 years ago	24	35.8%
Do you need for dialysis after the surgery?	Yes	8	11.9%
	No	59	88.1%

Table 2: Mean domain score for renal transplant recipient		
Physical	13.09	1.61
Psychological	13.53	2.12
Social relationship	13.89	2.13
Environment health	12.1	2
Perception of quality of life	3.49	0.73
Perception of general health	3.49	0.81
Overall QOL score	13.15	1.45

Table 3: The relation between demographic factors and quality of life.		
Variables	Categories	Transplant patients (n=67)
		Mean (SD)
Age (years)	18-30	12.92 (1.73)
	31-40	13.16 (1.30)
	41-50	13.04 (1.50)
	>50	14.00 (0.99)
	P-value	0.113
Sex	Male	13.24 (1.26)
	Female	12.91 (1.93)
	P-value	0.267
Nationality	Saudi Arabian	13.32 (1.45)
	Non-Saudi Arabian	12.50 (1.30)
	P-value	0.023
Marital status	Unmarried	13.79 (2.25)
	Ever married	13.11 (1.37)
	P-value	0.167
Education	Secondary school or below	12.54
	University or above	13.73 (1.61)
	P-value	0.004
Monthly income:	< 5,000 SR	11.9 (0.61)
	5,000 -10,000	12.3 (1.23)
	10,000 – 20,000	13.8 (1.01)
	> 20,000	14.2 (0.71)
	P-value	0.001*
Living with:	Alone	12.3 (0.41)
	With family	13.9 (1.23)
	P-value	0.001*
When have you had the transplantation surgery?	1 -5 years ago	13.12 (1.23)
	5 – 10 years ago	13.17 (1.12)
	P-value	0.992
Do you need for dialysis after the surgery?	Yes	11.7 (0.56)
	No	14.6 (1.23)
	P-value	0.0001*

Discussion

Quality of life is considered one of the increasingly recognized key outcomes parameters among patients with any medical and interventional treatment. The aim of this study was to determine the QoL of patients who underwent kidney transplantation during the last 10 years and the influencing factors that were assessed by the WHOQOL-BREF questionnaire. In the study, we found that the scores of quality of life and physical performance domain among patients who underwent kidney transplantation were 13.15 and 13.09. This is similar to the results of a previous study conducted by Ranabhat K et al, among 92 kidney transplant patients [26]. In comparison with hemodialysis, another intervention used in patients with kidney failure, the literature reported significantly lower scores of WHOQOL-BREF including a study of Ranabhat K et al, who reported the mean quality of life and physical domains among patients on hemodialysis of 11.46 and 10.61 [26]. Many previous studies enforced our results that QoL of life and physical assessment in patients who underwent kidney transplantation is better than those on hemodialysis. In a study conducted by Sapkota A et al, the authors used the same tool we used and reported that the mean total QoL and physical health domains scores were 14.2 and 15.2 respectively which reported to be better than those on hemodialysis had mean scores of 12.5 and 11.9 respectively [27]. Moreover, another study reported that the physical health domain score was significantly higher in patients who underwent kidney transplantation than those who were on hemodialysis (16.5 and 10 respectively) and the same study showed that physical health in patients with asthma (11.5) was better than those on hemodialysis but worse than those who underwent kidney transplantation [28]. In a previous study conducted by Rambod M, the authors reported that the mean total QoL score of kidney transplanted patients was 21.36 which is significantly higher than that reported among patients on hemodialysis with mean score of QoL of 20.35 using Quality of Life Index–Dialysis and Transplantation Version questionnaire [29]. The lower QoL in the physical domain in patients on hemodialysis reported in these studies, than in the transplant patients, can be associated with physical pain, weakness, insomnia and hindrance to daily activities associated with hemodialysis [30]. A previous study showed that the increase in duration of hemodialysis was associated with worse QoL [31]. Many other studies that used different tools to assess the quality of life and physical health reported similar results that patients with kidney transplantation had better quality of life than those on hemodialysis [5,31–33]. These results as well as our results showed that kidney transplantation has a significant positive impact on patients' quality of life and causes significant improvement considering the physical performance of patients. This result was reported in many previous studies [9,10,34–37].

The second aim in this study was to determine the demographic factors associated with better QoL among patients who underwent kidney transplantation. In this study, males had slightly better quality of life however, this difference is not significant. This is in agreement with the result of a previous study which showed that 72.7 % of the male patients and 70 % of female patients reported good QoL with no significant difference between the two genders [38]. However, the association between gender of the patients and QoL of patients with kidney transplantation is still under debate. Based on the literature, a previous study showed that women had better survival rates than males based on their adherence to their medication [39]. While other studies showed that male patients had significantly better QoL because they had the time to participate in more daily activities than women which increase their self-confidence while adapting to new body conditions after the surgery [40,41]. Educational level is one of the factors that affects the quality of life of patients where the higher the education level, the better quality of life. This is similar to the results of a previous study [38]. This could be explained by that higher educated patients had higher levels of understanding of the necessity for adhering to their medications and thus had better improvement in their health [39,42]. Kidney transplantation is a surgery that requires patience, motivation, and high confidence level in order to achieve good quality of life, thus, a patient's QOL will be better along with better educational level of patient. Living with family is associated significantly with better QoL of patients who underwent kidney transplantation. In a previous study conducted by Friedman, the author reported that family support that consisted of behaviors and acts of acceptance toward the patients and in the form of informational, assessment, and emotional support is one of the factors that affect the QoL of the patients [43]. The family support is also needed to encourage these patients to adhere to the medication and development new skills [38]. Moreover, we found that need for hemodialysis after having the surgery had a significantly negative impact on QoL of the patients which is expected as a feeling of failure and depression, anxiety and stress associated with the hemodialysis are associated with worse QoL [44–46].

This study had some limitations including depending on self-reported questionnaire which may lead to some personal bias where some patients underestimate or overestimate the aspects of their life. The distribution of questionnaire with online instrument had its positive effect on increasing the spread of the questionnaire however, it did not ensure being patients with kidney transplantation which is another limitation. Therefore, conducting the same study among patients who are admitted to clinics or hospitals should be considered.

In conclusion, this study showed that patients who underwent kidney transplantation showed good QoL and physical health when compared to the literature review of patients on hemodialysis. Higher educational level, living with family, having higher income and not needing hemodialysis after the surgery were associated significantly with better QoL.

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Investigating the awareness of breast cancer among female pharmacy students in the Makkah region, Saudi Arabia

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Abstract

Breast cancer (BC) is one of the causes of the leading mortality in Saudi Arabia. Previous studies have shown a recent dramatic increase in BC cases in Saudi Arabia. Therefore, the demand is high for measuring the level of awareness among young Saudi females about BC and its causes. This study is designed to assess the awareness level of female pharmacy students in the Faculty of Pharmacy, Umm Al-Qura University, Makkah region, Saudi Arabia about the general information regarding BC, as pharmacists are the health practitioners most accessible to the public. The data in this study were collected using a modified online questionnaire delivered to 217 participants in the Ccollege of Ppharmacy. Our results showed a sufficient awareness level among future female pharmacists, which may help in spreading their knowledge to society.

Keywords: breast cancer, awareness, public health, pharmacist, Saudi Arabia

Introduction

The most common type of cancer in developed and developing countries is breast cancer (BC), and the main reason for this spread in developed countries is lifestyle and urbanisation(1). In the Kingdom of Saudi Arabia, the number of cases has increased significantly, and the incidence tends to vary according to geographic areas, with the highest incidences being observed in the country's eastern, central and western regions (2). A recent study assessed the burden of BC mortality in Saudi Arabia and noted that between 2025 and 2050, deaths due to BC are expected to double (3).

The two types of risk factors for BC are modifiable factors such as weight, diet, exercise, smoking and drinking alcohol, and non-modifiable factors such as gender, age at the time of diagnosis, and family history. Approximately 5-10% of BC is thought to be linked to changes (mutations) in the BC gene (BRCA 1 and BRCA 2), which can lead to ovarian cancer and several other types of cancer, menstrual age, breastfeeding, menopause and exposure to chest rays (4-6).

The role of health promotion and education is essential in minimising the later stages of BC. Women must be encouraged to gain comprehensive information regarding early detection of BC, learn how to do breast self-examination, and ask for mammography testing when needed (7, 8). Studies have been conducted in the Kingdom of Saudi Arabia measuring community awareness (2).

In general, women should have sufficient awareness of BC and how to perform the examination, and pharmacists are the most accessible healthcare professionals to the general public. Most patients regularly visit community pharmacies for health information, including cancer information (9). Pharmacists are therefore in a good position to raise awareness, so our study aims to assess the awareness of female pharmacy students about BC in Umm Al-Qura University, Makkah region, Saudi Arabia.

Methods

Ethical approval
The Biomedical Research Ethics Committee, Umm Al-Qura University, Makkah, Saudi Arabia, approved the study. Approval number: (HAPO-02-K-012-2021-10-781), under the Declaration of Helsinki.

Study design
This cross-sectional descriptive study was conducted in the Makkah region of Saudi Arabia. The research was performed from September 2020 to September 2021. A computer-based survey about BC was done electronically. A standardised questionnaire consisting of 34 questions was distributed and answered by all participants. The questionnaire, with some changes, was designed using frequently asked questions from a study by Ashareef et al., 2020 (10). It was written in Arabic.

Sample size and data collection
The sample size required for the study was calculated based on Cochran's formula n=n_0/((n_0-1)), where n_0=(z^(2) pq)/e^2 = 385, N= population size = 477, so n= size of the sample = 214. We used multiple methods such as social media channels to facilitate the distribution of the survey. All the data were collected from the Google Forms website. Then, all data were placed in a spreadsheet and moved to Microsoft Excel.

Statistical analysis
Data were analysed using the Statistical Package for Social Sciences (SPSS) version 22.0 (SPSS Inc., Chicago, IL, USA)., All categorical variables were presented as frequencies and percentages (%). A Pearson Chi-square test was used to assess the differences between variables. Statistical significance was determined at a p-value of <0.05.

Results

Figure 1 shows the ages of the study participants. A total of 217 participants completed the questionnaire, with a response rate of 100%. The highest age range of participants was between 22 and 24 years (57%), followed by 19 to 21 years (42%) and 25 years and above (1%).

As shown in Table 1, 99% of participants indicated that BC is the most common type of cancer in women. While 89.9% of participants had an idea of BC, 83% of participants answered that men can get BC, 61.8% of participants answered that BC in men is the same as in women and 18% of participants had a family member diagnosed with BC. In addition, 79.7% of participants thought the factors fatty meals and drinking alcohol, Vitamin D deficiency and increased age may cause BC.

Moreover, 72.8% of participants said environmental factors affect the incidence of BC, while 99.5% thought early detection of BC contributes to reducing the mortality rate among women. Over half (55.3%) of participants had information about BC screening methods, 15.2% had undergone BC examination, 73.2% thought the appropriate age to start periodic examination was between 29 and 40 years, and 69.5% of participants said periodic examination should be performed every year. While 7.8% of participants thought a mammogram can cause BC, 96.3% thought multiple treatments are available for BC (chemotherapy, hormonal therapy and surgical), and 54.2% of participants mentioned self-examination as one of the BC screening methods, as shown in Table 1.

As shown in Table 2, there was a significant association (P = 0.044) between the responses to men getting BC and the age of the female pharmacy students. In addition, there was a significant association (P = 0.026) between responses to environmental factors that affect the incidence of BC and the age of the female pharmacy students. However, for the other responses, there were no significant associations.

Table 1: Responses of female pharmacy students as frequency and percentage

Questions	Frequency (%)
The most common type of cancer in women is?	
• Colon cancer	2 (0.9%)
• Breast cancer	215 (99.1%)
• Leukaemia	0 (0%)
Do you have an idea about breast cancer?	
• Yes	195 (89.9%)
• No	11 (5.1%)
• I don't know	11 (5.1%)
Is it possible for men to get breast cancer?	
• Yes	181(83.4%)
• No	12 (5.5%)
• I don't know	24 (11.1%)
Is breast cancer in men the same as in women?	
• Yes	34 (15.7%)
• No	49 (22.6%)
• I don't know	134 (61.8%)
Have any of your family members been diagnosed with breast cancer?	
• Yes	39 (18%)
• No	172 (79.3%)
• I don't know	6 (2.8%)
Which one of these factors may cause breast cancer?	
• Fatty meals and drinking alcohol	14 (6.5%)
• Vitamin D deficiency	3 (1.4%)
• Increased age	27 (12.4%)
• All the above	173 (79.7%)
Can environmental factors affect the incidence of breast cancer?	
• Yes	158 (72.8%)
• No	11 (5.1%)
• I don't know	48 (22.1%)
Does early detection of breast cancer contribute to reducing the mortality rate among women?	
• Yes	216 (99.5%)
• No	0 (0%)
• I don't know	1 (0.5%)
Do you have information about breast cancer screening methods?	
• Yes	120 (55.3%)
• No	97 (44.7%)
Have you ever had a breast cancer examination?	
• Yes	33 (15.2%)
• No	184 (84.7%)
• I don't know	0 (0%)
In your opinion what is the appropriate age to start periodic examinations?	
• 29-40 years	159 (73.2%)
• 39-50 years	49 (22.5%)
• I don't know	9 (4.1%)

Table 1: Responses of female pharmacy students as frequency and percentage (continued)

How often is the periodic examination performed?	
• Every year	151 (69.5%)
• Every two years	38 (17.5%)
• I don't know	28 (12.9%)
Do you think that a mammogram (X-ray picture of the breast) causes breast cancer?	
• Yes	17 (7.8%)
• No	109 (50.2%)
• I don't know	91 (41.9%)
What treatment is available for breast cancer?	
• Chemotherapy	1 (0.5%)
• Hormonal therapy	1 (0.5%)
• Surgical	6 (2.7%)
• All the above	209 (96.3%)
Do you have information about breast cancer screening methods?	
• By self-examination	84 (54.2%)
• By mammogram	50 (32.3%)
• By ultrasound	17 (11%)
• By MRI	3 (1.9%)
• By biopsy	1 (0.6%)

Figure 1. Age percentage of the study participants (N= 217)

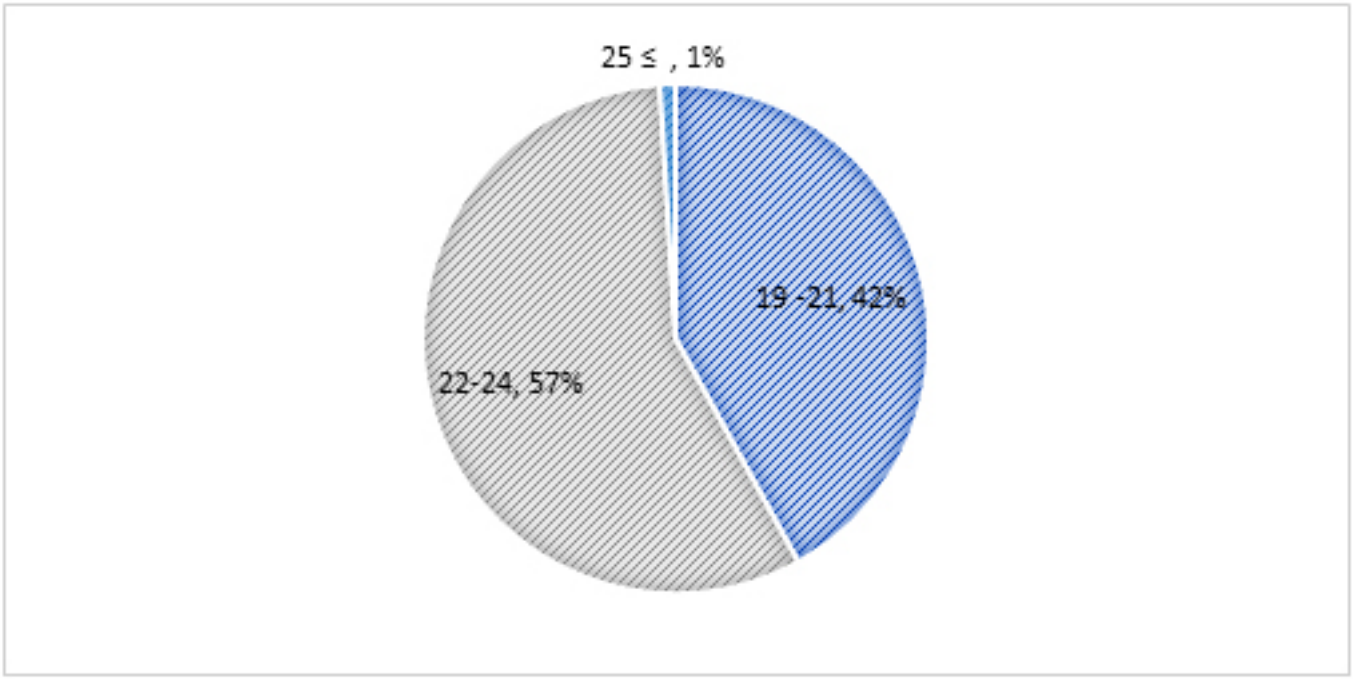

Table 2: Association of breast cancer awareness and age of the students

Questions	19-21	22-24	≤ 25	P-value
The most common type of cancer in women is?				
• Colon cancer	0	0	2	0.877
• Breast cancer	91	120	3	
• Leukaemia	0	0	0	
Do you have an idea about breast cancer?				
• Yes	80	111	3	0.770
• No	3	0	8	
• I don't know	8	0	3	
Is it possible for men to get breast cancer?				
• Yes	83	96	1	0.044
• No	4	8	0	
• I don't know	4	18	2	
Is breast cancer in men the same as in women?				
• Yes	14	20	0	0.066
• No	22	24	3	
• I don't know	55	79	0	
Have any of your family members been diagnosed with breast cancer?				
• Yes	17	22	0	0.990
• No	72	96	3	
• I don't know	2	4	0	
Which one of these factors may cause breast cancer?				
• Fatty meals and drinking alcohol	9	0	5	0.206
• Vitamin D deficiency	1	0	2	
• Increased age	7	0	19	
• All the above	75	95	3	
Can environmental factors affect the incidence of breast cancer?				
• Yes	53	101	3	0.026
• No	9	0	2	
• I don't know	29	19	0	
Does early detection of breast cancer contribute to reducing the mortality rate among women?				
• Yes	91	121	3	0.971
• No	1	0	0	
• I don't know	0	0	0	
Do you have information about breast cancer screening methods?				
• Yes	48	96	2	0.828
• No	43	53	1	
Have you ever had a breast cancer examination?				
• Yes	14	17	0	0.276
• No	77	104	3	
• I don't know	0	0	0	
In your opinion what is the appropriate age to start periodic examinations?				
• 29-40 years	67	88	3	0.920
• 39-50 years	20	29	0	
• I don't know	4	5	0	

Table 2: Association of breast cancer awareness and age of the students (continued)

How often is the periodic examination performed?				
• Every year	65	82	3	0.706
• Every two years	16	22	0	
• I don't know	10	17	0	
Do you think that a mammogram (X-ray picture of the breast) causes breast cancer?				
• Yes	7	10	0	0.799
• No	45	60	3	
• I don't know	39	52	0	
What treatment is available for breast cancer?				
• Chemotherapy	2	1	0	0.950
• Hormonal therapy	0	1	0	
• Surgical	4	2	0	
• All the above	85	119	3	

Discussion

The goal of this study was to find out how well female pharmacy students at UQU in Makkah were aware of BC. The level of understanding and attitudes of healthcare professionals concerning BC screening methods are major factors in their patients' use of these methods (11). BC is the leading cause of female cancer-related disability and mortality. In Saudi Arabia, BC ranks first among cancerous diseases in females (12). A clinical study showed that the percentage of those who believed that BC was common among women in Saudi Arabia was 86.5% (13). In other studies, 76% of medical students and 67% of non-medical students knew that BC is one of the most prevalent cancers in the Saudi community (14).

In our study, 83% of participants answered that men can get BC and 15.7% answered that the BC risk is the same in men and women. Similarly, another study found that BC risk in men and women is the same but the BC in men is more sensitive to hormone therapy (15). Moreover, the percentage of those who believed that males could get BC was 49.3% (16). Our study showed that 18% of participants had a family member diagnosed with BC, similar to another study that showed that 18% of both medical and non-medical university students had a positive family history of BC (14). In the nurses' health study follow-up, the highest risk is associated with an increasing number of first-degree relatives diagnosed with BC at a young age (under age 50). Compared with women who had no affected relative, women who had one, two or three or more affected first-degree relatives had risk ratios of 1.80, 2.93 and 3.90, respectively (17).

BC is most commonly diagnosed at late stages in countries with limited resources. Early detection of BC reduces the death rate as it enables simpler and more cost-effective treatment(18). Almost all participants (99.5%) in our study thought early detection of BC contributes to reducing the mortality rate among women, similar to 91% of participants in another study who knew that early detection of breast cancer improves treatment outcomes (19). The finding of our study showed that the participants have a good idea about early diagnosis, which could positively affect outcomes for patients and decrease mortality. These findings supported a previous study in Sudan and found that the women who participated in the study also have good knowledge about the importance of diagnosis of BC, which helps to detect cancer in its early stages (20).

In our study, 55.3% of participants had information about BC screening methods, while 61% of medical and 50% of non-medical students performed breast self-examination and 24% of the participants knew that periodic mammography is an important tool for early screening of BC and only 3% of students involved in this study confirmed having been screened by mammogram (14, 21). Moreover, 7.8% of participants thought a mammogram can cause BC. It has been estimated that 10 years' worth of annual mammographic screenings in 10,000 women will cause one additional BC (22).

Our study may not be representative because of its design (online survey), which could be a limitation. Despite that, the present study conducted among pharmacy students in Saudi Arabia will add to our knowledge in this area as we still have a limited number of studies addressing BC awareness. Therefore, it is important to create awareness, educate the community and remove misconceptions associated with ignorance through community awareness campaigns.

Conclusion

Women have poor knowledge of BC, whether it is related to risk factors or signs and symptoms that influence early detection procedures. Therefore, women should have sufficient awareness about BC and how to perform breast self-examination, and pharmacists are the most accessible healthcare professionals for the general public. Our study found that pharmacy students have sufficient awareness of BC, so they constitute a mainstay in raising awareness of BC.

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Assessing Medical Student Basic Otolaryngology Knowledge: A questionnaire-based Study

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Abstract

Background: Otolaryngology is one of the oldest medical specialties that involves the diagnosis and treatment of patients with diseases and conditions of the ears, nose, throat, head, and neck. The commonest ENT cases encountered by physicians are tonsillitis, acute otitis media, pharyngitis, epistaxis, and hay fever. The prevalence of otolaryngologic complaints in general practice is disproportionately high compared to the amount of otolaryngology module provided in medical school.

Objectives: The purpose of this study is to assess medical students' basic otolaryngology knowledge. Additionally, we will check factors that determine the level of knowledge.

Methods: A cross-sectional survey was conducted among medical students in clinical years in the Saudi Arabia who studied ENT module. Participating students completed an online questionnaire that included questions related to ENT module.

Results: The study included 483 participants, 53.4% were males and 46.6% were females. 43.7% were in the 4th academic year. 16.1% of participants intent to choose ENT as future specialty. 94.6% took ENT module and test. 44.5% reported spending 1-2 days on an ENT service or office, as part of clinical education. The majority of our study participants correctly answered ENT cases.

Conclusion: Saudi medical students have appropriate knowledge of basic otolaryngology. With a significant proportion of ENT complaints in general practice, it is critical that all graduating medical students, not just those entering ENT, are adequately trained in basic ENT to perform competently and be confident enough to manage or refer these patients.

Keywords: medical, student, basic, otolaryngology, knowledge, Saudi

Introduction

The specialty of otorhinolaryngology (often known as ENT) arose from the merging of the two fields of otology and laryngology in the beginning of the twentieth century. Otologists were surgeons, while laryngologists were doctors who manage issues with the nose and chest (1).

The otorhinolaryngology undergraduate medical education system taught in the US is disproportionate to the number of ENT (ear, nose, and throat) cases that physicians encounter. Around 10% of new adult general practitioner consultations are for ENT complaints. In the pediatric population, approximately 50% of patients seeing a general practitioner report an ENT complaint. Primary care providers, as well as all graduating medical students, must be capable of detecting and managing basic ENT disorders (2).

The research team discovered a gap in the literature when it came to evaluating a medical student's understanding of basic ENT disorders. Furthermore, a cross-sectional study conducted in 2018 on medical students and resident doctors in the following departments; internal medicine, emergency medicine, family medicine, and otolaryngology, with a total of 372 participants using a 10 question questionnaire multichoice, showed an average score of 93% among otolaryngologists while all the other scored an average score of 56% (3).

Due to the high number of cases that physicians encounter in the otorhinolaryngology (ENT) field, detecting, managing basic ENT disorders, and understanding when to refer patients to otolaryngologists is essential, especially for primary care providers and graduating medical students. Our study is designed to assess medical students' basic otolaryngology knowledge in the Kingdom Saudi Arabia; We also planned to identify the deficits area for each participant and elaborate on it and suggest appropriate resources.

Methodology

Study design: This was an observational study with a cross-sectional sample.

Study settings: The study was conducted in Saudi Arabia where data was collected through electronic online questionnaire between October 2021 and March 2022.
Study population: All clinical years' medical students, either male or female in Saudi Arabia. The inclusion criteria were all medical students either male or female including all clinical years in medical school, in which years head and neck examination was learned and from those who were willing to participate in the study. The exclusion criteria were any non-medical students and medical students in basic years or who had not studied the otolaryngology module.

Sample size: Considering a marginal error of 5%, a confidence level of 95%, and considering maximum uncertainty (50% of positive responses), a minimum of 377 participants were needed to be included in this study. The sample size was calculated by using the Qualtrics calculator.

Data collection method: Data was collected using a self-administered, electronic online questionnaire that was distributed to all medical students in Saudi Arabia as a link to a Google form using social media platforms (e.g., Twitter, Instagram, Linked-in, WhatsApp, …etc.).

Data collection tools: A structured questionnaire was used as a study tool. It was classified into two main sections. The first section contained sociodemographic data and the second section questions about the basic knowledge in ENT. A designed questionnaire (as a Google form) was shared with the targeted population through social media platforms (Facebook, Twitter, Instagram and WhatsApp), We used a similar questionnaire from a previous study (2).

Ethical consideration: The research proposal was approved by Ethical Approval Committee at Taif University to conduct the research with Ethical approval number (43-123).

Data entry and analysis: Data was entered on the computer using the "Microsoft Office Excel Software" program (2016) for Windows. Data was then transferred to the Statistical Package of Social Science Software (SPSS) program, version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) to be statistically analyzed. Descriptive statistical analysis was conducted to present the data. Categorical variables were expressed as frequencies and percentages. Numerical variables were expressed as mean and standard deviation if normally distributed. If not normally distributed, data was expressed as median and inter-quartile range (IQR).

Results

The study included 483 participants, 53.4% were males and 46.6% were females. 43.7% were in the 6th academic year, 26.5% in the 5th year, 12.4% were in the 4th year and 17.4% were interns. 16.1% of participants intend to choose ENT as a future specialty as mention in Table 1.
As illustrated in Table 2, 94.6% took the ENT module and test (60.2% of them had it in the 5th year, 34.0% of them had it in the 4th year and only 5.4% had it in the 6th year). 20.1% and 18.6% of participants reported the highest degree of comfort with examining and diagnosing or recognizing ENT conditions.

As illustrated in Table 2 (continued) 31.9% have never spent time in an ENT service or office as part of clinical education, while 44.5% reported spending 1-2 days on an ENT service or office and clinical education. 24.4% reported that ENT rotation only is the setting of time on an ENT service or office, while 21.3% reported that inpatient only is the setting of time on an ENT service or office.

As illustrated in Table (3) 82.2% of the participants diagnosed the first case with acute mastoiditis, and 58.8% of the participants reported that the management of the second case was evacuation and drainage of any blood or hematoma, followed by ear bolster dressing. In the 3rd case 67.9% of participants chose peritonsillar abscess as a diagnosis. 49.9% of the participants stated that the appropriate next step in the management of the 4th case would be silver nitrate cautery of Kiesselbach's plexus. In the 5th case 57.1% of participants stated that guiding the insertion of the trach tube is the part of the tracheotomy tube labelled in the image we provided in the questionnaire.

As illustrated in Table (3) (continued) 34.4% of participants stated that the appropriate step in the management of the 6th case would be a course of oral steroids, and 42.9% of participants stated that the next step in management in the 7th case is repeating canalith repositioning maneuver and providing reassurance, while in the 8th case 44.9% stated that trial of intranasal steroid is the best next step in management; finally in the 9th case 31.9% of participants stated that performing an esophagogastroduodenoscopy (EGD) is part of expected initial management, while 29.2% stated trial of proton pump inhibitor is part of expected initial management.

Table 1: Sociodemographic characteristics of participants (n=483)

Parameter		No.	%
Gender	Male	258	53.4
	Female	225	46.6
Academic year	intern	84	17.4
	4th year	60	12.4
	5th year	128	26.5
	6th year	211	43.7
Intended specialty choice	Anaesthesia	2	.4
	Dermatology	6	1.2
	Did not decide	6	1.2
	Emergency Medicine	10	2.1
	ENT	78	16.1
	Family medicine	84	17.4
	General surgery	88	18.2
	Internal Medicine	91	18.8
	Other specialties	117	24.6

Table 2: ENT knowledge parameters (n=483)

Parameter		No.	%
Took ENT module and test	Yes	457	94.6
	No	26	5.4
If yes, in which academic year	3rd year	2	.4
	4th year	164	34.0
	5th year	291	60.2
	6th year	26	5.4
What are the modalities used in teaching? Select which apply:	Seminars and hospital visits	49	3.1
	traditional class	147	30.4
	skill labs	469	29.7
	virtual class and small group discussion	8	0.5
	hospital visits	227	46.9
	virtual class	325	67.2
	seminars	176	11.1
	small group discussions	90	5.7
	hospital visits	87	5.5
	Real classes accompanied by clinics	3	0.2
Comfortability with performing a head and neck examination on a patient	Not comfortable at all	31	6.4
	Not comfortable	66	13.7
	Neutral	135	28.0
	Comfortable	154	31.9
	Very comfortable	97	20.1
Comfortability with diagnosing or recognizing ENT conditions	Not comfortable at all	27	5.6
	Not comfortable	84	17.4
	Neutral	159	32.9
	Comfortable	123	25.5
	Very comfortable	90	18.6

Table 2: ENT knowledge parameters (n=483) *-continued*

Parameter		No.	%
Time spent on an ENT service or office, as part of clinical education	Never	154	31.9
	1-2 days	215	44.5
	3-4 days	42	8.7
	5-7 days	72	14.9
The setting of time on an ENT service or office	ENT rotation	118	24.4
	ENT rotation, Surgery	7	1.4
	Inpatient	103	21.3
	Inpatient, ENT rotation	11	2.3
	Inpatient, ENT rotation, Surgery	17	3.5
	Inpatient, Outpatient office	30	6.2
	Inpatient, Outpatient office, Surgery	4	.8
	Inpatient, Surgery	6	1.2
	Outpatient office	133	27.5
	Outpatient office, Surgery	16	3.3
	Surgery	38	7.9

Table 3: Participants knowledge of ENT cases

Parameter		No.	%
An 8-year-old girl is brought in with a fever of 38, 33 ºC complaining of progressive ear pain and hearing loss over the past four days. On physical exam you find a tender, erythematous lesion (see above). The most likely diagnosis is:	Acute mastoiditis	396	82.0
	Hematoma	18	3.7
	Insect-bite	22	4.6
	Temporal bone trauma	16	3.3
A 20-year-old female comes in after being involved in a fight. Her outer ear exam is shown above. What is the best next step in management?	Apply a cold pack directly to the site and administer an anti-inflammatory to control swelling	86	17.8
	Apply a warm compress directly to the site	64	13.3
	Evacuation and drainage of any blood or hematoma, followed by ear bolster dressing	284	58.8
	No serious injury has been sustained. No further management needed	25	5.2
	Ultrasound of the ear	24	5.0
A 20-year-old female comes in with a 5-day history of sore throat with difficulty talking and a fever of 38.33 ºC. Her oropharyngeal exam (see above) is consistent with	Enlarged lingual tonsil	118	24.4
	Gastroesophageal Reflux Disease (GERD)	12	2.5
	Herpes Simplex Virus infection	19	3.9
	Non-Hodgkin Lymphoma	6	1.2
	Peritonsillar abscess	328	67.9
A patient presents to the ED with an intractable unilateral nosebleed. After 10 minutes of pinching the sides of the nose, the bleeding stops. A few minutes later, you visualize blood coming from the anterior nasal septum. The rest of the physical exam is unremarkable. A topical vasoconstrictor is tried but also fails to stop the bleed. After completing a history, the appropriate next step would be:	Have the patient tilt his head back for 10 minutes, or until bleeding resolves	48	9.9
	Observation	79	16.4
	Perform a nasal endoscopy	75	15.5
	Silver nitrate cautery of Kiesselbach's plexus	241	49.9
	Sphenopalatine artery ligation	40	8.3
The part of the tracheotomy tube is used for:	Cleaning or replacement to remove excess secretions	80	16.6
	Enabling speaking with trach in place	58	12.0
	Guiding the insertion of the trach tube	276	57.1
	Inflation of the cuff	69	14.3

Table 3: Participants knowledge of ENT cases - *continued*

An otherwise healthy 45-year-old female presents with sudden unilateral deafness. Management for this condition usually includes:	A course of oral steroids	166	34.4
	CT scan	147	30.4
	Empiric trial of broad-spectrum antibiotics	98	20.3
	Observation and reassessment in 2-4 hours	72	14.9
A 68-year-old woman presents with intense feelings of the room "swaying" or moving over. The episodes last about 30 seconds, and occur every time she rolls over in bed. She has had these episodes several times in the past, and has been previously treated with repositioning maneuvers. The next step in management should include:	A short, tapering course of oral steroids	80	16.6
	Meclizine, or a similar vestibular suppressant medication	94	19.5
	Repeating canolith repositioning maneuver and providing reassurance	207	42.9
	Semi-circular canal plugging	30	6.2
	Trans tympanic steroid injection	72	14.9
A 30-year-old otherwise healthy female with no recent illness presents with complaints of persistent watery, nasal discharge and throat clearing for the past 3 months. Physical exam revealed post-nasal drip, significant cobble stoning at the back of the throat, and nasal turbinates that are grey and boggy. In addition to laboratory testing, you decide the best next step is:	A short course of broad-spectrum antibiotics	110	22.8
	Endoscopic sinus surgery	85	17.6
	Trial of intranasal steroid	217	44.9
	Trial of nonsteroidal anti-inflammatory drug	71	14.7
A patient comes in to your primary care clinic with complaints of feeling a "lump in the back of her throat", "metallic taste" in the morning, halitosis, and a hoarse voice for 3 months. She denies any change in weight, fever, or difficulty swallowing. After referral, laryngeal exam performed by ENT reveals red, swollen arytenoid mucosa. You expect initial management will include:	Obtaining a CT of the neck	124	25.7
	Performing an esophagogastroduodenoscopy (EGD)	154	31.9
	Trial of anti-histamine	64	13.3
	Trial of proton pump inhibitor	141	29.2

Discussion

College students of medical education provide medical students with the fundamental knowledge and skills they need to become general practitioners. The incidence of otolaryngologic complaints in general practice is disproportionate to the amount of otolaryngology taught in undergraduate medical education (4).

