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IN THE NAME OF ALLAH,
THE MOST GRACIOUS,
THE MOST MERCIFUL

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About the Journal

Majmaah Journal of Health Sciences

Vision

The Majmaah Journal of Health Sciences shall be an international peer reviewed journal, which intends to serve researchers through prompt publication of significant advances, and to provide a forum for the reporting and discussion of news and issues concerning health sciences.

Mission

To lead the debate on health and to engage, inform, and stimulate the academicians, researchers, and other health professionals in ways that will improve outcomes for patients.

Objectives

To promote research & evidence based practice in health sciences, so that a firm scientific knowledge base is developed, from which more effective practice may be evolved.

To ensure that the results of the research are rapidly disseminated to the practicing clinicians and educators, in a fashion that conveys their significance for knowledge, culture and daily life.

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Editorial

From Editor's Desk…..

We welcome the new Rector Dr. Saleh Al-Mizil, at Majmaah University. He has a background as an extremely experienced Rector. We at Majmaah University are quite excited on his appointment.

Majmaah University center for Covid 19 vaccination was launched to help increasing number of the local population to get vaccinated during this pandemic, this was also to reduce the load on the Ministry of Health main center for vaccine. There was a high number of citizens and residents covered since the launch. It continues to be well managed by the Department of Medical Services. This vaccine center has also helped many students and the University faculty members to get their two doses of mandatory vaccines on time.

The faculty and students are back to college. They continue to maintain wearing of the face mask, social distancing and proper sanitization. There is a constant monitoring of all persons entering their respected buildings by the University security staff who are well equipped by thermals detectors placed right at the entry point. There is a constant monitoring of each lecture halls for making sure that social distancing is beaning maintained.

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Dr.Khalid Mohammed Alabdulwahhab

Editor in Chief

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Original Article :

Adherence To Lifestyle Modifications As A First-Line Therapy In Hypertension Management In Primary Health Care Setting, Medina, Saudi Arabia

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Abstract

Background & Aims:

Adherence to lifestyle management is an essential first-line step in treating hypertension due to its benefits in reducing hypertension, delaying the use of pharmacological medications, and reducing the incidents of complications. The current study aimed to assess the patients' compliance to the use of lifestyle modification, to identify the factors affecting the patients' compliance to the use of lifestyle modifications, and to assess the physician's use of lifestyle modification as first-line management in hypertension

Methods:

This observational cross-sectional study was conducted among randomly chosen participants from 06 June 2020 to 06 July 2020, in Primary health care centers of Medina region. The questionnaire was formulated and designed with a consistent structure and relations between the questions to meet the study goal. All data analyses were performed using SPSS version 21.

Results:

We found that out of the 1569 hypertensive patients, 90.4% had a good level of knowledge towards lifestyle modifications in hypertension management,

الملخص

الخلفية و الاهداف :

تهدف هذه الدراسة الى قياس مستوى التزام مرضى ارتفاع ضغط الدم بتغييرات أسلوب الحياة وما يماثلها من نصائح طبية متعلقة بالسلوك اليومي المساعد على خفض مستوى ضغط الدم. كما تهدف الدراسة بالعثور على العوامل المختلفة المؤثرة على مستوى التزام المرضى. وأيضا تهدف الدراسة بقياس مدى استعمال الأطباء للنصائح المتعلقة بتعديل أسلوب الحياة كجزء أساسي من الخطة العلاجية لمرضى ارتفاع ضغط الدم.

طريقة البحث :

هذه الدراسة هيا دراسة مستعرضة مقطعية على مشاركين تم اختيارهم بشكل عشوائي من تاريخ السادس من شهر خمسة ميلادي لعام ٢٠٢٠ لمدة شهر واحد. المشاركين هم من مراجعي مراكز الرعاية الصحية بمنطقة المدينة المنورة. تم تصميم الاستبيان بشكل متناسق ومترابط بحيث تسهل قراءته وتتمكن الأسئلة من تحقيق هدف الدراسة. كما تم تحليل البيانات باستخدام برنامج متخصص في المجال.

النتائج :

لقد وجنا بأنه من بين الالف ١٥٦٩ مشارك في الاستبيان النتائج التالية. ٩٠,٤٪ كان لديهم مستوى معرفة جيد بالتعديلات المهمة في أسلوب الحياة المساعدة على خفض مستوى ضغط الدم. ٥٤٪ كان لديهم ممارسة جيدة لهذه التغييرات في أسلوب الحياة. و٦٦,٣٪ من الأطباء قاموا بتوفير النصائح والارشادات للوسائل المختلفة لتغيير أسلوب الحياة بشكل يساعد على خفض ضغط الدم.

54.0% had good practice towards lifestyle modifications in hypertension management, and 66.3% of the doctors provided lifestyle modification advice to their patient.

Conclusion:

There is a gap between the level of knowledge and practice towards lifestyle modifications among hypertensive patients, which could be due to cultural, social, and environmental factors. Physician's adherence to prescribing lifestyle modifications was found to be at a moderate level. Multiple health disciplinary efforts are needed to improve compliance to lifestyle modification in hypertensive management.

Keywords:

lifestyle, hypertension, Medina, Saudi Arabia, management.

الخلاصة :

بينت الدراسة بان معرفة المرضى بطرق تغيير أسلوب الحياة للخفض من مستوى ضغط الدم (٩٠,٤٪) اعلى من ممارستهم لها (٥٤٪). هذا الفرق قد يكون ناتجا لعوامل اجتماعية وثقافية وبيئية مختلفة. معدل ممارسة الأطباء للتوصية بتغيير أسلوب الحياة لمرضى ارتفاع ضغط الدم كان منخفضا بالمقارنة لدراسات أخرى مشابهة. نحتاج الى بذل جهود من عدة مجالات في القطاع الصحي للتحسين من التزام مرضى ارتفاع ضغط الدم بتغيير سلوكيات الحياة اليومية.

الكلمات المفتاحية:

أسلوب الحياة، ارتفاع الضغط، المدينة المنورة، السعودية، الخطة العلاجية

Introduction

Adherence to lifestyle management is an important first-line step in hypertension management due to its benefits in reducing hypertension (HTN) and delaying or avoiding the use of pharmacological medications [1]. It can also play a major role in reducing the incidence of complications related to hypertension, such as atherosclerosis and stroke [1].

Lifestyle modifications are recommended for individuals with above optimal blood pressure, they are used as a first-line therapy or initial step for management of patients diagnosed with stage [1] of hypertension [2]. For patients who are treated with antihypertensive agents, they are used as adjunctive therapy along with modifications [2]. These modifications include weight reduction, dietary reduction of sodium intake, reduction of alcohol consumption, and following a Dietary Approaches to Stop Hypertension (DASH) diet.

Modifying a patient's lifestyle can play a major role in the management of hypertension and lower the incidence of complications [1]. Weight reduction can decrease Systolic Blood Pressure (SBP) by 5-20mmHg/10Kg [1]. Adapting the (DASH) diet can lower SBP by 8-14mmHg. Reducing dietary salt intake can lower SBP by 2-8mmHg. Limiting alcohol intake can lower SBP by 2-4 mmHg [1]. Maintaining aerobic exercises for 30 minutes/day can

lower SBP by 4-9mmHg [1]. With the provided benefits of cheap, easy, and simply adaptable lifestyle modifications, the use of pharmacological medications can be minimized or delayed. Following these steps would reduce the occurrence of many problems associated with polypharmacy and spread the culture of having a healthy lifestyle in the community [1].

According to multiple studies, population between 15-24 years has a HTN prevalence of 3.2%, those aged between 55-64 years has a prevalence of 51.2%, and up to 70% among the individuals above the age of 65 and older [3]. The prevalence among men is 28.6% and 23.9% among women [4]. In addition, 15.2% of adults in Saudi Arabia are hypertensive, 57.8% of those adults were unaware of their diagnosis and 78.9% of those who are aware of their diagnosis reported compliance with their medication[5]. We need to find out whether patients adhere to lifestyle modifications or not. We also need to determine the main factors and pitfalls to why some patients do not adhere to lifestyle modifications and which modifications are difficult to adhere to and why? By achieving this, we can assist healthcare providers in developing targeted self-management educational programs for people with hypertension. Covering these factors will ensure more success in enhancing the use of lifestyle modifications as the first-line management in hypertension.

This study aims to detect the adherence of hypertensive patients to lifestyle modifications in the management of their hypertension in Medina, Saudi Arabia. And to assess the adherence of primary care physicians to prescribing lifestyle modifications. We hope that this will help in guiding future studies, guidelines, or protocols related to the management of hypertension.

Materials and methods:

Study Setting:

Medina is a province in western Saudi Arabia along with the Red Sea coast. It has a population of 2,239,923 according to the 2019 census. It is the third-largest region in the Kingdom in terms of surface area and is the fifth largest in terms of population [6].

Study design:

This is an observational cross-sectional study. Data collection was conducted from June 06, 2020, to July 06, 2020. We used convenient sampling method and the target population consisted of 2,239,923 people living in Medina Region. The sample size was calculated to be 1561 with a 95% confidence level and 2.48% margin of error. We included 1569 participants for data analysis who met our inclusion criteria.

Data Collection:

An online questionnaire was given to experienced data collectors with a background

in the medical field who in their turn used different social media platforms to find eligible participants and interview them.

Inclusion criteria: Patients with primary hypertension, aged 18 years and above, both sexes, who were being followed up by a family physician at PHC clinics.

Exclusion criteria:

Patients who have secondary hypertension and patients who were diagnosed or followed up at a secondary or tertiary care hospitals.

Variables:

The questionnaire was formulated and designed with a consistent structure and relations between the questions to meet the study goal. It contains four main sections, the first section contains demographic data (gender, age, nationality, occupation status, residency, and educational level). The second section includes the current management plan of the patients, the compliance, and complications. The third section includes the patient's awareness about the health benefits of lifestyle management and the doctor's adherence to providing lifestyle modification advice. The last section assesses the adherence to non-pharmacological and pharmacological management of high blood pressure.

The criteria for awareness about lifestyle modifications in hypertension management were drawn from 5 questions designed on a five-grade scale starting from 0–5 points which generally means that the higher the score, the higher the awareness toward lifestyle modifications in hypertension management.

Meanwhile, the criteria for the knowledge toward hypertension control and the knowledge provided by the doctor were drawn from 5 questions and 3 questions, respectively, and had been presented in Table 2. Each question has a response of "yes" coded as 1 and "no/I don't know" coded as 0. The total score was generated by adding all questions related to the knowledge toward HTN control and related to the knowledge provided by the doctor. The total score of the knowledge toward HTN control has a score range from 0–5 points while the knowledge provided by the doctor has a score range of 0–3 points which generally means that the higher score, the higher the knowledge toward HTN control and information provided by the doctor. We used the mean score as the cut off points to determine the level of knowledge. A score above the mean was considered as good knowledge and a score equal to or below the mean was considered as poor knowledge.

Statistical Analysis:

Quantitative data are presented using means, Standard Deviation (SD), and median (min-max) as appropriate. Qualitative

data are presented using counts and proportions (%). In comparisons, the Chi-square test, Mann-Whitney U test, and Kruskal Wallis test were applied. Normality tests were conducted using the Shapiro-Wilk test as well as the Kolmogorov-Smirnov test. The data follow an abnormal distribution. Thus, non-parametric tests were applied. Furthermore, the correlation between the knowledge and practices score was also performed to determine each linear relationship. A p-value of <0.05 (two-sided) was used to indicate statistical significance. All data analyses were performed using the statistical package for social sciences, version 21, Armonk, New York, IBM Corporation, USA.

Ethical Consideration:

A statement of ethical approval has been granted by the Scientific Research Ethics committee at Taibah University with the number (IORG0008716 – IRB00010413).

Results:

We included 1569 hypertension patients who fulfilled our inclusion criteria. Among them, 91.8% were Saudi and 8.2 were non-Saudi. Majority of the participants were female (61.4%). Most of them were in the age group 41–60 years (54.7%), 27.1% of the patients were under 40 and 18.3% were older than 60.

Regarding the level of education, 59% of the participants had a degree of higher education. 35% had a secondary school degree and 6% were illiterate. Employees represented 36.5% of participants, while 28% were housewives, 23.2% of the participants were retired, and 8.5% were students as shown in Table 1.

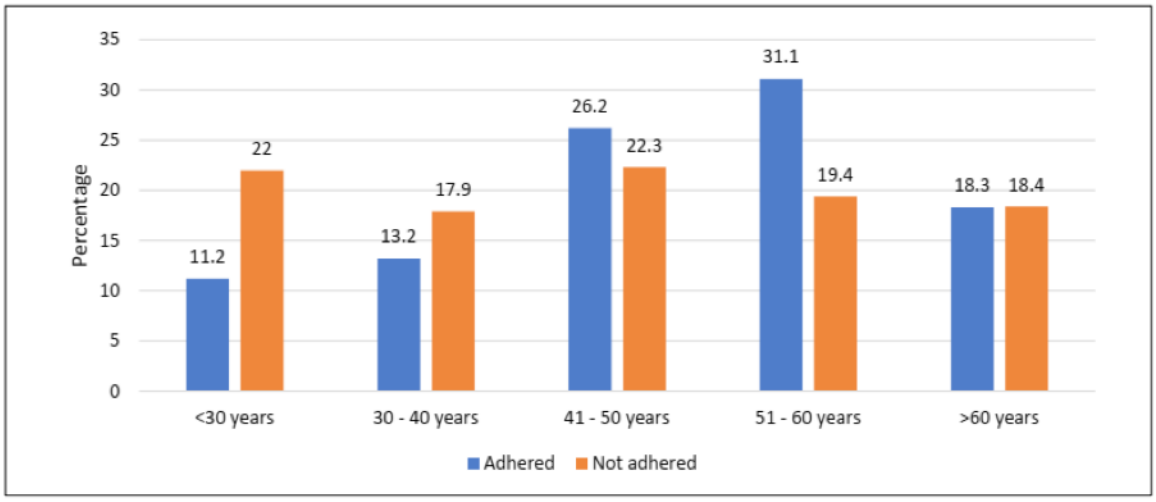
Table 1: Sociodemographic characteristics of patients (n=1569)

Study data	Overall N (%)
Age group	
<30 years	205 (13.1%)
30 – 40 years	220 (14.0%)
41 – 50 years	401 (25.6%)
51 – 60 years	456 (29.1%)
>60 years	287 (18.3%)
Gender	
Male	606 (38.6%)
Female	963 (61.4%)
Nationality	
Saudi	1440 (91.8%)
Non-Saudi	129 (08.2%)
Educational level	
High school or below	643 (41.0%)
University degree or higher	926 (59.0%)
Occupational status	
Unemployed	61 (03.9%)
Housewife	439 (28.0%)
Employed	572 (36.5%)
Retired	364 (23.2%)
Student	133 (08.5%)

HBP - High blood pressure.

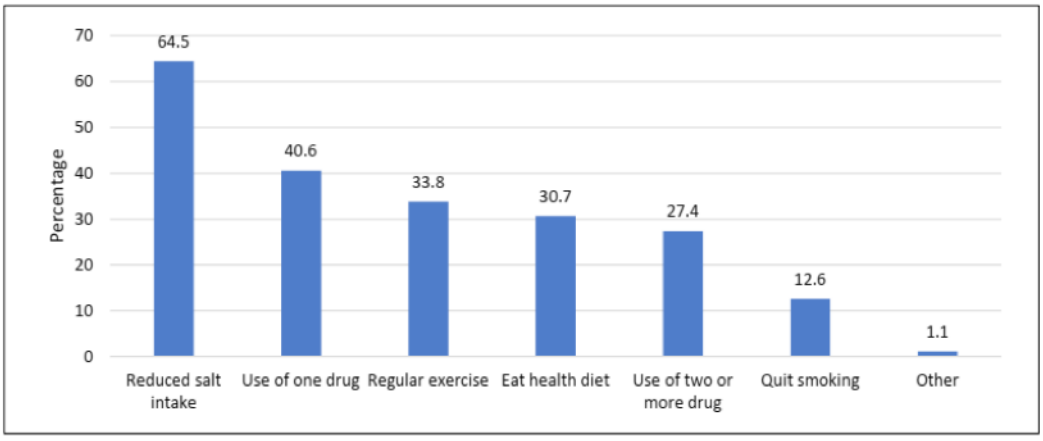
Figure 1 shows that the age group 51–60 years old (31.1%) followed more advice from the doctor regarding lifestyle management of HBP than the other age groups while the advice to the <30 years old group was significantly less (11.2%). Figure 2

Figure 1: Comparison between age groups regarding adherence to physician's advice in lifestyle management



shows different ways to control blood pressure. It was found that the most commonly known ways to control blood pressure were reducing salt intake (64.5%), followed by the use of one drug (40.6%) and regular exercise (33.8%) while the least of them was to quit smoking (12.6%). Table 2 shows the assessment of knowledge toward lifestyle modifications in hypertension management and the knowledge provided by the doctor. It was shown that nearly all patients were aware that eating healthy food and reducing salt intake could help in controlling HBP (89.7% and 92.9%, respectively). Also, 86% and 88.1% were aware that weight reduction and regular exercises could further help in regulating HPB. 93.5% agreed that reducing exposure to stress levels could also help in controlling HBP.

Figure 2: level of knowledge about the different methods of controlling blood pressure



With regards to the knowledge provided by the doctor, 73.2% reported that their

(Table 2: Assessment of knowledge toward hypertension control and the knowledge provided by the doctor (n=1569

Knowledge toward controlling HTN	**Yes (%)**
1.Is having a healthy diet an important factor in controlling HBP?	1408 (89.7%)
2. Do you consider reducing dietary salt intake as a factor in controlling HBP?	1458 (92.9%)
3. Do you believe that losing weight might help in controlling hypertension?	1350 (86.0%)
4. Do you consider regularly exercising a factor in controlling HBP and preventing its complications?	1382 (88.1%)
5. Is controlling stress levels and reducing exposure to stressors a factor in controlling HBP?	1467 (93.5%)
Knowledge provided by the doctor	
1. Did the doctor provide general information about HBP?	1149 (73.2%)
2. Has your doctor provided you with information about the first line management of HBP?	1103 (70.3%)
3. Did you do a trial of LSM with your doctor to lower your blood pressure at the start without using drugs?	654 (41.7%)

LSM – Lifestyle Modification.

doctor provided them with the general information about HBP, 70.3% indicated that their doctor provided them with information regarding the non-pharmacological treatment options to control HBP, while participation in a trial to lower down blood pressure before taking medication was lacking (41.7%).

According to the results of the assessment of practice toward hypertension management 24.9% had tried to take the recommended daily fiber intake all the time. However, the majority only did it sometimes (56%). Also, 54.7% of the participants were exercising some time, while 19.2% exercised regularly. Besides, 71.4% of the patients had attempted to lose weight while 74.6% had tried to manage their stress levels.

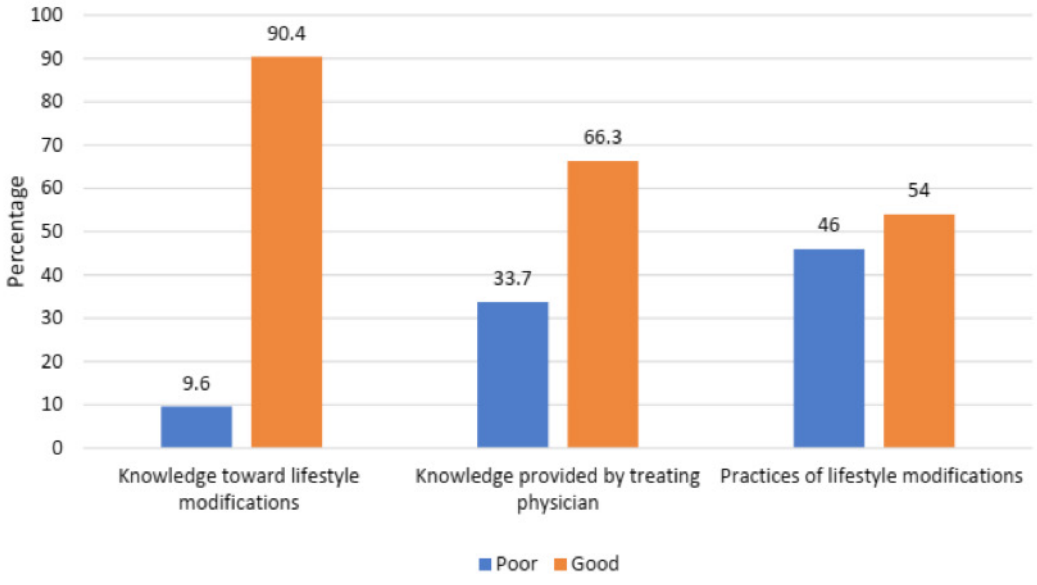
The descriptive statistics of the knowledge and practices toward lifestyle modifications in HTN management have been described in Fig. 3. and Table 3. Based on the results, it was found that the score of knowledge towards lifestyle modifications was 3.57 (SD 0.75) out of 5 points. Poor and good practice were identified among 9.6% and 90.4% of patients, respectively. In regard to the knowledge provided by the doctor; the mean score was 1.85 (SD 1.08) out of 3 points. Out of this score, 33.7% and 66.3% were classified into a poor and good level respectively. Finally, with regards to the practice of lifestyle modifications in HTN management, the mean score was 3.45 (SD 1.55) out of 6 points. 46% and 54% were classified as poor and good levels of practices towards HTN control, respectively.

When measuring the association between the knowledge toward lifestyle modification in HTN control and the practices toward lifestyle modification in HTN control

(Table 3: Descriptive statistics of the knowledge and practices regarding hypertension management and compliance (n=1569)

Variables	N (%)	Mean ± SD	Median (min-max)
Knowledge toward lifestyle modifications in hypertension management score	--	3.57 ± 0.75	4 (0 – 5)
Level of knowledge toward lifestyle modifications in hypertension management control			
Poor	150 (09.6%)	--	--
Good	1419 (90.4%)	--	--
Knowledge provided by the doctor score	--	1.85 ± 1.08	2 (0 – 3)
Level of knowledge provided by the doctor			
Poor	529 (33.7%)	--	--
Good	1040 (66.3%)	--	--
Practices toward lifestyle modifications in hypertension management score	--	3.45 ± 1.55	4 (0 – 6)
practice toward lifestyle modifications in hypertension management			
Poor	721 (46.0%)	--	--
Good	848 (54.0%)	--	--

Figure 3: Level of knowledge towards lifestyle modifications, knowledge provided by the treating physician, and practice of lifestyle modifications (Data provided as %)



in relation to the socio- demographic characteristics of the patients, we found that being older than 50 years (P-value 0.021), having a high school degree (P-value <0.001), or being unemployed (P-value <0.001) are all significant factors that might decrease one's practices towards lifestyle modification in HTN control as shown in Table 4.

Table 4: Statistical difference between the knowledge toward lifestyle modification in HTN Control and the practices toward lifestyle modification in HTN control in relation to the Sociodemographic characteristics of patients

Factor	Knowledge toward lifestyle modification in HTN Control		Practices toward lifestyle modification in HTN control	
	Total Score (4) Mean ± SD	F/T test; P-value	Total Score (6) Mean ± SD	F/T test; P-value
Age group [a]				
≤50 years	3.61 ± 0.71	T=2.362; 0.021 **	3.68 ± 1.53	T=6.284; <0.001 **
>50 years	3.52 ± 0.78		3.19 ± 1.54	
Gender [a]				
Male	3.53 ± 0.79	T=0.125; 0.153	3.49 ± 1.54	T=0.857; 0.432
Female	3.59 ± 0.72		3.42 ± 1.57	
Nationality [a]				
Saudi	3.58 ± 0.74	T=1.751; 0.085	3.47 ± 1.55	T=1.891; 0.034 **
Non-Saudi	3.46 ± 0.84		3.20 ± 1.54	
Educational level [b]				
High school or below	3.44 ± 0.82	T=-5.900; <0.001 **	3.05 ± 1.56	T=-8.613; <0.001 **
University or higher	3.66 ± 0.68		3.72 ± 1.49	
Occupational status [a]				
Unemployed	3.49 ± 0.79	F=12.186; <0.001 **	3.27 ± 1.55	F=13.509; <0.001 **
Employed	3.65 ± 0.69		3.69 ± 1.46	
Student	3.73 ± 0.59		3.58 ± 1.83	

a P-value has been calculated using Mann Whitney U test.

b P-value has been calculated using the Kruskal Wallis test.

** Significant at p<0.05 level.

Discussion:

Our study investigated the level of practice of lifestyle modifications (LSM) and the physician's adherence to giving LSM advice as a part of HTN management. We found that 90.4% of our study population had good knowledge of LSM in HTN management, while 54.0% had a good level of practice towards LSM in HTN management. Nonetheless, studies in Eastern and Southern Ethiopia showed a higher level of knowledge with a poor practice level regarding LSM in HTN management [7,8]. A study in Kuwait also reported, that more than 60% of their participants didn't adhere to LSM advice [9]. In Addis Ababa, a study found that only 23% adhered to LSM [10]. Some of the studies that were held in Ethiopia [11] and Nigeria [12] found that more than 50% of their subjects had a good knowledge level of LSM in HTN management which is in line with the results of our study. On the other hand, a study held in Egypt showed that only 8.9% had a good level of knowledge about LSM [13].

Among the population of our study, people who were 50 years or less had better knowledge and practice towards LSM

than people aged more than 50 years, this is contrary to the findings of the Ethiopian study which found that practice towards LSM among the old age population is six times higher than the younger age groups [10]. This could be dependent on the other covariates and the demographical differences between people living in Saudi Arabia and Ethiopia. However, we believe that more access to online information and better flexibility of adapting new habits made it easier for younger age groups to have a better practice of LSM.

The results showed that employed people had a better practice of LSM as compared to the unemployed individuals and students, while students had better knowledge than employed and unemployed people. This also can be viewed in the Ethiopian study where they noticed that employed respondents were better at adhering to LSM [10].

