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Awareness of life style related diseases and their risk factors among diabetes mellitus and hypertension patient visiting secondary hospitals in Saudi Arabia

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ABSTRACT

Background and introduction: Hypertension and diabetes are silent killers globally, and they're a big risk factor for other diseases including cardiovascular disease and kidney diseases. Based upon statistics by the World Health Organization, approximately 80% of the 17 million CV deaths worldwide in 2003 occurred in developing countries. As a result of that we aimed to determine the level of awareness of life style related diseases and their risk factors among diabetes mellitus and hypertension patients. *Objective:* to assess the level of awareness of lifestyle-related diseases and their risk factors among diabetes and hypertension patients visiting secondary hospitals in the Qassim region. *Methodology*: A cross-sectional, questionnaire based survey conducted in 320 diabetes and hypertension patients in Qassim region, Saudi Arabia. *Results:* Majority of the participants fell in the age group of 61-70 years (27.5% in hypertensive group and 39.4% in diabetic group). (138) of the hypertensive participants correctly answered that HTN is a disease, (142) knew that high blood pressure affects the heart, (136) knew that diet rich in salt is a major cause of HTN. In diabetic group, (112) correctly answered that DM is a condition in which body contains, (118) knew that diabetes can be cured by diet and exercise, (143) knew the accurate method of monitoring diabetes. *Conclusion:* both groups have acceptable understanding and awareness on HTN, DM and comorbidities. Education was found to have a great role in awareness.

Keywords: hypertension (HTN), diabetes mellitus (DM), Knowledge, awareness

1. INTRODUCTION

Cardiovascular diseases are the foremost root cause of mortalities globally (Mustaqeem et al., 2015). Physical activity is recognized having a comprehensive marked effect on obesity and further biological cardiovascular disease (CVD) risk factors for instance high waist circumference, dyslipidemia and high blood pressure (Hu et al., 2004). Physical inactivity is considered as a CVD risk factor itself, since prospective epidemiological studies find a contrary relationship between physical activity level and cardiovascular diseases as well as all-cause mortality. However, in many of these studies the calculations of physical activity are rough estimates that do not allow a detailed exploration of the association between activity level and risk factors. In conformity with this, the magnitude and type of the relation between physical activity level and CVD risk factors differ considerably between studies (Erlichman et al., 2002). Sedentary lifestyle and obesity are significant lifestyle-related public health problems all across the world the world (Pate et al., 1995). Physical inactivity and excess body mass are linked to a number of health-related risk factors, and are also considered as autonomous risk factors for cardiovascular disease (CVD), type 2 diabetes (Aadahl et al., 2007).

The prevalence of inactivity and obesity, and their gloomy health results, are hastily increasing in both developed and developing countries (Blair et al., 2001). Several modern assessments have analyzed the link between physical activity with CVD, cancer and all-cause mortality (Haffner et al,. 1998). The result was ended with that individuals who report balanced regular physical activity are less vulnerable than sedentary individuals to die from coronary heart disease. Cardiovascular disease and diabetes are well-defined clinical entities with a high mortality rate and require instant intervention (Smith et al., 2001; Tahir et al., 2018; Turkistan et al., 2020). Therefore, this study aims to measure the awareness level of lifestyle related diseases among patients of diabetes and hypertension, also the relationship between cardiovascular related risk factors and cardiovascular morbidities.

Research questions

Main question

What is the level of awareness of life style related diseases and their risk factors among diabetes mellitus and hypertension patients visiting secondary hospitals in Qassim region?

Sub-questions

Is there a relationship between knowledge, attitude and practice of diabetes mellitus and hypertension patients and their dietary habits during the day?

Is there a relationship between knowledge, attitude and practice of diabetes mellitus and hypertension patients and their smoking habit during the day?

Is there a relationship between knowledge, attitude and practice of diabetes mellitus and hypertension patients and physical exercise habits during the day?

Research Hypotheses

Main Hypotheses

There is a level of awareness of life style related diseases and their risk factors among diabetes mellitus and hypertension patients visiting secondary hospitals in Qassim region.