In this study, 16.1 percent of participants expressed a desire to pursue ENT as a future specialty. Previous research found that students planning to pursue a career in ENT had higher scores, basic ENT comfort, and comfort performing the H&NPE. Those intending to practice ENT are more likely to have had the most clinical exposure to the field in the Undergraduate Medical Education (UME), and the amount of clinical exposure to ENT, regardless of intended specialty, is also positively correlated with basic knowledge (5).

Previous research has found deficits in ENT competency when assessing primary care residents, with one study finding a measurable difference in basic ENT competency between primary care residents and ENT residents. These findings could indicate a lack of ENT competency among primary care residents or an increase in ENT resident competency (6). According to our findings, 94.6 percent of those who completed the OtoHNS module and test were successful (60.2 percent of them had it in the 5th year). A national survey of all Canadian medical schools conducted in 2007 revealed that mandatory OtoHNS rotations in clerkship existed in six of sixteen (38 percent) schools, with an average rotation length of 4.6 days (7).

Another follow-up study in 2012, which surveyed the same medical schools about the clinical clerkship-rotation format, teaching methods, faculty support and development, programme strengths, and perceived barriers to rotation implementation, found that a significant proportion of Canadian medical students graduate without ever having experienced an OtoHNS clinical rotation (8).

According to a UK study, 75% of senior residents in an emergency medicine residency programme felt they had not received enough OtoHNS training in medical school (9). Another study from the United Kingdom found similar results in a survey of practising family doctors, where nearly half of the respondents felt their OtoHNS training was inadequate in both medical school and residency; 75% said they wanted more OtoHNS training (10).

In fact, in the United Kingdom, the average medical school graduate has a clinical rotation in OtoHNS for less than 1.5 weeks over a 5-year period, with up to 20% having no clinical exposure at all (11).

In the North American literature, similar findings have been reported. Another study found that 66.7 percent of residents in a Canadian family medicine residency programme received little classroom instruction, while 75.6 percent received little clinical OtoHNS instruction. Across a wide range of commonly encountered OtoHNS problems, the overall self-reported comfort level in managing OtoHNS cases was moderate. The majority of our study participants correctly answered ENT cases when it comes to diagnosing basic ear or nasal pathologies (12).

Approaches to improving medical education in ENT will necessitate extensive collaboration with medical schools to identify areas of deficiency and ways to improve. Education could be improved in particular by incorporating ENT teaching and placement into the core curriculum. This could imply more dedicated teaching time using preferred in-person pedagogical methods such as tutorials, simulations, and workshops, as well as the introduction of ENT teaching where it is not currently available. To accomplish this, we would need to hire experienced registrars or consultants as educators. Integrating medical student teaching into the curriculum of ENT registrar training would help us achieve this goal. This would be a valuable resource for medical students, as well as a way to cultivate one of the core clinical competencies that underpin surgical training (13).

Limitations

A limitatiom of the study was the use of a pre-designed questionnaire that could have a recall bias.

Conclusion

Saudi medical students have appropriate knowledge of basic otolaryngology. With a significant proportion of ENT complaints in general practice, it is critical that all graduating medical students, not just those entering ENT, are adequately trained in basic ENT to perform competently and be confident enough to manage or refer these patients.

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Outcome of Antenatal Renal Pelvic Dilatation – Review of Cases from a Tertiary Care Center, in the Armed Forces Hospital, Southern Region, Saudi Arabia

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Abstract

Background: Renal pelvic dilatation (RPD) is the most common abnormality discovered on antenatal ultrasound. Unfortunately, little is known about antenatal hydronephrosis (ANH) and its associated etiology and outcomes. This study aimed to determine the incidence of antenatal RPD to evaluate antenatal resolution/progression and post-natal outcome. Also, this study aims to determine the outcome of patients diagnosed with ANH.

Methodology: The current study followed a retrospective design. Data were collected from the medical records of infants born between 2019 and 2021, with dilated fetal renal pelvis in Armed Forces Hospital, Southern Region, Saudi Arabia. According to the radiological report on the follow-up, the patients were categorized based on their pelvic anteroposterior diameter (APD) detected on the second-trimester ultrasound into: APDs of 5-9.9 mm, 10-14.9 mm, and above 15 mm were classified as mild dilatation, moderate hydronephrosis, and severe hydronephrosis, respectively.

Results: Among patients with RPD, 43.5% had mild dilatation while 33.3% had moderate hydronephrosis and 23.2% had severe hydronephrosis. There was no significant difference in incidence of RPD between mothers of different ages (P=0.302). Moreover, 69.6% of the patients were male with male: female ratio of 2.3:1. Among patients with RPD, 47 infants had good outcomes (68.1%), while 22 patients had poor outcomes. There was a significant difference in outcomes of patients with RPD according to their severity, where mild dilatation had the highest percentage of good outcomes as 86.7% of children with mild dilatation had good outcomes compared with 47.8% of infants with moderate hydronephrosis and 62.5% of those with severe hydronephrosis (P=0.009).

Conclusion: Male infants have higher risk for developing RPD, although gender is not a predictor for severity or outcomes. Among patients with RPD, most patients have good outcomes.

Key Words: Renal pelvic dilatation, antenatal hydronephrosis, infancy, ultrasonography, outcome, retrospective research design.

Introduction

Fetal renal pelvic dilatation (RPD) is the most common abnormality discovered on antenatal ultrasound. The incidence is 1-5% of all pregnancies. RPD may be unilateral or bilateral, but unilateral RPD is more common. It is two times more common among male fetuses, with the male-to-female (M: F) ratio being 2.5:1[1]. Antenatal hydronephrosis (ANH) is the most common congenital abnormality. It is often detected during pregnancy through an antenatal ultrasound (US) examination. This condition is defined as dilated renal pelvis and calyces in neonates [2].

Fetal hydronephrosis is often picked up incidentally on a routine antenatal ultrasound scan. Once detected, the anxiety of both the treating obstetrician and the parents persists until the baby is born and often after [3]. Different classification systems and cut-offs have been used for the detection of RPD. The diagnosis is based on an increased anteroposterior diameter (APD) of the renal pelvis in the transverse plane. Based on renal pelvic APD, it can be further classified into mild, moderate, and severe [4].

Recent studies have reported that ANH is the most common antenatally discovered urinary tract abnormality and that in most cases, ANH is resolved within two months after birth. However, this finding was challenged by other studies suggesting no consensus on the classification and management of ANH to date [5].

One of the current controversies that stems from it is that it is difficult to determine whether this condition is pathological or transient on US imaging. While most cases of ANH resolve spontaneously, the inability to predict the outcome can cause caregivers extreme concern, which could be easily avoidable by early testing. The early detection of persistent ANH may be essential to prevent the progression of renal damage. The effects of untreated ANH manifest as an initial increase in intra-tubular pressure, progressing to the compression of renal blood vessels, culminating in decreased renal perfusion, ischemic tubular atrophy, and thinning of renal cortex and medulla; all these factors contribute to irreversible loss of renal function. Unfortunately, little is known about ANH and its associated etiology and outcomes. Due to the distress associated with this disorder, it is imperative to predict the outcomes and detect the condition during the antenatal stage to determine prognosis and the best course of treatment [2].

Prior research has been done regarding antenatal RPD. A study conducted in Karachi, Pakistan aimed to determine the incidence of antenatal renal pelvic dilatation evaluated antenatal resolution/progression and post-natal outcome. The study concluded that the incidence of RPD is low, and the outcomes were normal in most cases [1]. Another study was conducted at King Abdulaziz University Hospital, Saudi Arabia. It aimed to determine the outcome of patients diagnosed with ANH. The study found that patients with ANH were more prone to develop urinary tract infections (UTIs). Patients with several ANH comorbidities were associated with poor prognoses [2]. Another study was conducted at King Abdulaziz University Hospital, and aimed to determine antenatally diagnosed congenital hydronephrosis incidence and outcomes in a large cohort. The study found that congenital hydronephrosis is the commonest. A large percentage resolved within two months after birth, but underlying anatomical abnormalities were found in 12.1%. Therefore, all babies with antenatally detected hydronephrosis should be examined by ultrasound postnatally, but further radiological investigations should only be performed for persistent, significant APD ≥10 mm [5].

However, little is known about ANH and its associated etiology and outcomes, especially in the Middle East [2]. Therefore, the present study aimed to determine the incidence of antenatal RPD to evaluate antenatal resolution/progression and post-natal outcome.

Methofology

The current study followed a retrospective research design. Data were obtained from the medical records of infants born between 2019 and 2021, with RPD in the Armed Forces Hospital, Southern Region (AFHSR), Saudi Arabia.

Sampling & Sample Size

The inclusion criteria comprised infants born with RPD, who were delivered and treated at the AFHSR. To reduce bias and confounding effects, the exclusion criteria were fetuses with RPD <5 mm, those with other significant abnormalities, and those with loss of follow-up. A purposeful consecutive sampling approach was adopted.

Measures:

We recorded patients' demographic data, fetal parameters, treatment data, laboratory and radiology reports, and patient outcomes. According to the radiological report on the follow-up, the patients were categorized into one of the following three groups based on pelvic APD detected during the second-trimester ultrasound: APDs of 5 to 9.9 mm; 10 to 14.9 mm and above 15 mm were classified as mild dilatation, moderate hydronephrosis, and severe hydronephrosis, respectively. Renal outcomes were assessed postnatally as 'good prognosis', including patients whose RPD improved or resolved, or 'poor prognosis', for patients whose RPD progressed and resulted in complications, such as parenchymal scarring and chronic kidney disease (CKD) with hypertension (HTN).

Data Analysis

The Statistical Package for Social Sciences (IBM, SPSS version 26) was used for data analysis. Descriptive statistics were performed. Frequencies and percentages were calculated for categorical variables, while the mean and standard deviation (SD) was calculated for quantitative variables. The Chi-square (X^2) and Fisher's exact tests were applied, when appropriate, for comparisons between groups to determine significance of differences.

All p-values <0.05 were considered statistically significant.

Ethical Consideration

Ethical approval was obtained from the Institutional Review Board (IRB) at AFHSR. All parents were informed about the adopted privacy policy for their children's data.

Results

In this study, we included 120 newborns who were delivered and treated at the AFHSR. Among those infants, the prevalence of RPD according to classification system of APD was 57.5%. Among patients with RPD, 43.5% had mild dilatation while 33.3% had moderate hydronephrosis and 23.2% had severe hydronephrosis (Figure 1). Among mothers, 55.0% of them did not have any comorbidities, while hypertension was presented in 10.8% of them, while diabetes mellitus and asthma presented in 7.5% and 6.7% had iron deficiency anemia (Figure 2).

Among newborns, transient tachypnea of the newborn (TTN) was the main condition presented in 30.8% of children, while neonatal jaundice and respiratory distress syndrome were presented in 17.5% each (Figure 3).

Among infants with abnormal APD, 66.7% of the mothers were younger than 40 years old, with mean age of (Mean±SD: 33.9±7.9 years). There was no significant difference in incidence of RPD according to mothers' age. Moreover, parity of 46.4% of the mothers of infants with abnormal APD was 1-3, while parity of 43.5% was 4-7. There was significant difference in incidence of RPD according to parity (P=0.042). Furthermore, 50.7% of mothers of infants with abnormal APD did not have any comorbidities. Moreover, 69.6% of the patients were males, with male: female ratio of 2.3:1. However, incidence of RPD did not differ according to infants' gender. Moreover, 46.4% of patients had APGAR score of 9, while 29% had APGAR score of 8. The only significant factor affecting severity of RPD was maternal comorbidities, where having commodities was associated with more severe conditions (Table 1).

Among patients with RPD, 47 infants had good outcomes (68.1%), while 22 patients had poor outcomes. There is a significant difference in outcomes of patients with RPD according to their severity (p=0.009), where infants with mild dilatation had the highest percentage of good outcomes (86.7%), compared with 47.8% with moderate hydronephrosis and 62.5% with severe hydronephrosis. No significant differences were present regarding gender and APGAR score (P=0.196, 0.120 respectively). However, it seems that male infants were associated with better outcomes than females (72.9%, 57.1% respectively), as shown in Table (2).

Table (3) shows that 18.6% of infants had severe (grade I-V) postnatal micturating cystourethrogram (MCUG), while 17.1% had moderate pelviureteric junction (PUJ) and 14.3% had severe posterior urethral valve (PUV). Furthermore, 89.9% of infants had no associated renal anomaly, while 4.3% had polycystic kidney disease (PKD). Moreover, 44.9% needed both medical and surgical management, while 43.5% needed medical management and 10.1% needed surgical management.

Table 1: Demographic factors of participants with normal and abnormal APD and according to severity of RPD

Characteristics	Anteroposterior Diameter				Severity of RPD					
	Normal		Abnormal		Mild		Moderate		Severe	
	No.	%	No.	%	No.	%	No.	%	No.	%
Mothers' age										
• <40 years	40	78.4	46	66.7	17	56.7	17	73.9	12	75.0
• ≥40 years	11	21.6	23	33.3	13	43.3	6	26.1	4	25.0
P-value	0.157				0.302					
Parity										
• 1-3	24	47.1	32	46.4	11	36.7	12	52.2	9	56.3
• 4-7	26	51.0	30	43.5	14	46.7	9	39.1	7	43.8
• ≥8	1	2.0	7	10.1	5	16.7	2	8.7	0	0.0
P-value	0.117				0.042†					
Maternal comorbidity										
• None	31	60.8	35	50.7	17	56.7	10	43.5	8	50.0
• Present	20	39.2	34	49.3	13	43.3	13	56.5	8	50.0
P-value	0.180				0.996					
Child's gender										
• Male	41	80.4	48	69.6	21	70.0	16	69.6	11	68.8
• Female	10	19.6	21	30.4	9	30.0	7	30.4	5	31.3
P-value	0.180				0.996					
APGAR score										
• 6	3	5.9	4	5.8	0	0.0	2	8.7	2	12.5
• 7	9	17.6	9	13.0	1	3.3	5	21.7	3	18.8
• 8	12	23.5	20	29.0	9	30.0	7	30.4	4	25.0
• 9	27	52.9	32	46.4	16	53.3	9	39.1	7	43.8
• 10	0	0.0	4	5.8	4	13.3	0	0.0	0	0.0
P-value	0.180				0.996					

† Statistically significant

Table 2: The relation between outcomes of infants and their demographic factors

		Outcome				
		Good (n=47)		Poor (n=22)		P
		No.	%	No.	%	Value
Hydronephrosis severity as shown at 1st postnatal ultrasonography	Mild	26	86.7	4	13.3	0.009†
	Moderate	11	47.8	12	52.2	
	Severe	10	62.5	6	37.5	
Gender	Male	35	72.9	13	27.1	0.196
	Female	12	57.1	9	42.9	
APGAR Score	6	3	75.0	1	25.0	0.120
	7	5	55.6	4	44.4	
	8	17	85.0	3	15.0	
	9	18	56.3	14	43.8	
	10	4	100.0	0	0.0	

† Statistically significant

Table 3: Patients' outcomes and management

Variables	No.	%
Postnatal MCUG		
• None	2	2.9
• Mild (grade I-V)	8	11.4
• Mild PUJ	6	8.6
• Mild PUV	3	4.3
• Moderate (grade I-V)	5	7.1
• Moderate PUJ	12	17.1
• Moderate PUV	5	7.1
• Severe (grade I-V)	13	18.6
• Severe PUJ	6	8.6
• Severe PUV	10	14.3
Associated renal anomaly		
• None	62	89.9
• PKD	3	4.3
• Single kidney	1	1.4
• Trisomy 13	1	1.4
• Cystic hygroma	1	1.4
• Spina bifida	1	1.4
Postnatal treatment		
• None	1	1.4
• Medical	30	43.5
• Surgical	7	10.1
• Both	31	44.9

MCUG: Micturating cystourethrogram
PUJ: Pelvi-ureteric junction
PUV: Posterior urethral valve
PKD: Polycystic kidney disease

Figure 1: Severity of RPD as assessed by APD

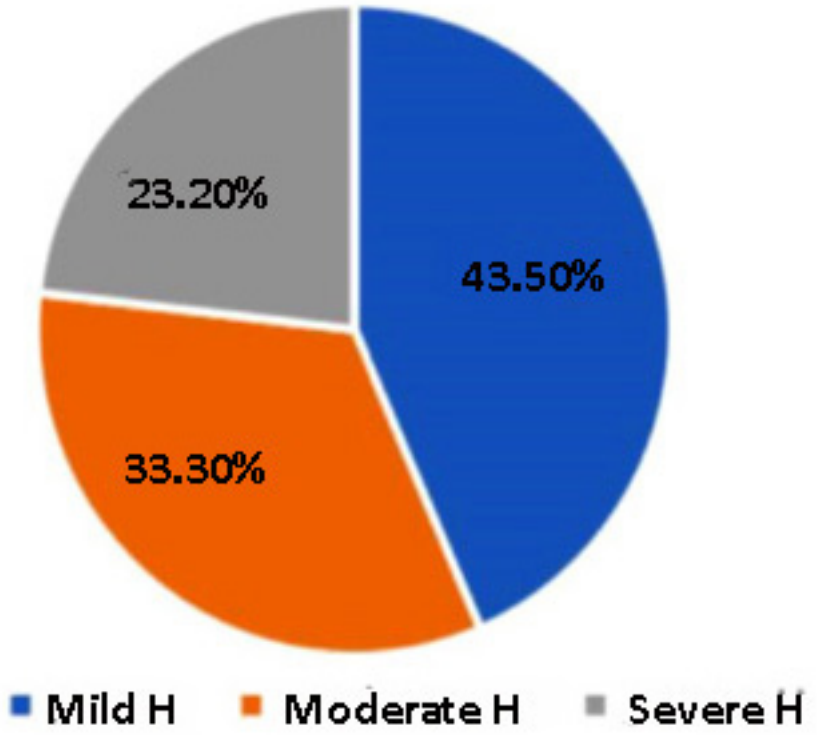


Figure 2: Maternal Comorbities

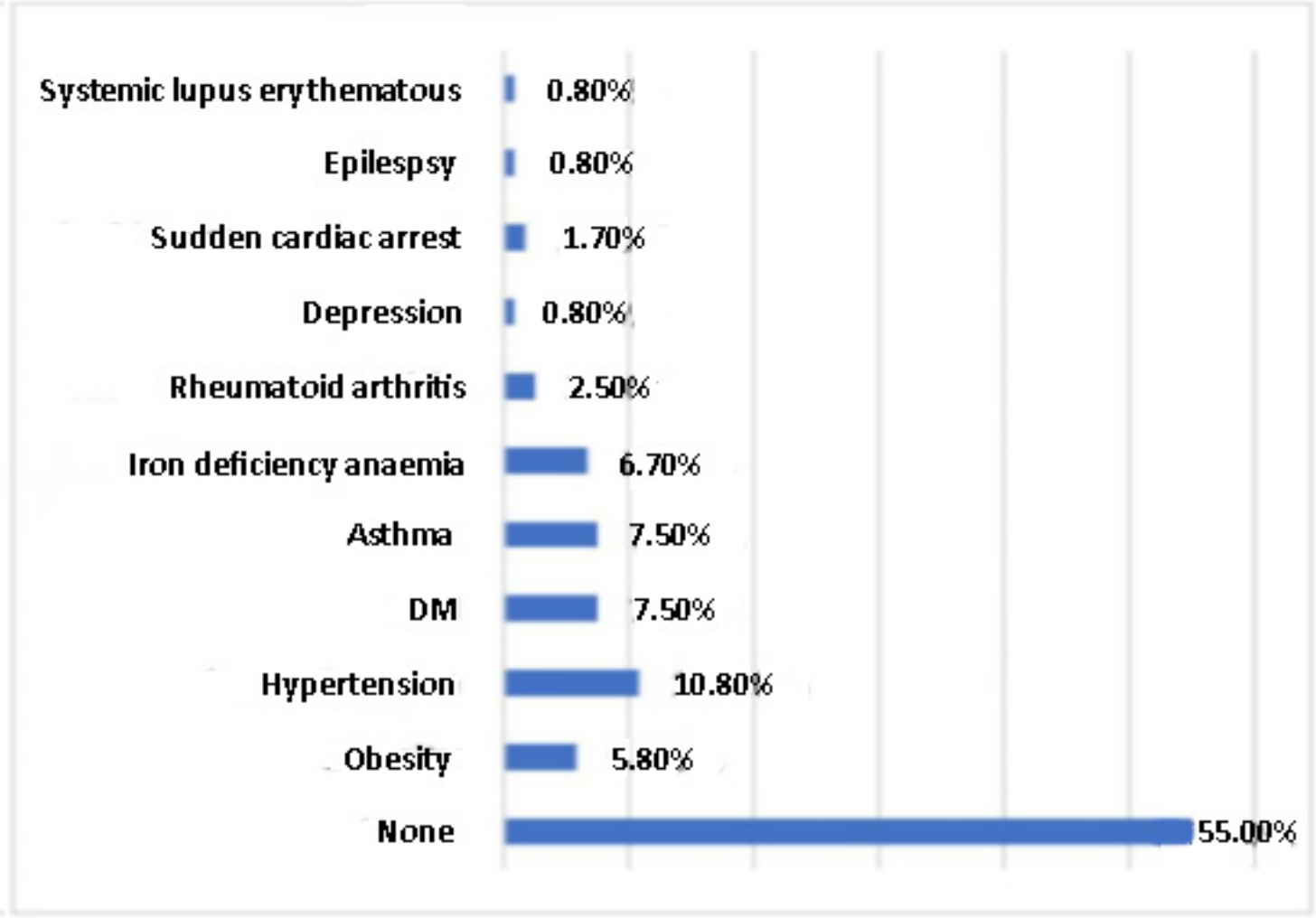
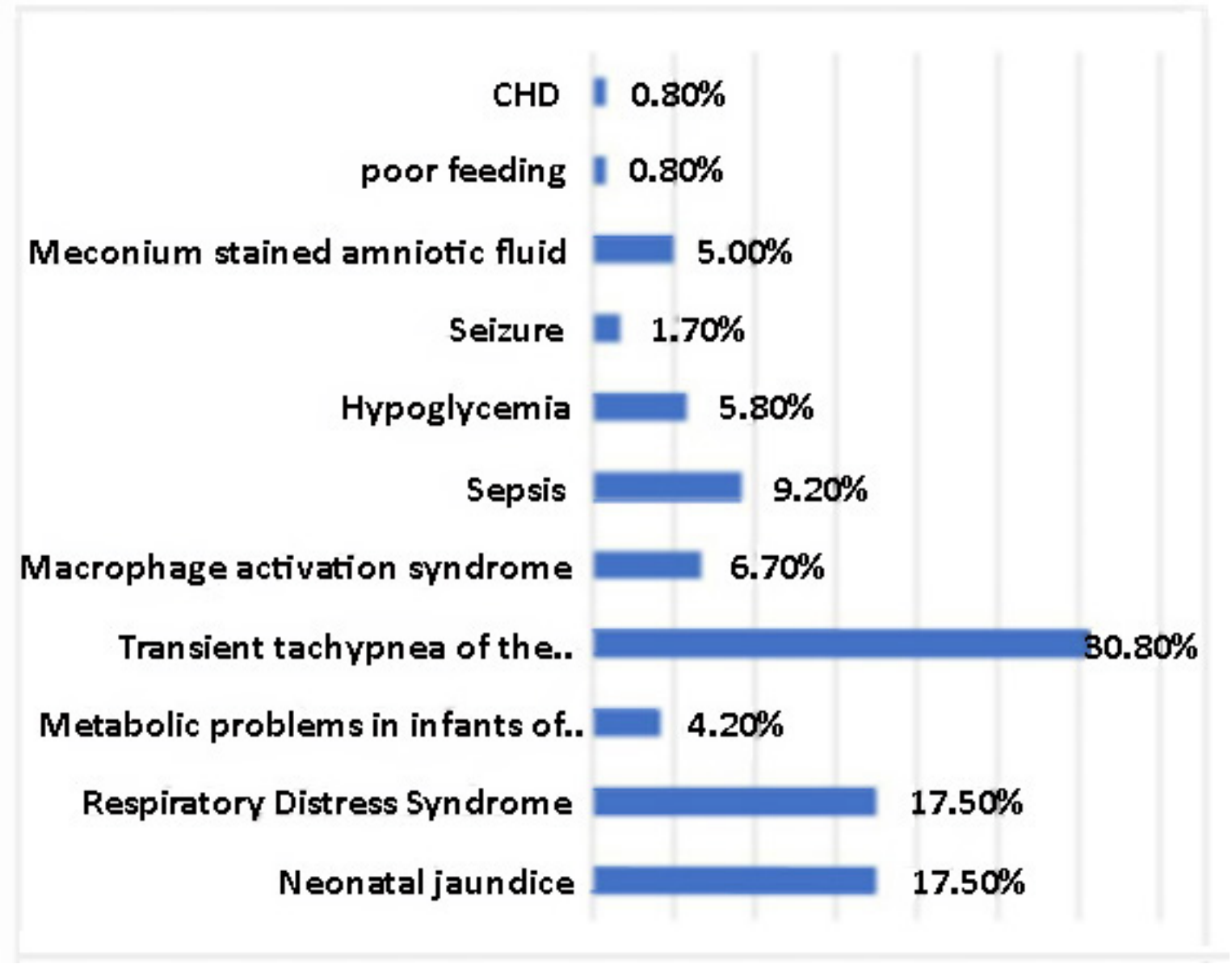


Figure 3: Neonatal characteristics



Discussion

The current study aimed to determine the incidence of antenatal RPD to evaluate antenatal resolution/progression and post-natal outcomes. In addition, this study aimed to determine the outcome of patients diagnosed with ANH.

In our study, we found that 57.5% of children with ANH had transient hydronephrosis. This is in accordance with that reported by Lee et al., who noted that most patients (64%) with ANH had transient hydronephrosis [6]. However, another study found that only 24% of patients had transient hydronephrosis [7].

Moreover, we found that 43.5% had mild dilatation, while 33.3% had moderate hydronephrosis and 23.2% had severe hydronephrosis. In a previous study, 34.9% of children had mild dilatation while 25.4% had moderate hydronephrosis and 39.7% had severe hydronephrosis [7]. Moreover, Cherian et al. reported that 30.1% of infants had mild hydronephrosis, while 43.9% and 25.8% had moderate or severe hydronephrosis, respectively [3].

The present study identified a male predilection among our patients, with a male-to-female ratio of 2.3:1. This is in agreement with those reported by several studies. Safdar et al. reported that 70.3% of infants with ANH were males [2], while Cherian et al. reported that males represented 74.3% of patients [3], and Kari et al. reported that 73.8% of patients were males [5]. Nevertheless, some other studies showed that ANH was 2.5 times more common among females [8–10].

The mean age of mothers in the current study among infants with ANH was 33.9 years, which is higher than that reported in some previous studies [3,5]. Moreover, our study showed that 68.1% of infants showed good outcomes. Similarly, Safdar et al. reported that 48.4% of children with ANH had good outcomes [2]. Furthermore, the study of Kari et al. showed that 48.4% of children with ANH had good prognosis [5].

Despite the unequal gender ratio considering outcomes of the condition, good or poor outcomes of ANH did not differ significantly according to gender of patients. This finding has been also reported by Safdar et al. [2].

In our study, we found that severity of antenatal renal pelvis dilatation was the only factor significantly associated with the outcomes in children with ANH. This result is in agreement with those reported by the meta-analysis of Lee et al., which included 1,308 neonates from 17 studies and showed that the risk of postnatal pathology was proportionate with increasing degree of antenatal renal pelvis dilatation, from 11.9% in mild, to 45.1% in moderate, and 88.3% in severe dilatation [6].

It has been shown that fetuses with minimal pelvic dilatation of 5-9 mm have lower risk of postnatal pathology than those more than 15 mm, who require more close follow-up [11–13]. Several studies have shown that between 78% and 96% of mild ANH cases had good outcomes [1,5,6,9,14]. Kari et al. and Chaudhary and Shah suggested that the outcome is possibly associated with the severity of ANH [5,15].

We found that 18.6% of the infants had severe postnatal MCUG (grade I-V), which is lower than that reported in a previous study which showed that 25% of infants were diagnosed with MCUG [5]. Moreover, 44.9% of children in the present study needed both medical and surgical management while 43.5% of them needed medical management and 10.1% needed surgical management. In a previous study conducted by Chaudhary and Shah, the authors reported that only 12.8% of patients needed surgery [15]. Moreover, another study conducted in Qatar showed that among 311 babies, 14.4% of the cases needed operative interventions [16].

The high percentage of surgical interventions in our patients could be attributed to the nature of our tertiary care hospital, which mainly receives more referred severe conditions than those referred to other hospitals. According to many investigators, an APD of 10 mm or more is considered abnormal [17–19], and 5 mm is recommended by other investigators as cut-off [20,21].

This study had some limitations including its retrospective design, which may lead to absence of some relevant information, and the possible inappropriate reporting of cases. Moreover, this study was conducted in single-center hospital, thus, the generalizability of the results is quite limited. More investigations should be conducted in different hospitals in order to collect larger samples.

In conclusion, male infants have higher risk for developing RPD, although gender is not a predictor for severity or outcomes. Among patients with RPD, most patients have good outcomes.

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COVID-19 Effect on Dietary Supplements' Consumption, Prophetic Medicine Practices and Herbs Use in Saudi Arabia

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Abstract

Background: The COVID-19 pandemic influenced dietary supplements' (DS) consumption and practices of traditional medicine.

Aims: This cross-sectional study aimed to compare dietary supplements, Prophetic medicine (PM) and herbal/plants (H/P) use among adults in Saudi Arabia before and during the COVID-19 pandemic.

Method: 1351 individuals participated in the study via an online survey shared on social media platforms between December 11th, 2021, and March 1st, 2022. The survey tool included 31 questions about sociodemographics, DS consumption, PM practices and H/P use, which the expert panel team validated. The data was analyzed using SPSS version 26. Descriptive statistics were presented as numbers and percentages. P-value ≤ 05 and 95% confidence intervals were used to report the statistical significance based on gender and prior infection with the COVID-19.

Results: The most common supplements consumed before the pandemic were Vitamin D (53.4%, n=358), Multivitamins (47.3%, n= 318), and Vitamin C (42%, n=282). This is along with the significant increase in the consumption of Multivitamins, Vitamin C, Vitamin B complex, Vitamin D, Zinc and Calcium during the pandemic. Females are significantly ($p < 0.001$) more concerned in consuming DS and H/P and practice PM before and during the COVID-19 pandemic, compared to males. Prior Covid-19 infection significantly impacted individuals' perception about DS, H/P and PM uses and practices, information and beliefs in their role in preventing and controlling the disease ($p< 0.05$). Significant changes in weight status during the pandemic were reported.

Conclusion: There was a significant increase in consumption of most dietary supplements and Prophetic medicine practices. The government should launch public awareness campaigns and employ regulations to educate about the risks and benefits of self-medicated Prophetic medicine practices and self-prescribed dietary supplements.

Keywords: COVID19, Dietary supplements, Herbs/Plants, Prophetic medicine.

Background

The new coronavirus pandemic (COVID-19) has negatively impacted the global economy and caused many deaths and health problems. As a result, the world has been desperately trying to find a treatment and prevention for COVID-19. The limited availability of treatment for COVID-19 has triggered public concern, attempting to discover other options to stop the spread of the disease or lessen the infection's progress (1).

Consumption of Dietary Supplements

A dietary supplement (DS) is defined by the USA's Food and Drug Administration as an ingestible product containing a "dietary component" intended to enhance the diet's nutritional value (2). People consume DS for various reasons depending on age, gender, physical activity or overall health. However, the most common uses are overall health and wellness, illness prevention, and repair of dietary deficiencies (3).

The most frequently reported indication to use vitamins or other DS was for therapeutic reasons and to strengthen the immune system (n = 142/160, 88.8%) (4).

Due to the COVID-19 pandemic, DS sales have significantly increased, and the increase reached 415% in the U. S. in March 2020 (5).

Practices of Prophetic Medicine and Use of Herbs/Plants

Prophetic medicine (PM) precedes Prophet Muhammad's time alongside other chronological uses of plant products such as Dates, Olives / Olive oil, Figs, Pomegranate and Black seeds were successfully anticipated by him. These foods were used as alimentary interventions to prevent diseases and maintain health and are considered essential parts of treatment in Saudi Arabia (SA)(6).

Despite the reported advantages of using herbal medicines in preventing, treating diseases, or relieving symptoms (7), studies showed that combining herbal medicine and prescribed drugs can lead to life-threatening conditions in some patients (8).

To the best of the authors' knowledge, no previous studies have examined the impact of COVID-19 epidemic on the outcomes DS, PM, H/P, weight status and prior infection. This study aims to research the effect of COVID-19 on the consumption of dietary supplements, use of H/P and practices of PM in SA and compare it with the period prior to the emergence of COVID-19. Another aim is to examine differences in the impact of COVID-19 epidemic using two outcomes: gender and prior infection with COVID-19.

Methodology

Study design
This survey-based cross-sectional study was administered online employing the Google Forms web survey platform. The connection to the electronic survey was shared through social media platforms (Twitter, WhatsApp, and Instagram), targeting the adult population (age > 18 years) who live in SA.

Study Tool and data collection
The survey included questions about the impact of the Covid-19 pandemic on the consumption of DS, the use of H/P, PM practices and weight status.