People with a university degree or higher education were found to have better knowledge and adherence to LSM than people with a high school degree or below. These findings are consistent with the study that was done in Taif [14]. These results can be an indication that the higher the educational level, the better the knowledge about the importance of LSM in managing hypertension.

When patients were surveyed about how they manage their hypertension, (64.5%) reported that they are reducing dietary salt intake as a non-pharmacological measure to control hypertension, while (33.8%) used regular exercise to manage their hypertension. This can be compared with a study done in Baltimore, United States, where they found that 75% of participants reported that they reduced their salt intake, and nearly 50% committed to regular exercise [15]. In Saudi Arabia, a systematic review of inactivity prevalence conducted in the year 2018 found that most Saudi children, youth, and adults were not active enough to meet the recommended guidelines [16].

It is clear that the number of participants who exercise regularly to manage their high blood pressure is low, therefore, primary health care physicians should emphasize the importance of physical activity as an essential method to control hypertension and prevent its complications.

The gap between knowledge and practice could be explained by cultural and environmental factors, such as excessive social events, increased dependency on maids/servants and cars which lead to decreased daily activities. Also, lack of time, easier accessibility, and lower cost of fast food compared with healthier options in addition to long summers. These factors are like those found in a study held in Kuwait[9].

When patients were asked about physi-

cians' prescription of LSM, 66% of our sampled group had a good level of knowledge provided to them by a doctor which is low in comparison with a study held in Asser, and another held in Nigeria where most physicians (more than 80%) prescribed LSM [17,18].

Our study derives its mains strengths from the large sample size. We used online questionnaire to collect the data that reduced the chances of data encoding errors. The questionnaire used is also a reliable tool to collect data since the questions were standardized in their phrasing to provide easier understanding for participants. This study is limited to the PHC setting and PHC-related healthcare specialties. So, the results cannot be generalized to settings or specialties. The study methodology involves self-reported measures which are highly dependent on the participant's memory and recall bias may occur.

Conclusion:

There is a higher level of knowledge (90.4%) than practice (54.0%) towered lifestyle modifications among hypertensive patients. This gap could be due to cultural, social, and environmental factors. Most of the participants can manage their hypertension non-pharmacologically by reducing salt intake. Physician's adherence to prescribing lifestyle modifications was low in comparison to other studies. Multiple health disciplinary efforts are needed to improve adherence to lifestyle modification in hypertensive management.

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Original Article :

Comparing Prevalence of Irritable Bowel Syndrome among Medical Sciences Students in Qassim, Saudi Arabia

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Abstract

Background & Aims:
This study aimed to measure the prevalence of Irritable Bowel Syndrome (IBS) among medical sciences students and differences in the prevalence with respect to specialty.

Methods:
A cross-sectional study was conducted on a sample of 271 medical field students (medicine, pharmacy, nursing, applied medical sciences, and dentistry students) in Qassim, Saudi Arabia. A self-administered Rome IV questionnaire was used for data collection. Data were analyzed using the statistical package for the social sciences (SPSS) version 21.0.

Results:
About 14.8% of the respondents had chronic health problems, (35.8%) have a positive family history of IBS, and (29.9%) enrolled in the college of medicine. We found that the overall prevalence of IBS was 20.5% among medical field students, with the highest (31.4%) of nursing followed by medical and dental 28.4%, 27.1%, respectively. The lowest prevalence (5.5%) was among applied medical sciences stu-

الملخص

الخلفية و الاهداف :
تهدف هذه الدراسة الى قياس نسبة مرض القولون العصبي بين طلاب وطالبات الكليات الصحية في منطقة القصيم.

طريقة البحث :
دراسة مقطعية شملت ٢٧١ طالب وطالبة من الكليات الصحية في القصيم. تم استخدام استبيان ROME IV لجمع البيانات وتم تحليلها عن طريق برنامج SPSS.

النتائج :
١٤.٨٪ من المشاركين كان لديهم مشاكل صحية مزمنة، ٣٥.٨٪ لديهم تاريخ عائلي للقولون العصبي و٢٩.٩٪ من المشاركين كانوا من طلاب وطالبات كلية الطب البشري. وجدنا في هذه الدراسة ان ٢٠.٥٪ من المشاركين في هذه الدراسة مصابين بالقولون العصبي، ٣١.٤٪ منهم كانوا من كلية التمريض يليهم كلية الطب (٢٨.٤٪) وطب الاسنان (٢٧.١٪)، وأقل نسبة (٥.٥٪) كانت بين طلاب وطالبات كلية العلوم الطبية التطبيقية. بالإضافة الى أن ٤٢.٥٪ من الطلاب والطالبات المشاركين في هذه الدراسة لديهم أمراض مزمنة و٢٩.٩٪ لديهم تاريخ عائلي للقولون العصبي. ٣٣.٣٪ من المدخنين و١٦.١٪ من الطلاب الذين يحصلون على ساعات نوم تزيد عن ٨ ساعات تم تشخصيهم بالقولون العصبي. وجدنا ان التاريخ العائلي ومجال الدراسة من أقوى العوامل المساهمة في التشخيص في القولون العصبي.

الخلاصة:

dents. In addition, (42.5%) of students with chronic diseases, 29.9% of students with a family history of IBS, (33.3%) of smokers students, and (16.1%) of students who sleep more than eight hours have been diagnosed with IBS. Family history of IBS and field of study were significant predictors of IBS among medical field students.

Conclusion:

The prevalence of IBS in medical sciences students was found to be high. This calls decision-makers to control this problem by developing strategies to detect, treat, and prevent IBS. Further large-scale studies are required to generalize the findings.

Keywords:

IBS; Medical sciences; ROME IV; Students; Saudi Arabia

نسبة طلاب وطالبات الكليات الصحية في القصيم المصابين بالقولون العصبي عالية. هذا يمكن المسؤولون من المساهمة بالتقليل من الاعداد المصابة في المستقبل عن طريق الحماية من الإصابة ومعالجة المصابين. وأيضا هناك حاجة لدراسات أخرى مستقبلية في هذا الموضوع للمساعدة بالوقاية والعلاج منه.

الكلمات المفتاحية:

القولون العصبي، الكليات الصحية، ROME IV، طلاب وطالبات، المملكة العربية السعودية.

INTRODUCTION

Irritable bowel syndrome (IBS) is a chronic functional disorder that affects the large intestine[1]. IBS affects 10-20% of the general population, with only 15% seeking medical care[2]. In addition, 5% or more visits to general practitioners and 20-50% of referrals to gastroenterologists are due to IBS-related complaints[3].

Studies in the general population have reported varying prevalence of IBS[4-6]. Similarly, a wide variation in the prevalence of IBS among medical students has been reported. Studies from other countries and Saudi Arabia have reported prevalence of IBS among medical students with a range from 12.6% to 38%[7-13].

All these studies have focused only on medical students, and none of them has compared prevalence across different specialties within medical sciences. Differences in curriculum, stress levels, number of bachelor years, and population characteristics associated with each of the specialties may lead to differences in IBS risk among students in these fields, thus affecting the prevalence. This study aimed to estimate and compare the prevalence of irritable bowel syndrome among medical sciences students in the Qassim region of Saudi Arabia.

METHODS

Study design and population:

This was a cross-sectional study among

medical colleges (Medical schools, nursing, applied medical sciences, pharmacy, and dentistry colleges) in the Qassim region, Saudi Arabia. Medical sciences students (medicine, pharmacy, nursing, applied medical sciences, and dentistry students) enrolled in participating institutes.

Sample size:

The sample size was calculated using the Open Epi online sample size calculator. The prevalence of IBS among medical students has been reported to be 13.7% in the Qassim region in a previous study [11]. We used this as expected prevalence for our sample size calculations. At 95% confidence level and 5% margin of error, the calculated sample size was 182. We further applied a design effect of 1.5 to account for non-random sampling. The final sample required was 273 medical sciences students (medicine, pharmacy, nursing, applied medical sciences, and dentistry students).

Sampling procedure:

A convenience sampling strategy was used to enroll potential participants. Medical field students currently enrolled in medical, nursing, applied medical sciences, pharmacy, and dentistry colleges in the Qassim region eligible to participate in the study. We approached batch leaders of different specialties in different years via WhatsApp groups, and they helped in disseminating the questionnaire.

Data collection:

Data was collected using a self-administrating questionnaire distributed online to the potential participants. The questionnaire had two sections. The first question had variables related to personal and clinical information, i.e., age, gender, marital status, current parents' status, Family history of IBS, chronic health problems, food allergies, daily sleeping hours, smoking status, regular exercise, Grade Point Average (GPA), specialty and year of studying. The second section consisted of a Rome IV questionnaire for adults. Rome IV questionnaire is a validated tool and has been used in various studies[12, 14].

Data analysis:

Data was downloaded as an excel sheet and exported to SPSS version 21.0 for analysis. Variables in Rome IV were coded, and sum scores were calculated according to the standard guidelines of the tool. Descriptive analysis was carried out to estimate frequencies and proportions, and prevalence of IBS. A Chi-square test was used to compare the prevalence among categories of personal and clinical variables. Logistic regression analysis was done to assess the association of IBS with specialty and other factors. Variables with a p-value less than 0.2 in the univariate analysis and biologi-

cal plausibility were included in the multivariate models regardless of statistical significance. Variables in the final model were retained based on changes in -2log likelihood ratios. Crude and adjusted odds ratio (OR) along with associated 95% confidence intervals (CIs) were calculated.

Ethics:

The study proposal was reviewed and approved by the subcommittee of Health Research Ethics, Deanship of Scientific Research, Qassim University. Permission for data collection was sought from the administration of participating institutes. Informed consent was obtained from all the participants. Confidentiality of the participants was maintained at all levels, and no personal identifier was obtained.

RESULTS

A total of 271 medical sciences students participated and completed the questionnaire. Socio-demographic characteristics of medical and allied health sciences students are presented in Table 1.

Table 1: Socio-demographic characteristics of medical sciences students in Qassim, Saudi Arabia (n=271)

Variable	N	%
Age		
Up to 22 years old	105	38.7
Older than 22 years old	166	61.3
Gender		
Male	89	32.8
Female	182	67.2
Marital Status		
Single	250	92.3
Married	21	7.7
Parents status		
Living together	219	80.8
Not living together	52	19.2
Chronic health problems		
Yes	40	14.8
No	231	85.2
Sleep hours		
More than 8 hours	137	50.6
Less than 8 hours	134	49.4
Smoking		
Smokers	36	13.3
Nonsmokers	235	86.7
Exercise		
Yes	77	28.4
No	194	71.6
Food Allergies		
Yes	41	15.1
No	230	84.9
GPA		
More than 3.75	192	70.8
Less than 3.75	79	29.2
Family History of IBS		
Yes	97	35.8
No	174	64.2
Specialty		
Medicine	81	29.9
Pharmacy	52	19.9
Dentistry	48	17.7
Nursing	35	12.9
Applied medical sciences	55	20.3
Year		
1st	17	6.3
2nd	35	12.9
3rd	29	10.7
4th	45	16.6
5th	43	15.9
6th (intern)	102	37.6

About 14.8% of the respondents had chronic health problems, (35.8%) have a positive family history of IBS, and (29.9%)

enrolled in the college of medicine. About 14.8% of the respondents had chronic health problems, (35.8%) have a positive family history of IBS, and (29.9%) enrolled in the college of medicine.

We found that the prevalence of IBS was 20.5% among medical field students; 28.4% of medical, 11.5% of pharmacy, 27.1% of dentistry, 31.4% of nursing, 5.5% of applied medical sciences students. In addition, (42.5%) of students with chronic diseases, 29.9% of students with a family history of IBS, (33.3%) of smokers students, and (16.1%) of students who sleep more than eight hours have been diagnosed with IBS. Around (31.4%) of nursing students, (28.4%) of students who are enrolled in the college of medicine and (17.6%) of interns have been diagnosed with IBS. Table 2 shows the association of the prevalence of IBS with the socio-demographic characteristics.

Table 2: Comparison of IBS prevalence with respect to socio-demographic characteristics among medical sciences students in Qassim, Saudi Arabia (n=271)

Variable	IBS (no)	IBS (yes)	p-value
	n (%)	n (%)	
Age			
Up to 22 years old	87 (82.9)	18 (17.1)	0.255
Older than 22 years old	128 (77.1)	38 (22.9)	
Gender			
Male	67 (75.3)	22 (24.7)	0.249
Female	148 (81.3)	34 (18.7)	
Marital Status			
Single	198 (79.2)	52 (20.8)	0.849
Married	17 (81)	4 (19)	
Parents status			
Living together	177 (80.8)	42 (19.2)	0.215
Not living together	38 (73.1)	14 (26.9)	
Chronic health problems			
Yes	23 (57.5)	17 (42.5)	<0.001
No	192 (83.1)	39 (16.9)	
Sleep hours			
More than 8 hours	115 (83.9)	22 (16.1)	0.058
Less than 8 hours	100 (74.6)	34 (25.4)	
Smoking			
Smokers	24 (66.7)	12 (33.3)	0.044
Non smokers	191 (81.3)	44 (18.7)	
Exercise			
Yes	65 (84.4)	12 (15.6)	0.193
No	150 (77.3)	44 (22.7)	

Variable	IBS (no)	IBS (yes)	p-value
	n (%)	n (%)	
Food allergies			
Yes	26 (63.4)	15 (36.6)	0.006
No	189 (82.2)	41 (17.8)	
GPA			
More than 3.75	153 (79.7)	39 (20.3)	0.824
Less than 3.75	62 (78.5)	17 (21.5)	
Family History of IBS			
Yes	68 (70.1)	29 (29.9)	0.005
No	147 (84.5)	27 (15.5)	
Specialty			
Medicine	58 (71.6)	23 (28.4)	
Pharmacy	46 (88.5)	6 (11.5)	
Dentistry	35 (72.9)	13 (27.1)	
Nursing	24 (68.6)	11 (31.4)	0.002
Applied medical sciences	52 (94.5)	3 (5.5)	
Year			
1st	13 (76.5)	4 (23.5)	
2nd	27 (77.1)	8 (22.9)	
3rd	25 (86.2)	4 (13.8)	
4th	35 (77.8)	10 (22.2)	
5th	31 (72.1)	12 (27.9)	0.695
6th (intern)	84 (82.4)	18 (17.6)	

Table 3: Factors associated with IBS among medical sciences students in Qassim, Saudi Arabia (n=271)

Characteristic	Univariate		Multivariate	
	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Gender				
Male	1	0.250	1	0.163
Female	0.70 (0.38 - 1.29)		0.60 (0.29 – 1.22)	
Age				
Up to 22 years	1	0.256		-
Older than 22 years	1.43 (0.76 – 2.67)		-	
Marital Status				
Single	1	0.849		-
Married	0.89 (0.28 – 2.77)		-	
Parents status				
Living together	1	0.217	1	0.374
Not living together	1.55 (0.77 – 3.12)		1.46 (0.63 – 3.40)	

Characteristic	Univariate		Multivariate	
	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Chronic health problems				
No	1	<0.001	1	<0.001
Yes	3.64 (1.78 – 7.44)		3.53 (1.44 – 8.63)	
Sleep hours				
More than 8 hours	1	0.060	1	0.083
Less than 8 hours	1.77 (0.97 – 3.23)		1.82 (0.92 – 3.60)	
Smoking				
Non-smokers	1	0.048	1	0.059
Smokers	2.17 (1.00 – 4.67)		2.47 (0.96 – 6.34)	
Exercise				
Yes	1	0.196		-
No	0.62 (0.31 – 1.26)		-	
Food allergies				
No	1	0.008	1	0.137
Yes	2.65 (1.29 – 5.46)		1.97 (0.80 – 4.83)	
GPA				
More than 3.75	1	0.824		-
Less than 3.75	0.93 (0.48 – 1.76)		-	
Family History of IBS				
No	1	0.006	1	0.030
Yes	2.32 (1.27 – 4.22)		2.13 (1.07 – 4.24)	
Specialty				
Applied medical sciences	1		1	
Medicine	6.87 (1.95 – 24.23)	0.003	8.20 (1.91 – 35.18)	0.005
Pharmacy	2.26 (0.53 – 9.55)	0.267	2.52 (0.47 – 13.47)	0.280
Dentistry	6.43 (1.70 – 24.25)	0.006	10.17 (2.26 – 45.84)	0.003
Nursing	7.94 (2.02 – 31.11)	0.003	11.63 (2.43 – 55.50)	0.002
Year				
6th (intern)	1		1	
1st	1.43 (0.41 – 4.91)	0.565	1.11 (0.26 – 4.79)	0.883
2nd	1.38 (0.54 – 3.53)	0.499	1.65 (0.50 – 5.45)	0.410
3rd	0.74 (0.23 – 2.41)	0.625	0.74 (0.19 – 2.83)	0.670
4th	1.33 (0.56 – 3.17)	0.516	0.84 (0.29 – 2.40)	0.752
5th	1.80 (0.78 – 4.17)	0.167	1.13 (0.39 – 3.24)	0.811

In the univariate analysis, we found that chronic health problems, food allergies, family history of IBS, smoking status, and specialty were significantly associated with IBS. In the multivariate analyses, chronic health problems adjusted odds ra-

tio (aOR) 3.53 (95% CI: 1.44 – 8.63) and family history of IBS aOR 2.13 (95% CI: 1.07 – 4.24) were significant predictors of IBS. The specialty was found to be significantly associated with the risk of IBS; nursing aOR 11.63 (95% CI: 2.43 – 55.50), dentistry aOR 10.17 (95% CI: 2.26 – 45.84), and medicine aOR 8.20 (95% CI: 1.91 – 35.18).

DISCUSSION

This study is one of the few studies from KSA to assess the burden of IBS and its association with medical sciences specialties. We found that 20.5% of students had IBS. This is more than the reported prevalence of IBS among medical students in the Qassim region, which was 13.7% [11]. Our estimate is also higher than reports from other regions of Saudi Arabia, 15.5% to 18%[9, 12]. Prevalence among medical students in our study 28.4% is comparable to a study from Jeddah 31.8%[10] and a national level study which showed prevalence among medical students to be 31.9%[15]. Our results are also comparable to estimates from Pakistan, where about 26% - 28% of the medical students were found to have IBS while higher than Iran 12.6%[7, 8, 16]. These variations in the studies could be explained partially by the differences in tools used for the assessment of IBS. Other reasons for the higher prevalence in our study could be the inclusion of different specialties other than medicine.

Although the literature suggests that females are at higher risk of IBS than males[17]. A study of IBS among medical students in Beijing, China, showed that female students were twice more likely to suffer from IBS than males18. Some studies from Saudi Arabia have also demonstrated a significant association of female gender with a higher risk of IBS[10, 15]. Contrary to this, 24.7% of male students and 18.7% of female students had IBS in our study. This difference, however, was not significant. This finding is similar to other studies on medical students and school teachers in Qassim region[4, 11]. Although Saudi females have started to be involved in all work fields, males still have more financial responsibility, which makes them more susceptible to stress. This variation in the association of gender with IBS could also be explained in terms of socio-economic and cultural differences in different regions of Saudi Arabia. Although many studies support that exercise[11] and GPA[5] are significantly associated with IBS, in our study, we found that there is no significant association of exercise and GPA with IBS.

In this study, 36.6% of students with food allergies have IBS, while 17.8% of students without food allergies have IBS. However, in the multivariate analysis, food allergy

was not significantly associated with IBS. This finding is consistent with a study from Jeddah[10].

Although some studies showed no relation between sleep hours and prevalence of IBS, in this study, 25.4% of students who sleep < 8 hours are diagnosed with IBS, while only 16.1% of students who sleep > 8 hours are diagnosed with IBS. This, however, was not significant in the multivariate analysis. Other studies have reported an inconsistent relationship between sleep hours and IBS[10, 15]. Since genetic factors may play a role in the pathophysiology of IBS, many studies showed that having a positive family history of IBS increases the risk of developing the disease[15, 19]. We also found a significant association of family history of IBS with IBS.

Having chronic health problems was found to be significantly associated with IBS in our study. This is similar to a study of the prevalence of IBS among medical students conducted in the Qassim region, Saudi Arabia[11]. On the other hand, studies conducted among medical students and nurses in Jeddah, Saudi Arabia, showed that chronic health problems are not significantly associated with IBS[10].

As expected, students who have their parents divorced or dead (either one or both) have a higher prevalence of IBS (26.9%) compared to students whose parents live together. However, this difference was not significant. A finding contrasting other studies from Saudi Arabia where those living away from parents and family were at higher risk of IBS[10, 15]. We did not find a significant association between smoking and IBS, a finding similar to other study on medical students in Jeddah[10].

In this study, we found a significant association of specialty with the risk of IBS. Compared to applied health sciences, those in nursing, dentistry, and medicine were at higher risks of IBS. A study among undergraduate students in Saudi Arabia also showed that those in the medical field are about seven times higher risk of IBS than non-medical[15]. Stress is a very well-known risk factor of IBS[10, 19]. Those in the medical and nursing field may be exposed to higher stress and anxiety levels because of their curriculum and requirements[16]. This is an important finding with implications for policymakers and institutions to establish students help desks and provide counseling services to address anxiety and stress that may affect them.

Strengths and Limitation:

This study is one of few attempts to measure the burden of IBS among medical field students and assess the association of IBS with the specialty. We used a validated tool for the assessment of IBS. However, certain methodological limitations need to be

considered while interpreting the results of this study. Firstly, data were collected online due to which response rate cannot be ascertained as it was not possible to assure how many students received the questionnaire link. Secondly, the proportion of nursing students was disproportionately low compare to others. We powered our sample for the prevalence only. The sample may not be powered enough for some of the associations observed in this study.

CONCLUSION:

The prevalence of IBS in medical field students was found to be high. Students in nursing, medicine, and dentistry are at higher risk of having IBS. This calls the academic staff and decision-makers to address this problem by developing strategies to detect, treat, and prevent IBS. Regular screening based on the risk factors of the students of the medical sciences may help detect disorder early and help them maintain functionality.

Given the diversity of medical sciences fields, their curriculum, and institutions, we also recommend large-scale studies to validate the finding of our study. Such studies should utilize a uniform methodology and tool across disciplines and institutions to obtain comparable decision-making results.

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Original Article :

Depression, Anxiety, And Insomnia Among Health Practitioners During Covid-19 Pandemic In Taif, Saudi Arabia

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Abstract

Background & Aims:

Health practitioners are facing stressful situations during COVID-19 outbreak which may affect their mental health. This study aimed to assess depression, anxiety, and insomnia among health practitioners and possible risk factors during COVID-19 outbreak in Taif, Saudi Arabia.

Methods:

A cross-sectional study was done among health practitioners in Taif governorate from April to June 2020, using online questionnaires including: the 9-item Patient Health Questionnaire (PHQ-9), the 7-item Generalized Anxiety Disorder (GAD-7) scale, the 7-item Insomnia Severity Index (ISI).

Results:

Total number of participants was 804; of them, 541 (67.4%) were males and 64.3% were Saudi. The mean age of study participants was 36.7 years (SD ±8.27). The majority were nurses (48.1%) followed by doctors (21.9%). Among all participants, the prevalence of 'significant' depression, GAD, and insomnia was 31.1%, 19.1%, and 15.6% respectively. Proportions were much higher when including those who have even mild symptoms; and they were 58%, 44.1%,

الملخص

الخلفية و الاهداف :

الاكتئاب والقلق والأرق لدى الممارسين الصحيين خلال جائحة كوفيد-١٩ في الطائف، المملكة العربية السعودية. هدفت هذه الدراسة إلى تقييم الاكتئاب والقلق والأرق لدى الممارسين الصحيين وعوامل الخطر المحتملة أثناء تفشي جائحة كوفيد-١٩ في الطائف بالمملكة العربية السعودية.

طريقة البحث :

دراسة مقطعية كمية أجريت على الممارسين الصحيين في محافظة الطائف في الفترة من ابريل الى يونيو ٢٠٢٠، باستخدام الاستبيانات عبر الإنترنت والتي تضمنت: العوامل الاجتماعية الديموغرافية، استبيان صحة المريض المكون من ٩ عناصر (PHQ-٩)، ومقياس اضطراب القلق العام المكون من ٧ عناصر (GAD-٧)، مؤشر شدة الأرق المكون من ٧ عناصر (ISI).

النتائج :

بلغ العدد الإجمالي للمشاركين ٨٠٤ شخصا؛ منهم ٥٤١ (٦٧,٤٪) ذكور و٦٤,٣٪ سعوديون. كان متوسط عمر المشاركين ٣٦,٧ سنة (SD ± ٨,٢٧). كانت الغالبية من الممرضين (٤٨,١٪) يليهم الأطباء (٢١,٩٪) ثم المجالات الأخرى. كان معدل انتشار الاكتئاب، واضطراب القلق العام، والأرق بين جميع المشاركين ٣١,١٪ و١٩,١٪ و١٥,٦٪ على التوالي. أما عند تضمين أولئك الذين لديهم أعراض خفيفة فقد كانت النسب أعلى بكثير؛ حيث بلغت ٥٨٪ و٤٤,١٪ و٤٣,٧٪ على التوالي. أظهرت الدراسة ارتباط الاضطرابات النفسية التي تم فحصها بالإناث، وبالسعوديين، والأصغر عمرا، ومن كان

and 43.7%, respectively. Female gender, being Saudi, younger age and direct contact with COVID-19 patients were the main risk factors for psychiatric disorders investigated, while having children and age ≥40 years were protecting factorsc .

Conclusion:

High rates of mental health problems among health practitioners were found which require immediate intervention to protect, support and treat those in need. Mental health research among this special group is recommended.

Keywords:

Coronavirus, COVID١٩-, Health personnel, Mental Health, Saudi Arabia

لهم اتصال مباشر بمرضى كوفيد -١٩، في حين أن إنجاب الأطفال وكون العمر من ٤٠ عاماً فما فوق كانت عوامل وقائية.