Sub- Hypotheses

There is a relationship between knowledge, attitude and practice of diabetes mellitus and hypertension patients and their dietary habits during the day.

There a relationship between knowledge, attitude and practice of diabetes mellitus and hypertension patients and their smoking habit during the day.

There is a relationship between knowledge, attitude and practice of diabetes mellitus and hypertension patients and physical exercise habits during the day.

Research objectives

Main objective

To determine the level of awareness of life style related diseases and their risk factors among diabetes mellitus and hypertension patients visiting secondary hospitals in Qassim region.

Sub-Hypotheses

To determine the relationship between knowledge, attitude and practice of diabetes mellitus and hypertension patients and their dietary habits during the day

To determine the relationship between knowledge, attitude and practice of diabetes mellitus and hypertension patients and their smoking habit during the day.

To determine the relationship between knowledge, attitude and practice of diabetes mellitus and hypertension patients and physical exercise habits during the day

2. METHODS

A cross sectional survey was conducted among patients of diabetes and hypertension in secondary hospitals. Target population is the diabetes and hypertension patients in Qassim region, Saudi Arabia. The study was conducted between June 2020 and Aug 2021. The sample was taken randomly from hospitals. The sample size was calculated based on estimated proportion of 50% among the population with 5% margin of error at 95% level of confidence. The equation of sample size determination is as follow: $n = Z^2\ p\ q / e^2$. n= sample size, Z: standard normal deviate =1.96, P (the prevalence) = 50% Margin of error =0.1, the sample turns to be 320 patients. This sample was planned to be collected over a three-month period. As a data collection instrument, a structured questionnaire developed from prior investigations was used and was distributed amongst the participants' patients after explaining the purpose of the study and taking informed consent. The questionnaire was divided into 3 main sections namely socio-demographic data, knowledge of patients with diabetes and hypertension (Tahir et al., 2018).

After finalizing the collection of the completed questionnaires, the data was coded, entered, summarized and analyzed by using Statistical Package for Social Sciences "SPSS" 21. The study was approved by the manager of the hospitals in Qassim region and Regional Research Ethical Committee – Qassim Province (20181206). After explaining the purpose of the study to the participants, a verbal or written consent was requested and confidentiality was ensured. The participants had the right to withdraw from the study at any time. The questionnaire is anonymous.

3. RESULTS

Many patients who are above 60 years are not capable of reading nor writing on the questioners, also some patients refuse to participate because they don't consider such a research might have an impact on the community in the future, 4.7 % of patient refused to continue answering the question because they felt terrified of questions about annual death rate and some diseases (figure 1).