Development and validation of the questionnaires
Based on the literature, the research team, who were clinical dietitians and senior medical students, defined the components of the survey and developed the tool in English. Eight members of a bilingual expert panel (EP) were selected for their expertise in the field and the topic of the study. The EP reviewed, edited, and approved the developed tool based on the questionnaire items' relevance, specificity and comprehensiveness. The members of the EP conducted their review conversations through email, online meetings through the Zoom program and onsite meetings in the female section of King Abdulaziz University Medical Center. Afterward, the research team translated the questionnaire into Arabic (the native language) and it was re-sent to the expert panel for their evaluation. Then, another step was taken to back-translate the Arabic version into English. Finally, the expert panel team compared the original English version and the translated version, considering all of the comments provided, to validate the questionnaire.

The survey was tested on 40 adult participants (all of them completed the English version, and only 20 completed both the Arabic and the English versions) to confirm the reliability and validity of the questions. In addition, based on participants' responses, some questions were modified to facilitate understanding of the surveys.

The survey instrument included 31 questions, whereas the first section included sociodemographic data and information concerning the health status of participants. Sociodemographic information included gender, age, social status, educational level and occupation. Responses from participants included their medical profile and family history of chronic diseases prior to COVID-19. Moreover, the effect of COVID-19 on weight status was investigated using weight changes during the pandemic. The second section concentrated on the use of the DS prior to the pandemic, its type, the reason for its use, and whether or not that use was affected by the pandemic. If it was, they were asked to clarify the reason behind that.

The third section investigated PM practices, H/P use prior to the pandemic, the type, the reason and whether or not they were affected during the COVID-19 pandemic. If they were, participants were asked to clarify the reason behind that.

The questionnaire was available online in English and Arabic during data collection, depending on the participants' preferences for a response.

Study sample and sample size calculation
The Epi Info sample size calculator was used to calculate the required sample size according to the total number of adult population living in the country in 2021–2022.

A total of 1351 participants were included in the study. The inclusion criteria were adults older than 18 who live in SA, and all other responses were excluded from the study.

The research team assured the participants that their survey responses were voluntary and anonymous. Information about the study, including its purpose, the possibility to publish data and the permission given to the authors to use and publish the collected data, was available to the participants before answering questions. Informed consent appeared on the first page of the questionnaire. Respondents had the right to accept or refuse to share their data. The questionnaire was available online from December 11th, 2021, to March 1st, 2022.

Statistical Analysis
Once completed, each questionnaire was sent to the Google platform, and the final database was downloaded as a Microsoft Excel sheet. The Statistical Package for Social Science (SPSS) version 26 was used to analyse the data (SPSS Inc., Chicago, IL, USA). Frequencies and percentages were used to present descriptive data.

Based on the study, aims were to identify the effect of COVID-19 on different outcomes. To test differences, the McNemar test was used for paired nominal data and Chi-square independence test with the dichotomous dependent variables and more than one independent variable was used to determine differences between variables. Outcomes considered: 1. the gender (male/female) and 2. Infection with COVID 19 (infected/non infected). A P-value of less than 0.05 was defined as statistically significant.

Results

Demographics of studied participants
A total of 1351 individuals participated in this study from all over the Kingdom of Saudi Arabia, where the majority were from Makkah Province 644 (47.7%), followed by the Eastern Region 356 (26.4%) and the Riyadh region 166 (12.3%) (Figure 1).

Most respondents were Saudi (89.9%, n=1215) and in the age group 18-29 years old (70%, n=946). More than half of them, 998 (73.9%), were females, and the remaining 353 (26.1%) were males (Table 1).

One-fifth of the participants had chronic diseases, 272 (20.1%). The most prevalent diseases were pulmonary diseases 79 (5.8%), followed by hypertension 72 (5.3%), depression or anxiety 70 (5.2%) and dyslipidemia 67 (5%) (Figure 2a/b).

Infection with COVID-19, impacts on demographics and weight status
According to the findings, 447 (33.1%) reported a prior COVID-19 infection, and 953 (70.5%) reported a prior COVID-19 infection among their family members. Among participants, 586 (43.4%) reported that their work status was affected or changed due to the COVID-19 pandemic. In terms of weight changes during the pandemic, 521 (38.6%) gained weight and 280 (20.7%) lost weight. Of those who gained weight, 252 (48.3%) gained 3-5 kg, while 125 (44.6%) lost weight by 3-5 kg (Figure 3).

Consumption of dietary supplements
Half of the participants reported regular intake of DS such as vitamins or minerals; 419 (62.4%) used them as per recommendation by family members and friends, and 354 (52.9%) reported reasons for consuming DS to meet their recommended nutritional needs and 347 (51.8%) for sports and fitness.

The most common supplements consumed before the pandemic were Vitamin D 358 (53.4%), Multivitamins 318 (47.3%) and Vitamin C 282 (42.2%). During the pandemic, the most commonly used were Vitamin C 588 (87.6%), followed by Vitamin D 517 (76.9%) and Multivitamins 468 (69.7%). Compared to the period before the pandemic, there was a significant increase in the usage of Multivitamins, Vitamin C, Vitamin B complex, Vitamin D, Zinc and Calcium (Table 2).

Participants' perceptions about PM practices and H/P use
Before the pandemic, 714 (52.8%) participants practiced PM and used H/P. The highest use was for the Talbina (porridge with barley, milk, and honey) 634 (46.9%), followed by honey 448 (33.2%), chamomile 435 (32.3%), pomegranate fruit 425 (31.5%), Vinegar 419 (31%) and Figs 409 (30.3%). During the pandemic, the highest consumption continued to be for the Talbina 981 (72.6%), followed by pomegranate fruit 816 (60.3%), honey 611 (45.2%), chamomile 536 (39.6%) and vinegar 519 (38.4%). Compared to the period before the pandemic, there was a significant increase in most PM practices (Table 2).

About half of the participants, 673 (49.8%), believed that people's information and beliefs about PM practices and and H/P use had increased during the COVID-19 pandemic. Moreover, 330 (24.4%) believed they could prevent and/or cure COVID-19. Additionally, 276 (20.4%) reported that their practices had increased during the pandemic, while 538 (39.8%) reported no change. The most common reason for the increase in use 198 (71.7%) was to improve their health and nutritional status during COVID-19.

Associations

Gender impact on DS consumption, PM practices, and H/P use.
In this study, female participants significantly consumed more DS and H/P and practiced more PM before the COVID-19 pandemic than male participants. Moreover, this tendency persisted during the COVID-19 pandemic period (p=< 0.05) (Table 3).

Impact of Covid-19 infection on DS consumption, PM practices, and H/P use.
Participants with a prior history of COVID-19 infection significantly consumed DS, practiced PM, and used H/P less frequently before and during the pandemic (p=< 0.05) than those previously not infected with COVID-19. They were also less likely to believe that the public's knowledge and beliefs about PM practices and H/P use had increased during the COVID-19 pandemic and to believe in their influential role in preventing or curing the COVID-19 infection (p=< 0.05) (Table 4).

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Figure 1: Participants' responses by Saudi Arabian provinces

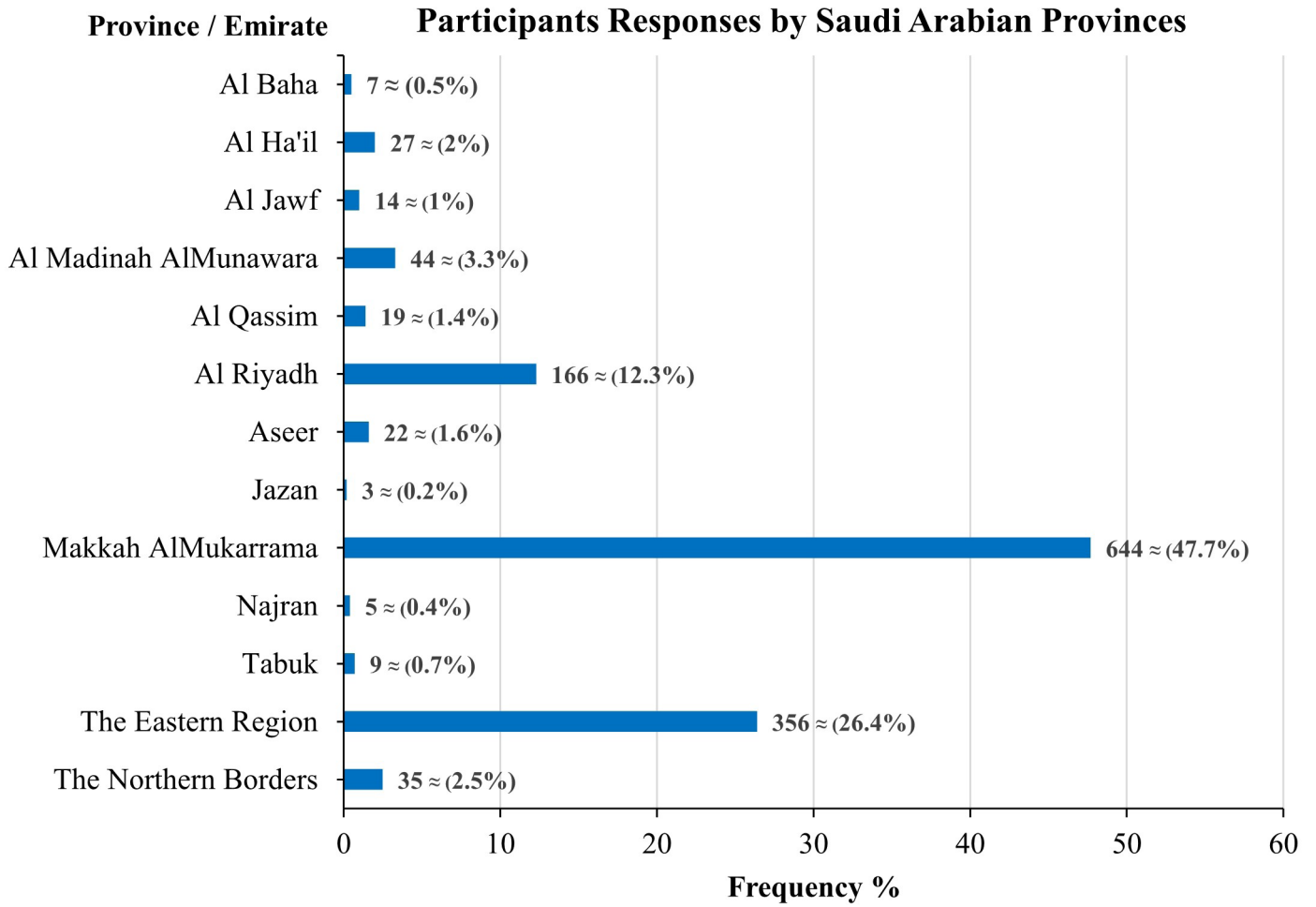


Table 1: Distribution of studied participants according to their demographic characteristics (No.:1351)

DEMOGRAPHIC DISTRIBUTION		
VARIABLE	**No.**	**(%)**
Age		
18-29	946	(70)
30-39	196	(14.5)
40-49	103	(7.6)
50-59	77	(5.7)
60-64	21	(1.6)
65 and more	8	(0.6)
Gender		
Female	998	(73.9)
Male	353	(26.1)
Nationality		
Saudi	1215	(89.9)
Non-Saudi	136	(10.1)
Marital status		
Widow	12	(0.9)
Single	894	(66.2)
Married	404	(29.9)
Divorced	41	(3)
Employment		
Employed	425	(31.5)
Student	671	(49.7)
Non-Employed	219	(16.2)
Retired	36	(2.7)
Educational level		
Primary education	8	(0.6)
Intermediate education	26	(1.9)
High school education	383	(28.3)
Diploma	118	(8.7)
University education	712	(52.7)
Higher education	104	(7.7)
Household monthly income (SR)		
Less than 5000	188	(13.9)
5000-10,000	217	(16.1)
11,000-20,000	885	(65.5)
More than 20,000	61	(4.5)

*n (%) shows data presented as numbers and percentages.

Figure 2a: Prevalence of chronic diseases among participants and types of chronic diseases.

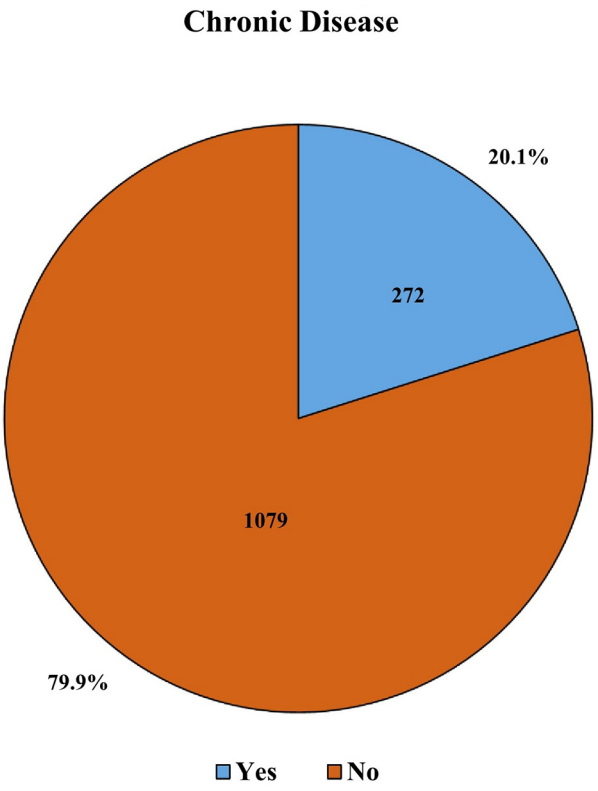


Figure 2b: Types of prevalent chronic diseases among participants and chronic disease.

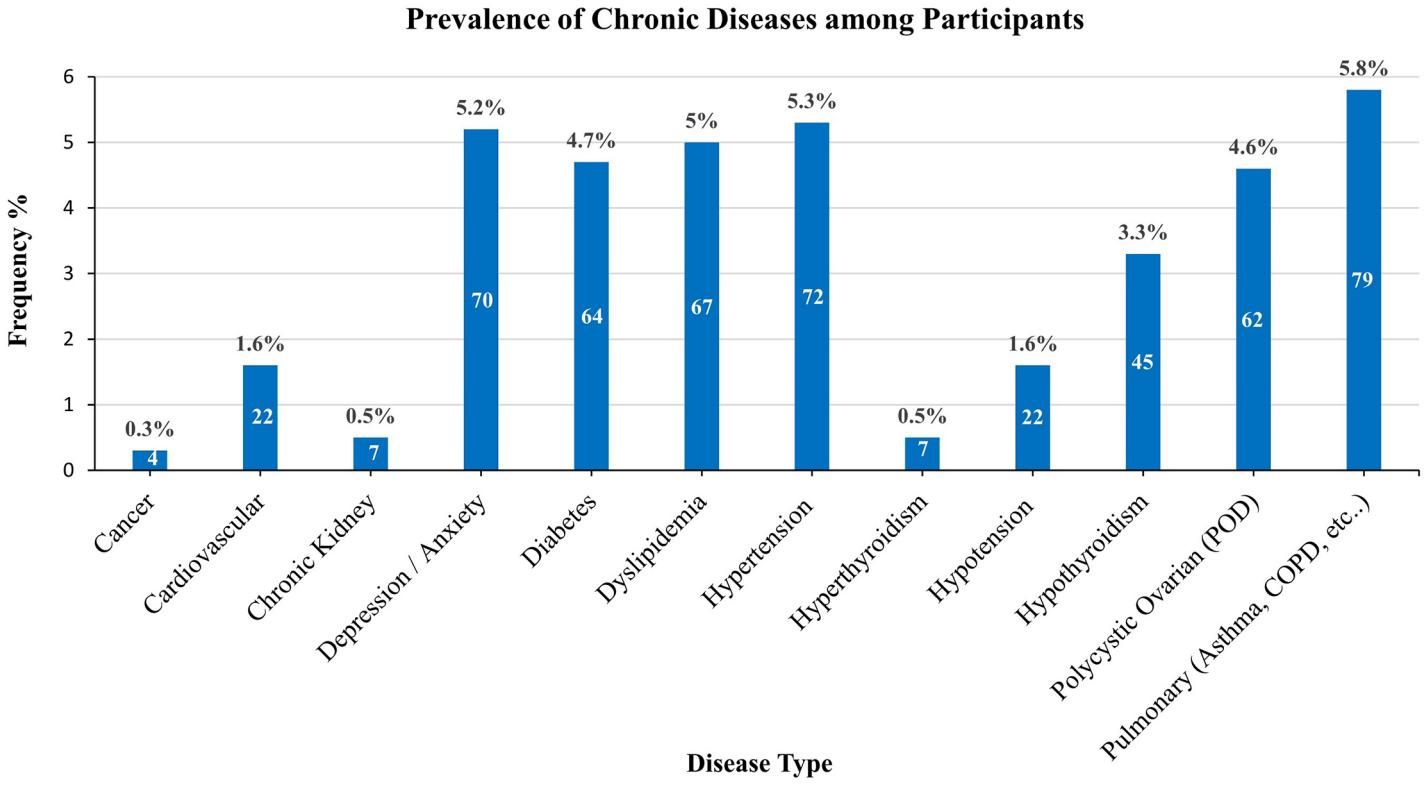
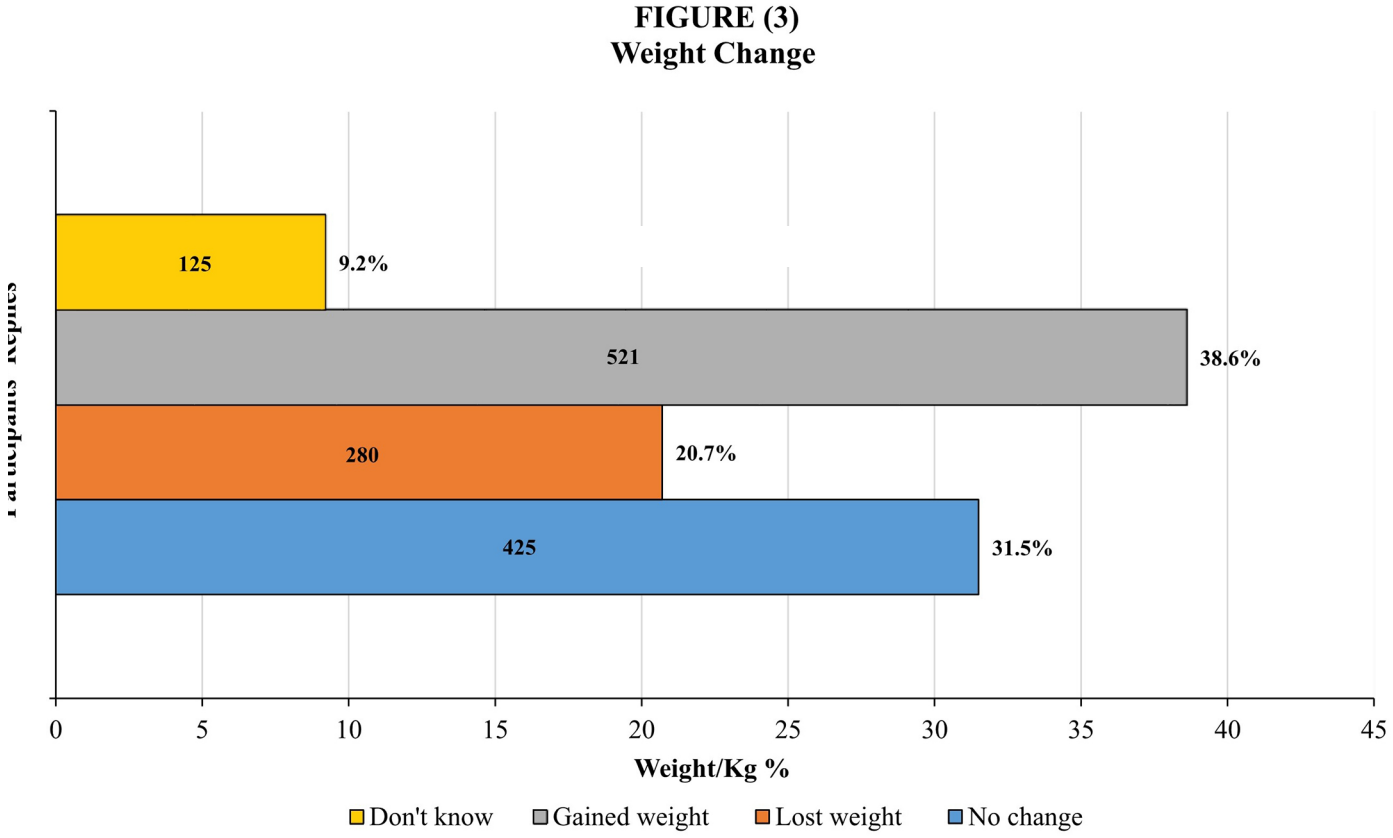
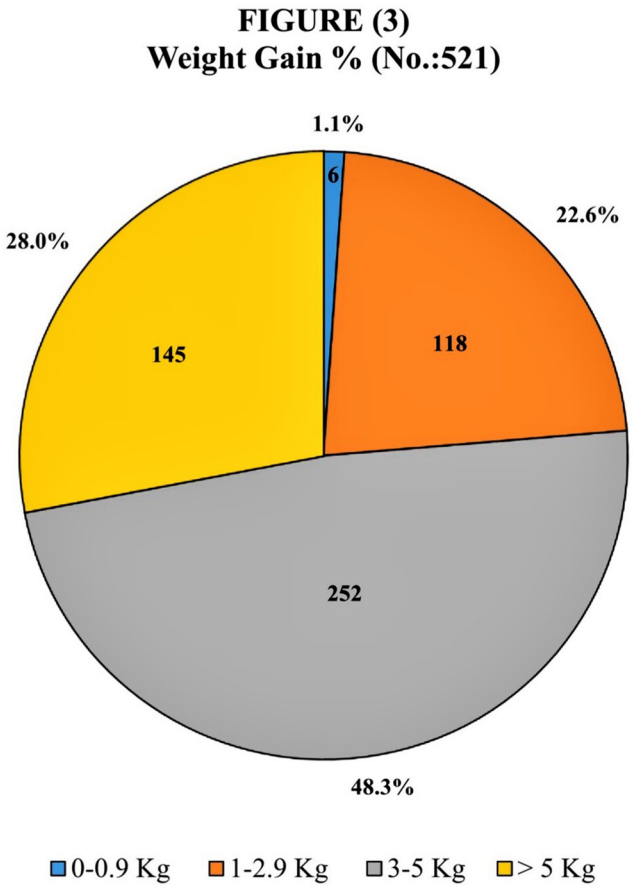


Figure 3: Weight change during the COVID-19 pandemic, gain and loss





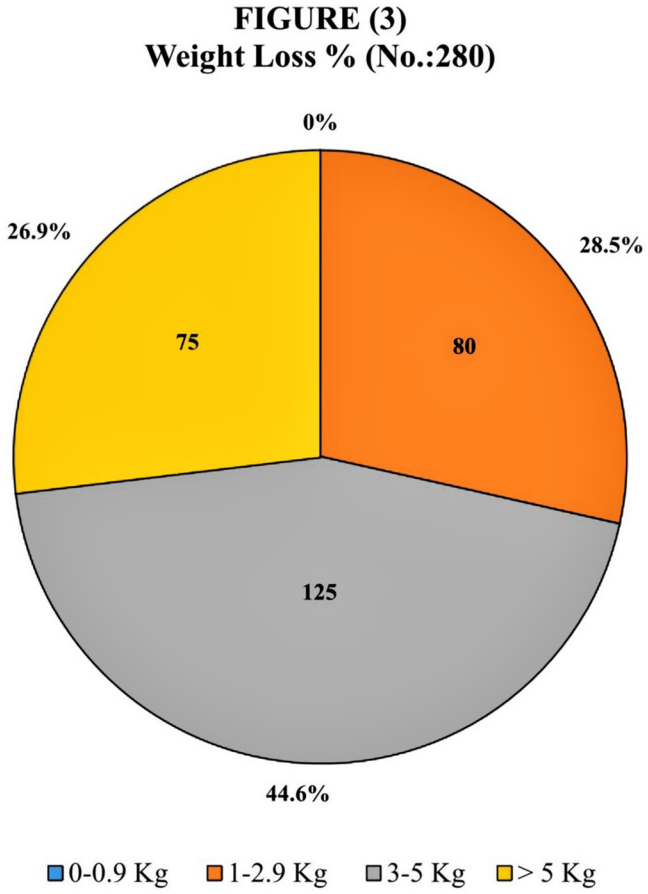


Table 2: Comparison of DS consumption, PM practices and H/P use before and during the COVID-19 pandemic.

Variable	Before COVID-19		During COVID-19		McNemar test
	No.	(%)	No.	(%)	(P-value)
Multivitamins	318	(47.3)	468	(69.7)	< 0.001
Vitamin C	282	(42)	588	(87.6)	< 0.001
Vitamin B complex	129	(19.2)	185	(27.5)	< 0.001
Vitamin D	358	(53.3)	517	(76.9)	< 0.001
Vitamin A	39	(5.8)	62	(9.2)	0.067
Iron	221	(32.9)	321	(47.8)	0.07
Omega 3	176	(26.2)	252	(37.5)	0.61
Zinc	159	(23.6)	281	(41.7)	< 0.001
Calcium	126	(18.7)	137	(27.1)	< 0.001
Potassium	40	(5.9)	54	(7.9)	0.51
Probiotics	40	(5.9)	61	(9)	0.032
PMPRACTICES, HERBS/PLANTS USE					
Variable	**Before COVID-19**		**During COVID-19**		**McNemar test**
	No.	**(%)**	**No.**	**(%)**	**(P-value)**
Hijamah	45	(3.3)	127	(9.4)	< 0.001
(Cupping therapy)	48	(3.6)	98	(7.2)	< 0.001
Talbina	634	(46.9)	981	(72.6)	< 0.001
Honey	448	(33.2)	611	(45.2)	0.003
Dates	175	(13)	354	(26.2)	< 0.001
Figs	409	(30.3)	617	(45.6)	< 0.001
Olive/Olive oil	196	(14.5)	301	(22.2)	< 0.001
Pomegranate fruit	425	(31.5)	816	(60.3)	< 0.001
Black seeds	51	(3.8)	116	(8.5)	0.043
Senna	289	(21.4)	318	(23.5)	0.067
Garlic	230	(17)	329	(24.3)	0.452
Onion Vinegar	106	(7.8)	197	(14.5)	< 0.001
Vinegar	419	(31)	519	(38.4)	0.7
Ginger	336	(24.9)	438	(32.4)	0.066
Anise	261	(19.3)	284	(21)	0.561
Cumin	276	(20.4)	301	(22.2)	0.073
Chamomile	435	(32.3)	536	(39.6)	0.082
Peppermint	118	(8.7)	132	(9.7)	0.613
Coffee peals	69	(5.1)	107	(7.9)	0.41
Lemon leaves	36	(2.7)	49	(3.6)	0.152
Orange leaves	131	(9.7)	197	(14.5)	0.031
Costus	109	(8.1)	176	(13)	0.051
Marjoram	128	(9.5)	169	(12.5)	0.16
Fenugreek	168	(12.4)	217	(16)	0.065
Carnation					

*n (%) shows data presented as numbers and percentages. **P-Value is significant at <0.05

Table 3: Differences in the prevalence and patterns of DS consumption, PM practices, and H/P use based on participants' gender

Variable	Female		Male		χ^2	P-value
	FRQ	(%)	FRQ	(%)		
Do you usually take any dietary supplements such as vitamins or minerals?						
➢ No	449	(66)	231	(34)	43.61	**< 0.001**
➢ Yes	549	(81.8)	122	(18.2)		
Was your intake of dietary supplements affected during the COVID-19 pandemic and quarantine period?						
➢ Yes, my intake was increased	143	(76.9)	43	(23.1)	30.25	**< 0.001**
➢ I don't take any food supplements	345	(66)	178	(34)		
➢ I only have started taking them during the pandemic	74	(81.3)	17	(18.7)		
➢ Yes, my intake was decreased	78	(81.3)	18	(18.8)		
➢ No, my intake was not affected at all	351	(78.3)	97	(21.7)		
Did you follow practices of prophetic medicine, or used herbs/plants mentioned in the prophetic medicine before the emergence of the Covid-19 pandemic?						
➢ No	429	(67.3)	208	(32.7)	26.58	**< 0.001**
➢ Yes	569	(79.7)	145	(20.3)		
Were your prophetic medicine practices, use of herbs/plants affected during the COVID-19 pandemic and quarantine period?						
➢ I don't practice any prophetic medicine or use herbs/plants	281	(64.7)	153	(35.3)	31.86	**< 0.001**
➢ No, my intake was not affected at all	415	(77.1)	123	(22.9)		
➢ I only have started taking them during the pandemic	55	(82.1)	12	(17.7)		
➢ Yes, my intake was increased	223	(80.8)	53	(19.2)		
➢ Yes, my intake was decreased	24	(66.7)	12	(33.3)		

*n (%) shows data presented as numbers and percentages. **P-Value is significant at <0.05

Table 4: Differences in the prevalence of DS consumption, PM practices, and H/P use based on participants' prior COVID-19 infection

Variable	No prior COVID-19 infection No. 904		Prior COVID-19 Infection No. 447		χ^2	**P-value
	*FRQ	(%)	*FRQ	(%)		
Do you usually take any dietary supplements such as vitamins or minerals?						
➢ No	453	(66.6)	227	(33.4)	0.05	**0.816**
➢ Yes	451	(67.2)	220	(32.8)		
Was your intake of dietary supplements affected during the COVID-19 pandemic and quarantine period?						
➢ Yes, my intake was increased	109	(58.6)	77	(41.4)	18.37	**0.003**
➢ I don't take any food supplements	369	(70.6)	154	(29.4)		
➢ I only have started taking them during the pandemic	**49**	**(53.8)**	**42**	**(46.2)**		
➢ Yes, my intake was decreased	60	(62.5)	36	(37.5)		
➢ No, my intake was not affected at all	312	(69.6)	136	(30.4)		
Did you follow practices of prophetic medicine, or used herbs/plants mentioned in the prophetic medicine before the emergence of the Covid-19 pandemic?						
➢ No	451	(70.8)	186	(29.2)	8.22	**0.004**
➢ Yes	453	(63.4)	261	(36.6)		
Do you believe that the people's information and beliefs about the use of prophetic medicine practices and herbs/plants have increased during the Covid-19 pandemic?						
➢ No	64	(71.1)	26	(28.9)	14.87	**0.001**
➢ Not sure	423	(71.9)	165	(28.1)		
➢ Yes	417	(62)	256	(38)		
Do you believe that the use of prophetic medicine practices, and herbs/plants? Could prevent and/or cure COVID 19?						
➢ No	234	(56.2)	125	(34.8)	6.5	**0.039**
➢ Not sure	464	(70.1)	198	(29.9)		
➢ Yes	206	(62.4)	124	(37.6)		
Were your prophetic medicine practices, use of herbs/plants affected during the COVID-19 pandemic and quarantine period?						
➢ I don't practice any prophetic medicine or use herbs/plants	316	(72.8)	118	(27.2)	35.71	< **0.001**
➢ No, my intake was not affected at all	380	(70.6)	158	(29.4)		
➢ I only have started taking them during the pandemic	34	(50.7)	33	(49.3)		
➢ Yes, my intake was increased	**153**	**(55.4)**	**123**	**(44.6)**		
➢ Yes, my intake was decreased	21	(58.3)	15	(41.7)		

*n (%) shows data presented as numbers and percentages. **P-Value is significant at <0.05

Discussion

Several countries enforced lockdowns due to the COVID-19 pandemic and subsequent measures to prevent its spread; these measures have substantially changed people's lifestyles, including dietary habits and physical activity to cope with the pandemic (9).

This study examined the impact of the COVID-19 pandemic on dietary supplements consumption, PM practices and H/P use among the adult population in SA before and during the pandemic. In addition, the impact of COVID-19 on weight status and DS, H/P, PM use and practices was also examined.

The reports of the present study indicated significant changes in weight status during the COVID-19 pandemic, as 38.6% of participants gained weight during the pandemic, 48% reported weight gain of about 3-5 kilograms, and 28% gained more than 5 kilograms. In comparison to a population from the United States of America (> 3400 adults), weight gain during the first 12 months of the pandemic was reported by 48% of participants (10).

Saudi reports showed a prevalence of high consumption of multivitamin-multimineral products among 47% of 1105 participants (11). Studies also reported the benefits of DS consumption and H/P use in preventing and treating SARS-CoV-19 (7). The present study's findings emphasized the significant prevalence of DS consumption among the adult population in SA as half of the participants consume DS regularly, and 13.8% reported increased intake of DS during the pandemic. These outcomes are consistent with reports by Alkharashi, N. A. (10), where 15.6% of the Saudi population reported regular consumption of DS during the pandemic. The present study also confirmed more consumption by females 549 (82%), compared to males 122 (18%). Moreover, to combat the pandemic, DS consumption was confirmed to be higher than 451 (67%) among participants who were not previously infected with COVID-19, compared to the infected, 220 (33%).

Increased sales and popularity of DS and herbal products during COVID-19 were due to people's personal beliefs that they confer beneficial effects (5). Additionally, many communities adopted non-pharmacological preventative measures, claiming they were safer than prescription medications and essential to enhance health or prevent most chronic diseases (12). Vitamins C, B, and D supplements have been considered possible interventions for COVID-19 treatment (12,13).

Vitamin C was essential in boosting immunological function interfering with COVID-19 pathology-related actions (14,15). The present study showed a significant increase in vitamin C supplement consumption before and during the pandemic, as 87.6% of the participants used it during COVID-19 outbreak.

Vitamin D has emerged as a critical prophylactic and therapeutic potential against SARS-CoV 2 and has been linked to several elements of immunological health and antiviral defense due to modulating both the adaptive and innate immune systems (16). However, in the present study, significant vitamin D consumption occurred before the pandemic and increased by 76.9% in consumption during the pandemic. Observational studies reported the consumption of vitamin D supplements by 41% of the participants before and during the pandemic. They addressed the need for adequate vitamin D intake for its potential association with the incidence of COVID-19 and its importance to overall health (17).