الخلاصة:

ارتفاع معدلات مشاكل الصحة النفسية بين الممارسين الصحيين يتطلب تدخلاً فورياً لحماية ودعم وعلاج المحتاجين. يوصى الباحثون بإجراء مزيد من بحوث الصحة النفسية بين هذه المجموعة الخاصة.

Introduction

In mid-December 2019 a Novel Coronavirus Infected Pneumonia (NCIP) has emerged in Wuhan, Hubei Province, China[1]. The World Health Organization (WHO) announced on January 30th, 2020, the appearance of the new coronavirus (nCOV-19) and declared Public Health Emergency of International Concern (PHEIC) [2]. Kingdom of Saudi Arabia (KSA) has taken the first response on the beginning of February 2020 to the declared PHEIC ordering the evacuation of its citizens from Wuhan, Beijing, and then Hong Kong, Then WHO officially named the novel coronavirus as Corona Virus Disease 2019 (COVID-19) on the 11th of February 2020 [2]. The First case of COVID-19 was confirmed in KSA on the 2nd of March 2020 [3] and a few days later, WHO characterized COVID-19 as a pandemic [2]. In response to this, KSA suspended all international flights.

While preparing this paper, certainly at the beginning of June 2020, numbers of confirmed COVID-19 cases exceeded 6 million with more than 372 thousand deaths worldwide, including more than 87 thousand confirmed cases with 525 deaths in KSA. Locally in Taif, Saudi Arabia, there were a total of 1,574 cases with two deaths so far [3].

Facing this critical situation, the world population is put under exceptional stress; the lockdown, social distancing, financial insecurities, etc. Healthcare workers are not an exception but are rather overwhelmed by the current health challenges especially those who are on the front line facing COVID-19 Pandemic. Previous studies have reported on negative psycho-

logical impact on medical staff due to 2003 SARS outbreak 4,6. Maunder R, Hunter J et al found that medical practitioners were afraid of transmitting infection to their family, friends, and colleagues, felt uncertain and stigmatized, and reported reluctance to work, or consider resignation [4]. Bai Y, Lin CC et al reported that healthcare workers experienced high levels of stress, anxiety [5]. Antoinette M Lee et al. added that healthcare workers also had depression symptoms, which could have long-term psychological implications [6].

Similar concerns about the mental health and adverse psychological reaction among medical staff taking care for patients with COVID-19 are now arising, since recent studies in China have shown that Health practitioners bear a significant psychological burden [7], Wen-Rui Zhang and Kun Wang et al found that healthcare workers had a higher prevalence of insomnia, anxiety, somatization, obsessive-compulsive symptoms and depression, [8] especially those having an underlying organic illness, living in rural areas 8, females, and front-line healthcare workers directly in contact with COVID-19 patients [8,9].

To deal with the secondary mental health problems involved in the COVID-19 pandemic, we need to understand the magnitude of the pandemic effect on mental health, define the most vulnerable groups and analyze the arising symptoms among healthcare workers, on local and international levels. This study aimed to provide an assessment of the mental health problems among Taif health practitioners, in terms of symptoms of depression, anxiety, and insomnia, with analyzing potential risk factors associated with these symptoms, which can serve as important evidence to direct the promotion of mental wellbeing among this special group.

Methods:

This is a quantitative cross-sectional study conducted among healthcare professionals in Taif, Kingdom of Saudi Arabia. Data were collected during the period from 29th of April to 20th of May 2020 through the use of anonymous self-reported questionnaires including the socio-demographic and work-related factors, and the 9-item Patient Health Questionnaire (PHQ-9) which has total scores ranging from 0-27 [10]. A score of 10 has been recommended by several studies as the cut-off score for diagnosing major depressive disorder [11, 12, 13]. The second scale was the 7-item Generalized Anxiety Disorder (GAD-7) scale which ranges from 0-21 as a total score [14] with a cut-off score of 10 for diagnosis [15, 16]. The last scale was the 7-item Insomnia Severity Index (ISI) which has a maximum score of 28 [17] and a cut-off score of 15 for

significant insomnia [18, 19].

The following equation was used to determine the sample size: N= (Z2PQ)/D2, While N is sampling size, Z is standard normal deviation at 95% confidence level (Z= 1.96), P is the proportion in target population from a previous study which was 50% 7, Q= 1–p, and D is degree accuracy which was set at 0.05. The sample size according to this equation was 384 but it was decided to increase the sample size by 100% to minimize the effect of any possible sampling error.

Stratified sampling was applied by defining the target population; health practitioners in Taif, Saudi Arabia, deciding the stratification variables which was the occupation; doctors, nurses, and others, then a proportional sampling intended to decide the size of each subgroup. But due to special regulations and precautions during COVID-19 pandemic, an online questionnaire was sent to official workgroups of health practitioners and some sort of self-selection affected sampling.

Data collected were analyzed using Statistical Package for social studies (IBM SPSS) version-24. Distribution and prevalence were presented in numbers and percentages. Analysis of variance (ANOVA) was used to compare means of different scales' results. Chi-square test and odds ratios with confidence intervals were used to examine the association between the presence of depression, anxiety, and insomnia and different socio-demographic and work factors. A P-value < 0.05 was chosen as the level of significance.

Ethical approval was obtained from the ethical committee of the Administration of Research and Studies, Ministry of Health in Taif. Informed consent was obtained from all participants. Confidentiality, anonymity, and voluntary participation was assured.

Results:

After excluding responses from outside Taif, the total number of health practitioners who completed the questionnaire was 804. Two-thirds of participants (67.4%) were males (n=541) and 64.3% were Saudi as shown in table 1. The mean age of participants was 36.7 years (SD= ±8.27) and they were from different health fields but the majority were nurses (48.1%) followed by doctors (21.9%). Six hundred (74.7%) were married, and 539 (67.1%) were having children. Participants' work experience was ranging from less than one year to 41 years, with a mean of 11.1 years (SD= ±7.98). Other respondents' characteristics are presented in table 1.

Among all participants, 250 (31.1%) scored 10 or more in PHQ-9 which considered the cut-off score for diagnosing de-

Table 1: Socio-demographic data of the participants:

Socio-demographic factors		N	%
Gender	Males	541	67.4
	Females	262	32.6
Nationality	Saudi	516	64.3
	Non-Saudi	287	35.7
Age	Below 30	137	17.1
	30-39	425	53
	40 or above	240	29.9
Health fields	Doctor	176	21.9
	Nurse	386	48.1
	Laboratory technologist	60	7.5
	Pharmacist	56	7.0
	Psychologist	9	1.1
	Social worker	42	5.2
	Others	74	9.2
Marital status	Single	178	22.2
	Married	600	74.7
	Divorced	23	2.9
	Widowed	2	0.2
Having children	Yes	539	67.1
	No	264	32.9
Educational level	Diploma	256	32.0
	Bachelor	377	47.2
	Master	75	9.4
	PhD or MD	34	4.3
	Board or Fellowship	57	7.1
Having chronic diseases	Yes	139	17.3
	No	664	82.7
Diagnosed with psychiatric disorders	Yes	24	3.0
	No	779	97.0
Line in facing COVID-19	First-line	399	49.7
	Second-line	404	50.3
Diagnosed with COVID-19	Yes	10	1.2
	No	793	98.8
Direct contact	Yes	389	48.4
	No	414	51.6
Treating COVID-19 patients	Yes	252	31.4
	No	551	68.6
Total		804	100%

pression ranging from moderate to severe (Table 2). Those who scored 10 or more in GAD-7 were 153 participants (19.1%). Regarding insomnia, 125 participants

(15.6%) were found to have moderate or severe insomnia according to ISI (Table 2). All participants who showed symptoms of depression, anxiety, and insomnia, including mild symptoms, were 467 (58%), 355 (44.1%), and 352 (43.7%) respectively.

Table 2: Depression, Anxiety, Insomnia scores among all health practitioners:

		Number	%
PHQ-9	Minimal or none	337	42.0
	Mild Depression	216	26.9
	Moderate Depression	131	16.3
	Moderately severe	78	9.7
	Severe Depression	41	5.1
GAD-7	Minimal or none	449	55.9
	Mild Anxiety	201	25.0
	Moderate Anxiety	81	10.1
	Severe Anxiety	72	9.0
ISI	Not significant	452	56.3
	Sub threshold	226	28.1
	Moderate insomnia	81	10.1
	Severe insomnia	44	5.5
Total		804	100%

PHQ-9 scores were found to be higher among female health practitioners; with mean scores of 8.28 (SD= ±5.98), compared with mean scores of males which was 6.85 (SD= ±6.30) a result which was statistically significant (P-value= 0.002). PHQ-9 scores were also significantly higher among Saudi participants, younger ages, single and widowed, those who don't have children, those who had only bachelor degree as a level of education (Table3), having direct contact with COVID-19 cases, and having fewer years of experience. Among doctors, residents had higher PHQ-9 scores compared with registrars and consultants.

Regarding anxiety, it was higher according to GAD-7 scores mean in female practitioners, Saudi, younger ages, those who don't have children, those who had diploma or bachelor degree, those who had chronic diseases, having a previous diagnosis of a psychiatric disorder, having direct contact with COVID-19 cases, pharmacists, having fewer years of experience, and residents compared with other doctors (Table 3).

Regarding insomnia, mean scores of ISI were higher among female gender, Saudi nationality, younger ages, being singles, having no children, having only bachelor degree, those who work in the COVID-19 first-line, those who had direct contact with COVID-19 cases, pharmacists com-

pared with other health practitioners, those with fewer years of experience, and among resident compared with other doctors (Table 3).

Table 3: Comparing Depression, Anxiety, insomnia scores according to socio-demographic factors and work factors in relation to COVID-19:

Socio-demographic and work factors Mean (SD)		PHQ-9		GAD-7		ISI	
		P-value	Mean (SD)	P-value	Mean (SD)	P-value	
Gender	Males	6.85 (6.30)	0.002*	4.90 (5.43)	0.016*	7.22 (6.74)	0.019*
	Females	8.28 (5.98)		5.91 (5.76)		8.41 (6.70)	
Nationality	Saudi	7.91 (6.60)	<0.001*	5.74 (5.89)	<0.001*	8.16 (7.24)	0.002*
	Non-Saudi	6.26 (5.34)		4.31 (4.77)		6.62 (5.64)	
Age	Below 30	9.50 (6.73)	<0.001*	6.17 (6.28)	<0.001*	9.55 (7.57)	<0.001*
	30-39	7.76 (5.97)		5.72 (5.66)		8.12 (6.42)	
	40 or above	5.33 (5.82)		3.83 (4.63)		5.62 (6.34)	
Marital status	Single	8.46 (6.32)	0.041*	5.72 (5.91)	0.436	9.21 (7.16)	0.003*
	Married	6.99 (6.17)		5.05 (5.45)		7.14 (6.61)	
	Divorced	6.78 (5.95)		6.09 (5.42)		7.91 (5.27)	
	Widowed	10.5 (10.61)		6.50 (7.78)		3.00 (2.83)	
Having children	Yes	6.71 (6.02)	<0.001*	4.92 (5.30)	0.025*	6.99 (6.45)	<0.001*
	No	8.56 (6.47)		5.86 (6.02)		8.86 (7.16)	
Educational level	Diploma	7.56 (6.35)	<0.001*	5.60 (5.84)	0.032*	7.85 (7.16)	0.003*
	Bachelor	8.03 (6.28)		5.56 (5.64)		8.21 (6.58)	
	Master	5.19 (5.24)		4.03 (4.98)		6.40 (6.53)	
	PhD/MD	5.00 (5.40)		3.71 (4.24)		4.12 (4.17)	
	Board/Fellowship	6.21 (6.00)		4.19 (4.72)		6.63 (6.71)	
Having chronic diseases	Yes	8.26 (6.75)	0.051	6.28 (6.13)	0.014*	8.41 (7.32)	0.123
	No	7.12 (6.10)		5.01 (5.41)		7.44 (6.61)	
Diagnosed with psychiatric disorders	Yes	9.75 (6.05)	0.052	7.79 (4.21)	0.022*	9.50 (5.81)	0.163
	No	7.25 (6.22)		5.15 (5.58)		7.55 (6.77)	
Line in facing COVID-19	First-line	7.69 (6.50)	0.097	5.55 (5.70)	0.108	8.17 (7.18)	0.019*
	Second-line	6.96 (5.94)		4.92 (5.40)		7.05 (6.25)	
Diagnosed with COVID-19	Yes	11.10 (7.13)	0.053	7.60 (6.90)	0.175	8.80 (7.30)	0.574
	No	7.27 (6.21)		5.20 (5.54)		7.59 (6.74)	
Direct contact	Yes	8.51 (6.59)	<0.001*	6.19 (5.92)	<0.001*	8.86 (7.24)	<0.001*
	No	6.20 (5.65)		4.33 (5.04)		6.43 (6.02)	
Health fields	Doctor	6.60 (5.85)	0.056	4.92 (4.88)	0.016*	6.69 (5.91)	0.029*
	Nurse	7.60 (6.36)		4.97 (5.55)		7.74 (6.80)	
	Laboratory technologist	6.68 (4.65)		4.88 (4.78)		8.45 (7.85)	
	Pharmacist	8.57 (6.63)		7.43 (7.00)		9.18 (6.88)	

Socio-demographic and work factors Mean (SD)		PHQ-9		GAD-7		ISI	
		P-value	Mean (SD)	P-value	Mean (SD)	P-value	
Health fields	Psychologist / social worker	5.76 (7.20)	0.056	4.65 (5.84)	0.016*	5.76 (7.39)	0.029*
	others	8.20 (6.24)		6.32 (5.93)		8.49 (6.44)	
Years of experience	Below 10 years	8.01 (6.25)	<0.001*	5.82 (5.82)	0.005*	8.34 (6.74)	0.001*
	10-19	7.27 (6.14)		4.95 (5.42)		7.37 (6.63)	
	20 or above	5.26 (5.95)		4.04 (4.83)		5.88 (6.69)	
Position for doctors	Resident	8.20 (5.97)	0.008*	6.05 (5.21)	0.029*	8.14 (6.25)	0.010*
	Registrar	6.23 (5.74)		4.79 (4.90)		6.69 (6.11)	
	Consultant	4.65 (5.29)		3.45 (3.95)		4.53 (4.36)	

According to table 4, risk factors of developing significant depression (PHQ-9 ≥10) included female gender, being Saudi, age <30, and direct contact. Having children appeared to act as protective factor as well as age ≥40. Risk factors of generalized anxiety disorder (GAD-7 ≥10) included being Saudi, age <30 and direct contact, while protective factors included having children, age ≥40 and being a doctor in comparison to other health fields. Regarding insomnia (ISI ≥15), risk factors were female gender, being Saudi, age <30, being in the first-line, and having direct contact. Protective factor of insomnia included age ≥40, having children, and being a doctor.

Table 4: Factors associated with depression, anxiety and insomnia in health practitioners dealing with the COVID-19 (P-value resulted from chi square test)

Independent Factors	Depression (PHQ-9 ≥10)				Anxiety (GAD-7 ≥10)				Insomnia (ISI ≥15)			
	P-value	OR	95% CI		P-value	OR	95% CI		P-value	OR	95% CI	
			Lower	Upper			Lower	Upper			Lower	Upper
Female	0.005*	1.58	1.15	2.17	0.053	1.43	0.99	2.07	0.044*	1.49	1.01	2.20
Saudi	0.014*	1.49	1.08	2.06	0.001*	1.95	1.31	2.91	<0.001*	2.20	1.42	3.42
Age <30	<0.001*	2.03	1.40	2.94	<0.001*	2.11	1.40	3.18	0.001*	2.13	1.38	3.29
Age ≥40	<0.001*	0.40	0.28	0.58	<0.001*	0.37	0.23	0.59	0.001*	0.46	0.28	0.74
Having children	0.011*	0.67	0.49	0.91	0.046*	0.69	0.48	0.99	0.005*	0.58	0.40	0.85
Doctor	0.168	0.77	0.53	1.12	0.037*	0.61	0.39	0.98	0.003*	0.44	0.25	0.76
First-line	0.341	1.61	0.86	1.56	0.559	1.11	0.78	1.58	0.015*	1.60	1.09	2.34
Direct contact	<0.001*	2.11	1.55	2.86	<0.001*	2.05	1.43	2.94	<0.001*	2.32	1.57	3.44

Discussion:

Previous studies during Severe Acute Respiratory Syndrome (SARS), the Middle East respiratory syndrome Coronavirus

(MERS-CoV), and recently during COVID-19 pandemic, have found considerable psychological effects on healthcare workers [20, 21, 22]. This current study included 804 health practitioners from Taif governorate during COVID-19 pandemic and showed a high prevalence of mental health symptoms; where 58%, 44.1%, and 43.7% of all participants reported symptoms of depression, anxiety, and insomnia, respectively. This is comparable to the findings of a recent study on COVID-19 in china where 50.4%, 44.6%, and 34.0% of health practitioners reported symptoms of depression, anxiety, and insomnia, respectively[7]. Some studies reported less prevalence of mental health symptoms during COVID-19 such as a study of Zhou Zhu et al. in Wuhan during COVID-19 which found that 29.8%, 13.5%, and 24.1% of health worker reported stress, depression, and anxiety symptoms [23]. This relatively lower prevalence was also found in Singapore, where proportions were 14.5% for anxiety, 8.9% for depression, 6.6% for stress, and 7.7% for Posttraumatic Stress Disorder [24]. On the other hand, other studies reported more prevalence such as a study done on health practitioners during Taiwan's SARS outbreak in 2003 and showed that 77.4% of health practitioners reported anxiety and worrying, and 74.2% reported depression[25]. As well, a study done in Hong Kong during SARS outbreak in 2003, found that 68% of healthcare workers have severe levels of job-related stress, and 57% have experienced psychological distress [26]. These remarkable variations between different studies may be attributed to several factors such as different scales used and different study areas where many factors may contribute to mental health problems, not only the exposure to the outbreak-related stressors. Another important notion is that even mild symptoms were included in some studies, while other studies considered only those with moderate to severe symptoms. Under the later condition, our current study proportions will be 31.1%, 19.1%, and 15.6% for the prevalence of depression, GAD, and insomnia, respectively.

Our study showed that females have higher scores of depression, anxiety, and insomnia according to the scales used, and female gender was a risk factor for developing significant levels of these disorders, e.g. OR= 1.58 for depression (table 4). This finding is similar to studies results from China and Italy during COVID-19 pandemic [27, 7], and it is expected since gender difference in depression and anxiety is already established [28, 29].

The second factor which showed significant association with more symptoms in all scales was younger age, and the risk

of having depression, generalized anxiety disorder, and insomnia is doubled in the age group <30 years. Again this is similar to previous studies results done in China and Italy during COVID-19 pandemic [27, 7]. Liang et al. in 2020 found that the younger age of healthcare workers (<30) was associated with higher self-rated depression scores, although this was not a statistically significant difference [30]. Some studies found age-group-related differences in the subject matter of worry; worries of health practitioners of younger ages were mainly about infecting their families, while in older ages they were more directed towards the patient's death [31, 22].

The effect of age may be related to the other result in this current study which was the years of experience since more symptoms of depression, anxiety, and insomnia were associated with little work experience among the surveyed healthcare workers. This result is supported by the previously mentioned studies in China and Italy[27, 7]. Being junior was an independent risk factor for anxiety and depression among healthcare workers according to Xiao et al. in 2020 [32]. Fewer years of experience may be associated with the junior position and so more obligations, more workload, and sometimes more contact with patients; factors that may increase stress.

Having direct contact with COVID-19 patients, per se, was associated with higher scores in all scales of interest in the current study and was an independent risk factor for developing significant depression, GAD, and insomnia. In agreement with this finding, the study of Xiao et al. in 2020 stated that contacting COVID-19 patients directly for all kinds of healthcare workers was independent risk factors for anxiety and depression [32]. The same results were proved by several studies [27, 7]. This was significant for actual contact with COVID-19 patients and not just being in the first-line since the difference in the latter case was significant only in insomnia in our study. This may be because those health workers in the first-line see different diagnoses and they may, or may not, contact suspected or confirmed cases of COVID-19.

Among socio-demographic factors, single health practitioners showed significantly higher scores in depression and insomnia scales compared with married ones, but the difference was not statistically significant when 'being single' was examined as a risk factor for moderate to severe depression, GAD, and insomnia. Having children was a protective factor from depression, GAD, and insomnia. This may be consistent with a study from Singapore that found that single doctors were at higher risk of developing psychological symptoms [23], as well as other studies with similar results in

the general population [33]. Having children is a protective factor from burnout [34], and even suicide [35].

The current study showed that being Saudi was a risk factor of developing depression, GAD, and insomnia, which seems to be unexpected since there are many studies that proved that foreigners have more psychological stressors, less support, and more symptoms of depression, adjustment disorders, or even suicidal ideation in comparison with native workers [36, 37, 38]. Although Saudi participants were significantly younger than non-Saudi ones, having significantly fewer years of experience, but these were not acting as confounders, since the result was significant after using logistic regression to adjust confounding factors including sex, age, years of experience, health field, working position (first-line or second-line), and having direct contact. So being Saudi was an independent risk factor for depression, GAD, and insomnia in this study population. One factor that can be suggested as an interpretation to this finding, it is that Saudi health workers may have an added stressor which is being afraid of transmitting infection to their extended families especially the elderly, and this is not applied to foreign health workers. The significance of this factor; being worried about harming family, was pointed out in a previous study among healthcare workers [31, 22]. However, our study finding needs more investigation to understand its reasons.

This study has a main limitation which is its sampling technique when online questionnaires sent to official workgroups of health practitioners, which allowed some sort of self-selection. Another limitation is that it gives information only about the situation at the time of data collection which may not reflect the whole picture as the COVID-19 pandemic is still expanding.

Conclusion:

Health practitioners in Taif, Saudi Arabia, reported high rates of depression, anxiety, and insomnia during the COVID-19 outbreak. The main risk factors for these problems were female gender, being Saudi, younger age and direct contact with COVID-19 patients. Researchers recommend immediate intervention to protect at-risk health practitioners, to support and treat those who are already suffering from mental health problems, and to promote mental health research among this special group.

Competing Interests:

The authors declare no conflicts of interest.

Authors' Contributions:

AI: designed the study, wrote methodology, carried out statistical analysis, interpreted results, and wrote most of discus-

sion and revised the whole manuscript.

IA: designed the questionnaire, participated in data collection, and wrote a part of discussion.

HH: wrote introduction and literature review.

AA: helped in data collection and communication with authorities.

All authors read and approved the final manuscript.

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Original Article :

Impact of Social Media on Risk Perception And Preventive Behaviors Toward Covid-19 In Saudi Arabia

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Abstract

Background & Aims:
Coronavirus disease (COVID-19) is an unprecedented pandemic in which social media can play a pivotal role in shaping public risk perception and enhances compliance with preventive behaviors. This study aimed to assess the impact of social media on risk perception and preventive behaviors toward COVID-19 in the Kingdom of Saudi Arabia.

Methods:
The study was conducted through a social media web-based survey on the adult population (872 responses). It comprised four parts: Socio-demographic Characteristics and Scales of Social Media Exposure to COVID-19 Risk Information, Perceived Role of Social Media during COVID-19 Pandemic; Risk Perception, and Preventive Behaviors.

الملخص

الخلفية و الاهداف :
يُعد انتشار فيروس كورونا (كوفيد-١٩) هو جائحة غير مسبوقة فى الوقت الحالي حيث يمكن أن تلعب وسائل التواصل الاجتماعي دورًا محوريًا في تشكيل إدراك المجتمع للمخاطر وتعزيز الامتثال للسلوكيات الوقائية. الهدف من هذه الدراسة هو تقييم تأثير وسائل التواصل الاجتماعي على إدراك المخاطر والسلوكيات الوقائية تجاه (كوفيد-١٩) في المملكة العربية السعودية.

طريقة البحث :
أُجريت الدراسة على السكان البالغين المقيمين بالمملكة العربية السعودية حيث تم إجراء دراسة وصفية مستعرضة على المشاركين بالدراسة باستخدام استبيان ذاتي يتألف من أربعة أجزاء: الخصائص الاجتماعية والديموغرافية وتأثيروسائل التواصل الاجتماعي وكذلك إدراك المخاطر والسلوكيات الوقائية تجاه فيروس كورونا (كوفيد-١٩).

النتائج :
شارك فى الدراسة ٨٧٢ بالغ و أظهرت النتائج أن غالبية المشاركين

Results:

A majority of the study respondents fall under the moderate and high category for all scales; preventive behaviors (9.2%, 88.0%) with a mean rank of 4.35 ±0.71; risk perception (25.6%, 68.1%) a mean rank of 3.57 ±0.69; the perceived role of social media (33.5%, 59.3%) with a mean rank of 3.48 ±0.59 and exposure to COVID-19 risk information (30.3%, 48.3%) with a mean rank of 3.31 ±0.9; respectively. Social media exposure to COVID-19 risk information and the perceived role of social media were significant predictors of both COVID-19 risk perception and preventive behaviors.

Conclusion:

Social media was the main source of health information about COVID-19 and had a major significant impact on risk perception and preventive behaviors among adults in Saudi Arabia.

Keywords:

COVID-19, Social media, Risk perception, Preventive behaviors

فى الدراسة يندرجون تحت فئة المتوسط والعالي لجميع المقاييس. فالسلوكيات الوقائية (٩,٢٪ ، ٨٨,٠٪) بمتوسط ٤,٣٥ ± ٠,٧١ ؛ إدراك المخاطر (٢٥,٦٪ ، ٦٨,١٪) بمتوسط ٣,٥٧ ± ٠,٦٩ ؛ الدور الملحوظ لوسائل التواصل الاجتماعي (٣٣,٥٪ ، ٥٩,٣٪) بمتوسط رتبة ٣,٤٨ ± ٠,٥٩ والتعرض لمعلومات مخاطر فيروس كورونا (كوفيد-١٩) (٣٠,٣٪ ، ٤٨,٣٪) بمتوسط تصنيف ٣,٣١ ± ٠,٩

الخلاصة:

وسائل التواصل الاجتماعي هي المصدر الرئيسي للمعلومات الصحية حول فيروس كورونا (كوفيد-١٩) ولها تأثير كبير على إدراك المخاطر والسلوكيات الوقائية بين البالغين في المملكة العربية السعودية.