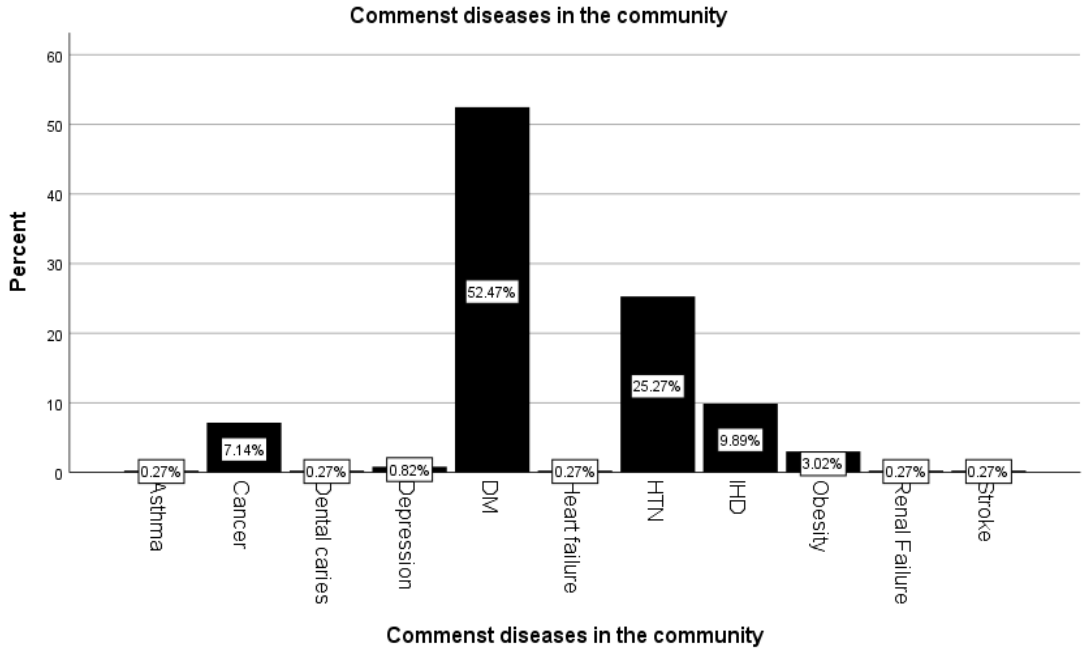

Figure 1 Bar chart shows the commonest disease in Qassim region from patient's perspective.

Demographic profile of study participants

Table 1 shows the demographic characteristics of the study participants. Females were more affected than males with hypertension and diabetes as they were 58.1% in the hypertension group and 53.1% in the diabetic group. The majority of the patients were from 61 to 70 years old in the hypertensive as well as the diabetic group (27.5% and 39.4%, respectively). The majority of the participants (76.9% and 81.25%, respectively) was married and had a family history of hypertension or diabetes (59.4 % and 60.6%, respectively). Also, 47.5 percent of hypertension patients have ever been diagnosed with diabetes. Most of hypertensive patients (26.8%) were graduated, while most of diabetic patients (28.1%) had primary educational level.

Table 1 Demographic profile of study participants

Variables		Hypertensive Respondents (n=160)		Diabetic Respondents (n=160)	
		Frequency	%	Frequency	%
Gender	Male	68	42.5	75	46.9
	Female	92	57.5	85	53.1
Age of Respondents	≤40yrs	37	23.1	13	8.1
	41-50yrs	32	20	13	8.1
	51-60yrs	36	22.5	52	32.5
	61-70yrs	44	27.5	63	39.4
	≥71yrs	11	6.8	19	11.9
Educational Status	Illiterate	40	25	44	27.5
	Primary School	25	15.6	45	28.1
	Sec. School	32	20	18	11.3
	Graduate	43	26.8	34	21.3
	Post Graduate	20	12.5	19	11.9
Marital Status	Married	123	76.9	130	81.25
	Un-married	37	23.1	30	18.75
Family History of Hypertension/ Diabetes	Yes	95	59.4	97	60.6
	No	65	40.6	63	39.4
Diagnosed ever for Diabetes/ Hypertension accordingly	Yes	77	47.5	100	62.5
	No	83	52.5	60	37.5

Knowledge assessing questions of hypertensive patients

Out of 160 patients, the majority of the respondents (138) correctly answered that hypertension is a disease, (142) knew that high blood pressure affects the heart, (136) knew that diet rich in salt is a major cause of hypertension, (133) had knowledge about the symptoms of hypertension, and (123) knew that regular exercise is beneficial for controlling hypertension. On the other hand, only (63) had knowledge about hypertension complications, (107) knew the normal blood pressure levels, and only (85) knew that obesity is associated with hypertension (Table 2 & figure 2).

Table 2 Knowledge assessing questions of hypertensive respondents

Sr.	Questions	Number of Correct Response by Patients	Percentage
1	Do you think hypertension is a disease?	138	86.2
2	Do you think that high blood pressure affects the heart?	142	88.7
3	Complications of hypertension	63	39.3
4	Normal blood pressure levels	107	66.8
5	Diet rich in salt; a major cause of hypertension	136	85
6	Symptoms of hypertension	133	83.1
7	Obesity associated with hypertension?	85	53.1
8	Regular exercise beneficial for control of hypertension	123	76.8