Zinc supplementation is essential for the wellness and growth of adaptive and innate immune cells (10). Low zinc levels can be a risk factor for pneumonia in elderly patients, owing to its anti-inflammatory and antioxidant activity (10). Zinc supplementation is advertised to improve the overall immune system health during the COVID-19 pandemic (18,19). The present study findings showed a significant difference in the consumption of Zinc supplements before and during the pandemic, with 42% of the participants reporting using the supplement during the pandemic; on the other hand, ALkharashi, N.A. (10) findings indicated that 72.9% of the participants used the supplement during the pandemic.

The worldwide outbreak of COVID-19 has raised many concerns among people due to the lack of evidence-based treatments, leading to their dependency on alternative traditional recipes to strengthen their immunity and decrease the risk of infection (1). The present study's findings indicated that some practices of PM and use of H/P were significantly higher during the pandemic than before. Herbs are widely used in SA, and reports showed that 88% of the Saudi population uses herbs for different reasons, and the use was mainly 88.7% for therapeutic purposes (4). In the context of the COVID-19 pandemic, Saudi studies reported that 22% of participants claimed that using DS and herbal products reduces the risk of infection with COVID-19 during the pandemic period (10). This trust was significantly ($p= 0.039$) more likely to be reported by participants who had no prior COVID-19 infection, 206 (62%), compared to those with prior infection 124 (38%).

Participants of the present study also claimed that they significantly ($P< 0.00$) increased their PM practices of consuming natural products such as Talbina, dates, figs, olive/olive oil, pomegranate fruit, and onion vinegar during the pandemic. Black seeds use also increased ($P< 0.043$) as well as orange leaves ($P< 0.031$). These H/P are commonly used in the Middle East due to their embedded relation to Islamic culture. They are stated in the Holy Quran and PM(20) and widely practiced in Saudi Arabia (21). Honey benefits are highly acknowledged by PM and Qur'anic verses to enhance overall health (22). Black seed was introduced as a potential adjuvant therapy to COVD-19, as it possesses antiviral, antioxidant and anti-inflammatory properties propitiates (23).

In another narration, Prophet Mohammed (Peace be upon him) stated that "There is healing in Black Cumin (Black seed) for all diseases except death." (24). Since ancient times, olives and olive oil have been used to treat many diseases, including influenza and rheumatoid arthritis (25). They have many health-promoting and pharmacological properties, including immunity-boosting (26).

Cupping therapy (Hijama) is a form of a PM. It is also considered by alternative medicine and is famous in China and the Middle East, in which pressure is applied to the skin through suction cups (27). Several studies reported the potential benefit of cupping therapy for pain conditions, Cough, Dyspnea, Hypertension and stroke rehabilitation (28,29). In the present study, n=127 (9.4%) used cupping therapy during the pandemic, and n=45 (3.3%) used it before the pandemic, with a statistical difference of P= 0.0001. However, in a study conducted by Ismail et al. to assess the use of traditional medicine in treating migraine during the COVID-19 pandemic in Kuwait, among n= 406 respondents who used traditional medicine, only 1.1% reported using Hijama during the pandemic (23).

The finding of the present study showed that 14.5%, n=197 of the surveyed participants, drank more onion vinegar during the pandemic. This behavior was also observed in the 2003 Severe Acute Respiratory Syndrome (SARS) pandemic (30), even though no scientific evidence proves the efficacy of vinegar drinking in reducing the risk of viral infection or death.

Conclusion

In conclusion, this study provided insight into the effect of the COVID-19 pandemic on DS and H/P consumption and PM practices among the population in SA. Some products' consumption and practices of PM were increased during the COVID-19 pandemic as a protective measure against infection. Although a few DS products, such as vitamin C and D, are reported in the previous literature to be beneficial, other products, such as vinegar, were highly consumed among the participants despite lacking evidence of their effectiveness.

We recommend:

- Health professionals should conduct public awareness campaigns to educate the general population about the risks and benefits of dietary supplements, particularly over-the-counter ones which require no prescription.
- The government is to employ regulations for PM practices if self-medicated and the consumption of dietary supplements and H/P if self-prescribed.
- Further extensive scientific evidence needs to be sought regarding the consumption and practices in COVID-19.

Limitations

Using an online survey for data collection might have excluded some vulnerable populations who could not be reached. Furthermore, data collection took longer than expected to reach the target population. Data collectors had to be recruited from different regions of SA to help share the survey link with the adult population in their regions and produce a diversified sample representing different geographical areas of SA.

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Self-Reported Adverse Events of COVID-19 Vaccines on Menstrual Cycles

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Abstract

Aim of Study: To investigate the adverse events of COVID-19 vaccinations on menstrual abnormalities in women in their reproductive period.

Methods: Following a cross-sectional research design, this study included 102 women who had received the COVID-19 vaccinations. A study questionnaire adapted from the Menstruation after COVID vaccine (MECOVAC) survey was used for data collection.

Results: Almost half of participants (48%) reported the incidence of menstrual abnormalities after receiving COVID-19 vaccinations, manifested as changes in frequency, length or quantity of menstruation. Participants received one, two or three doses of either Pfizer-BioNTech or Oxford-AstraZeneca vaccines. Adverse events of COVID-19 vaccines occurred mainly after the third doses of Pfizer and AstraZeneca (12.5% for both). The most frequent changes in quantity of menstrual blood among participants were variation in its quantity and having heavier menstruation (17.2% and 15.6%, respectively), which occurred after receiving the third dose of Pfizer vaccine, while menstrual blood became less among 25% of participants after receiving the third dose of AstraZeneca. Disturbance of personal life occurred in 44.9%, while 38.8% needed to visit a doctor, 26.5% underwent investigations and 32.7% took medications. Menstrual cycles of 51% returned to normal within 1-2 cycles, while those of 49% returned after more than two cycles.

Conclusions: Women who receive COVID-19 vaccinations may have menstrual abnormalities. This change mainly occurs after the third dose, regardless of the brand of received vaccine. It is recommended that women be clearly informed after vaccination of the possibility of short-term menstrual abnormality and to seek proper medical advice in such conditions. Further studies are required to investigate the possible mechanisms behind these COVID-19 vaccines' adverse events.

Keywords: COVID-19 vaccination, adverse events, menstrual abnormality, Saudi Arabia

Introduction

The global COVID-19 pandemic has shown an accelerated geographic spread over the last two years, (1) and caused devastating effects on public health and the global economy worldwide. Preventive strategies constituted the central role in limiting its spread, along with successful disease isolation and community containment. Moreover, a mass vaccination strategy was globally adopted to build up sufficient herd immunity, being the only effective tool to manage the situation (2).
Currently, there are several types of vaccines for COVID-19. The BNT162b2 (Pfizer-BioNTech), ChAdOx1 (Oxford-AstraZeneca), Sinopharm and Sputnik vaccines have been approved for use in many parts of the world (3). Despite the fact that COVID-19 vaccinations have been effective in reducing hospitalizations and mortalities, many studies have reported various side effects, ranging from mild symptoms, e.g., fatigue, headache, cramps in the arms, to severe symptoms, e.g., hemorrhage, thrombosis, anaphylaxis, venous blood clots and neurological events, including stroke and myocardial infarction (4-8).

Vaccination against SARS-CoV-2 was recommended for all women, including those who are pregnant or planning to become pregnant. However, since the beginning of the COVID-19 pandemic, there have been endless discussions on social media, during clinic visits or telemedicine, reporting that some women may experience menstrual changes related to vaccination, which has fueled vaccine hesitancy or its refusal (9-12).

Studying menstrual cycle features is challenging, since normal variations exist within women over their lifespan and in relation to characteristics, such as age, parity, history of infertility, body mass index and exercise. However, a worldwide increase in visits to the Obstetrics and Gynecology clinics was reported after receiving COVID-19 vaccination (13,14).

The cohort study of Edelman et al. reported that COVID-19 vaccination was associated with a less than one day change in cycle length for both vaccine-dose cycles, compared with pre-vaccine cycles (9). Moreover, a cross-sectional survey conducted in Italy reported slight changes in menstruation cycles after the second dose of vaccination (15). A cross-sectional study in the Middle East and North Africa (MENA) region reported that women experienced a longer duration of menstruation and cycle length after vaccination, which had a negative impact on their quality of life (16).

The information on incidence and types of menstrual irregularities associated with COVID-19 vaccination and its impact in KSA is lacking. Therefore, this study aimed to assess the incidence of menstrual irregularities among women in the region and to investigate the impact of the menstrual abnormalities on their lives. The study will also explore if there is any correlation between the type of administered vaccine and the associated menstrual abnormalities.

Findings of this study are expected to determine if the rates and severity are similar to those reported in the literature and will help in making subsequent decisions for optimal management.

Materials and Methods

The present study followed a descriptive cross-sectional design. A study questionnaire was adapted from the Menstruation after COVID vaccine (MECOVAC) survey (15). The questionnaire included two sections; the first section recorded the demographic and clinical characteristics, hormonal treatments, number of previous pregnancies and abortions, reproductive or peri-menopausal status, and type of COVID-19 vaccine received for the first, second, and third doses; and the second section assessed frequency, length, and quantity of the menstrual cycles after the administration of the first, second and third doses of the COVID-19 vaccine, how long the menstrual abnormalities lasted, whether participants required consultation, and if the experienced abnormality affected their normal daily life.

The ethical approval for conducting this study was obtained from Alkharj Military Hospital Institutional Research Board. An electronic survey form was sent to women fulfilling the inclusion criteria during the period from June to July 2022. All participants were clearly informed that their responses were anonymous and that they could withdraw at any point if they decided to.

The inclusion criteria involved all women of reproductive age, below 50 years old, attending Alkharj Military Hospital, who had received at least one dose of any of the COVID-19 vaccines, and had not been infected with COVID-19. On the other hand, women with gynecological diseases, undergoing hormonal and non-hormonal treatments that can affect menstrual cycle, in the menopause stage, or with a history of irregular menstrual cycles within the last 12 months before receiving the COVID-19 vaccine, or with past history of COVID-19 were not included.

Collected data were analyzed by the Statistical Package for Social Sciences (IBM, SPSS, version 28). Descriptive analyses were applied to describe the frequency and percentages for qualitative variables. The Chi-square (X^2) test was used to assess significance of differences in changes in menstrual cycles after receiving different doses of COVID-19 vaccines. All the tests of significance were two-tailed, and a p-value < 0.05 was considered statistically significant.

Results

Within the present study, electronic survey forms were sent to 200 women fulfilling the inclusion criteria. However, 102 responses were received, with a response rate of 51%.

Table 1: Personal characteristics of participant women (n=102)

Personal characteristics	No.	%
Age groups		
• <30 years	39	38.2
• 30-40 years	39	38.2
• >40 years	24	23.5
Marital status		
• Single	46	45.1
• Married	56	54.9
Number of received vaccine doses		
• One	3	2.9
• Two	21	20.6
• Three	78	76.5
Type of first dose		
• Pfizer-BioNTech	60	58.8
• Oxford-AstraZeneca	42	41.2
Type of second dose		
• Pfizer-BioNTech	64	62.7
• Oxford-AstraZeneca	35	34.3
Type of third dose		
• Pfizer-BioNTech	64	62.7
• Oxford-AstraZeneca	8	7.8

Table (1) shows that 38.2% of participants were less than 30 years old, 38.2% were 30-40 years old, while 23.5% were older than 40 years. More than half of the participants (54.9%) were married, and 48% had previous infection with COVID-19. Most participants (77.5%) received 3 doses of the vaccine, while 20.6% received two doses and 2% received one dose. Pfizer-BioNTech was the main received vaccine for the first, second and third doses (58.8%, 62.7%, and 62.7%, respectively), followed by Oxford-AstraZeneca (41.2%, 34.3%, and 7.8%, respectively).

Figure 1: Incidence of menstrual changes after receiving COVID-19 vaccines among participating women (n=102)

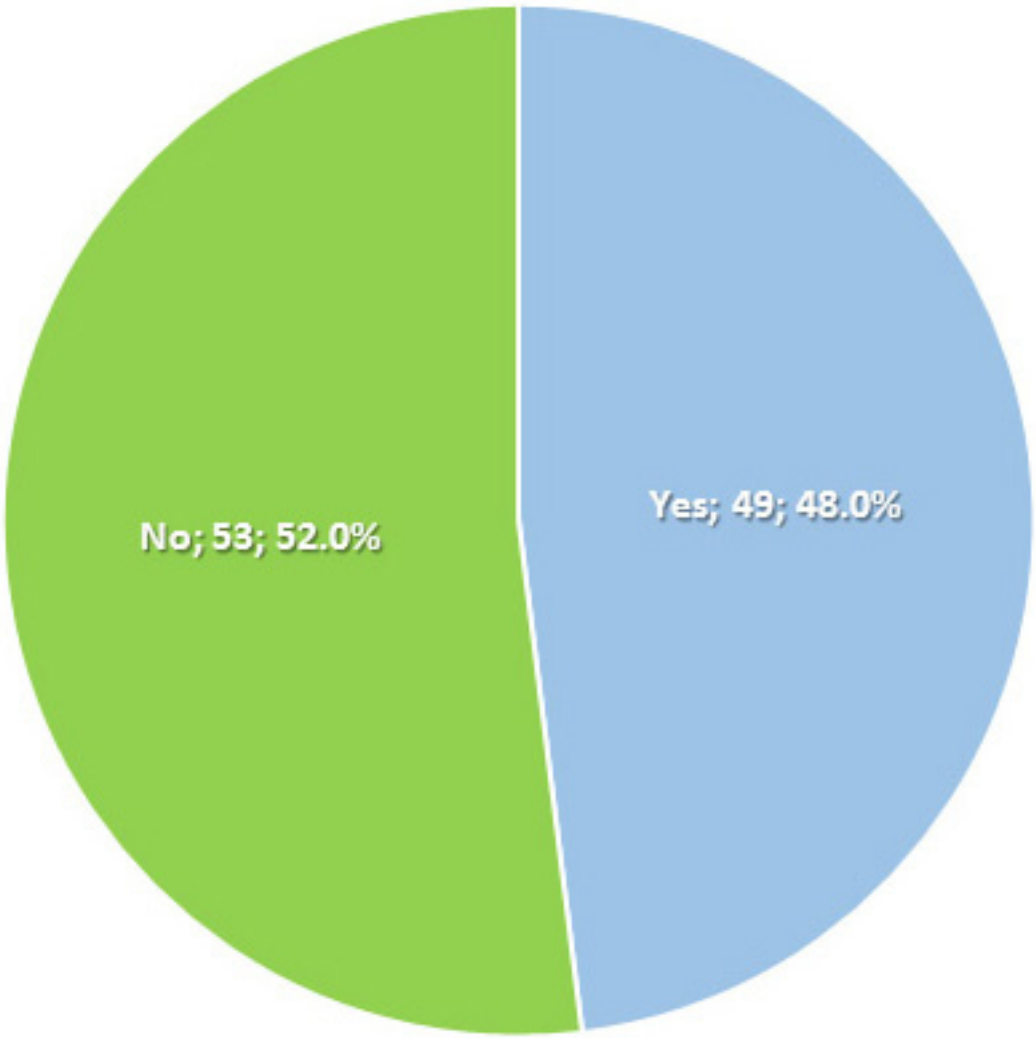

Figure (1) shows that menstrual changes occurred in 48% of participating women after receiving COVID-19 vaccines.

Table 2: Frequency distribution of variations in menstruation after first, second and third doses of COVID-19 vaccines

Changes in Menstrual Cycle	Pfizer			AstraZeneca			P Value
	1st (n=60)	2nd (n=64)	3rd (n=64)	1st (n=42)	2nd (n=35)	3rd (n=8)	
Changes in frequency							
Amenorrhea	2 3.3%	1 1.6%	1 1.6%	1 2.4%	0 0.0%	0 0.0%	
Period arrived 1–5 days earlier	2 3.3%	12 18.8%	7 10.9%	1 2.4%	2 5.7%	1 12.5%	
Period arrived 5–10 days earlier	1 1.7%	6 9.4%	6 9.4%	2 4.8%	3 8.6%	0 0.0%	
Period arrived >10 days earlier	1 1.7%	1 1.6%	3 4.7%	1 2.4%	1 2.9%	0 0.0%	<0.001
Period arrived 1–5 days later	2 3.3%	5 7.8%	8 12.5%	0 0.0%	2 5.7%	0 0.0%	
Period arrived 5–10 days later	1 1.7%	1 1.6%	8 12.5%	0 0.0%	3 8.6%	0 0.0%	
Period arrived >10 days later	1 1.7%	2 3.1%	3 4.7%	1 2.4%	2 5.7%	0 0.0%	
Duration of the cycle							
Variation in length of cycle	1 1.7%	6 9.4%	8 12.5%	3 8.6%	3 8.6%	1 12.5%	
Spotting	2 3.3%	0 0.0%	7 10.9%	1 2.4%	1 2.9%	0 0.0%	
Menstruation lasted >7 days	0 0.0%	1 1.6%	7 10.9%	2 4.8%	1 2.9%	0 0.0%	<0.001
Menstruation lasted <3 days	1 1.7%	4 6.3%	2 3.1%	0 0.0%	2 5.7%	0 0.0%	
Quantity of menstrual blood							
Became heavier	1 1.7%	8 12.5%	10 15.6%	1 2.4%	4 11.4%	0 0.0%	
Became less	4 6.7%	4 6.3%	8 12.5%	2 4.8%	0 0.0%	2 25.0%	<0.001

Table (2) shows that, regarding changes in frequency of menstrual cycles of participants, the most frequent were variation in frequency and 1-5 days earlier arrival of the period, after receiving the second dose of Pfizer vaccine (14, 21.9% and 12, 18.8%, respectively). Regarding changes in duration of the cycle, the most frequent was variation in length of cycle, which occurred mainly after the third doses of Pfizer and AstraZeneca (12.5% for both). The most frequent changes in quantity of menstrual blood among participants were variation in its quantity and having heavier menstruation (17.2% and 15.6%, respectively), which occurred after receiving the third dose of Pfizer vaccine, while menstrual blood became less among 25% of participants after receiving the third dose of AstraZeneca.

Table 3: Pattern and impact of menstrual changes among participating women (n=49)

Characteristics	No.	%
Menstrual changes		
• Irregularity	25	51.0
• Heavier menstrual bleeding	24	49.0
• Lighter menstrual bleeding /amenorrhea	20	40.8
• Prolonged duration of menstrual cycle	11	22.4
• Shorter duration of menstrual cycle	9	18.4
Disturbing personal life	22	44.9
Need to visit a doctor	19	38.8
Undergoing investigations	13	26.5
Taking medication	16	32.7
Return to normal		
• Within the next 1-2 menstrual cycles	25	51.0
• After more than 2 menstrual cycles	24	49.0

Table (3) shows that among participants who experienced menstrual changes, 51% had menstrual irregularities, 49% had heavier menstrual bleeding, 40.8% had lighter menstrual bleeding, 22.4% had prolonged menstrual cycles, and 18.4% had shorter menstrual cycles. Disturbance of personal life occurred in 44.9%, while 38.8% needed to visit a doctor, 26.5% underwent investigations and 32.7% took medications. Menstrual cycles of 51% returned to normal within 1-2 cycles, while those of 49% returned after more than two cycles.

Discussion

Several studies have been conducted worldwide to investigate the potential impact of COVID-19 vaccination on menstruation, including the longitudinal study by the NIH (17). It has been emphasized that the menstrual cycle is a vital reproductive sign among females during their reproductive period, which provides important insight into hormonal balance and pregnancy. Menstrual disorders may range from mild (not affecting life and daily activities) to severe, affecting life, productivity, psychological status, and even sexual life (13,14).

The present study aimed to investigate the incidence and impact of menstrual abnormalities among 102 women after receiving COVID-19 vaccines (Pfizer-BioNTech or Oxford-AstraZeneca).

The present study indicated that 48% of participants had menstrual abnormalities after receiving COVID-19 vaccinations, manifested as changes in frequency (51%), quantity, being heavier (49%), or lighter (40.8%), and length, being longer (22.4%), or shorter (18.4%). These changes affected almost half of those who experienced menstrual abnormalities. These abnormalities disturbed the personal life of almost half of participating women, while 38.8% had to visit a doctor and 32.7% received medications. However, these changes were short-term. Menstrual cycles of more than half of participants returned to normal within 1-2 menstrual cycles. Moreover, our study showed that changes in frequency and quantity of menstrual blood were significantly higher after receiving the third dose, especially that of Pfizer-BioNTech vaccine as compared to those after the first or second doses and those who received AstraZeneca vaccine.

Findings of our study are in accordance with those reported by several studies. Male (18) noted that short-term changes in the menstrual cycle have been reported for both mRNA and adenovirus-vectored COVID-19 vaccines. Moreover, the cross-sectional study of Muhaidat et al. (16) in the MENA Region reported that 34% of women had to seek medical help to alleviate their menstrual disturbances. Notably, only 17.3% who sought medical help required medications to alter their cycle, and fortunately, all the participants had their abnormalities resolved within one or two cycles. This finding is in line with other reports.

Several studies reported short-term and transient menstrual disturbances after receiving COVID-19 vaccinations, such as menstrual irregularities, heavier bleeding, delayed periods, unexpected vaginal bleeding, or altered duration (9-12).

The incidence rate of menstruation irregularity in our study is in agreement with those reported in other similar studies. In Italy, Laganà et al. (15) reported that the majority of the women had their menstruation arrive 1-5 days earlier than the expected date after their vaccination.

Pfizer-BioNTech vaccine has been widely available and accepted in the Gulf region, because of which we see the majority of women had this vaccine for their first, second and third or booster dose, reportedly based on its efficacy reports in combating the coronavirus (19).

Similarly, higher occurrences of heavy bleeding were also reported in some other studies. Moreover, alterations in the length of the menstrual cycle (e.g., more than seven days) were also in line with other studies (4; 15-18).

Male (18) argued that, although reported menstrual cycle changes after COVID-19 vaccination are usually short-term, research into these common adverse reactions is important for the overall success of vaccination programs. Moreover, research may also help understand the mechanism between COVID-19 vaccines and menstrual changes.

Alvergne et al. (20) explained that the hypothalamo-pituitary-ovarian axis may mediate the effects of COVID-19 vaccination on the menstrual cycle. They proposed that the possible mechanism for disturbances of menstrual cycle after receiving COVID-19 might be mediated by perturbations to ovarian hormones. However, their study was unable to detect a clear association between the timing of vaccination within the menstrual cycle and reports of menstrual changes. Their study also looked at the impact of vaccine types on menstrual timing or flow but found no noticeable differences. Therefore, they suggested that vaccine effects on menstrual periods are probably not mediated by a specific approach or ingredient, but rather by the immune response.

Biologically plausible mechanisms linking immune stimulation with menstrual changes include immunological influences on the hormones driving the menstrual cycle or effects mediated by immune cells in the lining of the uterus, which are involved in the cyclical build-up and breakdown of this tissue (21).

In terms of management, the Royal College of Obstetricians and Gynaecologists and the Medicines and Healthcare Products Regulatory Agency (MHRA) recommend that anyone reporting a change in periods persisting over several cycles, or new vaginal bleeding after the menopause, should be managed according to the usual clinical guidelines for these conditions. Clear and trusted information should be provided to all women before being vaccinated against COVID-19, especially those who rely on being able to predict their menstrual cycles to either achieve or avoid pregnancy. Moreover, Alvergne et al. (20) suggested the use of combined hormonal contraception to protect against vaccination-associated menstrual changes.

Conclusions

Women who receive COVID-19 vaccinations may have menstrual abnormalities, at least for one or two of their following menstrual cycles. This change mainly occurs after the third dose, regardless of the brand of received vaccine. It is recommended that women be clearly informed after vaccination of the possibility of short-term menstrual abnormality and to seek proper medical advice in such conditions. Further studies are required to investigate the possible mechanisms behind these COVID-19 vaccines' adverse events.

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Letter to Editor - World Family Medicine Journal
On Behalf of International Family Medicine Conference & Exhibition

Dear Editor,

Your publication, the World Family Medicine Journal, is an important influence for sharing vital information in Family Medicine and we appreciate the hard work and determination of everyone involved for producing such a rich and comprehensive journal.

With the upcoming 9th edition of the International Family Medicine Conference and Exhibition – IFM 2022, we believe that it is important for your readers to know about this event taking place in Dubai, UAE for it provides the perfect platform to showcase our work to the public and directly hear from the experts themselves. More than 2500 healthcare professionals, 50 expert speakers, and 40 international brands will be in attendance at the largest gathering of General Practitioners and Family Medicine Practitioners in the GCC.

IFM is the focal meeting point for education, knowledge transfer, and wholesome networking through its conference and exhibition. We will be joined by numerous expert doctors, public health administrators, nurses, social workers, scientists, medical researchers, pharmaceutical developers and manufacturers, academic professionals, university students, and the general public, all with the common goal to promote and maintain the best ethics and high-quality standards in the primary health care system through continuous education, informative discussions, and live demonstrations of the most advanced medicines and technology to date.

Primary Healthcare has always been the frontline of the healthcare system and it is quickly developing and expanding. The growth and improvements in technology is also evolving and this ultimately has an impact on the way we treat patients and develop new cures, especially recently with the advancements in Artificial Intelligence and Virtual Reality. These remarkable innovations will be conferred upon during the conference to show how precise technology is assisting us in diagnosing and treating our precious patients.

IFM contributes towards the betterment of health by enhancing the Family Medicine concepts inclusive of health promotions, prevention techniques and guidelines, curative programs, promoting equality for accessing health and medical services, and providing effective health programs to the community. IFM will also spend a great deal of time this year covering many topics to tackle mental health at the Primary Care level.

In 2020, due to COVID 19, more than 300 million people around the world and about 57% of people in the UAE have suffered from at least one mental health disorder, most commonly anxiety and depression. So, it is important for us to start addressing these issues early on to prevent them from occurring. However, this can be a sensitive issue for most. Although we are known to possess and handle effective treatments for mental disorders, more than 75% of people in low- and middle-income countries either take or receive no action because they consider it a stigma. That is why topics such as Integrating Psychiatry Services in Primary Care, From Depression to Somatic Diseases, Updates in Dementia Management, and new approaches to Brain Healing will be a valuable effort from our expert speakers to cover during IFM and help others to feel comfortable when addressing these matters.

Moreover, the recent Covid-19 pandemic also tested the basics of the healthcare industry. The Family Medicine sector played a key role in the general management of this pandemic, thereby being the true ‘Gateway to Healthcare.’ The best way to handle a situation is to start at the beginning, and this is why we put great focus and emphasis on continuously improving Primary Healthcare in Family Medicine.

We take this time to invite you and all your readers to attend the International Family Medicine Conference and Exhibition that will take place in the Rashid Hall of the Dubai World Trade Centre on October 25-27 to gain more insight on Family Medicine as a whole. It will be a chance for everyone to join in on our discussions and spend valuable time with healthcare professionals on a personal level to attain a better understanding on Primary Care. Additionally, it will also be a chance for healthcare professionals to attain CME credits to add to their profile.

Thank you, World Family Medicine Journal, and we hope to see you there!

Dr. Ibtesam Al Bastaki
IFM 2022 Conference Chairperson

Willingness and attitudes of parents of children under the age of 12 about the COVID- 19 vaccine in Taif city

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Abstract

Background: Coronavirus disease 2019 (COVID19), caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARSCoV2), is currently a global pandemic with the highest number of people affected in the modern era; only a small proportion of children have been infected with COVID-19. Most of them were asymptomatic or only had mild symptoms. Both direct and indirect advantages will result from an effective and a safe COVID-19 vaccination. Vaccine hesitancy is a potential threat to global public health. Parental attitudes to-wards the vaccines play a key role in the success of the herd immunity for COVID-19. This study aimed to evaluate the parents' willingness and attitudes about the COVID- 19 vaccine in Taif city in K.S.A.

Methods: A cross-sectional study was conducted on a representative sample of 384 parents. The data collection tool was an online questionnaire that consisted of sociodemographic data of parents and children, and questions for assessment of parents' willingness to vaccinate their children with the COVID-19 vaccine. All data were entered and analyzed by using SPSS program version 22. The committee is accredited by the National Committee for Bioethics with No. (HAO-02-T-105) and the proposal fulfills the requirements of Taif Uni-versity and accordingly ethical approval was granted.

Results: The analysis included responses from 579 participants where 54.4% were males, 76.9% belonged to 30-60 years, 72.5% had a university education, 57.9% were working in the non-healthcare sector, and 49.6% had monthly income >10000 SAR. It was reported 92.4% had received two doses of COVID-19 vaccines.

The analysis showed that Pfizer BioNTech was the most commonly taken COVID-19 vaccine for the first dose (70.5%), second dose (75.6%), and third dose (72.7%) [Figure 1]. There were 7 (1.2%) participants who had not yet received a single dose COVID-19 vaccine, and out of them, only two were planning to re-ceive the vaccine in the near future, whereas only two didn't want to receive it.

Conclusion: This study showed poor acceptance of COVID-19 vaccine for children among parents. The choice of wheth-er or not to vaccinate a child should be made by the child's parents. Individual benefits of protection against COVID-19 must be weighed against the population merits of pandemic control in regard to administering vaccines in children and analyzing their efficacy and advantages in terms of minimizing the risk of severe COVID-19.

Keywords:
Infections, COVID-19, vaccine, parents, willingness, attitudes, Taif city.

Introduction

Coronavirus disease 2019 (COVID-19), caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARSCoV2), is currently a global pandemic with the highest number of people affected in the modern era [1]. There have been over 198 million confirmed cases of coronavirus (COVID-19), and more than 4.2 million deaths have been reported globally since the start of the COVID-19 pandemic to 2nd of August 2021 [2]. The pandemic is not only causing a considerable mortality and morbidity rate, it also has a remarkable impact on the economy and the health care system [1].

At the beginning of the COVID-19 era, only a small proportion of children had been infected with COVID-19. Most of them were asymptomatic or only had mild symptoms [3]. The condition has altered, as evidenced by an increasing number of case reports and case series involving severe clinical symptoms in children. Even if only a tiny percentage of children suffer serious illnesses, they can still infect others. As a result, a COVID-19 vaccination that is both safe and effective will have both direct and indirect benefits [3]. The symptoms of COVID19 in children overlap with a variety of other pediatric viral infections. Most often, children have a mild flu-like condition that can develop into a life-threatening acute respiratory distress syndrome, fulminant pneumonia, and multiple organ failure[4]. As of 28 July 2021, a total of 3,839,816,037 vaccine doses had been administered [2]. By June 2021, The Ministry of Health (MOH) in Saudi Arabia has announced that Pfizer vaccine will be given to children in the age group of 12-18 years [5].

Vaccine acceptance represents the general public's overall impression of disease risk, vaccine attitudes, and demand, which is crucial for immunization programs to achieve high vaccination coverage rates[6]. Vaccine hesitancy is defined as the delay in acceptance, reluctance, or refusal of vaccination despite the availability of vaccination services [7]. Parents' willingness and views about the COVID-19 vaccination were assessed in a study published in Turkey in 2021. It revealed that 36.3 percent of parents were willing to have their children receive the vaccine, while 59.9 percent were willing to take it themselves [3]. From March 26 to May 31, 2020, an international survey was conducted to assess caregiver willingness to vaccinate their children against COVID-19 in six countries and found that when a vaccine for COVID-19 becomes available, 65 percent of caregivers say they plan to vaccinate their children [8]. Also in 2020, research conducted in China showed that 72.6% of Chinese parents accept vaccinating their children against Covid-19 which shows a positive attitude towards the vaccination [9]. The public's health and the fight against the pandemic requires knowledge about the status of COVID-19 vaccine acceptance. As a result, the goal of this study was to assess parents' attitudes towards COVID-19 vaccines, to determine the prevalence of vaccine rejection among parents, and to explain the reasons for vaccine rejection and the factors that influence it as there is an insignificant number of studies related to our topic especially in Saudi Arabia.

Methodology

This is an observational cross-sectional study conducted in Taif, Makkah region. Makkah region is located in the western part of Saudi Arabia. The ethical approval was accredited by the National Committee for Bioethics with No. (HAO-02-T-105). The study duration was from (Oct 2021 – June 2022). The study's population consisted of parents of children who were aged less than 12 years old in Taif city, Saudi Arabia. All parents in Taif city were invited to participate in the study through filling in an online questionnaire. The sample size 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 COVID-19 vaccination and parents' willingness to receive the vaccine for themselves and their children. This tool was developed after reviewing relevant studies conducted in Saudi Arabia and elsewhere. The questionnaire was divided into three main sections: the first section was for parents' demographic data, the second section consisted of questions about demographic data of the children, and the third section consisted of questions about parents' willingness to receive the vaccine. Data was entered by using Microsoft Office Excel software program (2016), and statistically analyzed by using the Social Science Software Statistical Package (SPSS), version 20 (IBM SPSS, Statistics for windows version 20.0 Armonk, NY: IBM Corp.)

Results

The analysis included responses from 579 participants where 54.4% were males, 76.9% were 30-60 years, 72.5% had a university education, 57.9% were working in the non-healthcare sector, and 49.6% had monthly income >10000 SAR [Table 1]. It was reported by 148 participants (25.6%) that they had tested positive for COVID-19, and 92.4% had received two doses of COVID-19 vaccines [Table 2]. The analysis showed that Pfizer BioNTech was the most commonly taken COVID-19 vaccine for the first dose (70.5%), second dose (75.6%), and third dose (72.7%) [Figure 1]. There were 7 (1.2%) participants who had not yet received a single dose COVID-19 vaccine, and out of them, only two were planning to receive the vaccine in the near future, whereas only two didn't want to receive it [Table 2].

In our analysis, we found that 468 (80.8%) were parents and out of whom 85.7% had children less than 12 years old. It was reported by 12.0% of the parents that their child had tested COVID-19 positive, and 81.8% had taken all the routine vaccines under the National Expanded Program on Immunization. It was found that only 31.9% of the parents wanted their child to receive the COVID-19 vaccine, and about 54.1% feared that their child might be infected with COVID-19. The most common reason that they don't want to vaccinate their child was 'fear of vaccination failure due to COVID-19 mutations' (33.3%), followed by fear about vaccination side effects (30.8%), and limited data on a new vaccine's safety in children (17.2%) [Figure 2].

Nearly three-quarters of parents (73.3%) agreed that they would advise other people to take COVID-19 vaccines, and more than half of the parents (54.1%) worried that their child may get infected with COVID-19 in the near future. About 34.7% of the parents definitely believed that COVID- 19 vaccine would end the pandemic soon, whereas 18.2% didn't think so. It was found that 54.6% of the parents believed that everyone should be vaccinated for herd immunity against COVID-19. It was reported by 33.7% of the parents that they daily/always' consulted information about the COVID-19 vaccine on social media in the previous month, whereas 23.4% did it once a month or rarely [Table 3].