1. Introduction:

After the incidence of the pandemic of the two novel coronaviruses related respiratory syndromes; Severe Acute Respiratory Syndrome (SARS-CoV) in 2003 and Middle East Respiratory Syndrome (MERS-CoV) in 2012, a third unprecedented zoonotic coronavirus named SARS-CoV2 emerged in December 2019. It was originally registered as the cause of viral pneumonia outbreak in Wuhan; China there soon spread across the globe as was declared by the World Health Organization (WHO) as the Coronavirus Disease (COVID-19) pandemic in March 2020 [1-3]. Until June2020 WHO confirmed that COVID-19 was affecting 216 countries or territories, resulting in over 20 million confirmed cases and more than 800,000 deaths [4]. In the Kingdom of Saudi Arabia (KSA), there have been over 300,000 confirmed cases with over 3000 deaths [5]. Since the confirmation of the first case of COVID-19 in KSA, on Monday 2 March 2020, the government has been vigilantly monitoring the situation and developing country-specific measures in alignment with the WHO

guidelines for the outbreak [6].

This growing pandemic is considered a tremendous and exceptional event that necessitates urgent actions, collaboration, and responsiveness not only from authorities, but also from the general population to support rapid containment of the disease, with sharing of up-to-date statistics and health information, and guidance on preventive measures and safety precautions [7]. Social media platforms such as Facebook, Twitter, and Instagram can have an influential role in the success and sustainability of such exercises. It can aid in fostering the immediacy of dissemination of valuable health messages in such emergency situations, reaching the majority of the population in a relatively short time and increasing accessibility of information about the COVID-19 situation locally, nationally, and globally. It can be utilized by health professionals and organizations to increase population awareness and provide evidence-based preventive and control measures to guide decision-making and the adoption of positive health behaviors. It can also have a crucial role in enhancing contact between researchers, public health authorities, scientists, experts, and sponsoring agencies, for efficient and rapid global response [1,6,7].

Recently, the WHO centered social media as a basic channel for risk communication and facilitation of community engagement that can enhance necessary behavioral changes to combat pandemic diseases that support emergency preparedness and health planning. This global crisis can be mitigated through public readiness to adopt COVID-19 related preventative health behaviors which are associated with public risk perception, which is one of the fundamental aspects of protection motivation theory and a critical determinant for successful management of public health risks throughout pandemics. Risk perception is best described as a subjective psychological experience that is shaped by individual differences and cognitive, emotional, social, and cultural variations on both individual and group levels. This can aid policymakers in designing effective risk communication strategies to fight disease outbreaks and pandemics [8-10].

Previous evidence has shown inconsistency in the validity and credibility of the health information provided through social media as users are typically sharing and re-sharing information without verifying or validating its source which can fuel speculation, dissemination of misinformation, and rumors currently known as “infodemic”. It can be associated with public panic as it spreads faster than the pandemic itself. In addition, the ambiguous nature of the COVID-19 can fuel much of the me-

dia hype and erratic public response. The propagation of this misinformation may jeopardize the work of governments and health authorities to control COVID-19, provoking panic, and risky behaviors [1,11,12]. Thus, the role of social media during a disease outbreak is a rising controversial issue. Many studies were conducted to assess the role of social media, but not much is known about its role during disease outbreaks more so with contradicting knowledge due to the exceptional nature of the COVID-19 pandemic. Therefore, the current study findings can support building strategies for health communication that will sustain the efforts to combat the COVID-19 pandemic. The aim of this study was to assess the impact of social media on risk perception and preventive behaviors toward COVID-19 in the Kingdom of Saudi Arabia, and the specific objectives of the research were to:

- Examine exposure for social media risk information about COVID-19
- Assess risk perception about COVID-19
- Investigate the preventive behaviors toward COVID-19
- Identify the perceived role of social media during the COVID-19 pandemic.

2. Materials and Methods:

2.1 Study Design and Population:

A descriptive cross-sectional research design was employed. The data were collected using a web-based electronic survey created using Survey Monkey and distributed via a link shared on multiple social media platforms such as Facebook, Twitter, Instagram. The target population of this study was the Saudi adult population of both gender, aged more than 18 years, and residing in the KSA during the COVID-19 pandemic.

2.2 Study Tools:

It comprised four parts that were developed by the researcher team after a thorough review of relevant and recent literature except for the Risk Perception Scale that was Adapted from the European Project for Effective Communication in Outbreak Management (ECOM 2015) [13].

Part I: Socio-demographic characteristics and social media exposure to COVID-19 risk information

- Socio-demographic Characteristics: age, sex, marital status, education, occupation, place of work, residence, and monthly income.
- Social Media Exposure to COVID-19 Risk Information scale: assessed the extent of utilization of social media as a resource for COVID-19 related information during the past month. It contained 4 items rated on a 5-point Likert scale (1) never, (2) rarely, (3) sometimes, (4), often, (5) always. In addition, the type of frequently used social

media platforms. The total score was calculated where higher scores corresponded to a high exposure rate to COVID-19 risk information via social media.

Part II: Perceived Role of Social Media during COVID-19 Pandemic Scale

Examined the perception of the role of social media during the COVID-19 pandemic. It contained 7 items rated on a 5-point Likert scale from (1) strongly disagree to (5) strongly agree. One negative statement was assigned a reversed score. The total score was pooled where higher scores indicated a higher perception of social media role [14,15]

Part III: COVID-19-Risk Perception Scale

Adapted from the ECOM project (2015) to develop an evidence-based risk perception assessment tool for infectious diseases. It was further translated into the Arabic language by the researcher team. It consisted of 5 items rated on a 5-point Likert scale from (1) strongly disagree to (5) strongly agree. The total score was calculated where higher scores signify a higher COVID-19 risk perception level [13,16]

Part IV: COVID-19 Preventive Behaviors scale

Used to assess the extent of engagement in COVID-19 preventive behaviors. It incorporated 6 items rated on a 5-point Likert scale (1) never, (2) rarely, (3) sometimes, (4), often, (5) always. The total score was calculated where higher scores highlighted a higher engagement level in COVID-19 preventive behaviors [17].

2.3 Validation and Pilot Study:

The tool was tested for content and face validity through a jury of 7 experts in public health at Saudi Electronic University (SEU). Necessary modifications were performed to ensure the ease and relevance of the content of the survey tool. Reliability was assured using the Alpha Cronbach test and seemed to have homogenous elements with a statistically satisfactory internal consistency score for all scales: social media exposure (α=0.90), risk perception (α=0.85), preventive behaviors (α=0.80), and perceived role of social media (α=0.75).

A pilot study carried out on 30 adults who were not incorporated in the full study sample with the aim of assuring the clarity, reliability, and applicability of the tools. Required modifications were completed to confirm the suitability of the survey tool for use in the study.

2.4 Data Collection:

The link to the online self-administered questionnaire was made available on various social media applications (Twitter, Facebook, WhatsApp, and Instagram) for one month during July 2020. On receiving and clicking the link the participants were directed to the information about the study

and informed consent. After their acceptance to take the survey they could start to fill in the questionnaire, the average time required to fill it was10-15 minutes.

2.5 Statistical Analysis:

Data scoring for 5-Likert scales was utilized based on the extent of approval for 1st (1-1.79), 2nd (1.80-2.59), 3rd (2.60-3.39), 4th (3.40-4.19), and 5th (4.20-5) degrees. The intervals were coded into three levels: low [1.00-2.59], moderate [2.60-3.39], and high [3.40 -5.00].

Data was investigated using Statistical Package for Social Science [SPSS] version 26. Descriptive statistics such as Frequency, Percent, Arithmetic Mean, and Standard Deviation were used for summarizing the study data. Analytical statistics such as weighted mean were used for the categorization of Likert scale items. Pearson and Spearman correlation coefficients were used to explore the relationship between the study variables. Multiple linear regression analysis was performed to assess the impact of social media on risk perception and preventive behaviors. The cut-off value of statistical significance (P-value) set at 0.05.

2.6 Research Ethics:

The Research Ethics Committee of Saudi Electronic University approved the study (Code SEUREC-CHS20116). The participants received the questionnaire with an explanation of the study, its purpose, and the required instructions were given. Informed online consent was attained from all the respondents prior to proceeding to the survey. Participants were assured about the anonymity and confidentiality of their responses and using it for the study's purpose only.

3. Results

A total of 1000 responses were recorded, of which 128 were excluded as under 18 years of age, non-Saudi, or not residing in the KSA during the pandemic, or did not submit a completed set of responses to the survey. A total of 872 responses were retained for analysis.

3.1 Socio-demographic characteristics of the study respondents and most commonly used social media platforms:

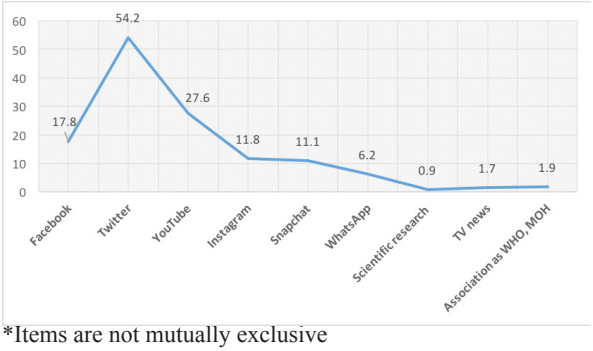
Table (I) shows that the mean age of the study respondents is 34.33±10.36, 75.5% are females and 58.7% are married. Bachelor level education is found among 51.3% while only 3.6% have primary educational level. More than half (59.4%) are employed mainly in the governmental sector (70.8%) and 47.4% have enough monthly income for basic needs only. Moreover, 47.3% reside in the Central region of KSA while only 6.2% reside in the Southern region.

Table (I) Socio-demographic characteristics (n=872)

Parameters	Frequency (%)	
Age (in years)	Mean ± SD = 34.33±10.36	
18 > 25	167	19.2
25 > 35	306	35.1
35 >45	245	28.1
≥ 45	154	17.7
Gender		
Male	214	24.5
Female	658	75.5
Marital status		
Single	313	35.9
Married	512	58.7
Widow	10	1.1
Divorced	37	4.2
Educational Level		
Primary education	31	3.6
High school	78	8.9
Bachelor education	447	51.3
Postgraduate education	316	36.2
Occupation		
Working	518	59.4
Not working	354	40.6
Place of work n=518		
Governmental sector	367	70.8
Non-governmental sector	140	27.1
Free business	11	2.1
Monthly income		
Not enough and need to loan	124	14.2
Enough for basic needs only	413	47.4
Enough and saving	335	38.4
Place of residence:		
Eastern region	156	17.9
Western region	174	19.9
Central region	412	47.3
Southern region	54	6.2
Northern region	76	8.7

Twitter has the highest rank (54.2%) followed by YouTube (27.6%) among the study respondents as a source of information about COVID-19. Only 1.9% uses official websites such as WHO and Ministry of Health (MOH) and only 0.9% use scientific research (Figure 1).

Figure (1) Distribution of the study respondents according to the most common used social media platforms (n=872)



*Items are not mutually exclusive

3.2 Descriptive statistics of the studied variables:

A majority of the study respondents fall under the moderate and high category for all scales; preventive behaviors (9.2%, 88.0%) with a mean rank of 4.35 ±0.71; risk perception (25.6%, 68.1%) a mean rank of 3.57 ±0.69; perceived role of social media (33.5%, 59.3%) with a mean rank of 3.48 ±0.59 and exposure to COVID-19 risk information (30.3%, 48.3%) with a mean rank of 3.31 ±0.9; respectively (Table II).

3.3 Regression analysis between the studied variables and their correlation with the Socio-demographic variables:

The multiple linear regression model is significant (F=38.04, P= 0.00). The coefficient of multiple determination (R2) is 0.81 or 81.0% of the variation in risk perception is predicted by independent varia-

Table (II) Distribution of the study respondents according to the studied variables

Variables	Mean ± SD	Low n (%)	Moderate n (%)	High n (%)
Preventive behaviors	4.35 ±0.71	25(2.8)	80 (9.2)	767(88.0)
Risk perception	3.57 ±0.69	55(6.3)	223 (25.6)	594(68.1)
Perceived role of social media	3.48 ±0.59	63(7.2)	292 (33.5)	517(59.3)
Social media exposure to risk information about COVID-19	3.31 ±0.91	187(21.4)	264(30.3)	421(48.3)

bles where exposure to COVID-19 risk information has a higher impact (β = 0.193) than the perceived role of social media (β = 0.152). The model concludes that both; exposure to COVID-19 risk information (t= 5.590, P=0.00) and the perceived role of social media (t= 4.394, P=0.00) are significant predictors of risk perception.

Regarding preventive behaviors; the model is also significant (F=56.18, P= 0.00). R2 is 0.114 or 11.4% of the variation in preventive behaviors is predicted by the independent variables where the perceived role of social media (β = 0.276) has a higher impact than exposure to COVID-19 risk information (β=0.124). The model concludes that both; exposure to COVID-19 risk information (t= 3.651, P=0.00) and the perceived role of social media (t= 8.116, P=0.00) are significant predictors of preventive behaviors.A multicollinearity test was used to verify the existence of the mentioned relationship (VIF=1.131< 3) which indicates the nonexistence of multicollinearity (Table III).

Table (III) Multiple linear regression model of the relationship between exposure to COVID-19 risk information, perceived role of social media, risk perception and preventive behaviors (n=872)

DV	IV	VIF	R	R^2	F	sig	B	B	t	Sig
Risk perception	Social media exposure to risk information about COVID-19	1.131	0.284	0.81	38.04	0.000**	0.148	0.193	5.590	0.000**
	Perceived role of social media						0.177	0.152	4.394	0.000**
Preventive behavior	Social media exposure to risk information about COVID-19		0.338	0.114	56.18	0.000**	0.096	0.124	3.651	0.000**
	Perceived role of social media						0.326	0.276	8.116	0.000**

IV: Independent variables DV: Dependent Variables

F: Model significance Adjusted R2: (coefficient of determination)

B: unstandardized coefficient **Significant at P < 0.01

β: standardized coefficient t: independent samples t test

VIF: Variance Inflation Factor for multicollinearity

Table (IV) demonstrates a significant positive relationships between exposure to COVID-19 risk information and educational level (rho=0.08, P= 0.01), between the perceived role of social media and educational level (rho= 0.11, P= 0.002) and monthly income (rho= 0.08, P= 0.01), and between preventive behaviors and age (r=0.15, P= 0.00), gender (r=0.09, P= 0.01), and marital status (rho=0.13, P= 0.00). However, a significant negative relationship is revealed between risk perception and monthly income (rho= -0.103, P= 0.002).

Table (IV) Relationship between the study respondents' Socio-demographic characteristics and the studied variables (n=872)

Variables	Exposure to COVID-19 risk information		Perceived role of social media		Risk perception		Preventive behaviors	
	r/rho	P value	r/rho	P value	r/rho	P value	r/rho	P value
Age	0.03	0.36	-0.03	0.41	-0.06	0.11	0.15	0.00**
Gender	0.05	0.11	0.08	0.02	-0.06	0.09	0.09	0.01*
Marital status	0.03	0.29	0.01	0.74	-0.02	0.55	0.13	0.00**
Educational Level	0.08	0.01*	0.11	0.002**	-0.03	0.32	0.05	0.19
Occupation	-0.06	0.09	0.05	0.18	-0.01	0.97	-0.06	0.06
Monthly income	-0.05	0.88	0.08	0.01*	-0.103	0.002**	0.041	0.22

Note. Pearson's correlation coefficient used with quantitative continuous variables and dichotomous variables while Spearman's correlation coefficient used with other variables

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is highly significant at the 0.001 level (2-tailed).

4. Discussion:

The current study demonstrates that social media plays a major role as the main source of information about COVID-19. It showed that nearly half of the respondents had high and about one-third had moderate social media exposure to risk information about COVID-19. More than half of them had a high perception of the role played by social media during the COVID-19 pandemic, social media use has become easily accessible and highly appealing in the new era of technology, and the preference is for readily accessible and condensed information. Most of the respondents were found to be educated and had sufficient monthly income for basic needs and this was found to be positively correlated with social media exposure and the perceived role of social media during the COVID-19 pandemic. Similar findings were shown by a study from China by Mya, et al. (2020)[18] examined COVID-19 related awareness, perceived risk, and preventive behaviors among adults. Two-thirds of their respondents reported that they obtained health in-

formation about the COVID-19 from social media and perceived them as reliable, most trusted, and shared without verifying the source of information, while only a minority were used official MOH sources. In assessing the mental health problems associated with social media use during the COVID-19 outbreak in china, Gao, et al. (2020) [19] found that more than 80% of the respondents reported frequent exposure to social media searching for information about COVID-19. They further explored that highly educated respondents used social media as a source of information about COVID-19 more than those less educated. However, the study by Mya, et al. (2020) [18] found that respondents agreed to the necessity of sharing official MOH information about COVID-19 to avoid rumors and perceived that they were easy and timely access. The study by Karasneh, et al. (2020) [20] showed that respondents had moderate trust in what was shared on social media and agreed that media increase public fear and anxiety in these situations. A study from Canada by Bridgman, et al. (2020)[21] which compared the role of news and social media in COVID-19 related misperception, found that COVID-19 misinformation is highly circulated on social media platforms (especially Twitter). Thus, the role of social media during pandemics is controversial and requires more research to understand the extent and consequences of its utilization.

The present study clarified that the highest percent of the respondents had high and moderate COVID-19 risk perception; this can be explained that the dominant female gender and the middle-income level among the respondents with high concern for living conditions and infection risk. Similarly, Karasneh, et al. (2020) [20] and He, et al. (2020) [22] found that COVID-19 risk perception was predicted by the female gender. The latter also found a significant negative correlation between risk perception and monthly income which was compatible with the present study. Parallel findings were supported by three previous studies where respondents had high-risk perception score regarding fatality of the disease, perceived susceptibility, and concern about family health; the study by Karasneh, et al. (2020) [20], and the work of Honarvar, et al. (2020) [23] to assess Iranian adults' knowledge, attitudes, practices, and risk perceptions about COVID-19, and He, et al. (2020) [22] who analyzed COVID-19 risk perceptions and its related factors in China. However, Mya, et al. (2020)[18]depicted that COVID-19 risk perception was moderate (77.2%) or high (22.8%) with no respondents in the low category. This finding was attributed to the respondents' incorrect perceptions about COVID-19 as

less common among young and healthy people and the high fatality of the disease. The current study proved that the highest percentage of the respondents had high and moderate preventive behaviors toward COVID-19 which were further positively correlated with age, gender, and marital status. Also, the study found that a high rate of females who were married, and this could be due to the cultural context and concern for family welfare. Congruent findings were shown by a Saudi study done by Al-Hanawi, et al. (2020) [24] to assess the population's COVID-19 related knowledge, attitude, and practice. They found that most of the respondents had good preventive practices toward COVID-19 especially women and adults. Abdelrahman, (2020) [25] explored the effect of personality attributes, risk perception, and protecting behaviors against COVID-19 in Qatar and reported that the majority of respondents were adhering to COVID-19 preventive behaviors which are higher among women than men. Iorfa, et al. (2020) [26] investigated COVID-19 knowledge, risk perception, and protective behaviors showed that older age, female gender predicted higher involvement in precautionary behaviors among Nigerians. On the other hand, Mya, et al. (2020) [18] found that most of the respondents had inadequate preventive behaviors toward COVID-19 (only 22% of them had good practices). This can be attributed to the prevalent low knowledge level among most of the respondents in this contrary study. Faasse and Newby, (2020)[27] conducted an Australian study about public perception about COVID-19 and found that COVID-19 protective health behaviors were relatively low at the beginning of the outbreak however the intended behaviors were reassuringly high. This can be attributed to the lack of perceived risk at the beginning of the COVID-19 pandemic. The current study represented that social media exposure to risk information about COVID-19 and the perceived role of social media during the COVID-19 pandemic were significant predictors of both risk perception about COVID-19 and its preventive behaviors. This sheds the necessary light on the role of social media in shaping perceptions and engagement in preventive behaviors. The applied linear regression model showed that the social media exposure and its perceived role during the COVID-19 pandemic predicted 81.0% of the variation in risk perception where social media exposure to COVID-19 risk information had a higher impact than the perceived role of social media. In addition, it predicted that 11.4% of the variation in COVID-19 preventive behaviors where the perceived role of social media has a higher impact than social media exposure

to COVID-19 risk information. Congruent findings were shown in five recent studies. Faasse and Newby, (2020) [27] found that higher media exposure was a powerful predictor of COVID-19 preventive behaviors and vaccination intentions. Huynh, (2020) [28] investigated the role of media in risk perception among Vietnamese and Karasneh, et al. (2020)[20] from Jordan, explored that using social media had a positive impact on COVID-19 risk perception. Oh, et al. (2020) [29] demonstrated that social media exposure had a significant positive indirect effect on preventive behaviors and risk perception through the role of emotions (fear and anger) as mediators of the relationship. Choi, et al. (2017) [30] examined the effect of social media on risk perceptions during the MERS outbreak in Korea and showed that social media exposure was positively related to risk perception.

However, Bridgman, et al. (2020) [21] found a strong association between social media exposure and misperceptions about COVID-19 which were also found to be associated with lower levels of risk perceptions and social distancing compliance. This highlights that the impact of social media on risk perception and preventive behaviors during pandemics and outbreaks is still an area that requires additional research and the need for efforts to ensure the credibility of the information posted on social media platforms to enhance public risk perceptions to initiate active public response and promote preventive measures. The WHO has developed a webpage 2020 (myth busters) to detect and correct misinformation disseminated through social media about COVID-19 by developing special teams for technical risk communication to reply and track COVID-19 related myths and rumors. In addition to, guaranteeing the availability of evidence-based data about COVID-19 which is the most excellent vaccine against misinformation and rumors [31]

5. Conclusion:

The current study concluded that social media is an important source of health information about COVID-19 and has a major impact on risk perception and preventive behaviors. High and moderate trends of all the study variables were detected from the study findings regarding social media exposure for COVID-19 risk information, the perceived role of social media in COVID-19 pandemic, risk perception, and preventive behaviors. Social media exposure to COVID-19 risk information and the perceived role of social media were found to be significant predictors of both COVID-19 risk perception and preventive behaviors.

6. Recommendation:

- Development of social media-based hotlines to enhance public awareness and compliance with COVID-19 preventive behaviors.
- Establishment of social media-based risk communication campaigns and awareness programs with infographics about COVID-19 for public mobilization and disease containment.
- Enhancing public education to avoid dissemination of any misinformation without validating sources to avoid misleading data and rumors about COVID-19.
- Further research on the role of social media during pandemics and the relationship between social media use and mental health.

Authors' Contribution:

All authors approved the final article.

Conflict of interest:

authors affirm no conflicting interests.

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Original Article :

Patients' Disclosure Preferences when Hypothetically Diagnosed with a Terminal Illness

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Abstract

Background & Aims:

Breaking bad news to patients is a challenge for physicians, nurses, and other healthcare professionals in various clinical settings. This study aims to explore patients' preferences when being told about an emerging life-threatening terminal illness, such as cancer, and to determine specific factors that can affect individuals' responses upon the disclosure of the disease and its prognosis.

Methods:

We employed a quantitative-cross sectional design using a convenient sample. A total number of 814 participants responded to an online survey invitation from four major cities in Saudi Arabia. Descriptive analysis was used to represent the socio-demographic characteristics of the participants, and the Chi-square ($\chi 2$) test was performed to analyze the differences in the disclosure preferences.

Results:

Most participants preferred to be directly informed

الملخص

الخلفية و الاهداف :

إبلاغ المرضى بالتشخيص المرضي في حالة الاصابة بمرض عضال يشكل تحدي للأطباء والممرضين وغيرهم من المتخصصين في مجال الرعاية الصحية في مختلف البيئات السريرية. تهدف هذه الدراسة إلى استكشاف ما يفضله المرضى عندما يتم إخبارهم عن مرض عضال ناشئ يهدد الحياة مثل السرطان،

طريقة البحث :

تم استخدام تصميم مقطعي وصفي باستخدام عينة ملائمة. استجاب ما مجموعه ٨١٤ مشاركا لدعوة استطلاع عبر الإنترنت من أربع مدن رئيسية في المملكة العربية السعودية. واستخدم التحليل الوصفي لتمثيل الخصائص الاجتماعية - الديمغرافية للمشاركين، وتم إجراء اختبار تشاي سكوير لتحليل الاختلافات فيما يفضله المرضى عند الكشف عن المرض وتشخيصه.

النتائج :

فضل معظم المشاركين أن يكونوا على علم مباشر بالتشخيص الناشئ (٨٥,٧٪)، ورغبوا في أن يكونوا مع أسرهم عند الكشف عن المرض (٩٨,٣٪)، وفضلوا المشاركة بشكل فعال في خطة صنع القرار والعلاج. وأشارت المشاركات إلى أن النساء أكثر حرصا على الكشف عن التشخيص من الذكور وكما أشارت النتائج ايضا الى ان المشاركين المتزوجين كانوا أكثر حرصا على الكشف عن التشخيص

about an emerging diagnosis (85.7%), wished to be with their family upon the disclosure of the disease (98.3%), and preferred to be actively involved in the decision-making and treatment plan. Female participants noted to be keener for a diagnosis disclosure than males $\chi2(2) = 18.7$, $p < .01$, and the same observation seen in singles compared to married participants, $\chi2(4) = 10.91$, $p < .05$.

Conclusion:

This study investigated public responses and preferences when being told about a terminal medical diagnosis. Healthcare providers are advised to plan ahead and make a strategy to report bad news to lessen the psychological burden on patients and their families.