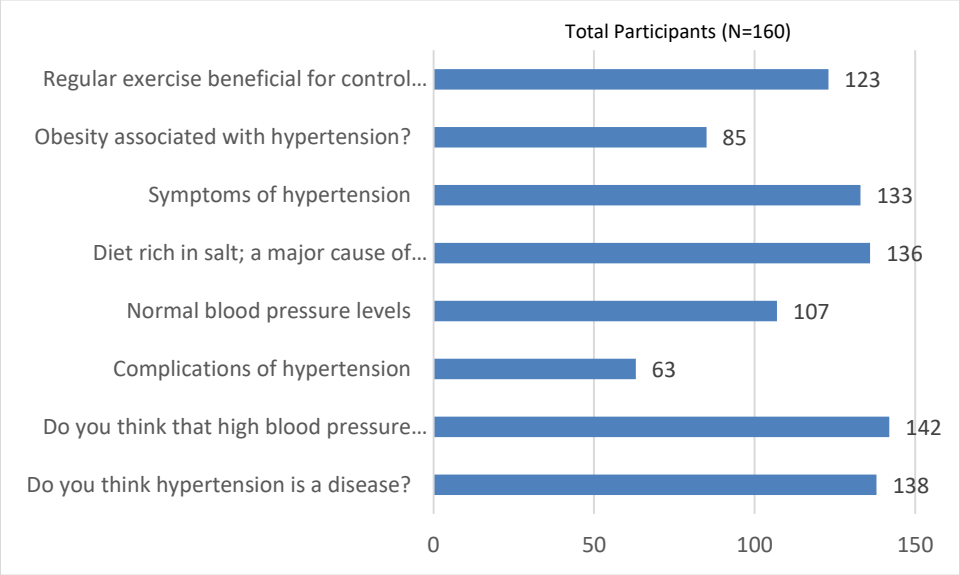

Figure 2 Knowledge assessing questions of hypertensive respondents

Knowledge assessing questions of diabetic respondents

Out of 160 patients, the majority of the respondents (112) correctly answered that diabetes is a condition in which body contains, (118) knew that diabetes can be cured by diet and exercise only, (143) knew the accurate method of monitoring diabetes, (117) knew that blood pressure monitoring is important for diabetic patients, and (55) knew that "Roti" increases blood sugar levels. On the other hand, only (79) had knowledge about the symptoms of diabetes, (105) knew that obese people are more likely to develop Type 2 diabetes, 104knew that Type 2 diabetes causes long term changes to which of the following: (nephropathy, retinopathy, arthritis, and digestive disorders), (83) knew that people with diabetes are more prone to infections, and only 103 knew the importance of proper foot care of diabetic patients (Table 3 & figure 3).

Table 3 Knowledge assessing questions of diabetic respondents

Sr.	Questions	Number of Correct Response by Patients	Percentage
1	Diabetes is a condition in which body contains?	112	70
2	Diabetes can be cured by diet and exercise only?	118	73.7
3	Symptoms of diabetes?	79	49.3
4	Obese people more likely to develop Type 2 diabetes?	105	65.6
5	Type 2 diabetes causes long term changes to which of the following: nephropathy, retinopathy, arthritis, and digestive	104	65

	disorders?		
6	People with diabetes are more prone to infections?	83	51.8
7	Accurate method of monitoring diabetes	143	89.3
8	Proper foot care of diabetic patients is important?	103	64.3
9	Blood pressure monitoring is important for diabetic patients	117	73.1
10	"Roti" increases blood sugar levels?	111	69.3