When we evaluated the relationship of the willingness of the parents to give the COVID-19 vaccine to their children under 12 years of age and their baseline characteristics, there were no statistically significant differences observed in willingness to give vaccine between educational levels of the parents (p=0.638). Parents working in health sectors were comparatively more willing to vaccinate their children than others, but no statistically significant differences were observed (p=0.593). Family income didn't show any statistically significant relationship with willingness to vaccinate the child (p=0.370). It was found that parents who didn't have a history of COVID-19 were comparatively more willing to vaccinate their children than those parents who were infected (p=0.005). Also, it was found that parents who had two or three doses were more willing to vaccinate their child than others who took one dose or had not received the vaccine yet (p=0.005). Parents who feared that their child would get infected with COVID-19 were the ones who were comparatively more willing to vaccinate their child against the virus (p<0.001). [Table 4].

Table 1: Sociodemographic details of the participants

		N	%
Gender	Female	264	45.6
	Male	315	54.4
Age	<30 years	111	19.2
	30-60 years	445	76.9
	>60 years	23	4.0
Educational level	Illiterate	1	.2
	Primary School	6	1.0
	Secondary School	82	14.2
	High School	18	3.1
	Diploma	52	9.0
	University	420	72.5
Employment	Unemployed	209	36.1
	Healthcare sector	35	6.0
	Non-healthcare sector	335	57.9
Average family income per month	<5000 SAR	145	25.0
	5000-10000 SAR	147	25.4
	>10000 SAR	287	49.6

Table 2 History of COVID- 19 diagnosis

		Frequency	Percent
Diagnosed with COVID-19	Yes	148	25.6
	No	431	74.4
Number of COVID-19 Vaccine doses received	1 dose	15	2.6
	2 doses	535	92.4
	3 doses	22	3.8
	Did not receive	7	1.2
Planning to take COVID-19 in future (n=7)	Yes	2	28.6
	Maybe	3	42.9
	No	2	28.6

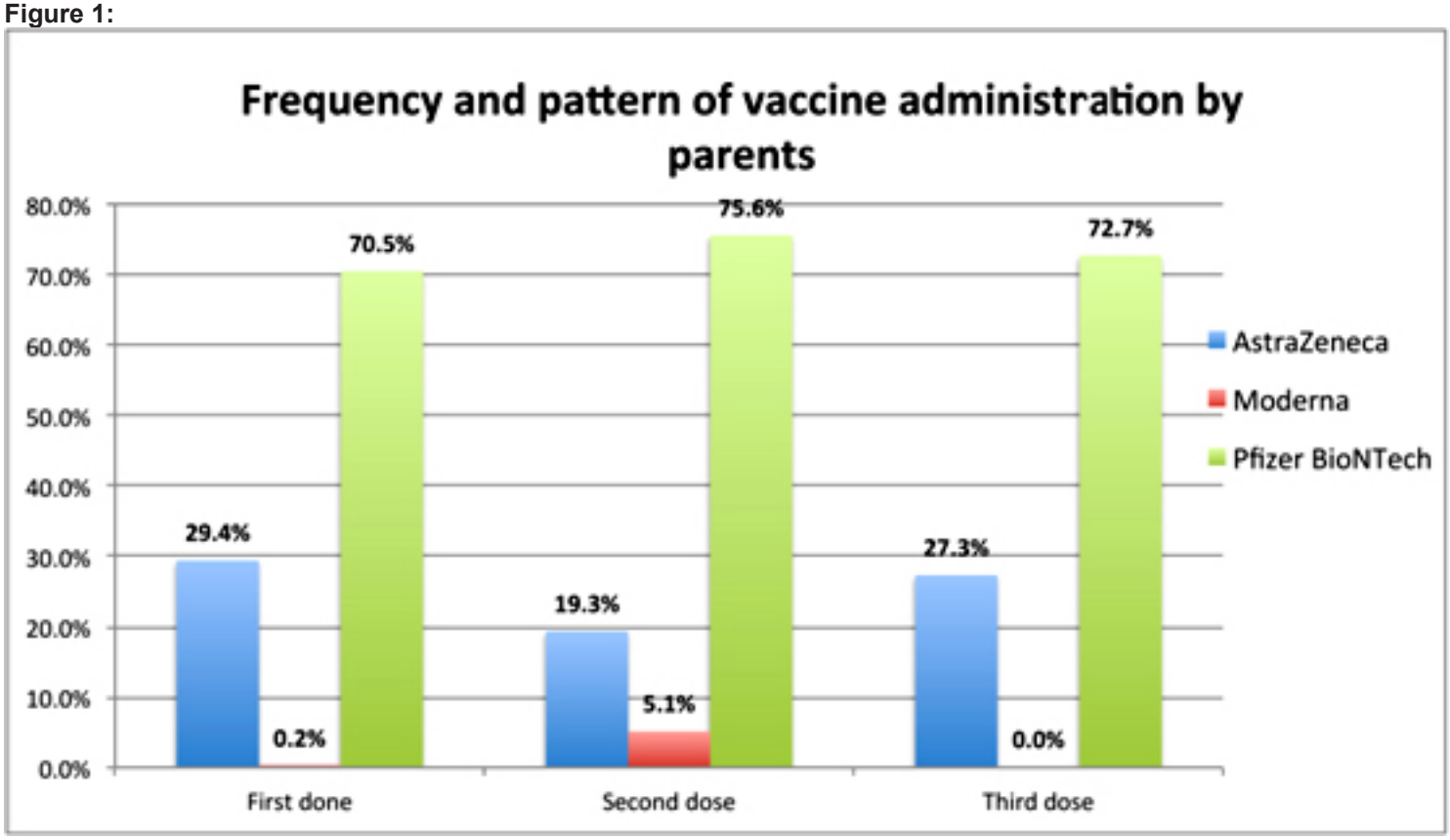
Table 3: Parents' attitude and perceptions about COVID-19 vaccine			
		N	%
Have children	No	111	19.2
	Yes	468	80.8
Number of children	1 child	72	15.4
	2-3 children	174	37.2
	4-6 children	185	39.5
	>=7 children	37	7.9
Have a child under 12 years old	No	67	14.3
	Yes	401	85.7
Age of children under 12 years (n=401)	<=2 years	45	11.2
	3-5 years	65	16.2
	6-10 years	218	54.4
	11-12 years	73	18.2
Gender of the child under 12 years (n=401)	Female	181	45.1
	Male	220	54.9
Child tested positive for the coronavirus	Yes	48	12.0
	No	353	88.0
Child suffers from chronic condition	Yes	31	7.7
	No	370	92.3
Child has all the routine vaccines under the National Expanded Program on Immunization	Yes	328	81.8
	No	73	18.2
Want the child to receive the coronavirus vaccine	Yes	128	31.9
	No	176	43.9
	Maybe	97	24.2
Would advise others to receive the COVID- 19 vaccine	Yes	294	73.3
	No	107	26.7
Worried that your child may catch or contract COVID- 19	Yes	217	54.1
	No	184	45.9
Believe that the COVID-19 vaccine will end the pandemic soon	Yes	139	34.7
	No	73	18.2
	Maybe	189	47.1
Believe that everyone should be vaccinated for herd immunity against COVID-19	Yes	219	54.6
	No	76	19.0
	Maybe	106	26.4
Frequency of encountering information about the COVID- 19 vaccine on social media in the previous month.	Always (daily)	135	33.7
	Sometimes (weekly)	172	42.9
	Rarely (once a month)	94	23.4

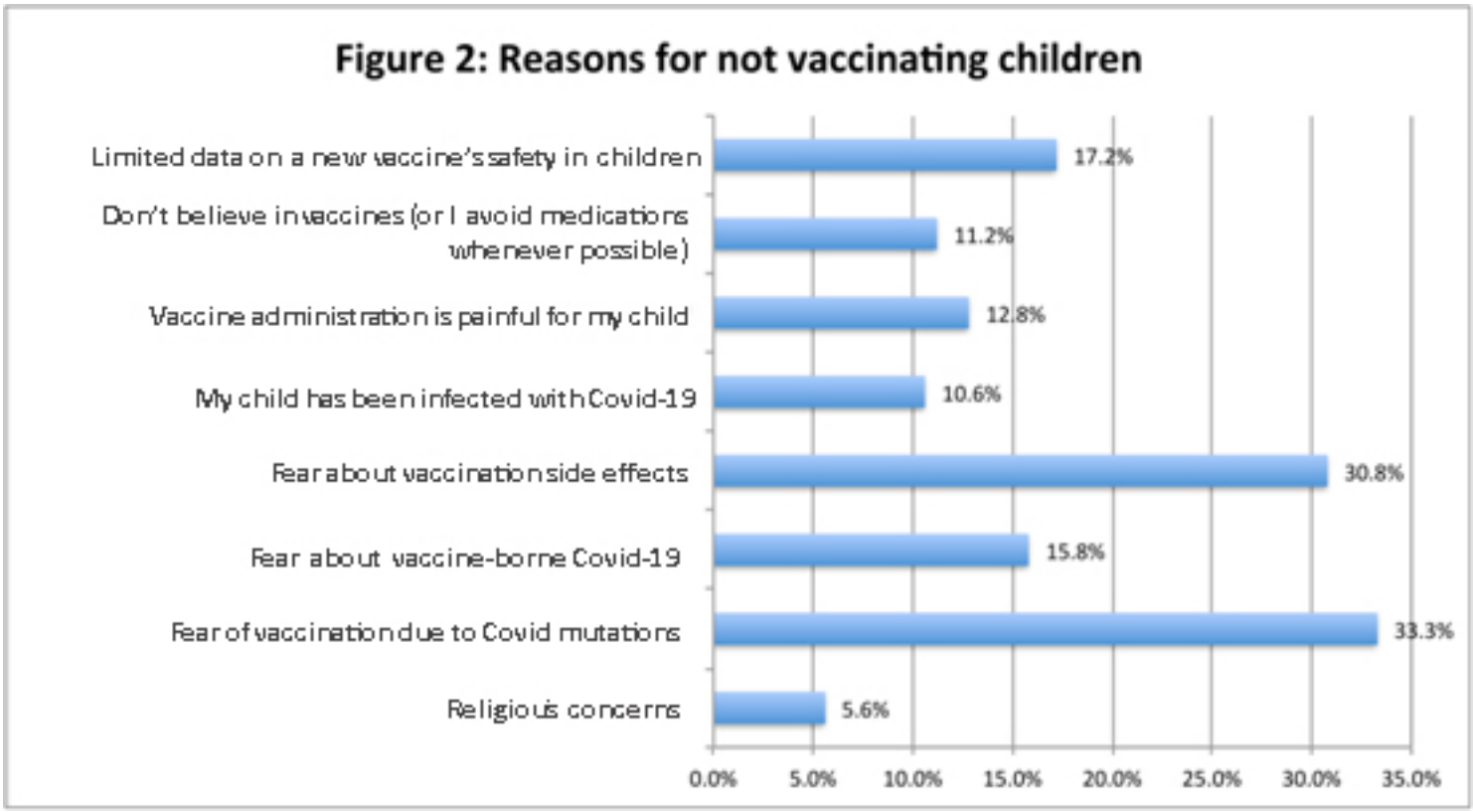
Table 4: Willingness to give COVID-19 vaccination to children under age 12 and parents' characteristics (n=401)					
		Willingness to vaccinate child			P value
		Yes	No	Maybe	
Educational level	Primary School	1 (50%)	1 (50%)	0 (0%)	0.638
	Secondary School	13 (27.1%)	22 (45.8%)	13 (27.1%)	
	High School	1 (10%)	4 (40%)	5 (50%)	
	Diploma	12 (34.3%)	16(45.7%)	7 (20%)	
	University	101 (33%)	133 (43.5%)	72 (23.5%)	
Employment sector	Unemployed	35 (28.9%)	30 (24.8%)	56 (46.3%)	0.593
	Healthcare sector	11 (45.8%)	4 (16.7%)	9 (37.5%)	
	Non-healthcare sector	82 (32%)	63 (24.6%)	111 (43.4%)	
Family income /month	<5000 SAR	24 (30.4%)	20 (25.3%)	35 (44.3%)	0.370
	5000-10000 SAR	27 (26%)	31 (29.8%)	46 (44.2%)	
	>10000 SAR	77 (35.3%)	46 (21.1%)	95 (43.6%)	
History of COVID- 19 diagnosis	Yes	24 (22.4%)	61 (57%)	22 (20.6%)	0.005
	No	104 (35.4%)	115 (39.1%)	75 (25.5%)	
Vaccine doses received	1 dose	2 (16.7%)	8 (66.7%)	2 (16.7%)	0.005
	2 doses	116 (31.4%)	164 (44.4%)	89 (24.1%)	
	3 doses	10 (66.7%)	0 (0%)	5 (33.3%)	
	Not received any dose	0 (0%)	4 (80%)	1 (20%)	
Fear child may get infected with COVID-19	Yes	80 (36.9%)	72 (33.2%)	65 (30.0%)	<0.001
	No	48 (26.1%)	104 (56.5%)	32 (17.4%)	

Table 5: Does your child suffer from any chronic diseases?

Valid	Frequency	Percent
asthma	4	1.0
diabetes	3	.7
Down's syndrome	1	.2
heart diseases	3	.7
Immunological diseases	2	.5
lung diseases	2	.5
obesity	7	1.7
others	10	2.5
Total	402	100.0

Figure 1:





Discussion

Vaccination against COVID-19 is critical in stopping the pandemic, while cognitive, emotional, and social factors determine public acceptance of such vaccination campaigns. Vaccination campaigns were initiated shortly after the Saudi Food and Drug Authority (SFDA) authorized the first COVID-19 Vaccine for distribution on December 10, 2020. Saudi Arabia's Ministry of Health (MOH) has streamlined vaccination registration using a government-run website portal. When a COVID-19 vaccine is approved for pediatric populations, parents' willingness to vaccinate their children will be vital for safeguarding pediatric populations, their communities, and homes against the infection [10,11]. Our study findings showed that 92.4% of the parents received at least two doses of COVID-19 vaccines, but only 31.9% of them wanted to vaccinate their child with the same vaccine, which shows a low level of parental acceptance to vaccinate their child. Our findings are similar to a nationwide survey conducted in Poland where 44% of the parents wanted to vaccinate their child with the COVID-19 Vaccine [12]. Another survey conducted in the USA reported that about 61.9% of the parents had plans to vaccinate their children [13]. Studies show that there are great variation in willingness to give COVID-19 vaccines to children from country to country [9,14,15]. These discrepancies can be attributed to a variety of factors, including cultural and religious contexts, public trust in authority, and degree of adaption to governmental recommendations.

The safety and efficacy of the COVID-19 vaccination in adults does not imply that it will have the same results in children. Although the onset of symptoms of acute respiratory illness was observed in adults following vaccination, most COVID-19 cases were mild and asymptomatic, and parents were not aware of the infection because children get ill quite often, more than adults (such as with common colds), resulting in an underestimated infection rate and an overestimation of vaccine efficacy in children after vaccination. Increased vaccination coverage among children may also reduce adult infections and help prevent community spread, as has been shown with other diseases [16]. Reducing the risk of infection in children and prevention of COVID-19 transmission will also assist children by allowing them to resume routine activities, such as school and other services and programs, that were restricted during the epidemic [17]. Furthermore, children less than 12 years of age are in a critical phase of growth and development, and thus caution should be exercised when evaluating the vaccine's long-term impact on children's development. Safety should be the primary consideration before the COVID-19 Vaccine is made available to younger children, even if vaccination is necessary to achieve herd immunity and decrease the severity of COVID-19. Post-marketing surveillance of vaccination safety should be conducted and maintained for a longer duration in children due to their specific immunogenicity profile and developmental stage.

In our study, more than half of the parents feared that their child would get infected with COVID-19 in the future, and these parents were more willing to vaccinate their child against the infection compared to others. Numerous studies have shown that a parent's willingness to get vaccinated is influenced by their perception of the risk of contracting an infection [18-20]. It has also been shown that those who have greater trust in the health care system are more likely to use preventive health care measures like vaccinations [21,22]. In our study, fear of vaccination side effects and fear of failure

of virus mutation due to vaccine administration were the most common reasons among parents not to give vaccines to their children. Parental anxieties regarding vaccine safety and benefits should be better understood in order to better educate and enhance strategies for reaching out to these groups.

Our study has several limitations, the most obvious of which is that it is cross-sectional, which means that the findings may not represent parents' attitudes toward the COVID-19 vaccination across Saudi Arabia. Second, rather than conducting a direct face-to-face interview, the responses to the study were recorded utilizing a web-based self-administered survey. This may result in a possible bias in the way their responses are reported. Another significant limitation of the study is the use of a convenience sampling approach, which may not accurately represent the real demographics of the study participants. As a first-of-its-kind investigation that included a representative sample size from across the county, we are confident in our results. After the pandemic is finished, we'll look into a variety of other topics, such as vaccine promotion techniques, vaccine safety, vaccine referral/recommendations, and vaccine cost, as well as the primary motivations for and barriers to vaccination against COVID-19.

Conclusion

Vaccinating children against COVID-19 has sparked a lot of discussion among parents and experts alike. This study showed poor acceptance of COVID-19 vaccine for children among parents. The choice of whether or not to vaccinate a child should be made by the child's parents. Individual benefits of protection against COVID-19 must be weighed against the population merits of pandemic control. Administering vaccines in children and analyzing their efficacy and advantages in terms of minimizing the risk of severe COVID-19 and subsequent consequences is a critical issue that has to be monitored on a regular basis.

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Type III Supracondylar humeral fracture in children treated by 3 lateral versus 2 cross K-wire fixation, Aden, Yemen

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Abstract

Background: Supracondylar fractures of humerus are the most common elbow fractures seen in children.

Objective: To describe the patients' condition and to evaluate the treatment and the outcome.

Materials and method: We retrospectively reviewed the records of 40 consecutive patients with 40 displaced, supracondylar fractures of the humerus treated between January 2019 and December 2020, in Aden.

The obtained data were sex, age, side of injury, time between injury and fixation, trial of reduction and complications.

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: The total study patients were 40 patients. Twenty-one (52.5%) were males and 19 (47.5%) were females. The age of the patients ranged between 2 to 10 years and the mean age was 6.6 ± 2.1 years. Twenty-four (60%) had the fracture on the right arm, and 16 (40%) had on the left arm. All the patients underwent surgery within 24 hours of injury. The mean time was 8.1 ± 4.5 hours.

There were 11 (27.5%) cases of once trial reduction, 14 (35%) of twice trial reduction and 15 (37.5%) of three times trial reduction. The average removal of K-wires was 3.55 weeks. Twenty-six (65%) patients were treated by III lateral K-wires fixation and 14 (35%) were treated by crossed K-wire fixation.

Post-operatively, (17.5%) patients got neuropraxia in the crossed K-wire group (n = 14), and none in the III lateral K-wire group. Two (5%) patients got angulation, one in the crossed K-wire group (n = 14), and one in the III lateral K-wire group (n = 26). Cupitus varus was seen in 2 (5%) patients in the crossed K-wire group and 2 (5%) in the III lateral K-wire group. Stiffness was found in the III lateral K-wire group with 2 (5%) patients.

Conclusion: The delay in surgical treatment may cause a number of complications.

Key words: Treatment, supracondylar fracture, humerus, children, Aden

Introduction

Supracondylar fractures of humerus are the most common elbow fractures seen in children [1,2,3,4].

Numerous studies have reported that supracondylar humeral fractures occur with nearly equal frequency among females and males [5], accounting for approximately 10% of all fractures in children [6] and 70% of all pediatric elbow injuries [7].

Omid et al [8] reported that supracondylar fractures of the humerus account for 55% to 80% of total elbow fractures in children and up to two-thirds of paediatric elbow injuries requiring hospitalization.

Other studies reported that supracondylar humeral fractures most common in the first decade of life and more in males than females [9,10,11].

Some authors, however, have found no variations among the sexes whereas others found higher incidence among females [12].

Supracondylar fractures of humerus are classified using the Gartland classification, which also serves as a treatment guide [13]. Gartland types I and IIa fractures may be managed non-operatively whereas types IIb and III are treated operatively [14].

Objective

To describe the patients' condition and to evaluate the treatment and outcomes

Materials and Methods

We retrospectively reviewed the records of 40 consecutive patients with 40 displaced, supracondylar fractures of the humerus treated between January 2019 and December 2020.

All patients received general anesthesia and underwent closed reduction of their fractures in the operating room of Alsalam and Al-Durrah hospital, in Aden.

The fractures were stabilized with III lateral K-wires fixation or with two crossed K-wire fixation. The obtained data were sex, age, side of injury, degree of swelling, time between injury and fixation, trial of reduction, time of removal of K-wires and complications.

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

Table 1 and Figure 1 reveal 40 patients were included in the study. Twenty-one (52.5%) of the patients were males and 19 (47.5%) were females. (Male : female ratio was 1.1 : 1). The age of the study patients ranged between 2 to 10 years and the mean age was 6.6 ± 2.1 years. Twenty-four (60%) patients had the fracture on the right arm, and 16 (40%) patients had the fracture on the left arm. Table 1 and Figure 2 also, show the degree of swelling and there were 16 (40%) moderate, 14 (35%) mild and 10 (25%) severe. Generally, all the study patients underwent surgery within 24 hours of injury: 16 (40%) cases within less than 6 hours, 19 (47.5%) cases between 6 and 12 hours and 5 (12.5%) cases between >12 and 24 hours after injury. The mean time was 8.1 ± 4.5 hours. There were 11 (27.5%) cases of once trial reduction, 14 (35%) of twice trial reduction and 15 (37.5%) of three times trial reduction.

Most supracondylar fractures of the humerus recovered at the final follow up which was between 3 to 4 months. The average removal of K-wires was 3.55 weeks. Twenty-six (65%) patients were treated by III lateral K-wires fixation and 14 (35%) were treated by crossed K-wire fixation (Table 1 and Figure 2).

Post-operatively, 7 (17.5%) patients got neuropraxia in the crossed K-wire group (n = 14), and none in the lateral K-wire group. Two (5%) patients got angulation, one in the crossed K-wire group (n = 14), and one in the III lateral K-wire group (n = 26). There were 2 (5%) coronal displacement in the patients treated by inserting III lateral K-wires. Comparison between the two groups were found statistically significant (p = 0.000), as shown in Table 2 and Figure 3.

Late complications were found in 6 patients. Cupitus varus was seen in 4 patients, 2 (5.0%) in the crossed K-wire group and 2 (5%) in the III lateral K-wire group.

Stiffness was found in the III lateral K-wire group with 2 (5%) patients. Comparison between the two groups was found to be statistically not significant (p > 0.05), (Table 2 and Figure 3).

Table 1: Distribution of variables of the study patients (n=40)

Variables	No	%
Sex:		
Males	21	52.5
Females	19	47.5
Male to female ratio:	1.1:1	
Mean age (years):	6.6 ± 2.1	
Age range (years):	2 - 10	
Side involved:		
Right	24	60
Left	16	40
Degree of swelling:		
Mild	14	35
Moderate	16	40
Severe	10	25
Time between injuries and fixation:		
Lessthan 6 hours	16	40
6 –12 hours	19	47.5
> 12 - 24 hours	5	12.5
Mean timing of reduction (hours)	8.1 ± 4.5	
Trial of reduction:		
Once	11	27.5
Twice	14	35
Three	15	37.5
Range of removal time K-wires (weeks):	3 – 4	
Average removal of K-wires (weeks):	3.55	
Method of fixation:		
III lateral	26	65
Cross	14	35

Figure 1: Distribution of study patients related to sex (n=40)

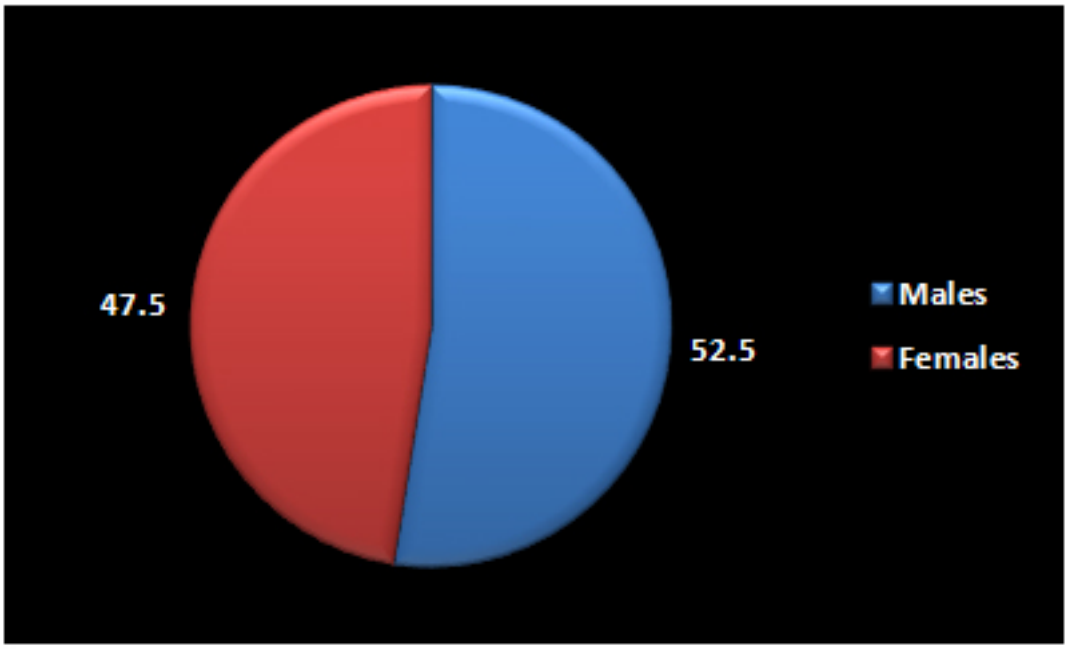


Figure 2: Distribution of variables of the study patients (n=40)

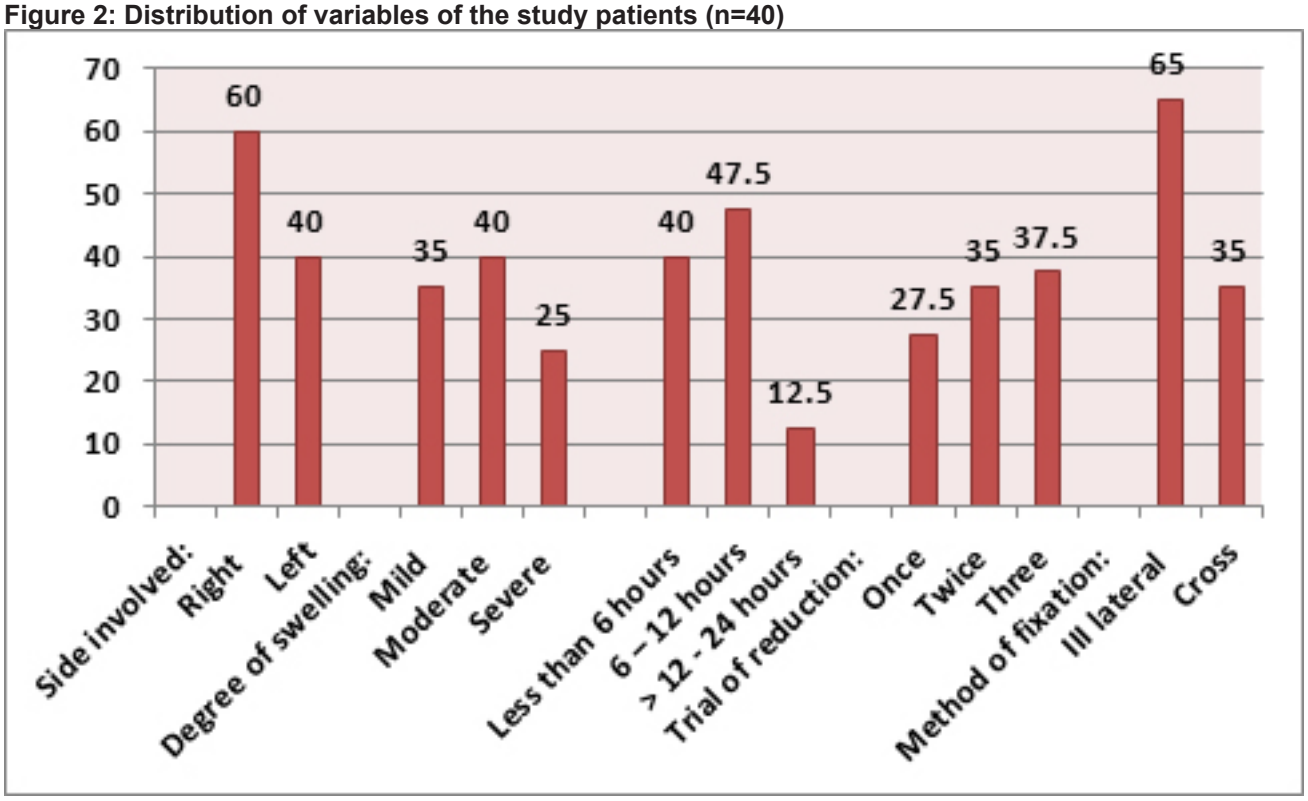
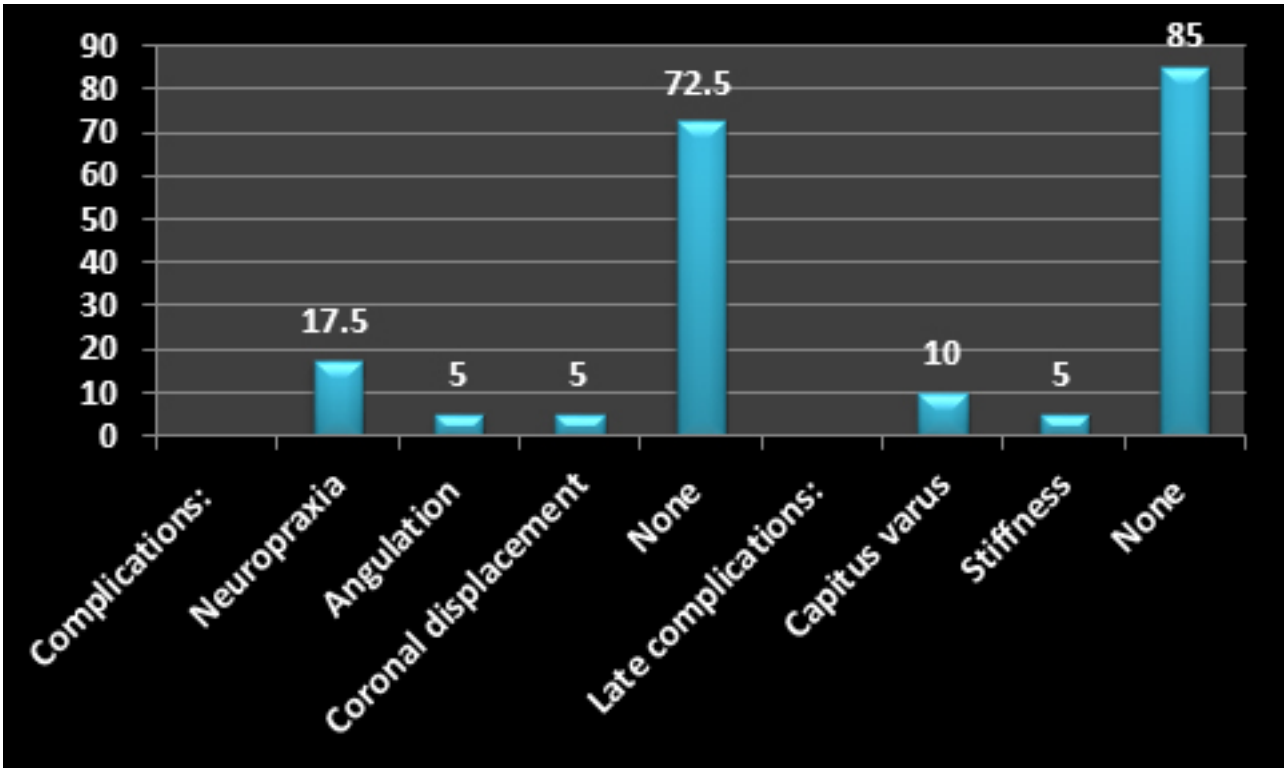


Table 2: Distribution of complications related to method of fixation (n=40)

Variables	Method of fixation				Total		P-value
	Cross		Ill Lateral				
	No	(%)	No	(%)	No	(%)	
Complications:							
Neuropraxia	7	(17.5)	0	(0.0)	7	(17.5)	
Angulation	1	(2.5)	1	(2.5)	2	(5.0)	P = 0.000
Coronal displacement	0	(0.0)	2	(5.0)	2	(5.0)	
None	6	(15.0)	23	(57.5)	29	(72.5)	
Total	14	(35.0)	26	(65.0)	40	(100)	
Late complications:							
Cupitus varus	2	(5.0)	2	(5.0)	4	(10.0)	
Stiffness	0	(0.0)	2	(5.0)	2	(5.0)	P > 0.05
None	12	(30.0)	22	(55.0)	34	(85.0)	
Total	14	(35.0)	26	(65.0)	40	(100)	

Figure 3: Distribution of complications and late complications (n=40)



Discussion

Supracondylar fractures of the humerus are the most common elbow injuries in children and make up approximately 60% of all elbow injuries in the first decade of life [15]. These injuries can be one of the most difficult to treat, owing to the presence of associated immediate and late complications like compartment syndrome, neurovascular damage, Volkman's ischaemic contracture and malunion [16,17].

Oetgen et al [18] recommended in their study the necessity of early treatment in order to avoid complications, as a result, routine surgical management for any sort of fracture with displacement.

In our present study, the total study patients were 40. Twenty-one (52.5%) of the patients were males and 19 (47.5%) were females. (Male : female ratio was 1.1 : 1). The age of the patients ranged between 2 to 10 years and the mean age was 6.6 ± 2.1 years. In addition the fractures were 16 (40%) left-sided and 24 (60%) right-sided fractures. Regarding the sex, age of children and sides of fracture, our results are similar to some reported studies [19,20] and differed from the results reported in other studies [21-23].