Keywords:

Breaking bad news, disclosure preferences, terminal illness, Saudi Arabia

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الخلاصة:

حققت هذه الدراسة في الاستجابات والتفضيلات لدى المشاركين عند الكشف عن المرض وتشخيصه الطبي النهائي. بناءا على ذلك ينصح مقدمو الرعاية الصحية بالتخطيط للمستقبلي ووضع استراتيجية للإبلاغ عن الأخبار السيئة لتخفيف العبء النفسي على المرضى

Introduction

Revealing the truth to a patient will support the whole process in instituting an optimum trust between healthcare providers (HCPs) and their patients [1]. As such, this enables patients and their families to be prepared, involved and make informed decisions that confine with their belief system, values, and cultural norms [2]. However, telling the truth can result in unexpected responses or reactions by patients and their families. Thus, this needs proper involvement of psychological, emotional, and spiritual support. Because when bluntly telling the truth can result in denial, frustration, and anger, which could affect patients' comprehension, decision-making abilities and consequently disrupt any proposed treatment options suggested by their HCPs [2].

While telling the truth might be difficult on the part of the HCPs' side, the need to strategize how to inform should be of utmost concern. Such consideration, therefore, includes communicating the needed information and the proper channels for communicating it [3]. Telling the truth encompasses disclosure of the diagnosis, the disease prognosis, treatment options, as well as the impact of the disease on the affected patient's social and work life [4-6]. Preferences refer to whether a person (e.g., patient) likes to be informed of their terminal disease findings. While responses

pertain to psychological and emotional reactions of a person when informed about a life-threatening terminal diagnosis [5, 6].

Previous studies on disclosing unfavorable medical diagnosis or prognosis have been explored in a variety of cultures and contexts [6, 7]. The communication process and who should be involved differs from various countries, and this can be greatly influenced by people's sociocultural backgrounds. For instance, the family involvement and needs for information and being updated about a critically sick family member is of great importance for Saudi families [7]. Because once fulfilled, it can relieve the family distress, otherwise, it may produce distress among the family, and create an untrusted relationship with the medical team [7]. In the Asian perspective, physicians have to struggle to disclose the truth to the patient and family members [4], while most physicians in North America and Europe can clearly and directly tell the diagnosis [8-10]. While telling the truth is an ethical responsibility, it is the ways of saying that can impact the responses [11]. As such, the traditional beliefs of the American physicians that disclosing diagnosis can likely harm and is distressing to patients. Also, the assumption that disclosing the diagnosis can result in unwarranted psychological stress [12, 13]. It can be argued, however, that not telling the truth can result in prohibiting the patient from participating in treatment options due to lack of information on the disease prognosis [14], thus, disclosing the information must be customary[15]. In this context, the patients themselves are allowed to participate in their treatment options.

With the similar assumption of the previous study, the disclosure preferences of the public seemed unclear and that the need for further information must be undertaken[16]. To date, there have not been published studies concerning the population of the Kingdom of Saudi Arabia (KSA) on their disclosing information preferences and responses when being told about an emerging terminal illness. This topic is of great interest to be explored among such populations with very strong religious backgrounds and very strong family connection bonds. Therefore, the disclosure preferences and responses of patients when newly diagnosed with a life-threatening disease are of paramount importance in the Saudi context. As such, it gives a better understanding to HCPs on the perceptions and preferences of patients and their families, and it could facilitate ways to communicate such sensitive and life-changing health information to the concerned individuals. Indeed, knowing the insights and preferences of such vulnerable people makes the difficult task of breaking bad news, and com-

municating other vital information about the emerging health issue, much easier for HCPs [17]. It is evident that when appropriate strategizing communication skills and techniques are deployed when breaking bad medical news to patients and/or their families, it is more likely to increase the patients' acceptance of the new reality, convey trust, and enhance positive two-way communications [2]. From a workplace safety perspective, it could prevent violence against medical staff, allow HCPs to deescalate a violent person, and deal with difficult people 18. We can also argue that it saves a lot of time too for all parties and shortens the length of hospital stay for hospitalized patients. However, to better understand these subjective individuals and collective thoughts and perceptions, which are significantly shaped by demographical and psychosocial factors, we need to study the communities where we practice.

This study aims to explore the preferences, attitudes, and responses of individuals from the population when hypothetically diagnosed with a life-threatening terminal illness. Cancer was used in this paper to serve this purpose since it is a widely known terminal illness among the public. Some reports indicate a dramatic increase in the incidence of cancer in the past decade in KSA, which could be due to the revolutionary change in socioeconomic status in the country. This necessitates the establishment of a national plan to combat this surge [17]. The current study aims to answer the following research questions; a) What are the disclosure preferences, attitudes, and responses of individuals when hypothetically diagnosed with a life-threatening terminal illness? b) What are the differences in participant's disclosure preferences based on their demographic and professional characteristics?

Materials and Methods

Design

This was a cross-sectional study using an online survey questionnaire to collect data from the public about their preferences and responses related to the disclosure of sensitive medical information in case they have been diagnosed with a terminal disease such as cancer.

Population and Sampling

The sample calculation using G*Power 3.1.9.4 software (2019) indicated that for proportions difference between two independents proportions assuming a significance level (α) of 0.05, a medium effect size, and a power of 0.80 would require a minimum sample size of 776 participants. Therefore, additional participants (814 participants) were approached to participate in the study to increase the power for additional analyses.

A convenient sample of 814 people who live in the KSA was recruited. In particular, the sample was taken from the following major cities; Jeddah, Riyadh, Makkah, and Hail. These locations have large cities with semi-dense areas. The inclusion criteria were as follow; an adult person living in KSA, able to communicate in Arabic and/or English, able to respond to an electronic invitation link on a mobile phone or a computer. However, medical professionals, the pediatric population, inpatients, and individuals with other comorbidities such as stroke, end-stage renal failure, and psychological disorders were discouraged not to participate in the survey.

Recruitment Strategy

This research used an online survey questionnaire developed via the google-forms platform to collect the data. The questionnaire included an informed consent at the beginning of the survey to inform participants about the purpose of the study, its benefits and risks, and why it was being conducted. If agreed, they could proceed to answer all items, otherwise, they could exit the survey without providing information. The primary investigator's contact information was provided in case some clarifications or questions arise by the participants to ease communication. When all the items were answered, a debriefing and a confirmation to participate statement appeared to users. After submitting, a thank you letter with a link is shown. Users were encouraged to share the link with those they knew, within their locality as potential participants, to invite them via social media applications. The data collection period extended from November 2019 until January 2020.

The development of the study data collection tool

The study used a questionnaire to collect data, which was developed by the researchers' following an extensive review of published research. The final questionnaire consists of 3 main parts. The first part is the participants' demographic characteristics: age, gender, marital status, nationality, educational level, and economic status. The second part includes hypothetical scenario items, it is further divided into three subsections: disclosure preference (9 items), a preferred pathway of disclosure (4 items), and participants' attitude toward disclosure (14 items). The third part consists of four items concerning non-disclosure reasons. The Likert scale items in this questionnaire consist of three levels (1) disagree, (2) neutral, and (3) agree.

Both Arabic and English versions of the questionnaires were developed by translating the final English copy into Arabic using a two-way translation by two independent (native Arabic) translators, who have med-

ical backgrounds and experience in the subject. Furthermore, the questionnaire underwent validity and reliability tests as follows; firstly, the researchers invited five panels of experts who are known for their expertise in the subject area of community nursing care. One member of the panel is an associate professor who has extensive experience in the field of psychometric validation and tool development. The panel advised some modifications to the items, some wording, and other remarks to enhance the tool, which all were adapted into the final copy. Secondly, the tool was subjected to the content validity index (CVI). The questionnaire obtained an overall CVI score of 0.72 for relevance and a CVI score of 0.70 for clarity, indicating a high level of content validity. Overall, the questionnaire yielded a reliability coefficient of 0.78.

Finally, the tool was piloted among 30 participants, who met the inclusion criteria but were excluded from the current dataset, to assess the suitability of the items to the culture, clarity of language, time management, and foresee any unexpected issues. As a result, minor wording and text adjustments were made. Overall, the questionnaire yielded a reliability coefficient of 0.78.

Ethical Consideration

This study was approved by the institutional review board (IRB) of the Health Affairs Directorate of Hail region, KSA (IRB log number: 2020-13). Participation was voluntary and no personal data were recorded or kept during the data collection process. Informed consent was attached to the electronic form during data collection.

Statistical Analysis

The research data were coded, cleaned, and entered for analysis using SPSS version 24 (Armonk, NY: IBM Corp. USA). Descriptive analysis using the frequency and percentage were used to represent the socio-demographic profile of the respondents and the items related to the disclosure of the terminal illness as perceived by the participants. In addition, a Chi-square ($\chi 2$) test was performed to analyze the differences in participants' disclosure preferences based on demographic and professional characteristics.

Results

Participants' Socio-demographic Characteristics

A total of 814 participants completed the study, among which 534 were females (65.6%). Participants' age varied between 17 and above 60 years of age; 43.4% were in the category of 21-30 years. The majority of participants (93.4%) were Saudis. The highest educational level was divided into four categories: Intermediate school, secondary school, undergraduate (Bache-

lor's degree), and postgraduate level of education (Master's or Doctorate). The majority of the participants (85%) fall within the Undergraduate educational level. More than half of the participants (55.5%) were single. In addition, the majority of the participants (85.1%) reported they had no terminal illness, and only one-third (30.5%) of them knew someone with a terminal illness.

Terminal Illness Disclosure Preference

When the study participants were asked about their disclosure preferences of a hypothetical diagnosis and prognosis of a terminal illness, the majority of participants (85.3%) preferred the direct disclosure of the terminal illness diagnosis (85.3%), and the disease prognosis (77.5%). However, a small proportion of the participants favored the non-disclosure option of the diagnosis (2.7%), and the disease prognosis (7.2%). Regarding the preferred level of disclosure (full or partial), most respondents (84.3%) preferred full disclosure. On the other hand, approximately half of the participants (51.3%) expressed interest in obtaining more information about the expected length of survival.

Most participants (78.7%) preferred to be actively involved in the decision-making and treatment plan of their disclosed terminal illness. Less than half of the participants (39.3%) did not like to be involved in the decision-making and treatment plan and preferred a healthcare specialist to decide their treatment course instead of them. Besides, a small proportion (14.7%) preferred to delegate the treatment plan decisions to a family member (Table 1).

Table 1. Descriptive statistics (participants' response frequencies) of diagnosis and prognosis disclosure preferences (N = 814).

Disclosure Preferences	Agree, % (N)	Neutral, % (N)	Disagree, % (N)
I would like to be informed about terminal illness diagnosis	85.3(694)	12(98)	2.7(22)
I would like to obtain information regarding my diagnosis of a general nature but not in detail (partial disclosure).	72.1(587)	12.3(100)	15.6(127)
I would like to be given all information regarding my diagnosis (full disclosure).	84.3(686)	11.2(91)	4.5(37)
I would like to obtain information on the expected prognosis and complication of terminal illness	77.5(631)	15.2(124)	7.2(59)
I would like to obtain information on the expected side effects of the terminal illness treatment plan	82.2(669)	10.9(89)	6.9(56)
I would like to be told about my prospects of the expected length of survival eventually	51.2(417)	20.1(164)	28.6(233)
I would like to decide on my terminal illness treatment plan	78.7(641)	16.2(132)	5(41)
I Would like specialists to decide on my terminal illness treatment plan (Instead of mine)	39.3(320)	34.5(281)	26.2(213)
I Would like the family to decide on my terminal illness treatment plan (Instead of mine)	14.7(120)	30.1(245)	55.2(449)

Desired pathways of disclosure

Regarding the desired pathway of disclosure, the majority of participants (N=702, 86.2%) indicated that they preferred to have a face-to-face disclosure of the diagnosis and/or the prognosis of their terminal illness, while others (N=107, 13.1%) desired a telephone disclosure. Likewise, a large proportion of the participants (80.5%) indicated their preference to be notified of their terminal illness directly by a healthcare specialist first, while (51.2%) wished to be told by a family member first.

Participants attitude toward terminal illness disclosure

Regarding positive and negative consequences of disclosure represented by the expected participant attitudes, the majority of participants agreed that disclosure would yield positive outcomes (82.8% improve understanding of the disease, 78.1% enhance the communication between patient and health care providers, 76.9% increase the trust relationship between patient and health care providers, 75.1% improve patient cooperation, 73.3% increase commitment to the treatment plan, and 60.4% reduce confusion). On the other hand, some participants indicated that disclosure would yield negative consequences (46.3% increase level of stress, 37.8% may lead to depression, 12.7% lack of commitment to the treatment plan, and 9% provoke suicidal ideation). Almost one-third of participants (N=263, 32.3%) indicated that males have a greater disclosure tolerance than females, while (N=143, 17.6%) indicated that females have a greater tolerance. Approximately half of the participants (46.3%) agreed that disclosure would eventually improve patients' quality of life (Table 2).

Table 2. Descriptive statistics of the participants' attitude toward disclosure (N = 814).

Participants' attitude	Agree, % (n)	Neutral, % (n)	Disagree, % (n)
Disclosure of terminal illness diagnosis will increase my level of stress	46.3(377)	39.4(321)	14.3(116)
Disclosure of terminal illness diagnosis will lead to depression	37.8(308)	48.6(396)	13.5(110)
Disclosure of terminal illness diagnosis will increase my hope	38.7(315)	47.9(390)	13.4(109)
Disclosure of terminal illness diagnosis will increase suicidal ideation	9(73)	31.1(253)	60(488)
Disclosure of terminal illness diagnosis will increase my commitment to the treatment plan	73.3(597)	22.4(182)	4.3(35)
Disclosure of terminal illness diagnosis will increase my lack of commitment to the treatment plan	12.7(103)	33.3(271)	54.1(440)
Disclosure of terminal illness diagnosis will reduce my confusion	60.4(492)	29.6(241)	10(81)

Participants' attitude	Agree, % (n)	Neutral, % (n)	Disagree, % (n)
Disclosure of terminal illness diagnosis will increase the trust relationship between patient and health care providers	76.9(626)	17.3(141)	5.8(47)
Disclosure of terminal illness diagnosis will enhance the communication between patient and health care providers	78.1(636)	18.3(149)	3.6(29)
Disclosure of terminal illness diagnosis will improve my understanding of the disease	82.8(674)	13.9(113)	3.3(27)
Disclosure of terminal illness diagnosis will improve patient cooperation	75.1(611)	21.1(172)	3.8(31)
Disclosure of terminal illness diagnosis will improve the patient quality of life	46.3(377)	43.1(351)	10.6(86)
Male can tolerate disclosure of terminal illness diagnosis rather than female	32.3(263)	39.2(319)	28.5(232)
Female can tolerate disclosure of terminal illness diagnosis rather than male	17.6(143)	48.6(396)	33.8(275)

Reasons for Non-disclosure of terminal illness

Of note, the participants disagreed with the following non-disclosure reason; "health care providers have no enough time" (60.7%), "when the patient has a low level of education" (45%), but participants agreed with the following non-disclosure reason; "when health care providers have no enough courage to inform about the diagnosis" (48.8%). Details of the participants' agreement level with the non-disclosure reasons are presented in Table 3. Differences in participant's disclosure

Table 3. Descriptive statistics of the participant perception of non-disclosure reasons (N=814).

Participant's perception	Agree, % (N)	Neutral, % (N)	Disagree, % (N)
Non-disclosure of terminal illness diagnosis is preferred when the patient has a low level of education	18.2(148)	36.9(300)	45(366)
Non-disclosure of terminal illness diagnosis is preferred when health care providers have no enough time to explain about diagnosis	14.4(117)	24.9(203)	60.7(494)
Non-disclosure of terminal illness diagnosis is preferred when health care providers have no enough courage to inform about diagnosis	48.8(397)	30.3(247)	20.9(170)

preference based on demographic and professional characteristics

A Chi-square ($\chi 2$) test was performed for the categorical variables to assess disclosure preference concerning age, gender, educational level, nationality, marital status, and economic status. The results revealed significant statistical differences in disclosure preference concerning gender, $\chi 2(2) = 18.7$, $p < .01$, with females expressing a more preference for terminal illness diagnosis disclosure than males. It was also found that single participants were more likely to express a preference for terminal illness disclosure than married participants, $\chi 2(4) = 10.91$, $p < .05$. How-

ever, other demographic and professional characteristics revealed no significant differences in disclosure preference (Table 4).

.Table 4. Analysis of terminal illness disclosure preferences by categorical variables

Categorical variable	Disclosure preference			Chi-square test		
	Disagree	Neutral	Agree	χ^2	Df	***P*-value**
Gender						
Male	12	50	218	18.7	2	.000**
Female	10	48	476			
Age						
15-20	2	17	128	13.44	8	.098
21-30	5	39	309			
31-40	8	27	135			
41-50	6	11	84			
51-60	1	4	38			
Nationality						
Saudis	21	93	646	.62	2	.74
Non-Saudis	1	5	48			
Marital status						
Single	5	51	396	10.91	4	.028*
Married	16	45	281			
Others	1	2	17			
Economic status						
Low	1	9	59	5.97	4	.20
Intermediate	19	79	602			
High	2	10	33			

(Notes: * $p < 0.05$; ** $p < 0.01$ (two-tailed

Abbreviations: Df, degree of freedom

Discussion

This study explored the disclosure preference and responses of individuals from the population when diagnosed with terminal diseases. Specifically, it looked into the determinant variables such as the demographic information that can affect an individual's preference and responses. The results revealed that the demographic information of the mainstream population has no influence on their preferences to disclosure the terminal disease. The earlier study confirmed that irrespective of variables like sex, an individual's age, culture, and civil status, and some particular determinants differ from each individual [17]. Other studies show that most patients prefer to be informed and that it might benefit from timely recognition of the terminal phase[2,18]. While, patients, families, and caregivers may differ on disclosure preference, patients themselves still preferred to have a direct disclosure with the palliative care option [19]. It is for the fact that while

the preferences differ from one patient to another, it is important to note how the physician assesses their readiness, which helps to understand their condition. This finding is very important to the physician to strategize how this terminal disease is communicated and be prepared to respond to the individual's reaction. Moreover, this helps in addressing the fear of putting stress on the patient and their family by way of addressing their concerns in a timely and considerate manner.

Married individuals were found to respond differently when being told about their terminal disease. One possible reason could be the fact that married people may understand the impending burden that creates adjustment to their married life because of the diagnosis. Spouses often feel devastated because they have not considered what life together with illness would involve[20]. De-Vleminck and colleagues postulate that married people and even those who share a house are found to prefer disclosure information about their illness and to be provided to their family members [16]. Conversely, other variables like age, sex, nationality, and educational level were not found to have a significant difference in to perceive response of the mainstream population. Although, helping the individual or the family member in their grieving process as a response to knowing their terminal disease is an important consideration. Indeed, helping the family member to be open to the grieving process and providing support and acceptance regardless of the reaction are very important 20. The finding that married individuals respond differently is a clear indication that when diagnosed with terminal illness support and presence of family are highly needed.

One of the preferred approaches of the mainstream population when being told about terminal diagnosis is being with their loved ones or relatives. Current studies showed that patients preferred to be aware of their diagnosis and to involve their families [21], and most patients would always want their relatives to be informed about their disease and prognosis [16]. In Saudi Arabia, the majority of the general population would prefer to have the family be present when being told about their terminal diagnosis [22]. As such, consideration of the responsibilities of the family-like emotional support is very essential. Having preferred to know the diagnosis first before their family is one of the considerations that healthcare professionals have to look into whenever disclosing the diagnosis.

These findings are very important for healthcare personnel to consider when disclosing the disease information. Indeed, it helps them to strategize a way of telling

the truth where prompt decision-making of the patient and families are of the essence in the treatment process. This can prepare the physicians to convey the actual information needed by the patients and their families.

Limitations of the Study

Other variables such as religion and culture are not explored in this study, which may give a clearer picture of how the physician would disclose the information in that context. This can be part of future exploration. Moreover, the self-report of the general population is prone to bias because the situation is hypothetical. An actual sample of the patient can be included to explore their actual perception of the phenomenon.

This study highlights information and understanding on the preference and responses of the general population when being told about their terminal diagnosis. Therefore, this study results recommend tailored fit strategies from the medical health workers when disclosing terminal diseases. As such, this will lessen the psychological burden to the patient and family.

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Original Article :

Dentists' Attitude towards Occupational Health and Safety Policies: a cross-sectional study in the Governmental hospitals in Saudi Arabia

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Abstract

Background & Aims:

Dentists are exposing to several occupational hazards during their practices. Effective comprehension of workplace wellness will be optimally effective if it combines dentists' intervention along with clinical intervention, so Occupational Health and Safety (OHS) policies constructed to enhance dentists' welfare in the workplace. This study aims to assess the dentists' attitude towards OHS policies in governmental hospitals in Riyadh, Saudi Arabia.

Methods:

A descriptive cross-sectional study was conducted on dentists working in the governmental hospitals in Riyadh using an online self-administered questionnaire include nineteen questions distributed into five dimensions.

Results:

الملخص

الخلفية و الاهداف :

يعد أطباء الأسنان من أكثر الفئات فى المجتمع عرضة للعديد من المخاطر المهنية خلال ممارساتهم لمهنة طب الاسنان ، لذلك تم وضع سياسات محددة للصحة والسلامة المهنية من أجل ضمان سلامتهم وسلامة المرضى في مكان العمل. لذلك كان الهدف من هذه الدراسة هو تقييم موقف أطباء الأسنان تجاه سياسات الصحة والسلامة المهنية في المستشفيات الحكومية في مدينة الرياض بالمملكة العربية السعودية.

طريقة البحث :

أُجريت هذه الدراسة على أطباء الاسنان العاملين فى المستشفيات الحكومية بمدينة الرياض حيث تم إجراء دراسة وصفية مستعرضة على المشاركين بالدراسة باستخدام استبيان ذاتي يشمل تسعة عشر سؤالاً تم توزيعها في خمسة أبعاد.

النتائج :

شارك فى الدراسة ٢٠٠ طبيب أسنان و أظهرت النتائج أن أطباء الأسنان لديهم موقف سلبي تجاه سياسات الصحة والسلامة المهنية بمتوسط (٢,٨١ ± ٠,٦٣) ، كما أظهرت أن أبعاد الصحة والسلامة

200 dentists participate in the study. The results showed that dentists had a negative attitude towards OHS policies with a weighted mean (2.81±0.63), it also showed that OHS dimensions which impact positively the dentists' attitude were pre-employment screening and training (3.42±0.53, 3.54±0.47) respectively while OHS dimensions that impact negatively the dentists' attitude were periodic medical examination, vaccination, and work-related conditions (2.98±0.62, 3.31±0.55, 3.10±0.59) respectively.

Conclusion:

Dentists in governmental hospitals in Riyadh, Saudi Arabia had a negative attitude towards OHS policies, so there is a demand to improve the dentists' adherence to OHS policies through raising awareness and regulations. Also, OHS policies should be enacted and linked to re-contracting and pre-employment to enforce compliance with OHS policies.

Keywords:

Attitude, Dentists, Occupational Health, Safety Policies, Saudi Arabia

المهنية التي تؤثر بشكل إيجابي على موقف أطباء الأسنان كانت فحص ما قبل التوظيف والتدريب بمتوسطات (٣,٤٢ ± ٠,٥٣ ، ٣,٥٤ ± ٠,٤٧) على التوالي في حين أن أبعاد الصحة والسلامة المهنية التي تؤثر سلبًا على موقف أطباء الأسنان كانت الفحص الطبي الدوري والتطعيم والحالات المتعلقة بالعمل بمتوسطات (٢,٩٨ ± ٠,٦٢ و ٣,٣١ ± ٠,٥٥ و ٣,١٠ ± ٠,٥٩) على التوالي.

الخلاصة:

لدى أطباء الأسنان في المستشفيات الحكومية في الرياض بالمملكة العربية السعودية موقف سلبي تجاه سياسات الصحة والسلامة المهنية ، لذلك هناك ضرورة لتحسين التزام أطباء الأسنان بسياسات الصحة والسلامة المهنية من خلال رفع مستوى الوعي والالتزام باللوائح والسياسيات الخاصة بالسلامة المهنية ، أيضًا يجب تفعيل سياسات الصحة والسلامة المهنية وربطها بإعادة التعاقد وشرط من شروط التوظيف لفرض الامتثال لسياسات الصحة والسلامة المهنية.