In this study, the degree of swelling was as follows: 16 (40%) moderate, 14 (35%) mild and 10 (25%) severe. Generally, all the study patients underwent surgery within 24 hours of injury: 16 (40%) cases within less than 6 hours, 19 (47.5%) cases between 6 and 12 hours and 5 (12.5%) cases between >12 and 24 hours after injury. The mean time was 8.1 ± 4.5 hours.

Sadek et al [20] from Egypt reported similar to our finding that the operations were done within the first 24 hours after admission.

We found in our study post-operatively, 7 (17.5%) patients got neuropraxia in the crossed K-wire group (n = 14), and none in the III lateral K-wire group.

Lee et al [24] mentioned that in lateral wire fixation, divergent wires have been shown to be more stable in extension and varus loading than crossed wires but not in valgus. There are reports of clinical failures of laterally placed wires, thought to be due to poor technique in reduction and fixation [25]. Reports vary as to the loss of reduction using lateral wires. The systematic review by Brauer et al [26], observed that the probability of deformity, from loss of position, was 0.58 times lower with medial/lateral crossed wires than with lateral entry wires.

Studies have shown an increased incidence of iatrogenic nerve injury when a medial wire is used [27]. Skaggs et al [28] observed no loss of reduction when comparing two groups using crossed wires and lateral wires. There was an increased incidence of iatrogenic nerve injury in 17 out of 160 (10.6%) cases treated with a medial wire. Data pooled from 1455 patients found that the incidence of ulnar nerve iatrogenic injury was 5.04 times higher in medial/lateral wire fixation compared to lateral entry fixation [26]. There is also concern about delayed iatrogenic nerve injury using medial wires [29].

Neural injuries can occur in 6.5% to 19% of cases of displaced supracondylar fractures and they are exceptional in non-displaced supracondylar fractures [30]. They can appear either before surgery (primary lesion) or after

reduction and fixation of the fracture (secondary lesion). Primary lesions are caused by fracture displacement, which can stretch, entrap or disrupt the nerve. Secondary lesions are caused by excessive manipulation, immobilization in hyperflexion or iatrogenic injuries by fixation [31,32].

In our study, two (5%) patients got angulation, one in the crossed K-wire group (n = 14), and one in the III lateral K-wire group (n = 26). Also, late complications were found in 6 patients with stiffness and cupitus varus. Cupitus varus was seen in 4 patients, 2 (5.0%) in the crossed K-wire group and 2 (5.0%) in the III lateral K-wire group. Stiffness was found in the III lateral K-wire group with 2 (5%) patients,

Body-condylar angle measured after the surgery shows flexion or extension displacement of the distal fracture fragment. This angle changes during skeletal maturation. Body-condylar angle changes are related with extension degrees of the elbow [33]. Aslan et al [34] reported that the most common complication of pediatric supracondylar fractures is cubitus varus. D'Ambrosia [35] revealed that cubitus varus is very rare after an adequate reduction and is related with medial angulation of the distal fragment. Ippolito et al [36] state that varus deformity is due to the defect of the distal humeral epiphysis growth plate. Surgical intervention decreases the rate of varus deformity. Gosens and Bongers [37] reported a cubitus varus rate of 2.5 %.

Conclusion

It can be concluded that the delay in surgical treatment may cause a number of complications. The choice of surgical approach should be based on the characteristics of the fracture and the experience of the surgeon in surgical treatment of displaced supracondylar fractures in children.

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Assessment of Premarital Screening for Prospective Couples in Aseer Region, Saudi Arabia, 2021

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Abstract

Aim of Study: to assess the prevalence of genetic and infectious diseases that could be identified through premarital screening in Aseer Region during 2021.

Methods: Following a retrospective research design, this study included data of all prospective couples who underwent premarital examination in Aseer Region, Saudi Arabia, during 2021 (N=25,023). The researchers retrieved data of all prospective couples registered during 2021 through the Health Services Platform "Seha" for Aseer. Retrieved data included number of marriage proposals, lab results for inherited hemoglobinopathies, and chronic diseases, i.e., hepatitis B, hepatitis C, and human immunodeficiency virus, (HIV/AIDS). A total of 128 patients with hepatitis B were identified (100, 78.1% were males), while 13 hepatitis C patients were identified (11, 84.6% were males), in addition to 9 HIV/AIDS patients, all of whom were males.

Conclusions: Sickle cell disease and hepatitis B are commonly identified by premarital examination in Aseer Region. Males are more frequently affected than females. Health education regarding the negative impact of consanguinity is highly needed. Vaccination against hepatitis B should be enforced. Prospective couples whose offspring is at risk of hereditary diseases should be strongly convinced to comply with marriage cancellations.

Key words: Premarital screening, Sickle cell disease, β-thalassemia, Hepatitis B, Hepatitis C, HIV/AIDS, Saudi Arabia.

Introduction

Autosomal recessive disorders, such as sickle cell disease, beta thalassemia, and other hemoglobinopathies are the most common genetic blood disorders in the Middle Eastern countries (1). The incidence of children born with sickle cell disease is expected to increase globally by 30% by 2050 (2). Available evidence suggests that congenital and genetic disorders are responsible for a large portion of mortality and handicap leading to poor quality of life of younger adults in this region. The incidence of hereditary blood disorders is intertwined with social, cultural, and religious practices in Middle Eastern countries, which makes the management of the disorders more complicated. This creates a huge burden on the individuals and families and the health care systems in these countries (3).

Premarital medical examination has been recommended as an effective measure for the prevention of several diseases. It is a consultation offered to individuals planning to marry. It involves history taking, clinical examination, and laboratory investigations to screen for inherited and communicable diseases (4). It refers to policies that make certain medical examinations a necessary condition for marriage, especially those in which diseases are endemic, for various legal and cultural reasons, and other educational and cost-effectiveness factors (5-6).

Premarital screening and genetic counselling programs have been established and implemented in eight Middle Eastern countries. This program offers premarital genetic counseling to couples at risk for hemoglobinopathy disorders and is considered as a mandatory step before receiving a marriage license (7).

Currently, premarital screening in Saudi Arabia includes laboratory testing and medical consultation sessions for common genetic blood disorders (i.e., sickle cell disease and thalassemia) and infectious diseases (i.e., hepatitis B, hepatitis C, and HIV/AIDS). Screening takes place at over 131 healthcare centers across the Kingdom, and couples planning to marry must attend at least three months prior to the marriage date. Screening aims to determine the odds of transmitting these diseases to the other partner or children and to provide partners with options to plan for a healthy family (4).

Premarital screening and genetic counseling programs can identify and modify the health risk factors known to impact genetic disorders. Premarital screening could be the most important way to prevent the several genetic blood disorders and many medical, psychological, and social marital problems (8). Premarital screening and genetic counseling programs have been declared mandatory in several Middle Eastern countries, including the Kingdom of Saudi Arabia. They are offered free of cost to reduce the at-risk marriages and the prevalence of genetic disorders (7).

A review conducted on the effectiveness of premarital screening and genetic counseling programs for beta thalassemia in Middle Eastern countries has revealed that a cancelation rate of 65% of at-risk marriage could not be achieved except in Iran, Turkey, and Iraq (7).

In the southern region of Saudi Arabia, hemoglobin abnormalities are still prevalent. In addition, prevalence of hemoglobin variants, including sickle cell and thalassemia, was higher in the younger population born after the premarital screening than in older subjects (9).

It is to be noted that in the Arab region, a greater proportion of people may prefer consanguineous marriages (10). Moreover, abortion is considered illegal, which necessitates urgent efforts to prevent the marriage of the disease-carrier couples (11). Therefore, premarital screening can help the couple prepare themselves for marriage with proper premarital counseling giving them a better chance for a stable and satisfying marriage.

Al-Mendalawi (12) argued that consanguineous marriage is a noticeable phenomenon in Saudi Arabia that tremendously contributes to the relatively high prevalence of various genetic diseases, particularly hemoglobinopathies. The control of consanguineous marriage remains a challenge if these diseases are to be successfully contained. It has often been proposed that consanguineous marriage should be strongly discouraged on the basis of medical background to prevent various genetic diseases. However, several expert groups have pointed out that this proposal is inconsistent with the ethical principles of genetic counseling, overlooks the social importance of consanguineous marriage, and is ineffective. Instead, they have suggested that the custom increases the possibilities for effective genetic counseling, and have recommended a concerted effort to identify families at increased risk, and to provide them with risk information and carrier testing when feasible. Therefore, it is anticipated that implementation of premarital screening and genetic counseling programs could provide adequate preventive measures at primary, secondary, and tertiary levels and effectively contain these genetic diseases in a highly consanguineous population, like Saudi Arabia.

Therefore, it is important to assess the data and yield of premarital screening recently conducted in Aseer region, in the southeastern area of Saudi Arabia. This is crucial in developing strategies to create awareness and build positive attitudes toward premarital screening.

Aim of study

The present study aimed to assess the prevalence of genetic and infectious diseases that could be identified through premarital screening in Aseer Region during 2021.

Methodology

Following a retrospective research design, this study included data of all prospective couples who underwent premarital examination in Aseer Region, Saudi Arabia, during 2021, and who registered at the Premarital Screening and Genetic Counseling (PMSGC) program. The researchers retrieved data of all prospective couples registered through the Health Services Platform "Seha" for Aseer Region during 2021.

Retrieved data included number of marriage proposals, lab results for inherited hemoglobinopathies, i.e. sickle cell disease and β-thalassemia, in addition to certain chronic diseases, i.e. hepatitis B, hepatitis C, and human immunodeficiency virus, (HIV/AIDS). No personal identification data (name, national ID or mobile phone number) were included.

The ethical approval for conducting the present study was obtained from the Institutional Research Board at the General Directorate of Health Affairs in Aseer Region, Saudi Arabia. Collected data were analyzed using the Statistical Package for Social Sciences (IBM, SPSS, version 28).

Results

Table 1: Results of premarital screening of prospective couples in Aseer Region during 2021

Congenital/Infectious Diseases	No.	%
• Positive	1705	6.8
• Negative	23318	93.2
Total	25023	100.0

Figure 1: Results of premarital screening of prospective couples in Aseer Region during 2021

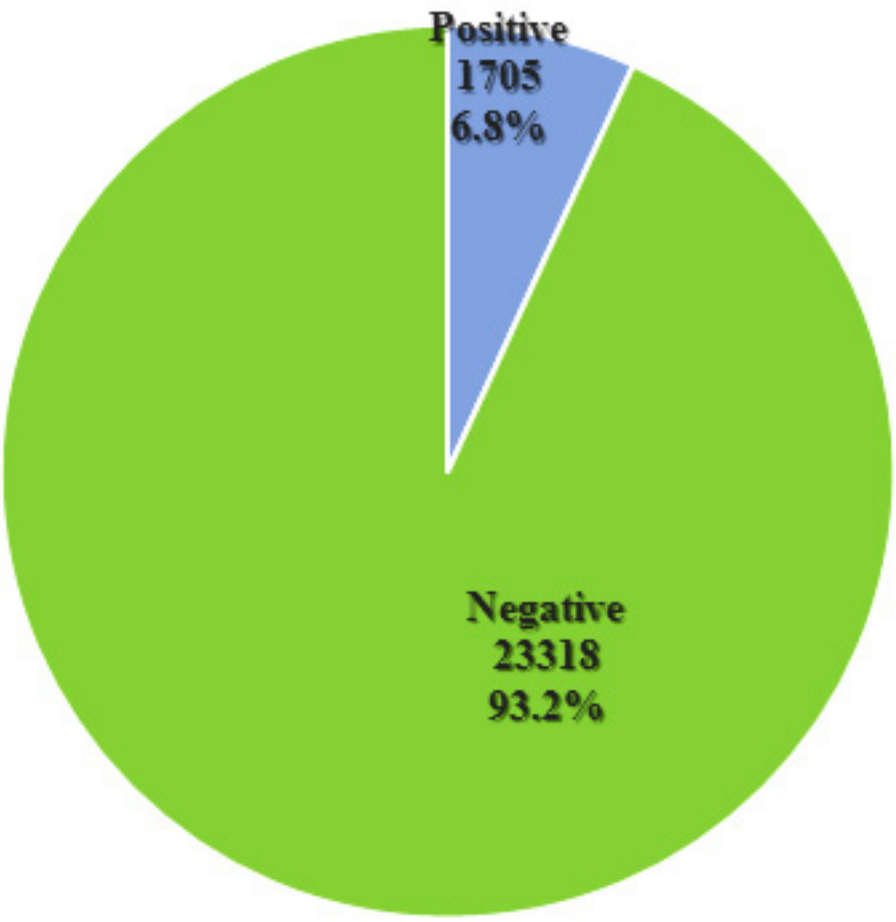

Table 1 and Figure 1 show that during 2021, there were 25,023 of premarital screening of prospective couples in Aseer Region, of whom 6.8% were positive for congenital or infectious diseases.

Table 2: Prevalence of genetic blood diseases among prospective couples who applied for premarital screening in Aseer Region during

Genetic diseases	Males		Females		Total		P value
	No.	%	No.	%	No.	%	
Sickle cell disease							
• Carriers	504	70.9	207	29.1	711	94.9	
• Cases	11	28.9	27	71.1	38	5.1	<0.001
• Total	515	68.8	234	31.2	749	100.0	
β-thalassemia							
• Carriers	181	62.0	111	38.0	292	99.7	
• Cases	1	100.0	0	0.0	1	0.3	0.434
• Total	182	62.1	111	37.9	293	100.0	

Table 2 and Figure 2 show that among prospective couples who underwent premarital screening in Aseer Region during 2021, a total of 749 patients with sickle cell disease were identified (515, 68.8% were males and 234, 31.2% were females), while 293 β-thalassemia patients were identified (182, 62.1% were males, and 111, 37.9% were females).

Figure 2: Genetic blood diseases among prospective couples who applied for premarital screening in Aseer Region during 2021

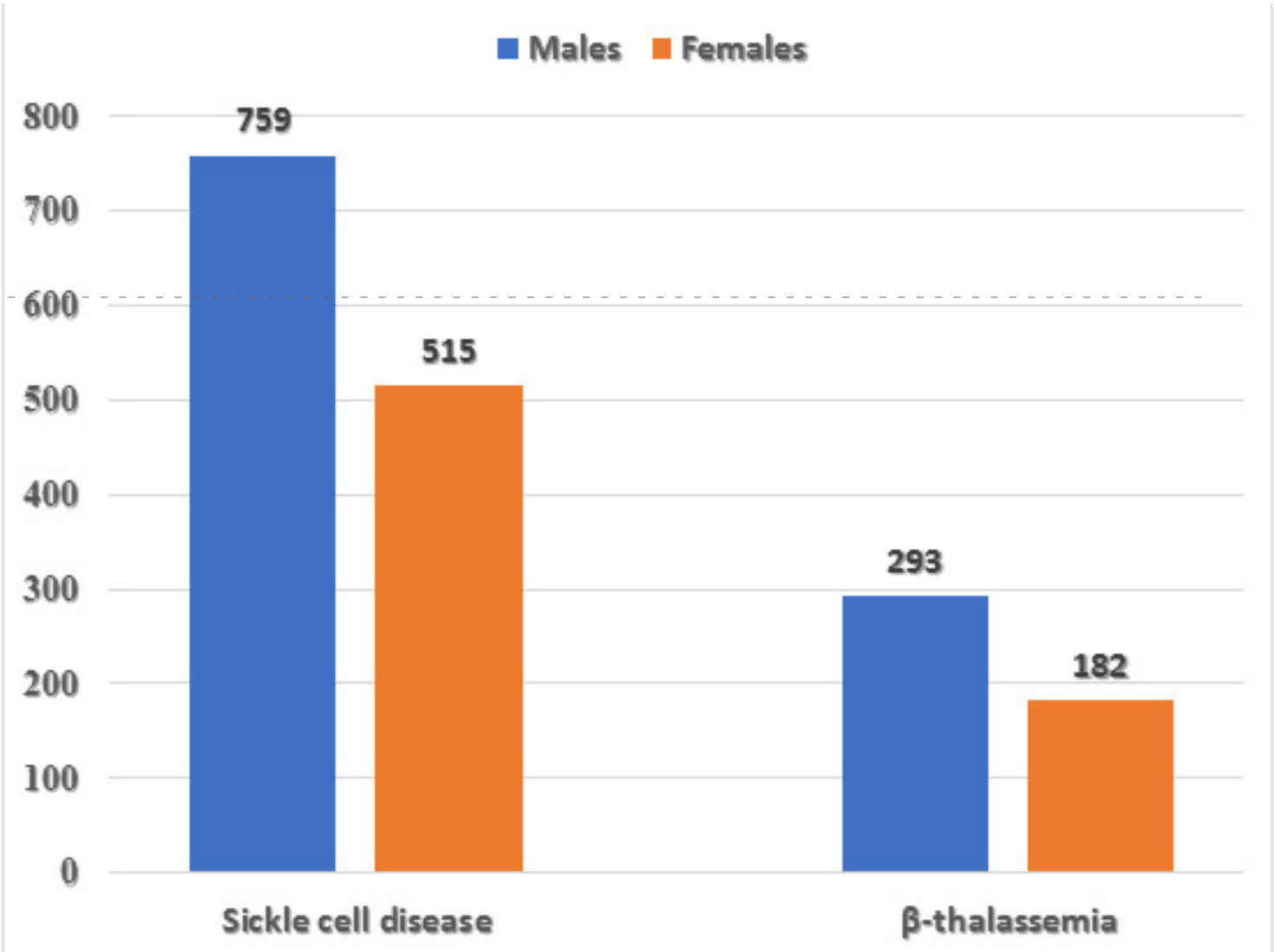

Table 3: Prevalence of infectious diseases among prospective couples who applied for premarital screening in Aseer Region during 2021

Infectious diseases	Males		Females		Total		P Value
	No.	%	No.	%	No.	%	
Hepatitis B virus	100	78.1	28	21.9	128	85.3	
Hepatitis C virus	11	84.6	2	15.4	13	8.7	
Human Immunodeficiency Virus	9	100.0	0	0.0	9	6.0	0.260
Total	120	80.0	30	20.0	150	100.0	

Figure 3: Infectious diseases among prospective couples who applied for premarital screening in Aseer Region during 2021

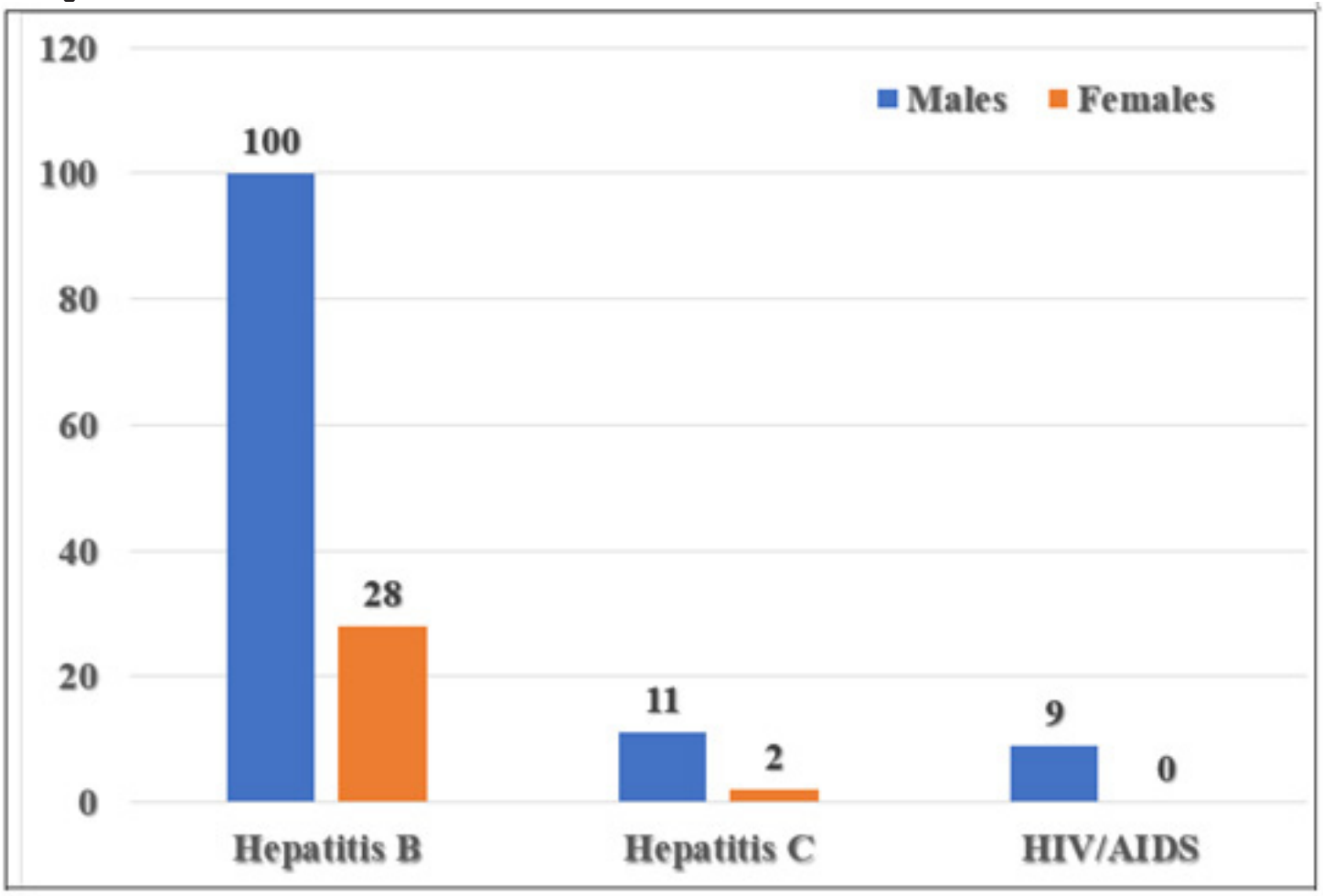

Table 3 and Figure 3 show that a total of 150 patients were diagnosed with chronic infections, of whom 128 patients with hepatitis B were identified (100, 78.1% were males and 28, 21.9% were females), while 13 hepatitis C patients were identified (11, 84.6% were males, and 2, 15.4% were females), and 9 HIV/AIDS patients were identified; all of them were males.

Discussion

The Kingdom of Saudi Arabia is considered to have the highest incidence of hemoglobinopathies among countries in the Middle East. The most common types of these hemoglobinopathies are thalassemia and sickle cell disease (9). Sickle cell anemia poses a continuous significant cause of elevated mortality and morbidity in Saudi Arabia (13), while data concerning the mortality rate associated with thalassemia are still lacking (14).

Results of the present study showed that during 2021, 25,023 prospective couples underwent premarital screening in Aseer Region. Out of those, 6.8% were positive for congenital hemoglobinpathies (i.e., sickle cell anemia) or chronic infectious diseases (hepatitis B, hepatitis C, or HIV/AIDS). Generally, hemoglobinopathies and chronic infectious diseases were more common among examined males than females. Among 749 patients with sickle cell disease, 68.8% were males and, while among 293 β-thalassemia patients, 62.1% were males. Moreover, among 128 patients with hepatitis B, 78.1% were males, and among 13 hepatitis C patients, 84.6% were males, while all identified HIV/AIDS patients were males.

Sickle cell disease is the most common genetic blood disorder. It may cause serious health issues and become life-threatening. Unfortunately, even with superior care being provided, life expectancy in cases of sickle cell disease is still reduced by 30 years (15-16).

Several studies have examined prevalence of hemoglobinopathies in various Saudi cities. Over a 6-year period, the study of Memish and Saeedi (17) that was conducted in all 13 administrative regions of Saudi Arabia reported prevalence rates of 4.5% and 1.8% for sickle cell disease and β-Thalassemia, respectively. Based on data obtained from the PMSGC programs, there were reported prevalence rates of 4.96% and 1.36 for sickle cell disease and β-Thalassemia among examined prospective couples (18). Mir et al. (19) noted that within Saudi Arabia, the eastern and southwestern areas are known to have the highest prevalence of hemoglobinopathies.

In Al Majma'ah City, Saudi Arabia, prevalence of β-thalassemia trait was higher than sickle cell trait in premarital couples. The PMSGC program reported that during February 2004 to January 2005, 4.20%, 0.26%, 3.22% and 0.07% of the participant premarital couples had sickle cell trait, sickle cell disease, β-thalassemia trait and β-thalassemia disease, respectively (20).

As hemoglobinopathies are among the most serious and costly disorders, the PMSGC program was first introduced in Saudi Arabia in 2001 and became mandatory by 2004. The program aims to improve quality of life and reduce the incidence of these disorders. Following launching the program, Saudi Arabia showed a marked reduction in the number of at-risk marriages and predicts to observe a considerable decrease in the burden of the genetic disease in the upcoming years (18).

Memish and Saeedi (17) stated that premarital screening is practically the main preventive measure against inherited hemoglobinopathies. They emphasized the success of the PMSGC program in reducing the detection and prevention of at-risk marriages. Detection of at-risk marriages was reduced by about 60%. However, sickle cell disease remains a predominant hemoglobinopathy accounting for more than 7% of total tests in Southern Saudi Arabia.

Several studies have established the benefits of compulsory premarital screening in minimizing the risk and impact of hereditary blood disorders (21-23).

Alsaeed et al. (18) examined the distribution of disorders throughout Saudi Arabia on a large cohort obtained from 2011 - 2015 PMSGC data. They reported a reduction in those with β-thalassemia traits over the 5-year study period. However, sickle cell disease remained constant from 2011 to 2015.

Premarital screening has been shown by several studies to decrease the rates of hereditary disease by lowering the incidence of genetic blood disorders including sickle cell anemia, thalassemia, and infectious diseases, including hepatitis B, hepatitis C, and HIV/AIDS (24-26).

Interestingly, Melaibari et al. (27) argued that, although Saudi Arabia has mandated the premarital screening program, almost half of the genetically incompatible couples have gone ahead with their marriage decision. The Saudi population is characterized by large families, high maternal and paternal ages, and high levels of inbreeding (28).

Despite the potential benefits of mandatory premarital screening, people continue to marry their intended partners (29). Several studies reported that a significant number of prospective couples do not abide with results of premarital screening tests (23; 30). Social stigma was reported to be one of the main reasons for non-compliance to results of premarital screening. Other stated reasons included interference with God's will, difficulty to cancel marriage, and hurting feelings (23; 31). Additionally, lack of sufficient knowledge regarding premarital screening could explain the negative perception among some individuals (32).

Therefore, ethical and social aspects should be considered for mandatory premarital screening to balance between prevention and autonomy of the couples. There is a need to identify the barriers against uptake of premarital screening tests (33).

Ceglie et al. (34) noted that gender could be a valuable factor in the risk stratification of hemoglobinopathy patients at diagnosis. Moreover, sex hormones were recognized as responsible for gender differences. Similarly, Marsella et al. (35) reported a higher prevalence of thalassemia among males. However, in Eastern Saudi Arabia, Udezue and Girshab (36) found no gender difference in prevalence of sickle cell anemia.

Al-Mazrou et al. (37) reported that the male: female ratio among HIV/AIDS patients in Saudi Arabia is 3:1. Moreover, in Aseer Region, Saudi Arabia Al-Humayed (38) reported a higher prevalence of HbSAg among males than female, but higher prevalence of HCV antibodies among females.

The higher preponderance of hemoglobinopathies and chronic infectious diseases among males in our study may be attributed to the fact that these diseases considerably affect the general condition and appearance of the patients. Therefore, females who are pale due to anemia and those who suffer wasting or weakness are less frequently asked for marriage.

Strength and Limitations

The inclusion of all the study population, and large sample of the study population were important strengths in this study. However, a limitation of this study is that we could not investigate factors related to non-compliance to results of premarital examination. Therefore, future studies should investigate concepts that can induce health behavior to comply with premarital screening recommendations. Future research is needed to explore possible related aspects, such as the impact of social stigma, religion on planned marriage cancellations.

Conclusions

Based on the study results, hereditary hemoglobinopathies, (especially sickle cell disease), and hepatitis B, are commonly identified by premarital examination of prospective couples in Aseer Region. Males are commonly more affected than females. There is a pressing need to provide health education messages to the public regarding the negative impact of consanguinity. Moreover, vaccination against hepatitis B should be enforced to minimize the incidence of this disease. Finally, prospective couples whose offspring is at risk of hereditary diseases should be strongly convinced to comply with marriage cancellations.

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High sensitivity C-reactive protein and dyslipidemia as a marker for the risk for cardiovascular disease

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Abstract

Background: High sensitivity C-reactive protein (hs-CRP), a sensitive marker of inflammation and tissue damage is an acute phase reactant. It is raised in hypertension and predicts cardiovascular outcome. Moreover elevated levels of inflammatory markers such as hs-CRP and altered lipid profile are commonly seen in hypertension which may develop cardiovascular events, hence, hs-CRP, lipid profile and nitric oxide (NO) have been incorporated in the study. The aims of this study were to find out a relationship of serum hs-CRP and dyslipidemia in hypertensives and to find out an association of serum hs-CRP with the risk for Cardiovascular disease (CVD).

Methods: A case-control study was done among the patients visiting the outpatient department (OPD) of BP Koirala Institute of Health Sciences, Dharan, Nepal in which forty seven newly diagnosed hypertensives as cases and fifty age and sex matched healthy normotensives as controls, were enrolled in the study with the prior informed consent. hs-CRP, nitric oxide (NO) and lipid profile were estimated in both the cases and controls.

Results: Hypertensives have significantly raised levels of hs-CRP, non-high density lipoprotein cholesterol (non-HDL-C) and NO compared to that in controls ($P < 0.05$). hs-CRP has a significant positive correlation with systolic as well as diastolic blood pressure, BMI, and with triglyceride (TG) ($P < 0.05$). However, the correlation of hs-CRP with NO is negative but statistically significant (0.000).

Conclusion: The level of hs-CRP, which is thought to be a marker of inflammation, is significantly raised in hypertensives. Moreover, the majority of hypertensives are dyslipidemic suggesting hypertensives to be at an increased risk for the development of CVD.

Key words: Cardiovascular diseases, dyslipidemia, hs-CRP, hypertension, inflammation.

Introduction

C-reactive protein (CRP), is an acute phase immunity protein which is mostly produced by hepatocytes and is also expressed in a variety of organs including heart, skeletal muscle, neurons, artherosclerotic plaques, monocytes and lymphocytes during inflammation (1, 2). Production of CRP is increased in response to stimulation from interleukin-6 (IL-6) and tumor necrosis factor (TNF), hence CRP is considered a biomarker of systemic inflammation (3). Studies have shown a positive association between hypertension and levels of CRP (4,5). CRP also results in significant reduction in mRNA and protein for endothelial nitric oxide synthase (eNOS) thus resulting in decreased production of NO and hence supporting its role in atherogenesis (6). The level of hs-CRP is associated with cardiovascular disease (CVD) and increased levels of hs-CRP in patients indicate a higher risk of suffering from acute myocardial infarction (7).

Both the elevated levels of CRP (>3mg/L) and increasing categories of blood pressure (BP) are independent determinants of future cardiovascular events (8). Hypertension frequently co-exists with dyslipidemia, known as dyslipidemic hypertension which includes derangement in any component of lipid parameters, either increased total cholesterol (TC) or low density lipoprotein cholesterol (LDL-C) or triglycerides (TG) or decreased high density lipoprotein cholesterol (HDL-C) (9). In dyslipidemic hypertension, the risk of CVD is more multiplicative than the sum of the individual risk factors (10). Hypertension is associated with upregulation of lipid oxidizing enzymes (11). In the meantime, when plasma cholesterol, especially LDL-C is high, it becomes trapped in an artery, that can undergo progressive oxidation forming oxidized LDL (ox-LDL) (12). Since, ox-LDL has phosphocholine epitopes, because of which uptake of oxidized LDL is promoted by CRP, this induces atherogenesis (13).

Very limited studies on hs-CRP in hypertension and its association with the risk of cardiovascular disease have been conducted in our setting. In this study, serum levels of hs-CRP were estimated by high sensitive ELISA method with the objective to find out the relationship of serum hs-CRP, BP and dyslipidemia among the subjects of Eastern Nepal and also to establish an association of serum hs-CRP with the risk for CVD.

Material and Methods

Study design

This was a cross-sectional, case-control study encompassing the patients visiting the outpatient department (OPD) of BP Koirala Institute of Health Sciences, Dharan Nepal, in which forty seven newly diagnosed hypertensives as cases and fifty age and sex matched healthy normotensives as controls, with their prior informed consent, were enrolled. Hypertension was clinically diagnosed according to the JNC 7 criteria (14). This study was approved by Institutional Ethical Review Board (IERB) of BP Koirala Institute of Health Sciences, Dharan, Nepal.

Participants

Newly diagnosed hypertensive patients were included in the study, however patients with chronic inflammatory diseases like rheumatoid arthritis (RA), osteoarthritis (OA), autoimmune diseases, tuberculosis and any previous history of diabetes or stroke were excluded from the study. The age and sex matched healthy individuals without any history of hypertension, diabetes mellitus and chronic inflammatory diseases were enrolled as controls.

Data collections and outcomes

Blood pressure (BP) was recorded, height and weight was measured and body mass index (BMI) was calculated in both the cases and controls. Fasting blood sample was withdrawn and serum was separated on which lipid parameters were estimated by enzymatic methods on spectro-photometer. Non-high density lipoprotein cholesterol (Non-HDL-C) was calculated by subtracting HDL-C from TC. Serum Nitrite was estimated by Griess Reaction Method where sulphanilic acid is converted to diazonium salt by nitrite which on coupling with N-napthylethylene diamine forms an azo dye that was quantitated spectrophotometrically at 545 nm (15).

The hs-CRP in the serum samples was estimated by using a high sensitivity ELISA method (CALBIOTECH INC, High sensitivity CRP Elisa) based on the principle of a solid phase enzyme linked immunosorbent assay. The assay system utilizes the mouse monoclonal anti-CRP antibody on microtiter well. A goat anti-CRP antibody was in the antibody enzyme conjugated solution. During reaction the CRP molecule is sandwiched between the solid phase and enzyme linked antibodies. Finally the color intensity was measured spectrophotometrically at 450 nm.

Data were analyzed using SPSS for Windows version 15. The group association was determined by Chi-square test, correlation was tested by Pearson correlation coefficient and P value of less than 0.05 ($P<0.05$) was considered to be significant.

Results

A total of 97 subjects were recruited for the study purpose of which 47 were newly diagnosed hypertensives as cases and the rest were age and sex matched healthy normotensives as controls. The mean values of the various parameters in cases and controls are shown in Table 1. Since, hypertensives were enrolled as cases and normotensives as controls, there was a significant rise in systolic blood pressure (SBP) as well as diastolic blood pressure (DBP) in hypertensives. Similarly, BMI and the levels of hs-CRP, TC, LDL-C and non-HDL-C were significantly increased in cases compared to controls ($P < 0.05$). However, the rise in TG and decrease in HDL-C and NO were statistically not significant in cases compared to that in controls as shown in Table 1.

According to the grades of BMI, 34.0% and 8.5% of the individuals among cases were overweight and obese respectively, although, the majority of the individuals (51.1%) had normal weight. Similarly, among the controls, a huge number of individuals, (76%) had normal weight, 20% were overweight and none was found to be obese which is shown in Table 2.

According to the levels of hs-CRP (considering hs-CRP ≥ 1 mg/L as risk group population), 72.3% of the cases and only 44.0% of the controls were categorized as risk group) which is statistically significant. Similarly, according to the lipid levels, the majority of the individuals of the cases, 59.6% are LDL-C dyslipidemic, followed by 55.3% as TG dyslipidemic and were categorized as a risk group. However, a very few number of controls, 20% were LDL-C dyslipidemic and 32% were TG dyslipidemic, categorized as a risk group for CVD and was statistically significant (P< 0.05) which is shown in Table 3.

Furthermore, hs-CRP as well as non-HDL-C had a positive correlation with SBP, DBP, BMI and TG and was statistically significant (P< 0.05). However, both the hs-CRP and non-HDL-C were negatively correlated with NO and was statistically significant (P< 0.05) as shown in Table 4.

Table 1. Comparison of different parameters between cases and controls
(Student's t test) [p<0.05 is significant]

Parameters	Cases (n=47) Mean±SD	Controls (n=50) Mean±SD	P value
SBP	155.34±18.17	114.00±6.38	0.000
DBP	102.51±9.38	78.50±4.31	0.000
BMI	24.60±3.72	22.55±2.59	0.040
hs-CRP	3.21±3.03	1.35±1.27	0.000
TC	178.27±37.14	146.28±26.31	0.021
HDL-C	41.53±4.05	42.16±3.23	0.150
Triglyceride	159.80±83.15	138.14±76.97	0.838
LDL-C	108.46±38.33	82.42±20.41	0.005
Non-HDL-C	136.74±35.58	104.12±26.02	0.034
Nitric oxide	21.08±7.97	29.88±10.48	0.230

Table 2. Distribution of cases and controls according to different grades of BMI

Different grades of BMI	Cases n=47 (%)	Controls n=50 (%)
Underweight	3 (6.4)	2 (4)
Normal weight	24 (51.1)	38 (76)
Overweight	16 (34)	10 (20)
Obese	4 (8.5)	0 (0)

Table 3. Risk group according to Lipid parameters and hs-CRP [Chi-square test]

Parameters	Group	Case n=47 (%)	Control n=50 (%)	X^2	P value
hs-CRP	Risk	34 (72.3)	22 (44.0)	7.97	0.005
	Non-risk	13 (27.7)	28 (56.0)		
TC	Risk	13 (27.7)	2 (4.0)	10.37	0.001
	Non-risk	34 (72.3)	48 (96.0)		
HDL-C	Risk	16 (34.0)	8 (16.0)	4.23	0.040
	Non-risk	31 (66.0)	42 (84.0)		
Triglyceride	Risk	26 (55.3)	16 (32.0)	5.36	0.021
	Non-risk	21 (44.7)	34 (68.0)		
LDL-C	Risk	28 (59.6)	10 (20.0)	15.92	0.000
	Non-risk	19 (40.4)	40 (80.0)		

Table 4. Correlation of hs-CRP and non-HDL-C with other variables in the total study population [Pearson's correlation] [p< 0.05 is significant]

Variables	hs-CRP r (P)	non-HDL-C r (P)
SBP	0. 289 (0.004)	0.529 (0.000)
DBP	0.376 (0.000)	0.469 (0.000)
BMI	0.471 (0.000)	0.251 (0.013)
TC	0.134 (0.192)	0.995 (0.000)
HDL-C	-0.131 (0.201)	0.152 (0.136)
TG	0.238 (0.019)	0.345 (0.001)
LDL-C	0.103 (0.316)	0.757 (0.000)
Nitric oxide	-0.481 (0.000)	-0.316 (0.002)
hs-CRP	----------	0.150 (0.142)

Discussion

This study intended to evaluate the relationship of high BP with dyslipidemia, NO and the markers of inflammation such as hs-CRP in hypertension. In the present study, statistically significantly raised levels of hs-CRP and BMI as well as an altered lipid profile were found in cases compared to that in controls. A study conducted in Thailand showed statistically raised levels of hs-CRP and BMI as well as deranged lipid profile even in prehypertensives when compared to normotensives (16). The present study has demonstrated significantly raised levels of hs-CRP in cases compared to that in controls (3.21±3.03 vs 1.35±1.27; P <0 .001) which is supported by the study of Cottone S et. al (2.37±0.57 vs 1.6±0.4, P < 0.001) and Shafi Dar M et. al. (3.26±1.37 vs 1.36±0.26, P < 0.001) (17). Similarly, a recent study conducted in Brazil also revealed significantly raised levels of hs-CRP (0.53 ± 0.44 vs 0.38 ± 0.21, P= 0.0118) and BMI (29.99 ± 1.41vs 25.75 ± 3.87 0.0435, P< 0.05) in hypertensives (18). HTN is an inflammatory condition during which the production of an acute phase reactant, the CRP, is increased causing its raised levels in circulation. Even more, CRP damages the endothelial cells, progresses the thickening of vascular intima resulting in peripheral resistance that decreases the speed of blood flow, induces vascular sclerosis and increases the BP (19) and hence, in these days, hs-CRP is believed to be an independent risk factor for hypertension (20).

The American Heart Association and Centre for Disease Control and prevention have recommended CRP as a risk marker for CVD, with CRP levels <1mg/L as a low risk, 1-3 mg/L as an average risk and >3 mg/L as a high risk for CVD (21). A study by Tofano et al. showed a total of 64% of the hypertensives (13.33% as moderate risk and 50.67% as high risk) as the risk population for the CVD in terms of serum levels of hs-CRP (18). Consistent with this, our study has found some higher number of the hypertensives, 72.3% as a risk group population, however, among normotensives, 44% are the risk group population for CVD which is statistically significant (p< 0.05). Showing a high numbers of control group to be an at risk group population in this study may predict the development of hypertension in future even if these people are normotensives now.

Results of the present study indicate a positive correlation of SBP, DBP and BMI with hs-CRP (p= 0.05). Shafi et al. also reported a graded association between BP and hs-CRP elevation in people with hypertension (17). Similarly, a study conducted among T2DM patients in India, showed a significant positive correlation of serum hsCRP with SBP (p < 0.001) and DBP (p < 0.001) in the hypertensives (22). Both HTN and Diabetes mellitus are inflammatory conditions thus showing the raised levels of inflammatory markers such as hs-CRP.

This study found reduced levels of NO in hypertensives. There may be the role of hs-CRP itself for the decreased levels of NO in hypertensives as they have significantly raised levels of hs-CRP which results in inflammation causing endothelial dysfunction and decreases the production of NO by endothelial cells (23). CRP also plays a role in lowering the levels of NO, by significantly reducing mRNA and protein for eNOS (6). NO is an endogenous vasodilator, therefore, decreased production of NO leads to vasoconstriction, arterial stiffness and increased peripheral resistance which finally results in high BP.

The present study showed significantly high BMI in hypertensives compared to that of controls (24.60±3.72 vs 22.55±2.59; p < 0.05). Besides, among the hypertensives 34 % and 8.5% of the individuals were overweight and obese respectively whereas among controls 20% of the individuals were overweight but none were obese. A study by Tofano et al. also found significantly raised BMI in hypertensives compared to that in controls (18). Similarly, a study by Ghomari et al. also established an association between BMI and markers of inflammation, such as CRP and dyslipidemia (24). In the individuals having high BMI, there may be the deposition of fatty tissues which increase the vascular resistance resulting in high BP. In addition, an increase in BMI leads to increased inflammation, insulin resistance, and catecholamine levels inducing other hormonal changes resulting in significant changes in gene expression and increased BP(25).

In the present study, hypertensives being dyslipidemic with statistically significantly high levels of TC, LDL-C and non-HDL-C, were found to be at increased risk for the development of CVD. However, our study found statistically insignificant rise in TG and decrease in HDL-C as well as NO in cases compared to that in controls. Some studies have suggested the co-existence of hypertension and dyslipidemia. According to Dutro et al. 49.7% of the hypertensive patients were dyslipidemic, (26) and in such populations the risk for CVD was more multiplicative than the sum of the individual risk factors (10, 11). Consistent with our findings, a study conducted by Sudjaroen, et al. in Thailand showed existence of dyslipidemia even in prehypertensives (16). A possible elucidation for these relationships is that hypertension and dyslipidemia share common pathophysiological etiologies, such as obesity and the resulting dysregulation of adipocytokine release from adipose tissue (27). Furthermore, dyslipidemia adversely affects functional and structural arterial properties which may impair BP regulation, which, in turn, predisposes individuals with dyslipidemia to the development of hypertension (28). In the present study, lipid parameters, except HDL-C, were positively correlated with hs-CRP. Correlation of NO with hs-CRP was negative and statistically significant (p= 0.000). A similar type of study conducted in Mongolia, also revealed a significant association of hs-CRP with the components of dyslipidemia (29). In general, individuals with dyslipidemia are in a pro-inflammatory state, characterized by elevated levels of inflammatory molecules such as hs-CRP and Interleukin-6 (Il-6). Besides, hypertensives have an ongoing inflammation in the artery and upregulation of lipid oxidizing enzymes which produces ox-LDL, the retention of which in sub-endothelium initiates early atherosclerosis (11, 30).

Therefore, hypertension, dyslipidemia and endothelial functioning are inter-related. The derangement of lipid parameters and significantly raised hs-CRP levels among hypertensives suggest inflammation in the body which indicates development of cardiovascular events in them. Moreover, hypertensives had higher BMI which was associated with markers of inflammation and dyslipidemia. So, early monitoring of markers of cardiovascular disease such as hs-CRP and lipid profile may lead to better quality of life and life expectancy. So, early estimation of markers of inflammation and identification of the patient at risk may prevent CVD events in the patients suffering from hypertension.

Conclusion

CRP, is an acute phase protein, the production of which is induced in response to inflammatory conditions, such as in hypertension which may result in the progression of cardiovascular diseases. Hypertensives have high BMI which is associated with markers of inflammation and dyslipidemia. So, early monitoring of markers of cardiovascular disease such as hs-CRP and lipid profile may lead to better quality of life and life expectancy.

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Role of Ipratropium bromide in management of Thunderstorm asthma

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Abstract

Epidemic thunderstorm asthma has been reported to have occurred around twenty times over the past three decades in locations around the world. Thunderstorm asthma events are characterized by a significant increase in asthma presentations, which on occasion can overwhelm local medical services and result in fatalities. Thunderstorm asthma (TA) typically presents during an aeroallergen season in individuals, sensitized to perennial rye grass pollen (RGP) in Australia, in combination with meteorological factors such as thunderstorms and lightning activity. Short acting beta agonist (SABA) only treatment is sub-optimal therapy for prevention of asthma exacerbations. The combined treatment includes inhaled corticosteroids (ICS) and SABA but is found to be contentious. So the present review focuses on suitable alternative, short acting muscarinic antagonist (SAMA), Ipratropium bromide and its efficacy on the management of allergic asthma. Salbutamol induces bronchodilation rapidly but it elicits profound cardiovascular event as the side effects. Meanwhile, ipratropium also has equivalent effect of salbutamol with low side effect profile. Ipratropium also minifies the asthmatic response to grass pollen, allergen induced bronchoconstriction. Further, it also reduces allergen induced early and late asthmatic response and also inhibits the response towards histamine inhalation. In this regard, ipratropium may be considered as a suitable agent in the management of thunderstorm asthma and future trials are highly warranted.

Keywords: Thunderstorm asthma, grass pollen, rye grass, short acting beta agonist, Ipratropium bromide

Introduction

Thunderstorm Asthma (TA) is a clinical entity which causes increased bronchospasm or an asthma attack mediated by rampant changes in the environment such as alteration in wind speed, temperature and the most important factor is the thunderstorm activity in the surrounding places (1). TA is usually sporadic, but it also has the potential to affect a large number of population with an outbreak in a localized space or for a period of time referred to as epidemic thunderstorm asthma (ETSA).

The onset of bronchospasm may be sudden or may be progressive and last more than a few minutes. The most effective treatment for acute exacerbation of dyspnea is the Short-Acting Beta Agonists (SABAs) (Salbutamol) given by nebulizer or inhaler (2). With emerging evidence on the role of cholinergic signaling in allergic asthma, muscarinic antagonist efficacy in allergic asthma is of great interest. Historically, pre-treatment with short acting muscarinic antagonists (SAMA) such as ipratropium, prior to an allergen inhalation challenge produced rather equivocal data. Anticholinergics work by competing with acetylcholine for receptor sites at the vagus nerve-nerve or nerve-muscle junctions. This prevents transmission of reflexes induced by asthma stimuli (3).

Although, the exact mechanism is not well reported, TA occurs as a result of environmental exposure to airborne allergic particles such as fungal spores and pollen grains concentrated in thunderstorm downdrafts (4,5). Grass pollen is one of the vital factors for the progression of hay fever in humans and also induces asthma symptoms (6). Meanwhile, whole pollen is also responsible for causing hayfever, but the size of whole pollen is large so it lacks the ability to penetrate into the airways to cause TA (7). But in specific conditions, the whole pollen may rupture and release sub-pollen particles (SPPs) with submicron size that have the ability to pass the pharynx and penetrate into small airways. The cause of pollen rupture is not clearly depicted, but reports suggest the possible mechanisms such as mechanical friction, lightning activity within thunderstorm clouds and water-induced swelling (8).

Environmental factors associated with the development of TA

• Aeroallergen Exposure

In the presence of water, grass pollen ruptures to release the large quantity of tiny (0.5-2.5 µm) starch granule particles with extensive presence of allergen. These ruptured starch grains are populated in the air during TA epidemics. Studies show that ryegrass pollen (starch granules) have the ability to provoke asthma like symptoms during breathing challenge tests (9). Generally, the size of ryegrass pollen grains are in the range of >35 µmdiameter and when they come into contact with the storm moisture they rupture to 3µm respirable granules (10).

• Air pollution

During thunderstorms, the level of gaseous pollutants and ozone factors are increased. But there is a lack of credible evidence of these factors in the progression of asthma in TA (11).

• Agricultural activity

Harvesting Alternaria (a genus of Deuteromycetes fungi) or Cladorsporium (a common mould) species during thunderstorm events is associated with the release of increased levels of fragmented airborne spores from these species. The evolution of new agricultural practices such as synchronized monoculture planting leads to the release of increased level of grass pollen from fodder and grain crops during the spring season with high concentrations of aeroallergens (12).

Incidence of Thunderstorm asthma

ETSA events are not only limited to Australia. There has been a global incidence with 26 reported events, but they are not responsible for large asthma exacerbations as occurred in Australia. Meanwhile, there are certain exceptions such as the 1994 London epidemic, 2013 Iran epidemic, and 2016 Saudi Arabia epidemic. In industrialized countries, the prevalence of atopic conditions is mainly due to the increased air pollutants in the atmospheric conditions (13).The occurrence of thunderstorms is higher in countries with temperate climates such as Europe or the Middle East, as well as in Australia with subtropical environments (14). TA presentations are also observed in countries like Mexico, (15) USA, (16) and Greece, (17) but till date no specific events have been documented (Table 1).

Australia has the majority of TA events with 10 episodes and among these 7 have occurred in Melbourne, precisely in the south-eastern state of Victoria which has a temperate climate. The majority of the Australian ETSA episodes have occurred during the Spring season which has high concentration airborne grass pollens. The clinical data based on the Australian ETSA event reveals that the majority of the patients were affected with allergic rhinitis (AR), meanwhile known asthma was present in 40% of the cases (18). A previous report shows that in Australian ETSA episodes the most prominent trigger allergen of TA was rye grass pollen (RGP) (Loliumperenne) (19). This pollen has a characteristic feature of < 2.5 µm diameter with ultrafine allergen-coated starch particles and can be released through osmotic shock mechanism, and is further respirable through small airways (10). The other reported mechanism responsible for TA was the outflow of colder air as a result of downdraught from the thunderstorm and this might lead to collection of pollen grains and particles and accumulates as a shallow band of air at the ground surface level (5).

Table 1: Global Thunderstorm Asthma Events

Date	Location	Allergen Trigger(s)
6–7 July1983	Birmingham, UK	Fungal spores
20–21 June 1984	Nottingham, UK	Fungal spores
11 November1984	Melbourne, Australia	Not specified
November1987	Melbourne, Australia	Not specified
22 Jul 1989	Leicester, UK	Fungal spores
November1989	Melbourne, Australia	Grass pollen
1–5 November1990	Tamworth, Australia	Grass pollen
24 Jun 1994	London, UK	Grass pollen
1 Dec1996	Kuwait City, Kuwait	Not identified
30–31 October1997	WaggaWagga, Australia	Grass pollen
27 October1998	Newcastle, Australia	Grass pollen
31 July–1 August 2000	Calgary, Canada	Fungal spores
29–31, Jul 2002	Cambridge, UK	Fungal spores
November 2002	Al-Ahsa, Saudi Arabia	Not identified
20 November 2003	Melbourne, Australia	Grass pollen
4 June 2004	Naples, Italy	Weed pollen
24 June 2005	South-East England, UK	Not identified
27–28 May, 2010	Barletta, Italy	Olive tree pollen
25 November, 2010	Melbourne, Australia	Grass pollen
8 November, 2011	Melbourne, Australia	Grass pollen
2 November, 2013	Ahvaz, Iran	Not identified
26 Oct, 2014	Canberra, Australia	Grass pollen
21 November, 2016	Melbourne and Geelong, Australia	Grass pollen
11 September, 2018	Yuling, China	Plant pollen

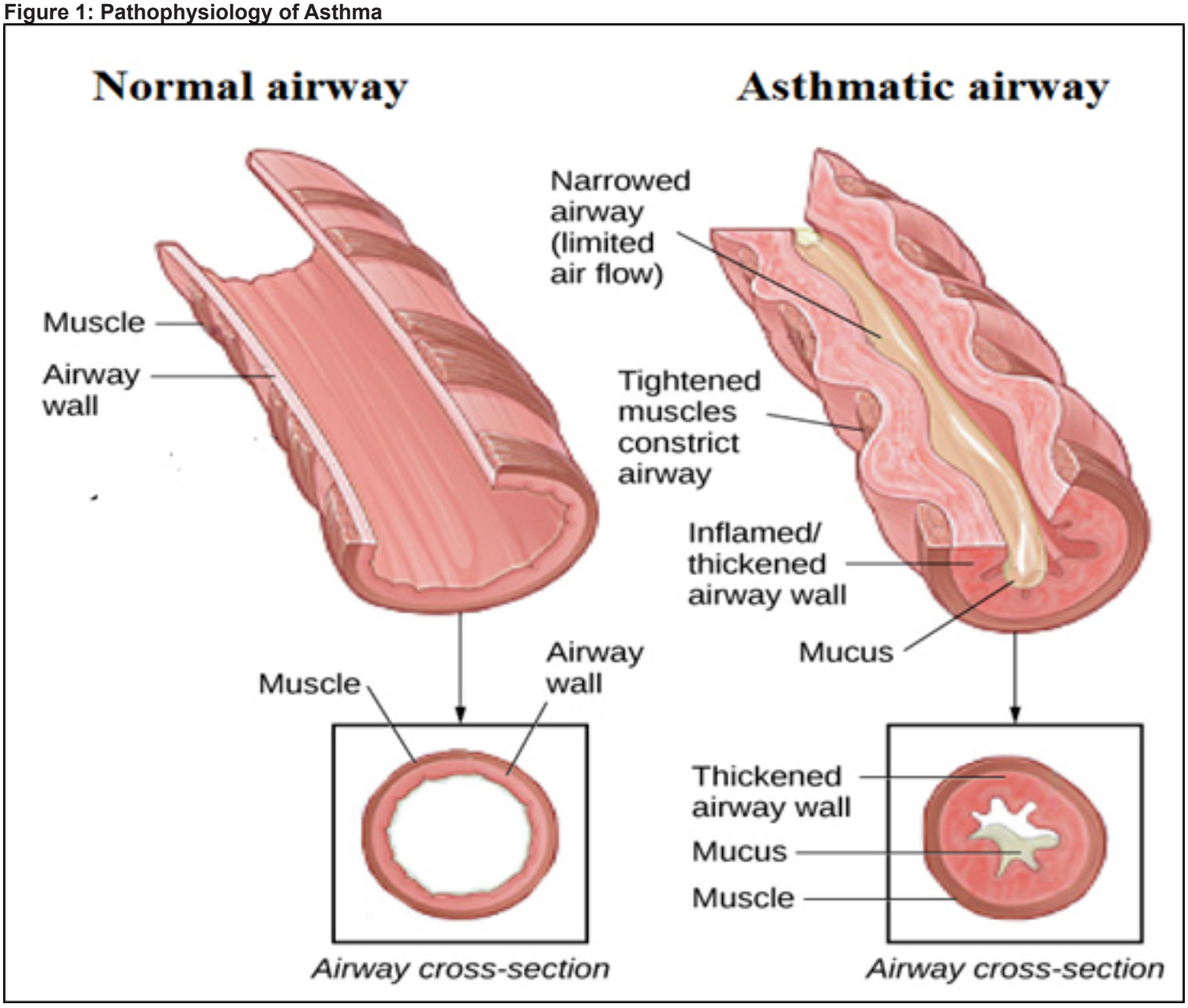
The first event of ETSA in Melbourne was reported during November 1984 (20), following a UK episode in July 1983 . Further, there were two quick events in 1987 and 1989 respectively, with the former reported to have second mortality due to TA (19). All seven ETSA episodes in Melbourne were recorded during the peak RGP season particularly in late Spring especially during November , which is considered a thunderstorm prone month. Meanwhile, the 2016 Melbourne ETSA event was larger in size in terms of severity and magnitude and thus raises the concerns over environmental conditions, health services and patient related factors contributing towards this event (21). During this event, the storm generated rye grass pollen from agricultural land and further bursts of tiny particles into the lungs of the residents. Further, the emergency department was presented with more than 14,000 admissions with the symptoms of TA. Meanwhile, within a span of time mortality was observed in seven men and three women aged between 18 and 57 years. Thus this event was considered as one of the worst events globally till date. The detailed sequence of TA events worldwide is depicted in Table 1.

Pathophysiology of asthma

Asthma is a chronic airway inflammatory disease, with symptoms ranging from wheezing, dyspnea, cough, and chest tightness along with expiratory airway obstruction. Globally, around 334 million individuals suffer from asthma (22).

The asthma exacerbation encompasses an early and late phase. The sensitized IgE antibodies released from plasma cells are responsible for early phase as a result of environmental triggers. IgE antibodies then bind to high-affinity mast cells and basophils (23). During inhalation of pollutants, the mast cells degranulate which leads to the release of cytokines and also the other inflammatory mediators such as histamine, prostaglandins, and leukotrienes. These mediators bind to the smooth muscle receptors and cause airway constriction (23). Th2 lymphocytes trigger the release of interleukins such as IL-4, IL-5, IL-13 and GM-CSF which also mediates the inflammatory process during asthma. Further, the mast cells are also responsible for the recruitment of acute phase reactants to the inflamed site(24). Thus inflammation along with bronchoconstriction develops intermittent airflow obstruction and elevates the breathing workload (Figure 1).

Figure 1: Pathophysiology of Asthma



Airway hyperresponsiveness (AHR) is a hallmark feature of asthma as a result of exaggerated bronchoconstrictor response due to a wide range of external stimuli. AHR is mediated by the release of acetylcholine (Ach) from airway neuronal and epithelial (non-neuronal) cells. Ach binds to muscarinic receptors located in the airways and leads to smooth muscle contraction and mucus production (25).

Role of bronchodilators in the management of asthma

Widely used pharmacotherapies for acute asthma are short acting beta agonist (SABA) e.g. Salbutamol, oral prednisone, short acting bronchodilators such as ipratropium and long-acting beta agonist/inhaled glucocorticoids (LABA/ICS); (e.g., budesonide-formoterol).

Short acting Beta2 Agonist (SABA)

SABA (Salbutamol, Turbutaline, Albuterol, Levalbuterol) bind to the beta2-receptors and cause airway smooth muscles to relax which leads to bronchodilation (26). SABAs are the frequently used therapeutic strategy for fast and acute relief of asthmatic events. Common side effects of SABA are tremors, tachycardia, and palpitations. Frequent use of SABAs must be restricted since it might be associated with resistance and thus deteriorates asthma control.

Long acting Beta Agonist (LABA)

LABAs (e.g. salmeterol and formoterol) are the drug of choice for long term management of asthma with marked bronchospasm since 1990s (27). The principal action of β2-agonists is to relax airway smooth muscle by stimulating β2-adrenergic receptors. This increases the intracellular messenger cyclic AMP that is responsible for the control of smooth muscle tone (28). Thus, activation of the β2-adrenergic receptor results directly in bronchodilation.

Short acting muscarinic antagonist (SAMA)

Short acting bronchodilators such as ipratropium and tiotropium, block the muscarinic effects of acetylcholine. Ipratropium bromide is economically affordable with a good safety profile and elicits smooth muscle mediated bronchodilation. Ipratropium hydrobromide which belongs

to the class of SAMA, is an isopropyl derivative of atropine with low lipid solubility and poor absorption. Ipratropium has the ability to block all muscarinic receptor subtypes with the same affinity, including neuronal M2 receptors (29). Further, due to the inhibition of a neuronal receptor, ipratropium has the potency to stimulate vagal mediated bronchoconstriction at the clinically used doses (30).

The Uptodate (53) recommends ipratropium bromide for the management of moderate to severe childhood asthma exacerbation in combination with beta-agonist. Previous RCTs, systematic reviews and meta-analyses show that 2-3 doses of inhaled ipratropium in combination with inhaled beta-agonist displayed marked reduction of hospital admission and enhances the lung function in children with moderate-to-severe asthma exacerbations as that of the inhaled beta-agonist alone.

Long acting muscaranic antagonist (LAMA)

Muscaranic antagonists (glycopyrronium, aclidinium and umeclidinium) were recommended only for the management of COPD and not for asthma, due to the involvement of vagal tone (31). Muscarinic antagonists are less effective in the management as compared to β2-agonists, since the cholinergic mediated bronchoconstriction is less as compared leukotrienes mediated constrictor effects (31). However, a previous study comparing the effect of LAMA, tiotropium and LABA, salmeterol asthmatic patients shows that both are equally effective in mediating the bronchodilator effect, exacerbations and patient reported outcomes (32).

Further, LAMAs, initially tiotropium as well as other agents such as glycopyrronium and umeclidinium are used as an add on therapy in asthmatic patients with frequent exacerbations, albeit the patients have been on inhaled corticosteroid (ICS)/LABA treatment (33).

A previous study done by Peters et al. showed the efficacy of tiotropium as add on therapy in mild to moderate asthma patients, whose disease was uncontrolled even on treatment with low-dose ICS (80 µg beclomethasone twice daily) (34). A systematic review which evaluated the efficacy and safety of LABAs, LTRAs and LAMAs (tiotropium) in pediatric asthma patients reveals that LABA as an add-on therapy to ICS improved the lung function as compared to the placebo (35).

Preventer' drugs or anti-inflammatory agents in management of asthma

Inhaled steroids (IHS)

Inhaled steroids such as beclomethasone, budesonide, ciclesonide, flunisolide, fluticasone, or mometasone are employed as a maintenance therapy among the asthma patients (36).

The recent GINA guidelines recommend the use of IHS in patients with asthmatic symptoms or SABA twice or more per month, one time or more for waking due to asthma or in patients with minimal symptoms or less risk factors associated with exacerbation (37). BTS/SIGN (2016) (38) implicates the use of IHS in patients' asthma attack for the past two years.

Oral corticosteroids

Corticosteroids mediated anti-inflammatory efficacy in asthmatic airways is rendered by blocking the release of proinflammatory mediators and also through inhibition chemotaxis of inflammatory cells to lungs. Thus, due to their efficacy with profound safety, the systemic corticosteroids are recommended in asthmatic children and adults (39).

Leukotriene inhibitors

Zafirlukast and montelukast are leukotriene inhibitors used in the management of allergic rhinitis and asthma symptoms. A previous randomized controlled trial encompassing 889 patients with uncontrolled asthma symptoms on inhaled budesonide and addition of montelukast to their regimen showed profound effect, which is also similar to the effect of doubling the dose of budesonide (40).

Ipratropium bromide (IB) in the management of Asthma

Ipratropium bromide which belongs to the class of SAMA is administered through pressurized metered-dose inhaler and it is the first inhaled muscaranic antagonist for the management of bronchoconstriction (41). Ipratropium displays non-selective affinity towards the airways muscarinic receptor subtypes such as M1, M2 and M3 respectively. M1 and M3 receptor inhibition leads to bronchodilation, whilst M2 blockade leads to the vagal stimulation Ach and thus lessens the bronchodilator effect (42). Thus due to its non-selective property, its use is limited as a bronchodilator.

A systematic review analysis encompassing various randomized controlled trials was conducted to evaluate the efficacy ipratropium bromide alone, or as a combination therapy with SABA and the results showed that ipratropium bromide alone showed a significant effect as compared to SABA alone (43). Ipratropium bromide alone displayed marked improvement of spirometry compared to SABA, with a mean difference of 30ml (95% CI 0 to 60) for FEV1 and 70 ml (95% CI 10 to 140) for forced vital capacity.

Efficacy of ipratropium bromide allergic asthma

A previous study shows that ipratropium (80µg) administered through metered dose inhaler (MDI) displayed significant protection in allergen induced bronchoconstriction. They also reported that out of 12 patients, 7 of them showed marked improvement in FEV1 following allergen (44). Further, 4 patients displayed late asthmatic allergy response (LAR) and ipratropium has not shown profound inhibition of this response.

In another study, ipratropium (40µg) administered through MDI showed marked protection against allergen and histamine and it is evaluated by calculating the number of

breaths required to elicit a 20% fall in FEV1 (45). Further, a single dose of ipratropium (1mg, via MDI) showed significant inhibition in grass pollen induced asthmatic response in 6 of 10 subjects even after the increased dose of grass pollen (46). Meanwhile, contrasting reports have been published in which nebulized ipratropium (1mg) displayed no marked effects in the allergen mediated fall in FEV1 in six allergic asthmatic patients (47).

The unique clinical action of SABA and SAMA is the quick onset of bronchodilation precisely during the case of acute bronchoconstriction (48). Thus, the bronchodilator effects of ipratropium and SABA, salbutamol has been compared in various studies. Salbutamol elicits rapid bronchodilation and it is employed as a first line treatment in patients with acute symptomatic bronchospasm (41). A previous study shows that salbutamol displays higher bronchodilator effects as compared to ipratropium in asthma patients (49). However, SABA tend to elicit cardiovascular adverse effects in some patients who were unable to tolerate it (50). In such cases, ipratropium may be prescribed due to its low toxic profile. Meanwhile, frequent use ipratropium is associated with tolerance towards bronchodilator effect, however there are no substantial clinical reports evaluate this issue (51).

Clinical utility of salbutamol and ipratropium during a thunderstorm asthma event

To date there are no studies in evaluating the efficacy of salbutamol and ipratropium in thunderstorm asthma.
Recently, Anderson et al. evaluated the medication and administration profile among the thunderstorm asthma and normal patients exposed to a thunderstorm event. In this study, the median time from triage to the first dose of salbutamol administration was 40 minutes in TA patients and 34 for control patients and it was found to be non-significant (p=0.19). Further, the study also showed that, salbutamol en-route provided by ambulance paramedics was higher for TA 33/53 (62.3%) thunderstorm asthma as compared to control 3/6 (50%) control patients. Meanwhile, the medication order history revealed salbutamol has been ordered by 48.3% and ipratropium has been ordered by 24.8% of the patients respectively (52).

Conclusion

Albeit, less frequent and episodic, ETSA can cause large outbreaks which further affect healthcare services with significant fatal cases. So more research is warranted to evaluate the environmental, climate and patients related susceptibility factors to understand the disease mechanism and also various treatment strategies for the accurate management. Evidence was reported regarding the efficacy of ipratropium in allergic asthma, superior to salbutamol. Thus future trials are warranted to study the efficacy of both drugs in the management of thunderstorm asthma.

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Subcutaneous Migration of Distal Ventriculoperitoneal Shunt Catheter in Morbidly Obese Patients: Two Case reports

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Abstract

Background: VP shunt failure due to distal catheter migration is an uncommon complication mainly associated with increased intra-abdominal pressure related to obesity.

Observations: We report two cases of morbidly obese patients who presented with recurrent distal catheter migration and pseudocyst formation in the subcutaneous space less than a month following VP shunt placement for the management of hydrocephalus.

Conclusion: Special attention must be given when placing a VP shunt in morbidly obese patients. There are various methods to prevent tube migration in such patients, like using a longer catheter tube, tight closure of the peritoneum while placing the catheter between the fat and abdominal muscles, using a hernia patch, and using laparoscopic techniques. We advocate for using different surgical procedures in obese patients prophylactically to avoid VP shunt failure and distal tube migration in patients with associated risk factors.

Keywords: Shunt Complication, Subcutaneous Migration, Ventriculoperitoneal Shunt, Obesity

Introduction

Introduction: Ventriculoperitoneal shunt (VP) is a standard procedure in neurosurgery [1]. It is considered superior management for hydrocephalus [2]. Hydrocephalus is defined as active distension of the brain's ventricular system resulting from impaired CSF flow [3]. The VP shunt placement complications include malfunction of the shunt, perforation caused by the shunt, and shunt infection. One of the complications of VP shunt is recurrent migration of the distal tube and coiling under the skin [4] or other anatomical cavities such as the thoracic wall or subgaleal space [1]; this prevents the proper drainage of the CSF to the abdominal peritoneal cavity [4]. The cause is still not understood, but there are risk factors that contribute to migration, such as vigorous head movement leading to dragging of VP shunt from the peritoneal cavity to the proximal subcutaneous area, scalp and skin movability, increased intraabdominal pressure, and using hydrogel covered catheter leading to low friction and sliding [1, 5]. This report describes two cases of recurrent migrations of VP shunt in obese patients.