Introduction

The workplace has been established as one of the priority settings for health promotion into the 21st century, it directly affecting the physical, mental, economic, and social well-being of workers[1]. Being unaware of occupational hazards in the workplace makes healthcare providers in general and dentists in particular vulnerable to these occupational illnesses[2]. Adherence to occupational safety guidelines will help in preventing occupational hazards and providing a safe dental environment for dentists and patients[3]. World Health Organization (WHO) addressing all determinants of workers' health, including risks for disease and injury in the occupational environment[4]. Occupational safety and health pose numerous challenges; one of these challenges is non-adherence to Occupational Health and Safety (OHS) policies among dentists that considered a significant problem because it might cause an unsafe environment for both dentists and patients[5,6]. Occupational Health and Safety

(OHS) Policies can be defined as a multidisciplinary field which concerned with the health, safety, and welfare of individuals at work and aims to foster a healthier and safer work environment[6]. In healthcare, OHS policies may also protect workers, patients, and family members where the policies involve the interrelationship between people, work, equipment and materials, work environment, and economic considerations like productivity[7]. Through the implementation of its first five-year plan, the Ministry of Health (MOH) in the Kingdom of Saudi Arabia (KSA) made efforts to improve and redistribute dental care facilities throughout KSA to be more equitably as the MOH aims to meet the comprehensive dental needs of the population of the Kingdom[8]. To regulate and monitor dentists' attitude regarding occupational health and safety, the MOH and other concerned agencies such as the Central Board for Accreditation of Healthcare Institutions (CBAHI) and Joint Commission International (JCI) had established occupational health and safety (OHS) policies[9-11]. These policies require that dentists should be equipped with a safe and healthy place of work, a safe work system, appropriate and safe facility equipment, and finally competent staff to supervise and manage the dental services[9,12]. Apparently, the prevalence of practice-related health problems in dentistry has continued to attract the attention of policymakers and stakeholders[13]. More OHS policies are therefore being instituted to improve the practice of dentistry in accordance with (JCI) and (CBAHI)[6,7]. Workers in the practice of dentistry are exposed to various occupational hazards and continue to be susceptible to infectious respiratory diseases, noise, eye injuries, and other chemical risks[14]. This is due to the continuous alterations in the work environment in the field of dentistry which brings new challenges[5] International Commission on Occupational Health (ICOH) inspired most countries to engage in OHS for their employees as well as dentists[15]. A study conducted on some of these countries revealed that only about one-third of these countries have had organized OHS for over 50 percent of the workers. Apparently, gaps in capacity, content, coverage, and implementation are considered the main issues related to the lack of OHS in a healthcare organization[15]. Hence, non-adherence to OHS policies is a significant problem because it might cause careless dental services to patients and the mishandling of new dental equipment[2]. Studying these aspects among the dentists would make the management understand how dentists would take advantage of OHS policies. This would allow managers to provide high-quality dental servic-

es to patients and handle well new dental equipment[16]. Consequently, as a result of the increased risks in dentistry, it is important to consider the successful implementation of OHS policies to reduce such risks and enhance the welfare of the dentists in the workplace. According to "Employee Health Program Policy" and JCI OHS aspects[9,10], the dimensions of OHS that have gotten the most attention include pre-employment screening, periodic medical examination, vaccination, training, and work-related conditions. Thus, studying the attitude of dentists regarding the aforementioned OHS policy dimensions would provide a clear view for policymakers and stakeholders. The aim of this study was to assess the dentists' attitude towards OHS policies in governmental hospitals in Riyadh, Saudi Arabia. The specific objectives of the research were to:

1.Determine the attitude of dentists regarding aspects of OHS policies; and

2.Identify the relationship between dentists' socio-demographic data and attitude in regards to OHS policies.

Materials and Methods

Study Design:

The study design was a descriptive cross-sectional design.

Sample and Setting:

A convenience sample of 200 dentists working in government hospitals in Riyadh, Saudi Arabia.

Inclusion Criteria

• Graduated and registered dentists who worked in government hospitals.

• Have experience more than one year as these dentists have operated for quite some time and are familiar with OHS policies.

Data Collection Tools

The data collection commenced in November 2018 using an online self-administered questionnaire developed by the researcher based on "Employee Health Program Policy" and JCI OHS aspects[9,10]. The tool of data collection consisted of two parts:

• The first part was concerned with socio-demographic data related to dentists' age, working place, years of experience, and job title.

• The second part was concerned with the attitude of dentists towards OHS policies using a 5-point Likert scale (Strongly disagree, disagree, neutral, agree, and strongly agree). This part comprised of five dimensions which include: pre-employment screening; periodic medical examination; vaccination; training; and work-related conditions.

Validity and Reliability

The pilot study has been performed on 20 dentists who were excluded from the sample size to evaluate the validity and reliability of the questionnaire in order to

detect any ambiguity in the tool, clarity of the items, as well as to determine the time consumed for data collection. Necessary modifications were carried out to develop the final form of the tool. Cronbach's alpha coefficient was used to measure the reliability of the items which equals 0.933.

Data Analysis

Data analysis was carried out using the Statistical Package for the Social Sciences 20.0 (IBM, SPSS). Descriptive statistics were presented as mean (M) and standard deviation (SD) for continuous data and as percentages (%) and frequencies for categorical data. Spearman's rank correlation coefficient (r) tests were used to determine the associations existing between variables. Analysis of the dentists' attitude towards OHS policies was done at a 95 percent confidence interval. A value of $p < 0.05$ was therefore considered statistically significant. Moreover, the means of Likert scale tables were calculated in regards to the cut-off point of the weighted mean for each dimension which is equal to 3.39, so a positive attitude was acknowledged if the weighted mean is more than 3.39. In contrast, a negative attitude was acknowledged if the weighted mean is less than 3.39.

Ethical Considerations

Informed consent was obtained from all participants for agreement to participate also a brief explanation of the study purpose and the required instructions were explained. Participation was voluntary and participants had the right to refuse to participate in the study. Confidentiality and anonymity were maintained to protect the identity and position of them.

Results

Table (1) showed that more than one-third of the sample (41.0%) was in the age group 30-40 years. More than half (54.5%) of the participants in this study were females. (34.0%) were consultants. Regarding years of experience, the table presented that more than one-third of the sample had 5- 10 years of experience.

Table (1): Socio-demographic characteristics of dentists participated in the study (n=200).

Parameters	Frequency (%)	
Age in years		
23-29	49	24.5%
30-40	82	41.0%
>40	69	34.5%
Gender		
Male	91	45.5%
Female	109	54.5%
Job title		
Dental Postgraduate Student	39	19.5%
General Practice Dentist	58	29.0%
Dental Registrar	35	17.5%
Consultant	68	34.0%
Years of Experience		
1- 4 years	44	22.0%
5- 10 years	74	37.0%
11-20 years	43	21.5%
> 20 years	39	19.5%

Table (2) concerned with the attitude of

dentists regarding dimensions of OHS policies. It showed that dentists' attitude was positive regarding pre-employment screening and training while it was negative regarding periodic medical examination, vaccination, work-related conditions, and OHS policies in general.

Table (2): The attitude of dentists regarding dimensions of OHS policies: (n=200)

OHS dimensions	Weighted mean	SD
Pre-employment screening	3.42	0.53
Periodic medical examination	2.98*	0.62
Vaccination	3.31*	0.55
Training	3.54	0.47
Work-related conditions	3.10*	0.59
OHS policies in general	2.81*	0.63

* Cut-off point = 3.39

Table (3) demonstrated that; the job title was significantly correlated with pre-employment screening, periodic medical examination, training, work-related conditions, and OHS policies in general, with correlation ranging between (r =.148* – r =.215**) and also there was a significant correlation between age and work-related conditions. While there was no statically significant correlation between gender and years of experience regarding OHS aspects.

Table (3): The correlation between dentists' attitude and OHS dimensions (n=200)

OHS dimensions	Job title	p	Gender	p	Age	p	Years of Experience	p
Pre-employment screening	.215	.002*	.004	.951	.028	.693	.116	.101
Periodic medical examination	.164	.021*	.078	.273	.088	.213	.004	.954
Vaccination	.071	.316	-.001	.984	-.004	.961	.020	.782
Training	.148	.036*	.005	.947	.029	.682	.104	.145
Work-related conditions	.165	.020*	.040	.575	.168	.017*	.114	.107
OHS policies in general	.169	.016*	-.067	.348	.113	.110	-.034	.634

Note. *Correlation is significant at the 0.05 level (2-tailed).

Discussion

The present study focused on the five aspects of OHS; pre-employment screening, periodic medical examination, vaccination, training, and work-related conditions. The aim of this study was inspired by the question of what is the dentists' attitude towards OHS policies? Regarding pre-employment screening; the results showed that dentists had a positive attitude towards pre-employment screening. From these results, the dentists believed that pre-employment health screening is important in dentistry and would impact positively

on the dentists' practice. Also, this may be attributed to that the pre-employment screening is obligatory as a prerequisite of employment. The study done by El-Helaly et al. (2014)[17] claimed that pre-employment screening tests among healthcare workers in KSA are common since about 73.7 percent of the workers undergo the tests. A study done by Mahmud et al. (2012)[18] also found that pre-employment screening prevents occupational injuries and diseases breakout and their spreading to other workers. If there are risks detected after the screening, healthcare workers are subjected to risks mitigation plans such as training programs. Therefore, pre-employment screening as a policy for OHS is vital in mitigating occupational injury and also reducing the spread of possible diseases to other workers.

As regards a periodic medical examination, which is an aspect that dentists must comply with as a part of the OHS requirement; the findings of the study showed that dentists had a negative attitude towards the periodic medical examination. Despite the benefit of a regular medical review, some dentists still found reasons to provide for their different contributions. In this parameter, there were dentists who believed that periodic medical examination influences their practice positively. Those dentists who thought they know all the necessary medical examinations for their practice received the lowest ranking. The findings of this study are in agreement with the conclusion of Shires et al. (2012)[19], the author found that healthcare workers have a positive attitude towards the periodic medical examination because it reduces the cost of curing. The study done by Omokhua, et al. (2020)[20] also found that even though the level of awareness of routine medical check among dentists was high but their practice was poor. Therefore, more measures are needed to increase practice to be aligning with a high level of awareness.

Another noteworthy result of this study was that dentists had a negative attitude towards vaccination, however, the study was done by Mahasneh, et al. (2020)[3] proved that controlling infection exposure in dental care settings can be achieved efficiently by vaccination, so a comprehensive vaccination policy for dentists should be implemented. Contrary to the results of this study Al-Hazmi et al. (2015)[21] found that the majority of the dentists hinted that vaccination is safe and their positive attitude influenced their high number being vaccinated. Also, the study done by Althobati et al. (2018)[22] found that dentists value vaccination. Therefore, there is a need for the dentists to engage in further education to increase their understanding and perception of the vaccination programs.

The role of training plays a vital contribution in improving dentists' skills, the level of dentists' awareness can be enhanced through training programs so dental training is a concern in the healthcare sector. The results of this study showed that dentists had a positive attitude towards training. The results of the study were in agreement with the conclusion of Al-Hazmi et al. (2015)[21], the author concluded that dentists require additional education program that focuses on the occupational risk of lack of vaccination. In another study which evaluated the attitude of dentists towards treating individuals with disabilities, the study was conducted on senior dental students in King Abdulaziz University, Jeddah in KSA as well as students from Boston in the U.S. it concluded that dentists who were highly trained and experienced developed positive attitude in treating dental disabilities. Therefore, training is essential for better service delivery of dentists[23]. Also as recommended by the study done by Mahasneh, et al. (2020)[3], that educational programs and training strategies should be implemented to maximize the compliance of dentists, as well as enhancing the compliance of dental support staff with infection-control guidelines

Work-related conditions are a concern to many dentists, a better work-related condition encourages dentists to spend extra time in the clinic, and the contrary happens in poor work-related condition. In this study, the results showed that dentists had a negative attitude towards work-related conditions. This result may be attributed to the reason that more strategies are needed to improve work-related conditions and reduce the effects of occupational hazards in order to secure the well-being of dentists. The study done by Fischer et al. (2013)[24] asserted that the working ability of dentists is directly affected by the work-related conditions. Similarly, Da Silva et al. (2016)[25] found that work-related conditions are associated with the fatigue of the workers, and this reduces their service delivery. Thus, maintaining an improved working environment is desirable for the workability of dentists. So, it is important to promote safe work-related conditions through further study to fill the gaps in this area.

Occupational health and safety policies are essential in healthcare, lack of these policies affects service delivery and outcome of the patients. The findings of the present study showed that dentists had a negative attitude towards OHS policies in general. Finally, the study findings that there was a significant correlation between job title and the pre-employment screening, periodic medical examination, training, work-related conditions, and OHS policies in general,

this may be because job title can increase dentists' job satisfaction and motivates them to perform better also it is a sign of being valued at work and makes dentists work hard to increase their status. Meanwhile, age was found to have no significant correlation with the work-related conditions. In contrast, according to Brasaite et al. (2016),[26] age increases health workers' capacity to evaluate teamwork climate, job satisfaction, perception towards management, and safety climate[26]. Therefore, age boosts experience which helps in the evaluation of the healthcare environment for the improvement of the safety of the patients so work-related conditions affect dentists of all categories regardless of age. Gender and experience also did not have any significant association with the attitude with regards to OHS aspects. However, experience not having any meaningful relationship was contrary to the findings of Alkhudhairy (2016) who clarified that the less experienced dentists used the healthcare tools less frequently, and this affected their attitude towards their duty as well[27].

Conclusion

The study concluded that dentists had a negative attitude towards OHS policies in general. The OHS aspects that impacted positively on the dentists' attitude were pre-employment screening and training. These aspects would increase safety and a healthy environment for dentists as well as improve the productivity and performance of the dental clinics. Conversely, OHS aspects that impacted negatively on the dentists' attitude were the periodic medical examination, vaccination, and work-related conditions. The study findings show a significant correlation between job title and the pre-employment screening, periodic medical examination, training, work-related conditions, and OHS policies in general. Experience and gender did not have any significant association with the attitude with regards to OHS aspects. It is hence clear that there is a need to implement educational and training programs to enhance the dentists' adherence and compliance to OHS policies. Dentists must, therefore, adhere to safe and healthy work practices they also should make OHS a part of their day-to-day routine and realize the importance of OHS policies in dental practice.

Conflict of Interest: None

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Review Article :

Calcific uremic arteriopathy (calciphylaxis) multidisciplinary approach narrative review

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Abstract

Background & Aims:

Background: calcific uremic arteriopathy or calciphylaxis is a rare condition. The condition is fatal, with high mortality. A multidisciplinary approach is essential and useful in such patients.

Review the therapeutic options for calcific uremic arteriopathy. And to provide a smooth and applicable reference for a multidisciplinary team treating patients with calcific uremic arteriopathy.

Methods:

We searched PubMed, Medline, the Cochrane Library, and Embase for calcific uremic arteriopathy and calciphylaxis.

Conclusion:

calcific uremic arteriopathy is a life-threatening condition. There is no consensus on a unified management protocol. In such a situation, we have to apply our basic sciences knowledge and treat patients accordingly to provide a clear plan and enroll such patients in studies to end up with clear guidelines.

Keywords:

Calciphylaxis, Calcific uremic arteriopathy, Secondary hyperparathyroidism.

الملخص

الخلفية و الاهداف :

اعتلال الشرايين الكلسي البولي أو التكلسي هو حالة نادرة. الحالة قاتلة مع ارتفاع معدل الوفيات. نهج متعدد التخصصات ضروري ومفيد في مثل هؤلاء المرضى.

مراجعة الخيارات العلاجية لاعتلال الشرايين المتكلس البولي. لتوفير مرجع سلس وقابل للتطبيق لفريق متعدد التخصصات يعالج المرضى الذين يعانون من اعتلال الشرايين البولي الكلس

طريقة البحث :

بحثنا في PubMed و Medline ومكتبة Cochrane و Embase عن اعتلال الشرايين المتكلس اليوريمي والتكلس التكلسي.

الخلاصة:

اعتلال الشرايين الكلسي البولي أو التكلسي (CUA)هي حالة تهدد الحياة. لا يوجد إجماع على طريقة علاج موحدة في مثل هذه الحالة ، يتعين علينا تطبيق معرفتنا بالعلوم الأساسية وعلاج المرضى وفقًا لذلك لتوفير خطة واضحة وإدراج هؤلاء المرضى في الدراسات حتى ينتهي الأمر بإرشادات واضحة.

Introduction:

The term calciphylaxis is a word of two portions, "calci" means calcification, and "phylaxis" means protection. The term was introduced by Dr. Seyle in 1961[1] when he described a skin shell in rats that took high parathyroid hormone (PTH) or vitamin D. Calcium deposits on the rat's skin and form shells at the site of minor skin trauma; subsequently, these shells creep out, and new skin forms. The scientists thought that calciphylaxis in the renal patient is similar to that developed in the rat's skin. However, the mechanism included the same milieu (high phosphate and parathyroid hormone) and the same dermis deposition. In renal patients, healthy skin doesn't replace the skin shells. In rats [1], the calcium deposition occurs in the skin only; however, in humans, it involves both skin and blood vessels. Further, in humans, the skin lesions are associated with ischemic signs; thus, this is not a protective mechanism, and based on that, the term calcific uremic arteriolopathy was introduced.

The yearly incidence of calcific uremic arteriopathy (CUA) among renal patients varies from 0.4 – 4 2 and the ischemic skin lesions are at high risk of infection; hence the condition is life-threatening. Risk factors include [2,3] female gender with end-stage renal disease (ESRD), abnormal vitamin D, phosphate, calcium, hypo- or hyperparathyroidism, and hypoalbuminemia. Vascular endothelium and smooth muscle secret molecular calcifications inhibitor matrix Gla protein (MGP). Vitamin K is essential for MGP activation. So, vitamin K deficiency in the renal patient either by warfarin or by low vitamin intake leads to MGP dysfunction which result in more calcification and development of calcific uremic arteriopathy (CUA). Protein C is a vitamin K dependent factor, and it is natural anticoagulation, vitamin k deficiency, makes it less effective. It may play a role in CUA pathogenesis. As a recommendation from national kidney foundation in united states 4 the following values should be maintained to decrease the risk of CUA in hemodialysis patients; serum calcium concentration of 8.4–9.5 mg/dL, serum phosphate concentration of 3.5–5 mg/dL and an intact parathyroid hormone concentration of 150–300 pg/mL.

CUA is diagnosed clinically in ESRD patients. Typically, the patient presents with [2, 5] indurated, abdominal tenderness, or legs skin chronic ulcers or plaques. The punch biopsy of 3-5 mm is indicated in non-uremic patient with atypical presentation [5]. Pyoderma gangrenosum, cholesterol emboli, Purpura fulminans, and Warfarin-induced necrosis are differential diagnosis [2]. The skin biopsy is contrain-

dicated in an infected skin lesion, [6] and it might lead to the formation of new lesions. Histopathology features include epidermal ulceration, focal dermal necrosis, and vascular calcification [7,8]. The best treatment is prevention by modification of modifiable risk factors, such as correction of vitamin D, phosphate and, calcium levels. However, once a high-risk patient presents with pain, full nonhealing abdominal or leg skin ulcer, or plaque, a multidisciplinary approach should be initiated by (nephrologist, dermatologist, wound care team, nutritionist and endocrine surgeon). The target of the group is to confirm the diagnosis and to start management. There is no evidence-based treatment; however, the management approach should focus on the following aspects:

- *Pain.*
- *Wound care.*
- *Correction of minerals disturbance.*
- *Elimination of eliminable risk factors.*
- *Prevent further calcium deposition in the skin and blood vessels.*
- *Correction of uremia.*
- *Correct of hypercoagulability.*

Pain management:

CUA pain is ischemic and needs special care. Knowing the pharmacological properties of the analgesia in the renal patient is the cornerstone as they need many analgesias. The use of the synergetic effects of several analgesics can give good results. Dose manipulation of analgesia for the renal patient is dependent on the renal impairment severity and if the patient is on dialysis. Opioids are the best analgesic for renal patients with CUA. Avoid morphine[9] as it has active metabolites that cause respiratory depression. Consider abuse and misuse. Some studies showed sodium thiosulfate relief the pain in CUA renal patients [2] before wound healing. The intramuscular and subcutaneous injection must be avoided [10] to prevent the formation of plaques and ulcers at the site of injection. Nephrologists and clinical pharmacists should take this part of management.

Wound care:

General principles of modern wound care, in addition to the general morbidity of the patient and hypoxic wound due to ischemia, must be kept in considerations. Wound care specialist is essential, and a professional wound care center is preferable for wound's care of CUA ulcers. Type of dressing, the role of debridement, prevention of infections, and wound oxygenation are general concepts of wound care in such patients.

The type of dressing is preferred to be non-adhesive or products with silicon layers [11] to decrease trauma and pain during redressing.

Topical antibacterial agents are an attrac-

tive option to be applied during dressing in infected wounds.

The surgical debridement is controversial and must be individualized. Debridement of dead tissue decreases bacterial overgrowth and improves wound healing. Still, it is excruciating, and it increases the risk of a new lesion formation at the site of trauma; it resembles skin biopsy. So, if the debridement is mandatory [11], it should be done gently with analgesia to be given to the patient before the procedure to decrease the pain. Chemical debridement, as well as maggot therapy, is advised by some authors [12] especially for non-infected, dry wounds.

The wound oxygenation was tried invasively by revascularization of the affected leg [10] and had poor result. The unfortunate results are due to the poor general condition of the patient and the nature of the disease as it affects the small and medium blood vessels and not large ones.

As a non-invasive method of oxygenation, hyperbaric oxygen (HBO) therapy, theoretically it improves the fibroblast function, angiogenesis, and promotes healing. Jennifer AN et al. retrospective case series study of 34 cases [13] showed an improvement of 58% with complete healing in 50%; on the other hand, deterioration was observed in 38 %. The adverse effects of HBO therapy are claustrophobia and middle ear barotrauma. The systemic review [24] did not demonstrate a promising efficacy of HOB on CUA lesions.

Wound care specialists and surgeons are the responsible persons in wound management.

Correction of minerals disturbance:

Controlling of hyperphosphatemia is crucial [11] in the treatment of CUA cases. Frequent hemodialysis, non-calcium phosphate chelating agents, and phosphate intake restriction are actions to decrease the phosphate level. The target phosphate level in CUA patients [14] is 3mg/dl. Isolated hyperphosphatemia can cause CUA.

The serum calcium level should be optimized, and the target level [2] is 8mg/dl. Restricted calcium and vitamin D diet[8], increase the frequency of dialysis with avoidance of high calcium dialysate, cinacalcet, parathyroidectomy; all are used to correct the patient's calcium level. If medical therapy fails, then parathyroidectomy is indicated.

Surgery is a risky option in such patients; the optimal time of surgery is not yet determined. Some studies [15,16] showed improvement after surgeries other show deterioration. Duffy et al. study [17] showed complete wound healing and survival rate improvement of [6] patients after parathyroidectomy out of [15] patients. The limitation of this retrospective study is a limited number, and

all six parathyroidectomies younger patients and their general clinical conditions are better than the conservative group. Another single-institution retrospective study. Forty-nine patients by Weening et al. [18] sixteen of them underwent parathyroidectomy, and the study showed a 33% one-year survival rate of parathyroidectomy patients versus 38% of medically treated patients, wound improvement, and patient's conditions were not provided. Lal et al. retrospective study [19] showed wounds and survival rate improvement of patients who underwent surgical intervention of lesion and parathyroid. The first and third studies mentioned above showed surgery is more beneficial for patients with high parathyroid hormone. Kang et al. [20] advocated that the benefit is likely to be more in patients with very high PTH. The authors who take the PTH level as an indicator for parathyroidectomy [16] the PTH level ranges between 500-800pg/ml. The PTH shouldn't be lower than 100pg/ml [21] at this level; there is a risk of calcium deposit outside the bone and threat of more CUA lesions. Total parathyroidectomy was the only cause of CUA in some reports [22]. Patrick et al. [23] suggested a new approach dependent on the bone metabolism status. The hyperdynamic bone disease patients benefit from lowering their parathyroid hormone (medically or surgically) more than patients with adynamic bone disease patients who might need recombinant parathyroid hormone (hrPTH) to treat their CUA lesions bone biopsy is necessary to evaluate the bone metabolic status. This approach supports the older studies, which showed that the patients with high PTH and underwent parathyroidectomy has better survival and wound healing rate. However, parathyroidectomy can improve the CUA lesions in patients with high PTH and hyperdynamic bone disease theoretically, but it lacks evidence-based support. The recent systemic review [24] showed that patients who underwent parathyroidectomy have a better survival rate. The benefit of parathyroidectomy in this systemic review attributed the patient's selection as most of those patients were fit and younger than no parathyroidectomy group. Surgery or no surgery must be tailored according to patients' condition, and the decision depends on the failure of medical therapy, bone metabolism status, and operability of the patient. We doubt the benefit of urgent parathyroidectomy as there are medications that can control the hormone level till the patients' general condition improve, then surgery can be done as an elective procedure to treat hyperparathyroidism rather than treating CUA. Up to this date, there is no strong evidence-based recommendation for urgent parathyroidectomy versus

no parathyroidectomy.

Elimination of eliminable risk factors:

Risk factors must be well determined for any disease. The determination of risk factors can help in two ways; first, modifying the modifiable risk factors impact positively on the affected patients second can help to plan the prevention of development of disease in unaffected patients. A Nationally Representative Study of Calcific Uremic Arteriolopathy Risk Factors [25] showed that the median time for CUA to develop after initiation of dialysis is 925 days, and it gives proper time to modify the modifiable risk factors. The same study confirms the risk factors that showed by older studies. Diabetes, low albumin level, body mass index >37kg/m2, female gender, and the white race are all confirmed risk factors when they present at the initiation of hemodialysis.

High albumin, corrected serum calcium level, and high PTH all are essential risks for CUA. The use of warfarin and vitamin K deficiency are risk factors. The insulin injection site can precipitate for central CUA due to trauma [26,27]. Phosphate binders both (calcium-containing and non-calcium-containing binders) did not show [25] an increase in the odd ration of CUA development. The use of vitamin D supplementation increases the odds ratio of CUA; on the other hand, the use of an active form of vitamin D does not show the same association. The use of erythropoietin and high hemoglobin level decreases the odds ratio of CUA development. The evaluation of Cinacalcet Hydrochloride Therapy to Lower Cardiovascular Events (EVOLVE) trial showed [28] that there is a CUA risk reduction in the cinacalcet arm. The recommended PTH level must be between 2-9 times of normal to prevent adynamic bone disease.

Prevent further calcium deposition in the skin and blood vessels:

Correction of uremia by intensive hemodialysis with low dialysate calcium [29]. improves the calcium and phosphate levels and decreases the chance of calcium deposition. Sodium thiosulphate (STS) distributes in the extracellular compartment when it is administered intravenously. STS combined with tissue calcium to form thiosulphate calcium salt. The thiosulphate salts are the most soluble salts among other calcium salts in the body; hence it decreases further deposition of calcium salts and improves the lesions in around 70% of CUA patients as this shown by Peng et al. meta-analysis 30 and other case series [31]. STS is a vasodilator, and anti-oxidant [32] prevents further calcification and ischemia and improve pain and healing when injected directly in the lesion [2,33]. Very low PTH leads [21,34] to more deposition of calcium in

soft tissues so, severe hypoparathyroidism should be avoided in CUA.

Correction of uremia:

Correction of uremia by intensive dialysis has a positive effect on the general condition of the patient and promotes healing by decreasing further vascular calcification. Nephrologists advise the shifting of peritoneal dialysis patients to low dialysate calcium hemodialysis [29] to correct the calcium and phosphate product. PTH is oxidized in the uremic milieu and becomes inactive [23,35] results in adynamic bone disease in hyperparathyroidism patients leads to an increase in the calcium deposition in vessels. So, uremic correction can improve the regular activity of PTH and improve the calcium-phosphate product.

Correct of coagulation:

Most of CUA patients 36 are on warfarin. Such treatment affects the vitamin k dependent coagulation factors 37, including anti-coagulant such as protein C. Several case-control studies showed no relation between protein C and CUA. MGP is a vascular calcification inhibitor that is activated by vitamin K, so; antivitamin K treatment should be quitted in all CUA patients. The patient can be shifted to heparin if anticoagulation is needed. Interestingly several cases of CUA were treated with heparin [38] but there is no reliable evidence to use it as a routine treatment for CUA.

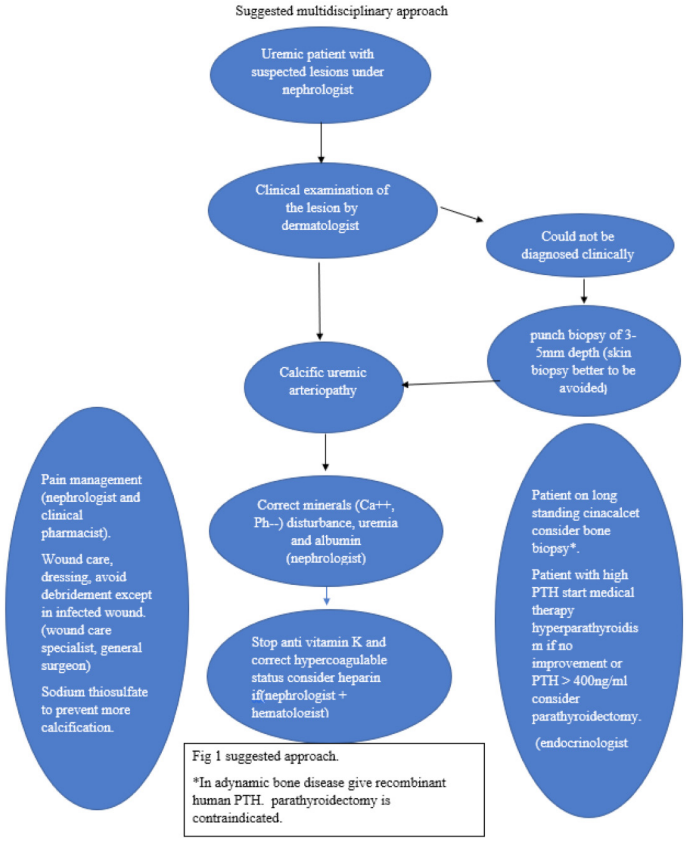

Fig 1 suggested approach.

*In adynamic bone disease give recombinant human PTH. parathyroidectomy is contraindicated.

Conclusion:

CUA is a life-threatening condition. There is no consensus on a unified management protocol. In such a situation, we have to apply our basic sciences knowledge and treat patients accordingly to provide a clear plan and enroll such patients in studies to end up with clear guidelines. Please see figure 1 and for the suggested approach.

Key points:
1. CUA is a rare disease. 2. There is no clear protocol to be followed. 3. Treatment must be individualized. 4. We emphasize a multidisciplinary approach. 5. We emphasize basic knowledge.

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Review Article :

Physical child abuse Prevalence and its risk factors in Saudi Arabia – A review Update

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Abstract

Background & Aims:

The aim of this overview to provide a summary overview of physical child abuse prevalence, its and its risk factors in Saudi Arabia.

Methods:

A searching strategy for the included Studies were gathered by reviewing published articles from 1991 to 2020, in the PubMed and Google Scholar databases reporting the prevalence of Physical child abuse and Its risk factors in Saudi Arabia. Out of the total of 131 Articles that were searched 79 articles were excluded follows the article's title screening, out of 52 articles 37 excluded by abstract reading, out of 22 articles read as full text only 15 full-text articles met the inclusion criteria of the review. The data extraction from the review articles was done based on a selection form. The form has been used to summarize evidence of included studies, it includes the following categories: title, design of the study, demographic data, study population, year of publication, and conclusion.

Results:

Most studies of child abuse have been published in Saudi Arabia were cross-sectional studies and case

الملخص

الخلفية و الاهداف :

تهدف هذه الدراسة إلى تقديم نظرة عامة وملخص عن انتشار وعوامل الخطر للاعتداء الجسدي على الأطفال في المملكة العربية السعودية.

طريقة البحث :

تم جمع إستراتيجية البحث للدراسات المشمولة من خلال مراجعة المقالات المنشورة من عام ١٩٩١ الى ٢٠٢٠ في قواعد بيانات PubMed و Google Scholar التي تشير إلى انتشار الإساءة الجسدية للأطفال وعوامل الخطر في المملكة العربية السعودية. من إجمالي ١٣١ مقالة تم البحث في ٧٩ مقالة تم استبعادها بعد فحص عنوان المقالة ، من أصل ٥٢ مقالة تم استبعاد ٣٧ مقالة بعد قراءة الملخص ، من أصل ٢٢ مقالة تمت قراءة النص كامل ، استوفت ١٥ مقالة فقط معايير التضمين للبحث .تم تلخيص البيانات من المقالات في نموذج يشمل ملخص الدراسات على النحو الآتي : عنوان ونوع الدراسة ، بيانات مجتمع الدراسة، سنة نشر الدراسة، ملخص نتائج الدراسة.

النتائج:

معظم الدراسات التي تم نشرها عن إساءة معاملة الأطفال في المملكة العربية السعودية كانت عبارة عن دراسات استقصاء مقطعي وتقارير لحالات فردية ،والتي تعتبرذا مستوى متدني في التسلسل الهرمي للأدلة البحثية وكان الاعتداء الجسدي على الأطفال هو النمط الأكثرالمبلغ عنه لإساءة معاملة الأطفال حيث يقدر انتشاره بنسبة ٤٧٪. عوامل الخطر المرتبطة بشكل كبير بالاعتداء الجسدي على الأطفال هي وجود تاريخ سابق لتعرض الآباء للاعتداء الجسدي ، الوالدين الاصغر عمرا ، مشاهدة العنف المنزلي ضد أحد أفراد العائلة

reports which consider the low level of evidence studies based on the hierarchy of research evidence, physical child abuse was the most prevalent reported form of child abuse its prevalence estimated to be 47 %. The significant risk factors associated with physical child abuse were parents' history of physical abuse during their childhood, young age parent, witness to domestic violence within family members, parents with poor self-control, and Parents who did not own a house compared to parents who live in a rented house.

Conclusion:

Physical child abuse is the most commonly reported form of child abuse in Saudi Arabia, it has a high prevalence. Its risk factors are complex. However, many of these risk factors can be identified early. It is doable to initiate prevention programs, such as screening and counseling for parents of at-risk children and it can be implemented in all hospital service setting especially emergency department and primary health care.

Keywords:

Child abuse; physical abuse; risk factors;
Saudi Arabia

، وضعف التحكم في النفس والآباء الذين لم يكن لديهم تملك منزل مقارنة بالآباء الذين يسكنون في منزل مستأجر..

الخلاصة:

الاعتداء الجسدي على الأطفال هو الشكل الأكثرالمبلغ عنه لإساءة معاملة الأطفال في المملكة العربية السعودية ، حيث ينتشر بشكل كبير. حيث تعتبرعوامل الخطر له معقدة. ومع ذلك ، يمكن تحديد العديد من عوامل الخطر هذه في وقت مبكر. كما أنه من الممكن تطوير المبادرات والبرامج الوقائية مثل تقديم المشوره للآباء المعرضين لعوامل خطرالاعتداء الجسدي ضد الأطفال . كما يمكن تنفيذ هذه البرامج في أقسام المستشفى المختلفه وخاصة قسم الخدمات الطارئه والرعاية الصحية الأولية

Background:

Child physical abuse is defined as actions or inactions, which result in actual or potential physical harm, that is within the control of or preventable by the parent, career, or authorized person such as a school teacher [1].

Unfortunately, we noticed that physical child abuse globally, as well as within Saudi Arabia is underreported, there have been limited reports about the prevalence of physical child abuse in Saudi Arabia. Globally, many studies have been done to assess physical child abuse prevalence. A study has been done in the UK for almost there thousand adults reporting 21% they had physical abuse,11% they had sexual abuse (before age 16 years), 6% had neglected and 6% had emotional abuse. [2]

In 2002 the World Health Organization (WHO) recognized Child abuse and neglect as a global problem, manifested in different forms and deeply rooted in cultures. 3A cross-sectional study done in Yamen showed that the prevalence of physical child abuse is a common range

from 50-80% [6]

King Abdul-Aziz Medical city in Riyadh belongs to the ministry of the Saudi National Guard health affairs established the national family safety program [8]. The establishment of this program has led to an improvement in the reporting system for physical child abuse cases attending to health care facilities. Nevertheless, recent papers published in Saudi Arabia have reported a continuous increase in the number of such cases annually. [9]

In 2008, the hospital-based child protection teams project proposed by the national family safety program has been approved by the Saudi National Health Council even after, 39 CPTs have been founded in major hospitals across the 13 provinces of Saudi Arabia. [10]

Our recent literature review showed that Risk factors of physical child abuse are multiple and complex, they include parent history of physical child abuse during their childhood, poor coping skill of parent, stressed parent, domestic violence in the family, less educated parent, smoker parent, poor parent impulse control, a child with attention deficit hyperactivity disorders. [11,12]

This review aims to seek the contents of all relevant updated published articles and reports on physical child abuse in Saudi Arabia from scientific journals and to provide an overview of the extent of this issue and estimates of the prevalence of physical child abuse and its risk factors, identifying knowledge gaps for future research and prevention program development.

Methods:

Search Strategy:

This review was based on studies published in Saudi Arabia between 1991 to 2020. These were primarily observational, analytical studies (prevalence and incidence), case reports, and reviews from different Governmental hospitals.

Inclusion criteria:

1. Studies related to children less than 18-year-old of age
2. Prevalence studies of child abuse at home and in school in Saudi Arabia.
3. Studies on risk factors associated with physical child abuse.
4. Studies published in the English language only.

Electronic searches in the database were the main method of selecting the articles through the PubMed and google scholar. In addition to this, a manual search was also done on relevant books, journals, indexes, and abstracts to extract the required information.

Certain keywords defined the search criteria to make it more specific and accurate like child abuse, physical abuse, child mal-

treatment, corporal child abuse, risk factors, and Saudi Arabia.

PubMed Search with the following keywords: (child abuse) or (physical abuse) or (child maltreatment) or (corporal child abuse) and (risk factors) and
(Saudi Arabia)

A total of 36 articles were reached out by PubMed, in which 19 articles were flawed and they rejected based on inconclusive findings. Again, out of these 17 articles, 5 articles were excluded to include 12 articles on physical child abuse or its risk factors in Saudi Arabia.

Google Scholar search, we search with the following keywords:

"physical child abuse" "risk factors" in "Saudi Arabia" sorted by relevance 95 articles were researched out by google scholar which 62 articles were considered flawed and thus rejected based on inconclusive findings in them. From these 33 articles again 17 articles were excluded to include 16 articles on child abuse which were from Saudi Arabia.

Out of the total of 28 Articles that were searched out by PubMed and Google Scholar 13 articles were excluded because of duplication thus 15 articles were included on physical child abuse and its risk factors in Saudi Arabia.

Articles fulfilling the above criteria were first selected and their abstracts scanned to ensure that it is suitable for inclusion in the study.

The data extraction from the review articles was done based on a selection form. Having categories like title and type of study, demographic data, study population, year of publication, and conclusion.

Finally, an overall assessment of each article was maintained depend on included studies, based on their relevance and appropriateness of each study design and methods which have been used to the stated objectives.

Results:

Physical child abuse is an international prevalent phenomenon. Saudi Arabia has begun to recognize the existence of such a problem and this would be a good beginning to make it a focal point of substantial public and governmental attention. [9]

It has been noticed that in 1990, reporting for the first case of child abuse and neglect occurred in Saudi Arabia [4] however, most child abuse and neglect cases in Saudi Arabia were underreported by health care professionals. [5]

In 1991, an article was published by AlEissa described seven children ranging from five months to seven years of age attending a teaching hospital in Saudi Arabia who had suffered from child abuse and neglect[19]

Eleven reports from all over Saudi Arabia

reported 40 child abuse cases; 6 cases with neglect 24 with physical abuse, 4 with MSP cases, and 6 cases with sexual abuse. The fatal outcome was identified in 5 cases. [7]

In 1994, Kattan H, reported 3 physical child abuse cases, 4 cases of child neglect, and one case of sexual assault [7]

In 2007, Al-Mahroos FT, a study was done in Saudi Arabia, eleven case reports were reported, 40 child abuse cases,24 physical child abuse, 6 child neglect cases, and the same number of cases for sexual abuse and 4 Munchaian syndrome by proxy cases. Five children were with high fatal outcome. [6]

Furthermore, he noticed that the highest child abuse fatality rates in cases occurred among poor people pointing to a possible association between low income and child abuse. Less-educated parents, large families, and young parents' age and low family income have been suggested as probable risks. [6]

In 2010 Al Eissa reported that the most common form of child abuse in Saudi Arabia in the first (2000-2004) and second (2005-2006) period was physical abuse at 61% and 76%, respectively. It has been changed in the third (2007-2008) period to neglect 41.6%. perpetrators in most of the cases were Parents at 48.9%. Such a high case was due to mandatory reporting and data collection strategies. [18]

Osama et al, conducted a study in Dammam in 2012 to declare that the total of the child abuse case reports were 87 cases, including a majority of sexual abuse cases (74 cases) followed by other types of abuse like physical. The victim's mean age was 11.04 ±5 years. [20]

Al-Eissa et al, in the 2015 study included 2043 cases, they found the majority of cases of psychological abuse and neglect 1533 and 1021 cases respectively. They found 1175 physical child abuse cases. Lastly 287 sexual abuse cases. Thus, the incidence of physical abuse in this study was (57.5%,), exposure to violence (50.7%) [17]

Retrospectively chart review of case reports for files of the Child Protection Centre between 2009 and 2013 was published by Almuneef et al in 2016 in Riyadh showed the most common form of child abuse was Physical abuse (42%), which has been followed by child neglect (39%), however, child sexual abuse has been reported around (14%), and lastly child emotional abuse (4%) [13].

Nonworking fathers were 2.8 times as likely to use physical abuse toward their children. Besides, Children who live in single/ step-parent households were 4 times more to suffer physical abuse [13]

Almuneef et al, conducted a cross-sectional study including all regions of Saudi Arabia in 2017 which showed that physical

child abuse (42%) in this study. Witnessing domestic violence against any family member was the most common family dysfunction around (57%) and the least prevalent was living with a parent addicted to substance abuse around (9%) then Less parent's education level and lastly conflict in marital life. [16]

AlDosari et al conducted a study in Riyadh in 2017 which found that almost 18% of the parents used physical punishment for their children. [15]

Several risk factors were associated with physical child abuse, a parent's history of physical abuse during childhood, a witness of domestic violence, poor parent self-control, and a parent who did not own a home. Children will be more prone to physical child abuse child who has attention deficit hyperactivity disorders or child who is difficult to control. [15]

Another cross-sectional study was done in Al-Medina (Al Monawara) in 2017 which showed that children aged 12–16 years old estimated prevalence of physical abuse was estimated to be (72%). However, 42.5% of children (mean age: 9.67 years) were exposed to physical punishment. [14]

Table 1 showed a summary of all previous physical child abuse and its risk factors studies results conducted in Saudi Arabia.

Table 1: Review of published papers about the prevalence of physical child abuse and its risk factors in Saudi Arabia

Study Title	study design	Location of Study Population	Year of publication	Main Results
A study of child physical abuse	A cross-sectional	Al Medina (Al Monawara)	2017	Children aged 12–16 years old estimated prevalence of physical abuse was estimated to be (72%). However, 42.5% of children were exposed to physical punishment. [14]
Parents' perceptions about child abuse and their impact on physical and emotional child abuse: A study from primary health care centers in Riyadh, Saudi Arabia	A cross-sectional	Riyadh	2017	18% of parents estimated to experience physical punishment. significant risk factors associated with child abuse were parents' experience of physical abuse during their childhood, younger parent, poor self-control and witness domestic violence in household members and Parents who did not own a house. Child-related risk factors, a child who is difficult to control or has attention deficit hyperactivity disorder (ADHD). [15]

Study Title	study design	Location of Study Population	Year of publication	Main Results
Family profile of victims of child abuse and neglect in the Kingdom of Saudi Arabia.	Retrospectively from case files of the Child Protection Centre between 2009 and 2013. Case reports	Riyadh	2016	The most common form of child abuse was Physical (42%), followed by neglect (39%), Nonworking fathers were 2.8 times as likely to use physical abuse toward their children. Children who live in single/step-parent households were 4 times more to suffer physical abuse [13]
The impact of Adverse Childhood Experiences on social determinants among Saudi adults	A cross-sectional, national study	All region of Saudi Arabia	2017	Estimated prevalence of physical child abuse (42%) . Witnessing domestic violence against any family member was most common family dysfunction around (57%) and the least prevalent was living with parent addicted to substance abuse around (9%) then Less parent's education level and lastly conflict in marital life. [16]
Determining child maltreatment incidence in Saudi Arabia using the ICAST-CH: A pilot study	A cross-sectional study	Al-Kharj city in 2011–2012	2015	The prevalence of physical abuse (57.5%,), exposure to violence (50.7%) [17]
Child abuse and neglect in Saudi Arabia: a journey of recognition to implementation of national prevention strategies.	A retrospective collection of data from 2000 to 2008 of case reports	Riyadh	2010	The most common form of child abuse in Saudi Arabia in the first (2000-2004) and second (2005-2006) period was physical abuse at 61% and 76%, respectively. It has been changed in the third (2007-2008) period to neglect 41.6%.[18]
Child abuse and neglect in the Arab Peninsula.	Case Reports	Saudi Arabia	2007	Eleven case reports from Saudi Arabia identified 40 abused children; 24 with physical abuse. Fatal outcome was documented in 5 children.[6]
Child Abuse in Saudi Arabia: Report of Ten Cases	Case Reports between 1986 and 1992	Riyadh, Saudi Arabia	1994	Three out of ten children suffered varying degrees of physical abuse, 4 neglect [7]
The Battered child syndrome, Dose it exists in Saudi Arabia?	Case Reports between 1987 and 1991	Riyadh, Saudi Arabia	1991	Seven cases of physical child abuse.[19]

Discussion:

This review summary showed that most child abuse studies that have been published in Saudi Arabia were cross-sectional studies and case reports, the most common form of child abuse was physical abuse, its prevalence estimated to be 47 %.[13, 17] The significant risk factors associated with physical child abuse were parents' history of experience of physical abuse during their childhood, the witness of domestic violence in household family members, poor parent self-control, and the parent who did not own a home and young parent. [13, 17]

Several methodological issues need to be discussed. Limitations for this review, it limited results to within Saudi Arabia and in English language only.

The studies in this review were done on the parent and their children in different regions of Saudi Arabia, who shared a similar background and socioeconomic status. So, we cannot generalize studies results to all other parents

Strength for this review to our knowledge, this study is the first review specifically about Physical child abuse & its risk factors in Saudi Arabia in the last two years. Searching in PubMed database which is one of the major Databases for a high quality of research in medicine and health sciences

When we compare our review, results reported percentage of physical child abuse in Saudi Arabia is similar to physical abuse prevalence reported by the National Longitudinal Study of Adolescent Health study from the United States that prevalence of physical assault and neglect (40.2%) [22]

A study conducted in England and Wales by Michelle Degli Esposti et al in 2019 showed that Physical abuse was the primary reason (8900 [33%] of 27 100 registrations) for a child being placed on a child protection register in 1988–99, then the primary reason became neglect in 2000–16 [23]

Interesting there was an association between the parent who did not own a house and corporal punishment of their children in a study in 2017 in Riyadh by AlDosari et al, it might be an indicator of the low income of the parent. [15]

Whipple et al., found that child physical abuse is associated with stressful life events, parenting stress, and emotional distress. [28] Besides, many stressful situations like anxiety, or depression, may exaggerate the emotional characteristics of the family members affected which may also increase the level of family conflict and abuse. [29]

The National Family Safety Program (NFSP) reported that Physical maltreatment and neglect were slightly more com-

mon among boys. [21]

Several risk factors for child abuse have been identified by (NFSP) based on their report in 2016 including 159 (26.3%) cases of divorced parents, 104 (17.2%) of family dysfunction, 66 (10.9%) large family size-more than 6 members, 51 (8.4%) young child's age, 33 (5.4%) poor parental skills, 32 (5.3%) drug abuse, 26 (4.3%) chronic illness/disability of the child, 24 (4%) domestic violence, 19 (3.1%) chronic illness/ disability of parents. Also, there were 14 (2.3%) for false social beliefs, 13 (2.1%) young parents, 9 (1.5%) unemployment, 8 (1.3%)

parents' death, and 5 (0.8%) peer violence. There were 42 (6.9%) registered cases with unknown risk factors recognized by child protection teams. [21]

AlDosari M. et al study in 2017 in Saudi Arabia found that parent who using physical punishment toward their children were younger at least five years compared with who did not use physical punishment. [15]

Schumacher et al. study showed that inconclusive results about parent age as risk factors for physical child abuse (24) several other studies showed younger mothers more prone to physical abuse their children compare with old mothers. [25, 26]

This review showed that parent's childhood history of physical abuse, they were more likely to use physical abuse toward their children. 15 It similar to the previous study in the United States of America that approximately 33% of those exposed to physical abuse during their childhood will expose their children to physical abuse 27

Implications: as it was shown in the review physical child abuse is prevalent in Saudi Arabia and the causes of physical child abuse are complex. However, early identification of risk factors of physical child abuse can help to develop initiatives for prevention, for example, screening and counseling for the high-risk parent who might physically abuse their children and can be put in primary care practice. Risk factors of Physical child abuse include a wide range of services such as the promotion of community awareness, support of parent education, and home visit for audiences ranging from the general public to individuals who have abused or neglected a child.

It is recommended to have family education programs in primary health care for a newly married couple in addition to community support-based services.

It's advised that based upon this review special attention for those parents who have been physically abused during their childhood as it has been found it is a significantly associated risk factor for them to be hit or physically abuse their children. [15]

We support the idea of parents screening

for child physical abuse risk factors in hospital-based (inpatient) or outpatient setting or any child with early sign of violence to have easy convenient access to the resource in healthcare setup or governmental sector to connect an at-risk individual with appropriate support services like social protection in the ministry of social affairs. Our conclusions, physical child abuse is the most common type of child abuse in Saudi Arabia, it has a high prevalence. Its risk factors are complex. However, many of these risk factors can be identified early. It suggested to have prevention initiatives, like proper screening tools for parents at-risk children and it can be implemented in all hospital service setting especially emergency department and primary health care.

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Review Article :

Pulmonary Rehabilitation for Patients Post Severe COVID-19:A Literature Review

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Abstract

Background & Aims:

The overall understanding of the clinical outcomes and prognostic factors among patients discharged from hospitals following the acute phase of COVID-19 is still limited. Thus, there is still considerable debate regarding whether patients discharged from the hospital after a severe COVID-19 infection have fully recovered or whether they retain permanent lung damage or experience fibrotic lung changes. Many recommendations regarding respiratory rehabilitation in the post-acute phase have been published. Still, the efficacy of those published recommendations is unclear. This review has shed light on the need for more evidence of the beneficial effects of pulmonary rehabilitation programs on patients recovering from COVID-19 and their role in ensuring that this population can resume a functional life. Most of the evidence assessing the impact of pulmonary rehabilitation programs on COVID-19 survivors has been published as reports by various organizations and pulmonary rehabilitation committees, although there have been a few prospective cohort and cross-sectional studies. However, to produce findings that can be translated into practice, the challenges inherent to this

الملخص

الخلفية و الاهداف :

لايزال الاستيعاب العام لمرض كوفيد-١٩ والذي يسببه فيروس كورونا محدودا من ناحية معرفة المضاعفات الإكلينيكية المصاحبة للمرضى المتعافين منه والذين خرجوا من المستشفيات. حيث مازال هناك جدل واسع في مجال الابحاث العلمية عن احتمالية حدوث تغيرات فسيولوجية لأنسجة الجهاز التنفسي للأشخاص الذين تعافوا من الإصابة بفيروس كوفيد-١٩ الحاد والذي من الممكن ان يؤدي الى تليف في انسجة الرئة. لذلك تم نشر العديد من التوصيات من جهات مختصة تتعلق بأهمية التأهيل الرئوي للمرضى المتعافين من الإصابة بكوفيد-١٩. ومع ذلك لا توجد دراسات كافيه حول تأثير برامج التأهيل الرئوي في تحسين الوظائف التنفسية. تم في هذه الدراسة الحالية مراجعة الدراسات الوبائية المنشورة التي درست تأثير برامج التأهيل الرئوي في تحسين جودة الوظائف التنفسية للمرضى الناجين من كوفيد- ١٩. وتشير نتائج هذا التقرير الى أن اغلب الأدلة عباره عن تقارير من قبل منظمات ولجان طبية في مجال الرعاية التأهيلية مع قلة وجود ابحاث منهجية علميه في هذا المجال. وذلك يرجع الى وجود بعض التحديات في مجال الابحاث المتعلقة بالرعاية التأهيلية التي يجب أن تدرس بشكل كافي منها خطر التعرض للإصابة والحظر الوبائي والتباعد الجسدي. مثل هذه العوامل تشكل عائقا امام تنفيذ الدراسات في هذا المجال. لذلك هناك المزيد الذي من الممكن تقديمه في مجال التأهيل الرئوي لزيادة استيعاب الاثار طويلة المدى المتعلقة بفهم مرض كوفيد-١٩ وايضا في سياق أي جائحة عدوى تنفسيه في المستقبل.

line of research need to be addressed. Specifically, the extant risk of infection, quarantine times, and physical barriers rules have added more challenges to the implementation of pulmonary rehabilitation sessions. Overall, this field still has much to accomplish in the future to fully understand the long-term outcomes of COVID-19, also in the context of any future respiratory infection pandemic.