Case Presentation 1

Case 1: 76 year old female known case of hypertension and diabetes on metformin with a body mass index (BMI) of 42.89. Complaining of headache for the last 5 years, progressive in nature and intensity with occasional dizzy spells, not associated with vomiting, loss of consciousness, seizures, bladder incontinence, memory loss, or gait disturbance. On examination she was neurologically intact. MRI of the brain showed intraventricular ependymoma, in addition to mild to moderate supratentorial hydrocephalus; thus, A VP shunt was placed with a right parietal approach. A transverse abdominal incision was made above and lateral to the umbilicus followed by dissection of subcutaneous fat. Then, the posterior rectus sheath was pulled up, the facia was incised, and a 30 cm peritoneal catheter was inserted into the peritoneal cavity and connected with the proximal catheter. The patient tolerated the procedure well with no complications. On the 6th post-operative day, the patient presented to the emergency department complaining of dizziness for 2 days associated with severe vomiting and vague abdominal pain. Imaging studies revealed displacement and looping of distal catheter forming a cyst within the abdominal wall (Figure 1,2). Thus, revision of the distal peritoneal catheter was done, and the tube was found looped around within the fat layer of the abdominal wall causing a seroma. Distal catheter patency was tested and found to be functioning well. The tube was placed back into the abdomen. Upon closure it was hitched to the fat and sutured from the outside to the rectus sheath to prevent further dislodgement. Post-operative imaging revealed the catheter was in place at the level of the right iliac fossa. The patient's symptoms improved and she was discharged clinically and vitally stable.

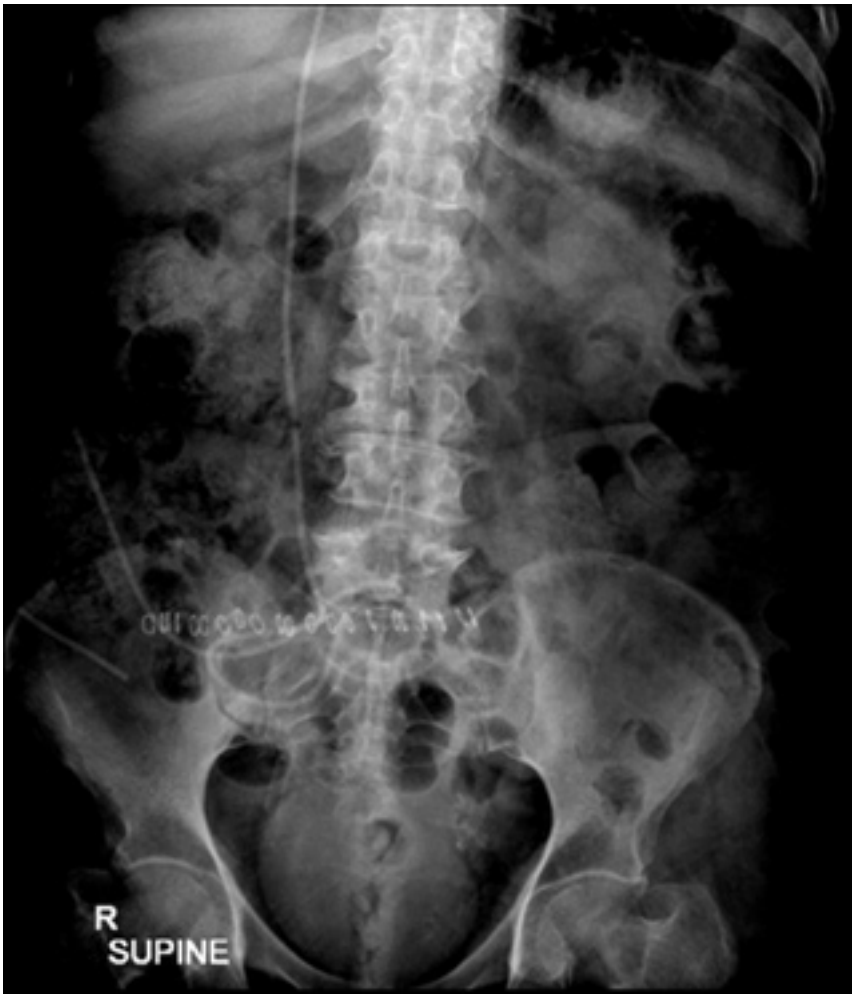


Figure 1: Abdominal x-ray (supine): shows the distal catheter tube coiled at the right side of the abdomen. Multiple surgical clips noted in the upper pelvis related to the previous surgery.

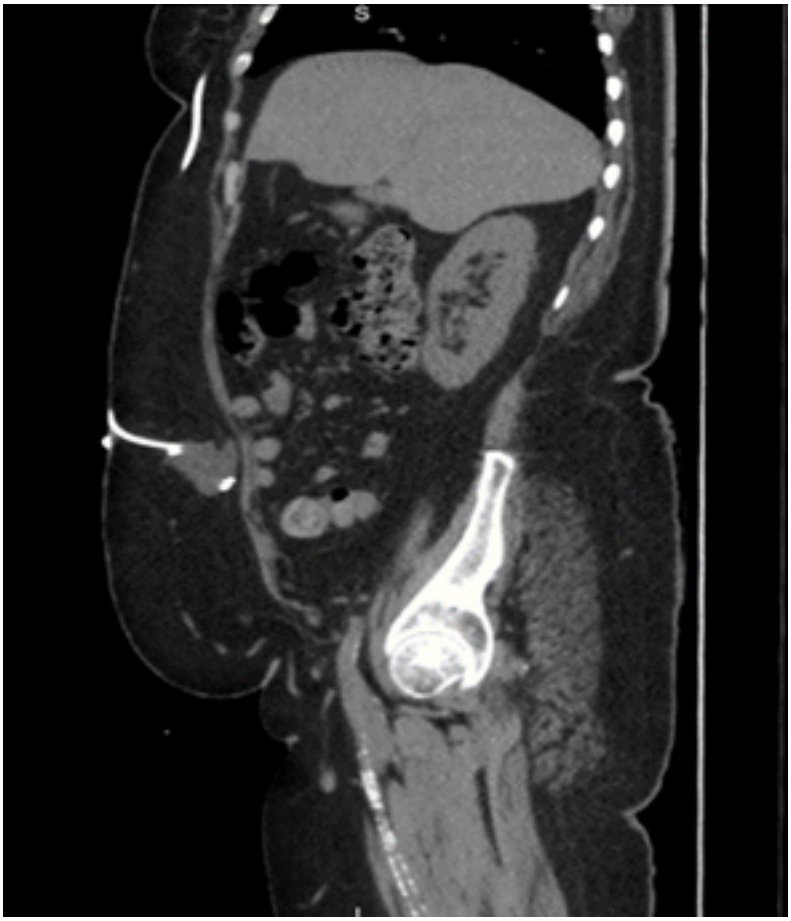


Figure 2: Abdominal CT with contrast: sagittal view shows misplaced distal tip of the VP shunt, with surrounding fluid collection at the anterior abdominal wall.

Case Presentation 2

A 43-year-old female known case of left Petroclival meningioma with a BMI of 46.05. She presented to the clinic with a 10 day history of headache, nausea, and vomiting without blurred vision or decreased level of consciousness. She was found to have obstructive hydrocephalus secondary to meningioma. Subsequently, a right VP shunt was placed, and post-operative recovery was uneventful. On the 10th day, she presented to the ED complaining of unsteady gait, alternate weakness of upper limbs, and numbness of the right side of her face. Imaging studies revealed cavernous thrombosis and she was started on warfarin. A VP shunt x-ray showed right sided parietal VP shunt with the tip located in the abdomen with no area of kinking or cut off (Figure 3). Two weeks later, the patient came to the clinic with a large abdominal swelling under the incision measuring 15 cm x 15 cm. Abdominal CT reported a shunt displacement into the subcutaneous tissue and a large CSF pseudocyst (Figure 4). Thus, shunt revision was done for peritoneal catheter repositioning and CSF-collection drainage. Afterward, the patient presented to the ED on the 19th day post 1st revision complaining of right upper anterior abdominal wall swelling at the site of the scar from the previous surgery with the size of 8x8 cm. She had no symptoms of increased intracranial pressure and a CT abdomen showed distal catheter outside the abdominal cavity (Figure 5). Hence, a second shunt revision was done for evacuation of the abdominal pseudocyst. The distal catheter was removed, and 80 cm peritoneal catheter was placed under the abdominal fat and inserted into the peritoneum. The shunt worked well, and the patient was discharged.

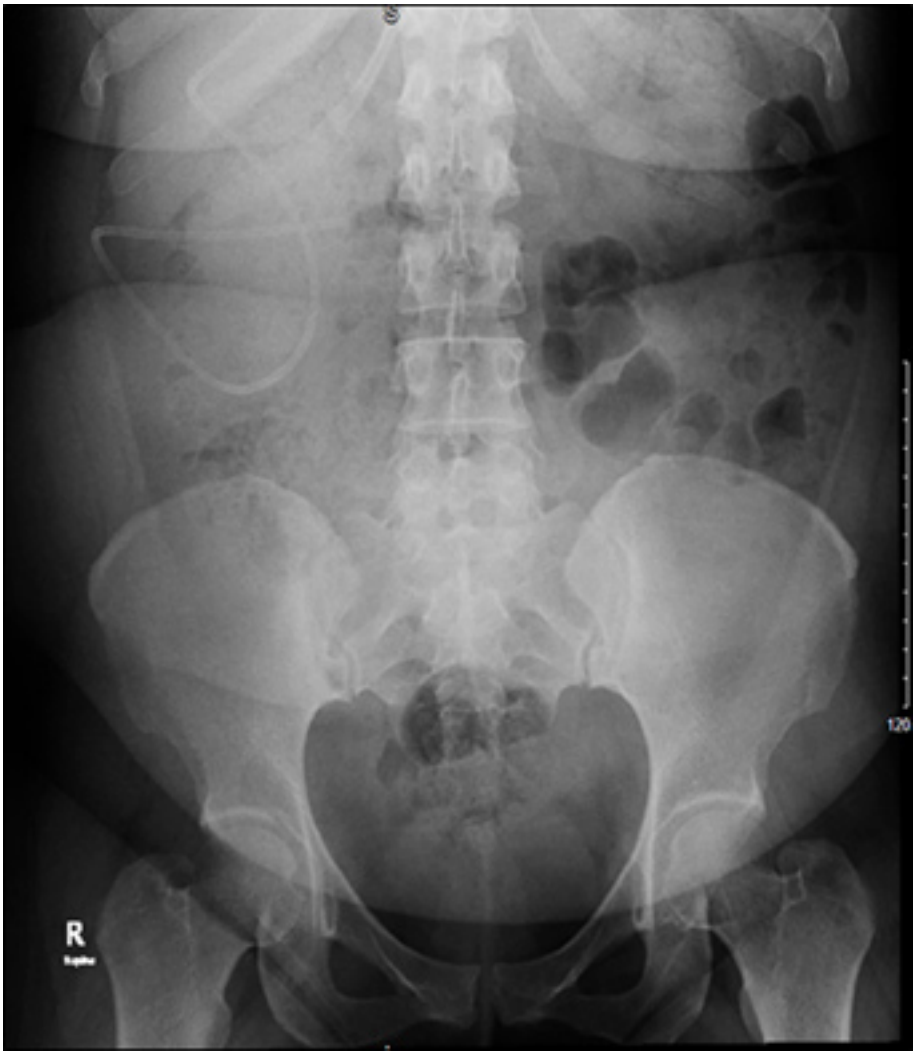


Figure 3: Abdominal X-ray: shows distal catheter tip in the abdomen. Image of rectum represents constipation.

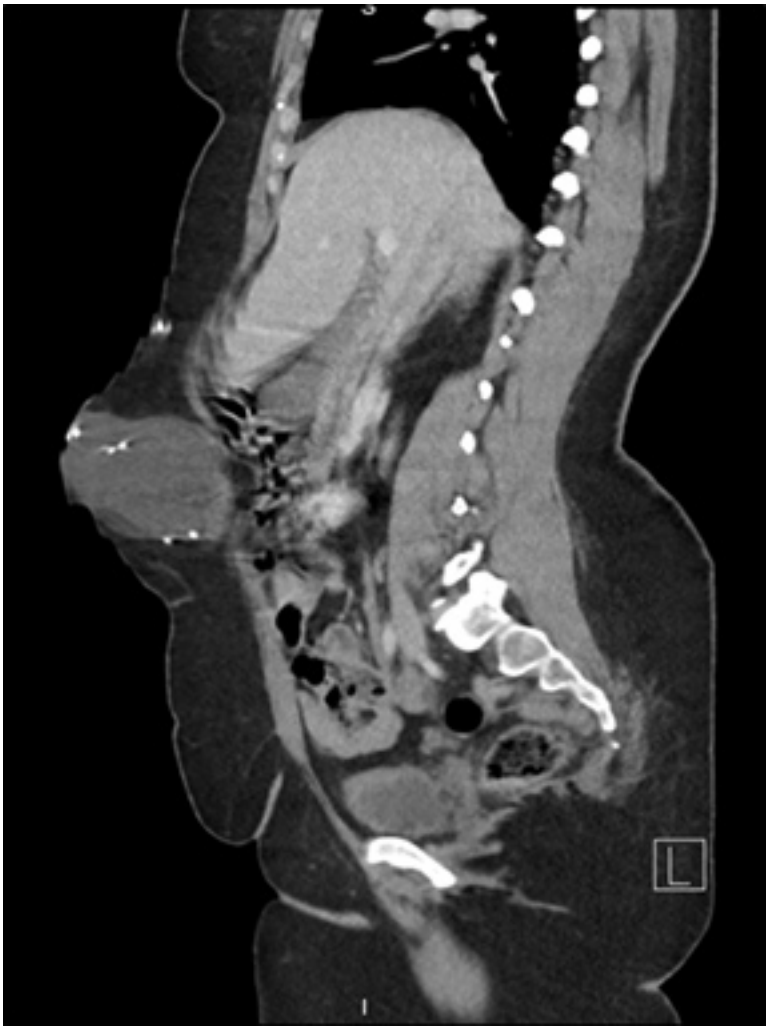
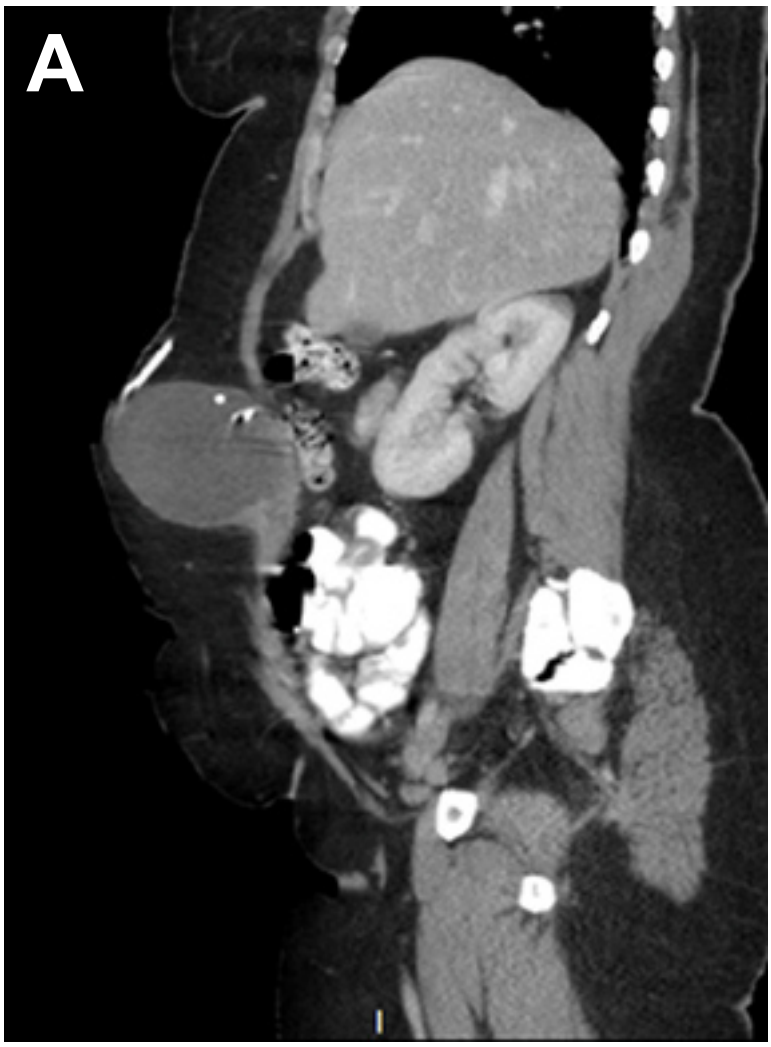


Figure 4: Abdominal CT with contrast: shows The VP shunt terminating in the subcutaneous tissue with a large CSF pseudocyst



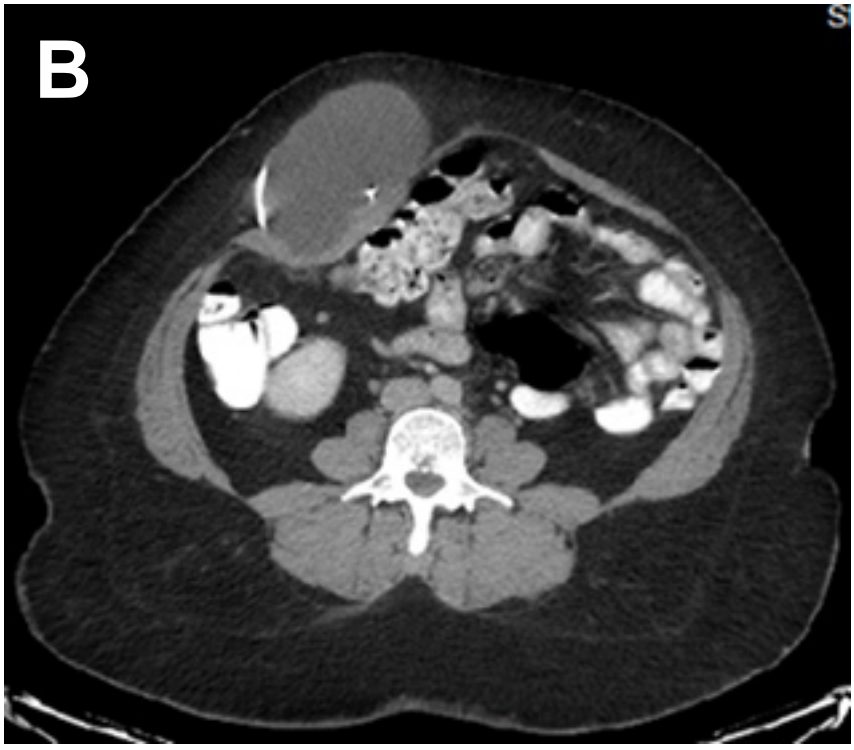


Figure 5: Abdominal CT with contrast shows the distal tip of the VP shunt is terminating in the subcutaneous tissue of the mid abdomen forming a large CSF collection with no intra-abdominal extension. Axial view of the abdomen (A) Sagittal view (B) show the tip of the catheter at the right anterior abdomen with a large pseudocyst that formed at the tip of the catheter and measures 9.6 x 5.6 cm.

Discussion

Literature review: Migration of a ventriculoperitoneal shunt catheter is an uncommon complication with no known cause; however, several theories are speculated. The most accepted theory attributes increased intra-abdominal pressure to distal catheter migration via gradually pushing out the catheter through the peritoneum and into the subcutaneous space [6]. Morbid obesity is a known cause of increased intra-abdominal pressure leading to catheter retraction into the subcutaneous tissue and pseudocyst formation. Several reports describe the association between obesity and shunt migration [1,5-10]. In addition to obesity, Lee C et al. described a case of VP shunt migration probably due to increased intra-abdominal pressure because of chronic bowel distention [4]. Another mechanism, reported by Nakahara et al., suggests that catheter migration could be due to abdominal fat pad shift that drags the tube upward when going from sitting to standing position [5].

Multiple reports described surgical techniques to prevent this complication [6,8,10]. Many advocated for using laparoscopic procedures to place the distal catheter because it decreases complications and lowers the rate of future revisions [8,10]. Morrison et al. reported successful use of a hernia patch to anchor the catheter, thereby increasing friction and reducing catheter sliding into the subcutaneous tissue [6]. Moreover, Nagasaka et al. explained that careful placement of the distal catheter between the subcutaneous fat and abdominal muscles with tight closure of the peritoneum is sufficient to prevent migration [1]. Another method reported by Couldwell WT et al., detailed inserting an extended length tubing (120cm) for children to avoid needing future lengthening procedures as they grow. The authors stated no increase in complications and explained that the extra length could theoretically decrease the possibility of pseudocyst formation because the catheter would be moving freely within the peritoneum [11].

Observations: In the first case we placed the catheter between the abdominal fat and muscle layers in addition to suturing the tube to the rectus sheath muscle from the outside, anchoring it to the abdominal wall, while, in the second case, we described using a longer distal catheter tube to overcome the effect of fat pad shifting and dragging of the catheter. Follow-up with both our patients revealed that the techniques we used were sufficient in maintaining the catheter in place, and likely prevented further migration.

Conclusion: VP shunt failure due to distal catheter migration is an uncommon complication mainly associated with increased intra-abdominal pressure related to obesity. The present cases suggest that we need to implement extra precautions when performing a VP shunt placement for obese patients to prevent unnecessary revisions. However, more studies need to be conducted to evaluate the best method to prevent distal catheter migration in obese patients undergoing VP shunt placement.

Disclosures:
None of the authors have perceived conflict of interest related to the manuscript or its subject matter.

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A diagnostic surprise of Hodgkin's Lymphoma in a 29-year-old long distance runner

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Abstract

Painless lymphadenopathy enlarging over months is the most frequent presentation in Hodgkin's lymphoma. Bony pain and lesions at presentation is usually not seen in Hodgkin lymphoma. However, in this case study, an uncommon presentation of classical Hodgkin's Lymphoma, involving bone, in a 29-year-old long distance female runner was reported. Patient initially presented with bony pain without classic type B symptoms and lymphadenopathy. A final diagnosis of classical Hodgkin's lymphoma stage IV was confirmed and PET scan evaluation was also done. Patient started on Escalated BEACOPP regimen and four cycles of chemotherapy were completed in 12 weeks and showed good response post treatment. Albeit, its rare, primary osseous Hodgkin's Lymphoma should be considered in the diagnosis of bony pain. The absence of classic type B symptoms and any local lymphadenopathy in this case did make the diagnosis challenging.

Keywords: Hodgkin's lymphoma, bony pain, escalated BEACOPP

Introduction

Multinucleated Reed-Sternberg cells with inflammatory potency are the characteristic features of Hodgkin lymphoma. Classic Hodgkin lymphoma (CHL) is one of the major types of HL. Hodgkin's Lymphoma is commonly diagnosed in the 20-34 years age group, which accounts for 31% of new diagnoses but it occurs through a wide spectrum of ages ranging from adolescents to the elderly(1). The common mode of presentation of Hodgkin's lymphoma is painless lymphadenopathy enlarging over months. Fevers, night sweats, chill, or sudden weight loss of around 10% is commonly seen in the advanced stage of the disease and that determines the prognosis of the disease. Erythrocyte sedimentation rate (ESR) is usually elevated at the time of diagnosis and acts as a reliable marker to assess the disease severity. Similarly, leukocytosis/neutrophilia and anaemia are observed during advanced stages of Hodgkin lymphoma and have been associated with poor prognosis. Gastro-intestinal tract and pulmonary system are the common extra-nodal sites of involvement in Hodgkin lymphoma. Bony lesions at presentation are usually not seen in Hodgkin lymphoma, although skeletal involvement is seen in the advanced stage of the disease. Primary bone Hodgkin lymphoma is usually rare (2). Hodgkin lymphoma is highly curable and the 5-year relative survival rate is 96.4% in patients between the age group 0-19 years and 89.8% for patients 20-64 years (3). The present case report was an uncommon presentation of classical Hodgkin's Lymphoma in a 29-year-old diabetic female.

Case Report

In May 2021, a 29-year-old woman developed left sided musculo-skeletal pain the chest region. Initial X-ray investigation was normal. She has type-2 diabetes which is quite well controlled. Subsequently, she developed right sided hip pain which was attributed to her extensive training for her half-marathon. Patient underwent physiotherapy for the symptoms, but the pain increased in intensity, with back pain radiating to the right leg. Initial investigations including X-ray and MRI didn't show any concerning features and were essentially normal. Her left sided rib pain worsened and a repeat X-ray showed lytic lesions in the left lower ribs. She was referred to oncology. A couple of weeks later, in October she presented to emergency with worsening pain and cauda equina symptoms. Repeat MRI this time showed a large expansile mass arising from the sacrum and invading the right posterior ilium, adjacent muscles and Rt S1, S2 and S3 nerve roots of the sacral plexus. Biopsy of the lesion, histological examination and immunohistochemical analysis made the diagnosis of classical Hodgkin's lymphoma (mixed cellular pattern) by finding the diagnostic Reed-Sternberg cells.
Standard blood test showed that the WBC (white blood cell) count was 21.23 × 109 L−1 with the neutrophil rate of 84.3% and lymphocyte rate of 11.2%; Hb was 109 g/L and platelet count was 540 × 109 L−1). The biochemical results showed ESR and CRP were also increased.

Based on the complete staging workup the final diagnosis for this 29-year-old patient on November 2021 was confirmed as classical Hodgkin's lymphoma stage IVA, predominately bony disease with very low-grade uptake in supraclavicular lymph nodes. She had a number of high-risk factors including stage IV disease, high white cell count and low albumin which does increase her risk in general. Escalated BEACOPP regimen was started for the patient. Four cycles of chemotherapy were completed in 12 weeks and she had complete response to treatment.

Discussion

Osseous HL presenting with the bony pain and lesion, is an unusual presentation of this disease. A painless progressive enlargement of the lymph node is the commonly observed clinical presentation of Hodgkin's lymphoma. Primary skeletal involvement is very rare. The occurrence of Hodgkin's lymphoma in skeletal muscle is observed in the middle age to older population and frequently long bones are usually affected. Bone pain is the most common presentation, followed by bone mass and pathological fracture. Neurological abnormalities as a result of nerve compression are also observed in these patients (4).

Radiological investigation for skeletal involvement displays either lytic or sclerotic lesions, however lytic lesions are more frequently encountered compared to sclerotic lesions. The common radiographic differential diagnosis includes osteomyelitis, primary sarcomas of the bone, non- Hodgkin's lymphoma, metastatic lesions, and leukemia.

Because, both radiological and clinical features are non-specific for the primary osseous Hodgkin's lymphoma, histopathological examination remains the mainstay of diagnosis. Balancing the disease control with the occurrence of early and delayed treatment related side-effects is required, when choosing the preferred first-line treatment. Patients with advanced stage of Hodgkin's lymphoma are most likely to relapse and thus need intensive treatment. Combination chemotherapy is the mainstay of treatment for those patients.

An intensified front-line regimen has been developed by the German Hodgkin Lymphoma Study Group (GHSG) consisting of bleomycin, etoposide, doxorubicin, vincristine, cyclophosphamide, prednisone and procarbazine for the treatment of Hodgkin's lymphoma.

The escalated BEACOPP treatment protocol has higher-than-standard doses of doxorubicin, etoposide and cyclophosphamide. Escalated BEACOPP regimen elicits effective tumor control, with an overall increase in 11% at 10 years as compared to COPP-ABVD. GHSG advocates BEACOPP regimen as the standard treatment strategy for patients with high risk factors and advanced-stage Hodgkin's lymphoma (5, 6). Treatment of Hodgkin Lymphoma with eBEACOPP regimen displayed frequent and long-lasting remissions. However, the estimated

increased risk of secondary malignancies is not reported (7). Previous reports comparing eBEACOPP with other regimens showed that eBEACOPP treatment showed good overall survival rate and less relapses with a comparable rate of secondary neoplasia. A meta-analysis study encompassing 10,000 patients from 14 studies showed that eBEACOPP treatment regimen displayed marked survival benefit of 7% in advanced stage of Hodgkin's lymphoma as compared to the ABVD regimen (8). The outcome of patients with osseous Hodgkin's lymphoma has been reported similar to that of patients with lymph node involvement, (9, 10) and this was true for our patient as well.

Conclusion

Even though it's uncommon, the primary osseous Hodgkin's lymphoma should be considered in the differential diagnosis of ongoing bony pain. Lack of classic type B symptoms and lymphadenopathy can make the diagnosis challenging. Remarkable response was noted in the patient with the current chemotherapeutic regimens.

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Middle age man with Gastroparesis

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Abstract

Dyspepsia and complaints related to upper gastro intestinal disorders are very common in primary care. Different disorders can present with similar symptoms with only subtle differences. Full evaluation of such patients is essential for the optimal management of disease. This case is about a middle aged man with delayed gastric emptying or gastroparesis with a chief complaint of nausea and bloating. Although the incidence of gastroparesis is small, many patients could be misdiagnosed due to lack of awareness amongst physicians and due to limited investigations. Gastroparesis should be kept in mind in patients presenting with upper gastrointestinal symptoms and disease specific management should be given.

Key words
Gastroparesis, delayed gastric emptying, vomiting, nausea, bloating, fullness, early satiety, Scintigraphic gastric emptying study
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Case Report

45 year old male patient presented to the health center to request repeat medications. He was known to have hypertension and Dyspepsia. He was on 5 mg amlodipine along with 30 mg Lansoprazole which he was taking quite regularly. He was requesting to increase the dose of PPI further as he was still having gastrointestinal symptoms. He was a nonsmoker, slightly overweight with BMI of 29 and had central obesity.

He was lately trying to lose weight and had changed his diet. He was consuming more fiber and protein and less carbohydrates. He was also eating an increased proportion of fat to counter his need for carbohydrate food. He had also started drinking more fresh lemonade without sugar. He reported that the change in the diet had helped him lose 2 kg of weight in two weeks. But he was worried as his dyspepsia had become worse. He enquired if the dose of PPI could be increased further to counter his symptoms.

His symptoms were further explored in the clinic. His main complaint was nausea,; he had been sick on a couple of occasions, and there was also a feeling of fullness and bloating. He felt that the satiety was attained earlier than before. He was passing stools regularly with normal formed stools without blood or mucus.

Clinical examination was normal and there was no suggestion of intestinal obstruction. His temperature was 36.6 Celsius, Pulse rate was 72, blood pressure was 142/91 and O2 saturation was 98 percent on air. His last blood test showed HbA1c of 6.0 whereas renal and hepatic functions were normal. His total cholesterol was 5.9, HDL 0.9, and triglycerides were 5.1. On risk assessment using ASCVD risk his 10 year risk of having an ischemic event was 4.7 percent.

He was suspected to have some element of Gastroparesis. He was advised to reduce fiber intake, acidic food, and fatty food {1}; he was also counseled to increase oral hydration. He was also advised to stop Amlodipine 5 mg (calcium channel blocker) and instead was started on perindopril 5 mg. He was advised to take his Lansoprazole when needed instead of using it regularly. He was also prescribed metoclopramide 10 mg three times daily when needed, to be taken 15 minutes before food {2}.

The patient was followed up in two weeks in the general clinic when he reported significant improvement in his symptoms. The use of PPI was reduced in the first week and he had not used any PPI in the previous five days. Nausea had settled and there were no episodes of vomiting; the bloating was also settled. He was explained about the possibility of delayed gastric emptying and was given further information and leaflets. As his symptoms had improved, he declined to have any further investigations. He was referred to dietetics and was advised to start an exercise program to improve his health and blood parameter.

Gastroparesis is a syndrome of objectively delayed gastric emptying of solids in the absence of a mechanical obstruction {3}. Common symptoms are Nausea, Vomiting, Early or easy satiety, Bloating, and Weight loss {4}. It could be idiopathic or could be caused by Diabetes {5}. Other causes include; viruses, medications, post-surgical, Neurological diseases, and auto immune diseases. Medications such as; Narcotics, Alpha-2-adrenergic agonists (clonidine), Tricyclic antidepressants, Calcium channel blockers, Dopamine agonists, Muscarinic cholinergic receptor antagonists, Octeotide, Glucagon-like peptide-1 agonists (Exenatide or Liraglutide), Phenothiazines, and Cyclosporine could result in gastroparesis.

Exclusion of gastrointestinal obstruction is essential in evaluation of such patients. The gold standard investigation is Scintigraphic gastric emptying study {6} in which a patient is given diet and imaging is obtained at two hours and four hours to see the percentage of stomach emptying. Patients are categorized as positive for gastroparesis if more than 10 percent of stomach still contains food. Categorization can be made as mild (10 to 15 percent), moderate (15 to 35 percent), and severe (>35 percent).

Initial management includes increase in oral Hydration, dietary modification and control of blood glucose. The patient is advised to consume a diet low in fiber, acid, fat and spice; carbonated drinks are discouraged. Any causative medication should also be reviewed and altered if possible.

If symptoms persist after dietary change, pharmacological treatment can be initiated. Metoclopramide 10 mg three times daily can be used, taken 15 minute before food. Another option is cautious use of domperidone 10 mg three times daily. ECG monitoring is essential as it can cause QT prolongation and arrhythmias {7}. It should only be used cautiously in selective patients. Domperidone is discontinued in some countries due to its potential adverse effects. Erythromycin is also known to increase gastric motility and can be used in the dose of 40 -250 mg in liquid form up to three times daily before meal for four weeks {8}.

Resistant cases may need interventions such as; decompression and enteral feeding, total parenteral nutrition, and gastric stimulation {9}. Surgical intervention is reserved for refractory causes and procedures such as; surgical enterostomy, gastrostomy, jejunostomy and pyloroplasty can be undertaken.

Conclusion

Gastroparesis or delayed gastric emptying can present with upper gastrointestinal symptoms. It can be confused with gastrointestinal obstruction or gastritis. The symptoms can be worsened by certain diet and medications . Although the incidence of gastroparesis is reported low in the literature, many cases could have been undiagnosed. Gastroparesis should be kept in mind in managing chronic disease patients presenting with upper gastrointestinal symptoms and disease specific dietary advice must be given. Resistant cases can be referred to secondary care for definitive diagnosis where pharmacological, adjuvant and surgical treatment can be considered {10}.

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