Key words:
COVID-19, pulmonary rehabilitation.

INTRODUCTION:

Since the beginning of the coronavirus disease 2019 (COVID-19) pandemic with the first outbreak in China, the relevant literature has focused on the disease's epidemiology, diagnostic testing, and treatment modalities as well as the cardiopulmonary complications of patients with COVID-19, particularly those admitted to hospital [1–3]. With the ongoing pandemic, the overall understanding of the clinical outcomes and prognostic factors among patients discharged from hospital following the acute phase of COVID-19 is still limited [4,5]. Current evidence suggests that COVID-19 patients may complain from respiratory, physiological, and psychological impairment after hospital discharge [4]. Furthermore, research has shown that around one-third of COVID-19 patients had severe respiratory failure and acute respiratory distress syndrome (ARDS), which can lead to persistent respiratory and physical impairment [6]. Thus, lung tissue alterations, such as consolidation, thickening of the vascular wall , and pleural effusion have been reported among acute COVID-19 pneumonia patients [7]. Finally, the increased risk of intensive care unit (ICU) acquired weakness has also been discussed in the literature as patients who experience severe respiratory failure end up on a mechanical ventilator and have extended ICU or hospital stays [8]. Despite this substantial body of research, there is still considerable debate regarding whether patients discharged from the hospital after a severe COVID-19 infection have fully recovered or whether they retain permanent lung damage or experience fibrotic lung changes. Studies have shown that up to 30% of patients who recover from severe COVID-19 pneumonia continue to experience breathlessness and require supplementary oxygen [9]. While there is conflicting evidence regarding the actual pathophysiological mechanism through which a COVID-19 infection can predis-

pose a patient to lung fibrosis, a meta-analysis suggested that a chronic viral infection can induce a mild and long-latency inflammatory response that contributes to the fibrotic response 10. In line with this, other studies have reported that ARDS can predispose patients to lung fibrosis; as a COVID-19 infection can cause ARDS, there is thus a risk of fibrosis, even after recovery [11].

Owing to the respiratory complications as a sequela of severe COVID-19 pneumonia, many recommendations have been published regarding respiratory rehabilitation in the post-acute phase. However, the efficacy of these recommendations is unclear. In addition, few studies have examined the effectiveness of pulmonary rehabilitation programs in the context of COVID-19, and thus, much of the published literature on this topic comprises editorial letters or recommendations from rehabilitation societies or organizations. Against this backdrop, the current report reviews published articles addressing pulmonary rehabilitation in patients with COVID-19 and highlighting the benefits of such rehabilitation for patient outcomes.

Pathophysiology mechanisms of COVID-19 infection to lung injury:

The virus that responsible for COVID-19 disease, SARS-CoV-2, is an enveloped virus. It infects the host cells through a series of viral spike proteins attached to the receptor on the host called angiotensin-converting enzyme-2 (ACE2) [12–14]. Then, endocytosis occurred in which the viral genome is released into the host cell to establish the synthesis of the viral RNA through changes in the endoplasmic reticulum of the infected cell [15]. Research has provided a list of host cells targeted by the SARS-CoV-2 virus, including type II pneumocytes, alveolar macrophages in the lungs, and basal epithelial cells in the nasal passages[5]. Many research identified different mechanism that activate proinflammatory and profibrotic pathways in the host cell after SARS-CoV-2 invasion [16,17]. Thus, a reduction in the host cell ability to balance the renin-angiotensin system (RAS) is occurred as result of reduction in the expression of ACE2 that caused by cleavage of SARS-CoV-2 spike proteins18. Therefore, when the RAS is reduced at the cellular level, an increase in the activation of interleukin (IL)-6 and tumour necrosis factor-α (TNFα) occurred as well as the increase in recruitment of neutrophils and macrophages. This series of action cause direct endothelial cell injury16,18. Biological research have listed IL-2, IL-7, IL-10, and TNFα as inflammatory cytokines which increased in COVID-19 patients[19–21].In addition , cellular injury occurs as result of viral replication and simu-

lation of the immune response of infected cell,. This results in altered cell function and demise of type II alveolar epithelial cells, which suggested to be responsible for the beginning of the development of pulmonary fibrosis[21,22].

In terms of the disease severity, different SARS-CoV-2 infection phenotypes have been identified based on clinical and radiological characteristics [23]. The first, Phenotype-1 is the most common and is characterized by mild respiratory symptoms, a normal chest radiograph, and the absence of hypoxemia; symptomatic treatment is used for such patients. Phenotype-2 is characterized by the presence of hypoxemia or multiple small ground-glass opacities on the chest radiograph. These patients require close respiratory monitoring because they may progress to Phenotype-3, which presents more significant hypoxemia, higher respiratory rates, and high IL-6 and other inflammatory marker levels [23]. This type also requires close monitoring as patients may need to be intubated. Phenotype-4 is characterized by alveolar edema and normal/low lung compliance, meaning patients have severe hypoxemia requiring intubation [23,24]. Treatment should include tidal volumes of 6 mL/kg PBW and moderate-to-high positive end-expiratory pressure (PEEP) as well as lateral or prone positioning. Phenotype-5 is characterized by an ARDS-like appearance, and management should follow standard ARDS guidelines. A protective ventilatory strategy and prone positioning are indicated [23,24].

Thus, the majority of patients with a severe manifestation of COVID-19 required respiratory support and ICU admission, where 88% of those required assisted ventilation by a mechanical ventilator25. There is a lack of consensus in the data regarding the respiratory mechanics and optimal mechanical ventilator setting in patients admitted to ICU for COVID-19 associated respiratory failure3,26. Intubated patients with severe COVID-19 disease were placed on with high PEEP, increasing barotrauma incidence [27]. Studies suggest that COVID-19 patients who progressed to ARDS have oedema and atelectasis, which cause a change in lung volumes, resulting in over distention of the lung (called volutrauma), or an increase in the strain of the ventilated alveolar space (called atelectraum). Additionally, the alteration in lung tissue due to the pathological process of severe COVID-19 causes friability of the lung parenchyma and subsequently increases the risk of lung fibrosis [27].

Pulmonary rehabilitation for post-COVID-19 infection:

Pulmonary rehabilitation, in general, considers a critical component in the manage-

ment approach to enhance the shortness of breath and exercise tolerance, and ultimately the health status of patients with chronic lung disease[28]. The primary strategy of pulmonary rehabilitation programs is exercise training, education, and behaviour changes. All those strategies improve physical and psychological well-being, therefore promoting the long-term health quality of life [29]. Different health settings utilize different approaches and structures of pulmonary rehabilitation programs; however, all programs share the key components of training include: endurance, interval, resistance/strength exercise of upper and lower limbs, walking, and self-management training. Most of those sessions usually implemented through outpatient programs 30. Since the pulmonary rehabilitation program includes many sessions for a long period, patient adherence is the major issue to achieve such a program's effectiveness [31].

The need for pulmonary rehabilitation in COVID-19:

The need for pulmonary rehabilitation for COVID-19 patients has been discussed in the literature. Specifically, during the acute phase of a severe COVID-19 infection, patients receive intensive medical management, including prolonged mechanical ventilation, sedation, and neuromuscular blocking agents. This intensive medical management is considered a risk factor for developing post-intensive care weakness [32]. Studies have shown that many patients referred to pulmonary rehabilitation programs after severe COVID-19 have symptoms common to other ICU patients, including dyspnea, anxiety, prolonged pain, and reduced physical function and quality of life [33].

Consistent with SARS infection outcomes, many studies have hypothesized that the lung tissue damage and alteration that occur in severe COVID-19 may cause various degree of physical dysfunction[34]. Therefore, experiences with pulmonary rehabilitation in post-SARS patients provide supportive evidence for the implementation of pulmonary rehabilitation programs for COVID-19 patients [35]. Therefore, COVID-19 patients tend to have the same problems as patients with chronic lung disease; however, COVID-19 patients, the need for a pulmonary rehabilitation program is critical to overcome breathlessness and fatigue, improve physical performance, and subsequently enhance the quality of life [36]. The main goal of pulmonary rehabilitation programs for COVID-19 survivors is usually endurance as these patients had a prolonged hospital stay and are thus at risk of developing ICU acquired weakness[8,28]. Moreover, as dyspnea and a high respiratory rate are known predictors of

severe disease or death, it is important to continue monitoring such patients closely. While many pulmonary rehabilitation programs focus on endurance, there is a need for more research on how to best quantify patients' endurance level as part of an outcome assessment[37]. Meanwhile, many patients with COVID-19 require supplemental O2 for post-acute rehabilitation, and thus a secondary goal in rehabilitation programs is to wean them off O2. Third, prolonged bed rest and immobility contribute to the loss of strength, and studies have indicated that patients with COVID-19 have a greater muscle mass loss compared to pathologies with similar ICU and bed rest time[38]. This may be due to specific COVID-19 loads, the impact of the prolonged lack of muscle tissue oxygenation, and the physiological reaction to longer periods of increased respiratory rate and heart rate along with decreased PaO232. Finally, there is the issue of independence: most patients are discharged as early as possible to free up ICU and hospital beds, meaning that the patients may not yet be fully independent at home[39].

With the growing body of evidence showing that COVID-19 survivors have pulmonary sequelae after the acute phase of the infection, an increasing number of studies have investigated the clinical outcomes among COVID-19 survivors, especially concerning the long-term effects [35,39,40]. In relation to the abovementioned points on the functional deficits post COVID-19, various associations and committees have published recommendations for inpatient and outpatient pulmonary rehabilitation[37,41–43]. Those recommendations have been utilized as essential clinical practice guidelines for effectively managing severe COVID-19 with ICU support. However, the main challenges for pulmonary rehabilitation, which mainly take the form of inpatient sessions, are the limited numbers of therapists compared to the number of patients as well as existing infection and hygiene measures, especially if the patients are isolated [44].

Reviewing the published research:

Most of the evidence assessing the impact of pulmonary rehabilitation programs on COVID-19 survivors has been published as reports by various organizations and pulmonary rehabilitation committees, although there have been a few prospective cohort and cross-sectional studies [36,39,40,44]. Thus, the guidelines and recommendations for implementing pulmonary rehabilitation programs in the COVID-19 era have primarily come from organizations [41–43,45,46]. Table 1 present the published studies on the effective of pulmonary rehabilitation on COVID-19 patients. At the beginning of the COVID-19 pandemic, several stud-

ies described the short-term effects of inpatient pulmonary rehabilitation for patients with severe COVID-19 infection admitted to ICU and placed on mechanical ventilation. For example, a cross-sectional survey recruited post-COVID-19 patients referred to a rehabilitation unit in Italy and assessed their pulmonary function and disability status 36. The study shared the experience of their pulmonary rehabilitation program and stressed the clinical importance of pulmonary rehabilitation programs for COVID-19 patients in the early stages of recovery [36].

In 2020, Spielmann et al. described the effect of a three-week standardized inpatient pulmonary rehabilitation program for hospitalized COVID-19 patients and compared their outcomes to the outcomes of patients who had other lung diseases and had undergone a similar pulmonary rehabilitation program in 2019 [47]. The study found improvements in physical performance, measured by Functional Independence Measure (FIM) and 6 Minute Walk Test (6-MWT), among hospitalized COVID-19 patients. This finding provides emerging evidence regarding clinical and functional improvements for severe COVID-19 and highlights the importance of post-acute pulmonary rehabilitation for COVID-19 recovery [47]. Other studies have indicated that the length of time on ventilation, level of sedation, and function after extubation are the most important indicators of long-term recovery48. Furthermore, Puchner et al., who conducted a cohort study to assess the status of COVID-19patients enrolled in a pulmonary rehabilitation program, showed that more than 50% of their sample had pathological Forced expiratory volume in 1 second (FEV1), Forced vital capacity (FVC), and Total lung capacity (TLC) below < 80%. That study also found that 83% of study participants still showed reduced diffusing capacity of the lungs for carbon monoxide(DLCO) at the end of the rehabilitation program [40].

Beyond this, many studies have reported that patients have reductions in their maximum inspiratory pressure and diffusion capacity measures within the first year following their discharge from ICU [49]. Those reductions in respiratory function manifest as increased work of breathing and an effective cough [50]. Mo et al. found that patients discharged from hospital after severe COVID-19 pneumonia had impaired lung diffusion capacity and complained of dyspnea, chest pain, and general fatigue for weeks after hospital discharge [51]. Moreover, another study reported that COVID-19 survivors who were referred to a pulmonary rehabilitation program still had residual infiltrates of the lung, which possibly progressed to fibrosis, leading to

a limitation in gas exchange [41,52]. The study further highlighted that COVID-19 survivors require close monitoring of their lung function and residual capacity to monitor changes in FEV1, FVC, FEV1/FVC%, and DLCO% 41. Additionally, respiratory and aerobic exercises has shown promise in helping to enhance endurance and quality of life of COVID-19 patients in addition to reduction in the anxiety and depression level [53].

Meanwhile, there is limited clinical trial-based evidence regarding pulmonary rehabilitation for COVID-19 survivors. One randomized-controlled trial (RCT) assessed the effectiveness of a 10-min pulmonary rehabilitation session for six weeks on respiratory function, Health-related quality of life (HRQoL), mobility, and psychological function among elderly COVID-19 survivors discharged from hospital 39. The study's findings showed an improvement in respiratory function (FEV1/FVC), HRQoL, and in level of anxiety among their patients.

Recently, a scoping review highlighted pulmonary rehabilitation in COVID-19 patients, underlining the lack of data on this topic, although the recommendations published by various societies highlight the benefits of early pulmonary rehabilitation program initiation [54]. The review strongly suggests implementing a plan for multidisciplinary rehabilitation programs to prevent the development of long-term consequences of COVID-19.

Table 1: Epidemiological studies that have been carried out to assess the impact of pulmonary rehabilitation programs on COVID-19 survivors.

Study author	Type of study	Study population	Main Finding
Curci C et al.[36]	Cross-sectional study	Post-acute COVID-19 patients in Italy	Patients suffered from dyspnea and shortness of breath for minimal activities. This caused disability, and few of the study population were able to perform 6-MWT in which they have poor results.
Spielmanns M et al.[45]	Cohort study	post-COVID-19 patients referred to pulmonary rehabilitation in 2020 compared to patients with other lung diseases in 2019	Comprehensive pulmonary rehabilitation resulted in improvement in -MWT and FT
Puchner B et al[38]	cohort study	Patienst discharged after severe to critical COVID-19 infection	83% of all study participants still reduced the DLCO at the end of the rehabilitation program
Liu K et al.[39]	Quasi-experimental study	Elderly COVID-19 survivors, weaned off from mechanical ventilation and discharged from hospitals in China	Pulmonary rehabilitation over 6 weeks reulsted in Improvement in respiratory function (FEV1/FVC), QoL, level of anxiety, physical function (SF-36).

CONCLUSION:

This review has shed light on the need for more evidence of the beneficial effects of pulmonary rehabilitation programs on patients recovering from COVID-19 and their role in ensuring that this population can resume a functional life. However, to produce findings that can be translated into practice, the challenges inherent to this line of research need to be addressed. Specifically, the extant risk of infection, quarantine times, and physical barriers rules have added more challenges to the implementation of pulmonary rehabilitation sessions. In response to this, there has been much discussion of the role of home-based telemedicine in pulmonary rehabilitation 55,56. Overall, this field still has much to accomplish in the future to fully understand the long-term outcomes of COVID-19, also in the context of any future respiratory infection pandemic.

Key Points:

• Research suggested that chronic viral infection can induce an inflammatory response that contributes to the fibrotic response.

• The is a lack of solid evidence on the impact of pulmonary rehabilitation programs on COVID-19 survivors.

• Most of the studies highlighted the challenges to the implementation of pulmonary rehabilitation sessions.

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Guidelines for Manuscript Preparation

A. TYPES OF MANUSCRIPTS

I. ORIGINAL MANUSCRIPTS

Manuscripts submitted in this category are expected to be concise, well organized, and clearly written.
The maximum length is 5000 words, including the abstract, references, tables, and figure legends. The maximum length is 5000 words, including the abstract, references, tables, and figure legends.

- The structured abstract must not exceed 250 words.
- The title must not exceed 130 characters.
- A maximum of 4 tables and 4 figures is allowed.
- References should not exceed a maximum of 100.
- The abstract must be organized as follows:
- Background & Aims
- Methods
- Results
- Conclusions
- Do not use abbreviations, footnotes or references in the abstract.
- An electronic word count of the abstract must be included.
- Three to ten key words at the end of the abstract must be provided.

The manuscript must be arranged as follows:

- Title page
- Abstract
- Introduction
- Materials and methods (or Patients and methods)
- Results
- Discussion
- Acknowledgements
- References
- Tables
- Figure legends
- Figures

Acceptance of original manuscripts will be based upon originality and importance of the investigation. These manuscripts are reviewed by the Editors and, in the majority of cases, by two experts in the field. Manuscripts requiring extensive revision will be at a disadvantage for publication and will be rejected. Authors shall be responsible for the quality of language and style and are strongly advised against submitting a manuscript which is not written in grammatically correct English. The Editors reserve the right to reject poorly written manuscripts even if their scientific content is qualitatively suitable for publication. Manuscripts are submitted with the understanding that they are original contributions and do not contain data that have been published elsewhere or are under consideration by another journal.

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Review articles on selected clinical and basic topics of interest for the readers of the Majmaah Journal of Health Science will be solicited by the Editors. Review articles are expected to be clear, concise and updated.

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- Review articles must be accompanied by a title page and a summary.

- Reviews should include at least one Key Point Box, with a maximum of 5 bullet points, that briefly summarizes the content of the review.

Review articles are reviewed by the Editors and may be sent to outside expert reviewers before a final decision for publication is made. Revisions may be required.

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This section consists of invited brief editorial comments on articles published in the Majmaah Journal of Health Science

The length of an editorial should not exceed 1500 words, excluding references.

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Letters to the Editor will be considered for publication if they are related to articles published in recent issues of Majmaah Journal of Health Science. Occasionally, Letters to the Editor that refer to articles not published in Majmaah Journal of Health Science will be considered.

The length of a Letter to the Editor should not exceed 800 words.

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- References should not exceed a maximum of 10.
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B. MANUSCRIPT SUBMISSION

ORGANIZATION OF THE MANUSCRIPT

- The submitted manuscript must be typed double-spaced throughout and numbered (including references, tables and figure legends). Preferably using a "standard" font (we prefer Times/Arial 12).
- For mathematical symbols, Greek letters, and other special characters, use normal text. The references must be in accordance with the Vancouver reference style (see References).
- Approved nomenclature for gene and protein names and symbols should be used, including appropriate use of italics (all gene symbols and loci, should be in italics) and capitalization as it applies for each organism's standard nomenclature format, in text, tables, and figures.
- Full gene names are generally not in italics and Greek symbols are not used. Proteins should not be italicized.
- Improperly prepared manuscripts will not be entered into the peer review process and will be sent back to the author for correction.

TITLE PAGE MUST CONTAIN:

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- Running title (not to exceed 60 characters)
- Names of the Authors as it should be published (first name, middle initial, last name)
- Affiliations of all authors and their institutions, departments, or organizations (use the following symbols in this order to designate authors' affiliations: *, †, ‡, §, ¶, ||, #, **, ††, ‡‡, §§, ¶¶, || ||, ##).
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Animal trials: Manuscripts reporting experiments using animals must include a statement giving assurance that all animals received human care and that study protocols comply with the institution's guidelines. Statistical methods used should be outlined.

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REFERENCES

References must be in accordance with the Journal of Hepatology reference style. References are ordered as they appear in the text and citation numbers for references are placed between "brackets" ("[ ]") in the text as well as in the reference list.

Authors should be listed surname first, followed by the initials of given names (e.g. Bolognesi M). If there are more than six authors, the names of the first six authors followed by et al. should appear.
Titles of all cited articles are required. Titles of articles cited in reference list should be in upright, not italic text; the first word of the title is capitalized, the title written exactly as it appears in the work cited, ending with a full stop. Journal titles are abbreviated according to common usage, followed by Journal years, semicolon (;) before volume and colon (:) before full page range (see examples below).

All articles in the list of references should be cited in the text and, conversely, all references cited in the text must be included in the list.

Personal communications and unpublished data should be cited directly in the text by the first Author, without being numbered. Please make sure you have the latest, updated version of your reference management software to make sure you have the correct reference format for Majmaah Journal of Health Science.

An example of how references should look within the text:

"HVPG was measured by hepatic vein catheterization using a balloon catheter according to a procedure described elsewhere [14, 15] and used as an index of portal hypertension [16]."

An example of how the reference list should look:

[14] Merkel C, Bolognesi M, Bellon S, Zuin R, Noventa F, Finucci G, et al. Prognostic usefulness of hepatic vein catheterization in patients with cirrhosis and esophageal varices. Gastroenterology 1992;102:973-979.

[15] Groszmann RJ, Wongcharatrawee S. The hepatic venous pressure gradient: anything worth doing should be done right. Hepatology 2004;39:280-282.

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A maximum of 4 figures is allowed

(This can be modified if needed by Editorial board).

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- • Furthermore, panel lettering should be in Arial bold 14 pt, capitalized and no full stop (A, B) while lettering in figures (axes, conditions), should be in Arial 8 pt, lower case type with the first letter capitalized and no full stop. No type should be smaller than 6 pt.

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A maximum of 4 tables is allowed

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- Tables should be provided as Word files (*.doc) or Illustrator/InDesign (*.ai, *.eps, *.indd) compatible files. No TIFF and JPG files are acceptable for table submission.
- When submitting tables in Microsoft Word table function, no tab, space or colors should be used. Tables should contain a maximum of 10 columns.
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- Figure legends should be listed one after the other, as part of the text document, separate from the figure files.
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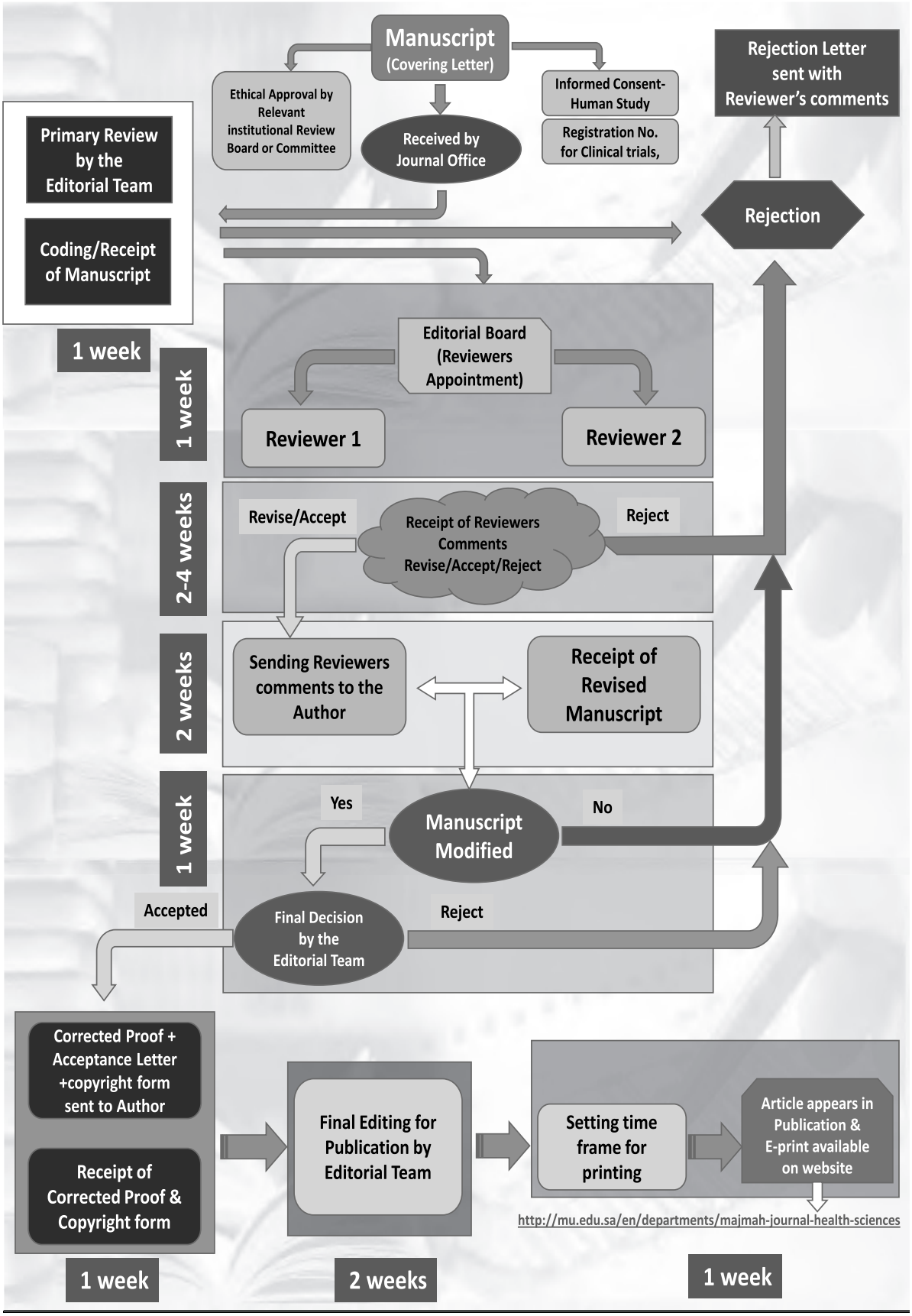
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