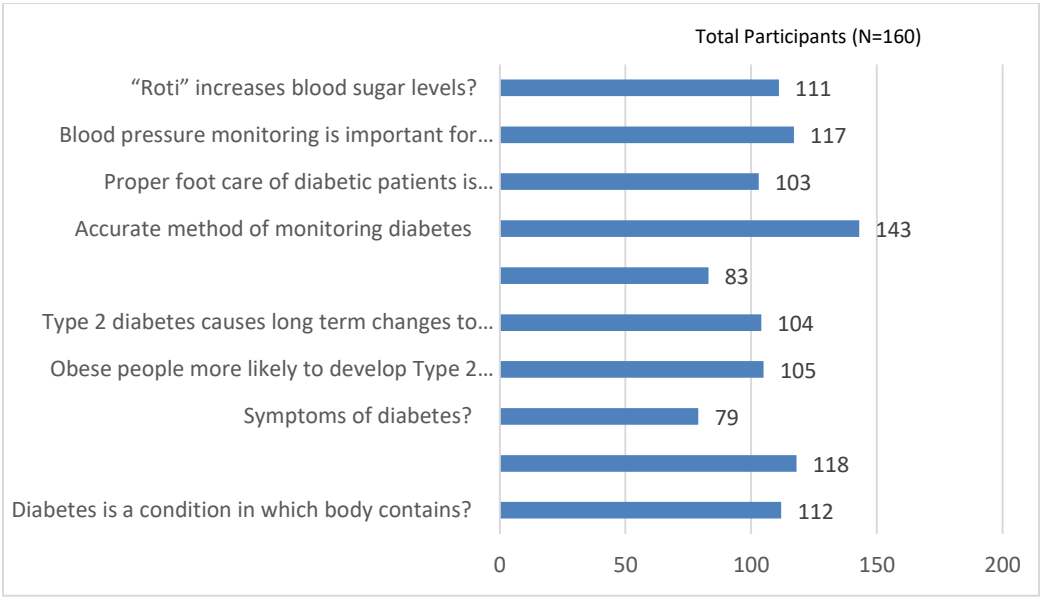

Figure 3 Knowledge assessing questions of diabetic respondents

Risk factors associated with awareness of hypertension

Table 4 shows the risk factor analysis and the contribution of each independent variable to hypertension. Elder age (OR = 5.44, 95% CI =3.49–8.47), higher educational level (OR = 1.22, 95% CI =(0.9-–1.57), being married (OR = 1.43, 95% CI = 1.02-–2.07), presence of obesity (OR = 1.96, 95% CI = 0.83–4.63), healthy diet (OR = 2.71, 95% CI = 1.98–3.03), and the moderate or high physical activity were associated with better awareness among all participants with hypertension (OR = 2.31, 95% CI =1.85–2.99.

Table 4 Risk factors associated with awareness of hypertension (OR, 95% CI)

Variable	Awareness (n = 160)
	OR, 95% CI
Age	
45–59 years	3.34(2.14–5.23)
≥60 years	5.44(3.49–8.47)
Sex	
Female	2.77 (2.24–2.89)
Male	1.99 (1.69–2.38)
Education	
Primary school	0.89 (0.80–1.18)
High school	1.22 (0.9-–1.57)
Marital status	
Single	0.97 (0.40–1.24)
Married	1.43 (1.02-–2.07)
BMI	
Underweight	1.24 (0.53–2.98)
Overweight	1.51 (0.64–3.45)

Obese	1.96 (0.83–4.63)
Diet	
Healthy diet	2.71 (1.98–3.03)
Physical Activity	
Low	1.18 (1.01–1.39)
Moderate/ High	1.85–2.99)

CI: confidence interval; OR: odds ratio; BMI: body mass index.

Risk factors associated with awareness of diabetes

Table 5 shows the risk factor analysis and the contribution of each independent variable to diabetes. Elder age (OR = 5.44, 95% CI =3.49–8.47), higher educational level (OR = 1.19, 95% CI =0.80–1.77), presence of obesity (OR = 1.11, 95% CI = 0.74– 1.67), healthy diet (OR = 1.23, 95% CI = 0.90 –1.68), and having other comorbidities were associated with better awareness among all participants with diabetes (hypertension: OR = 2.19, 95% CI =1.54–3.13).

Table 5 Risk factors associated with awareness of diabetes (OR, 95% CI)

Variable	Awareness (n = 160)
	OR, 95% CI
Age	
45–59 years	3.34(2.14–5.23)
≥60 years	5.44(3.49–8.47)
Sex	
Female	2.43 (2.24–2.89)
Male	2.24 (2.12–2.68)
Education	
Primary school	0.55(0.35–0.80)
High school	1.19(0.80–1.77)
Marital status	
Single	0.44(0.20–1.00)
Married	2.54(1.35–4.79)
BMI	
Underweight	0.60(0.16–2.19)
Overweight	0.95(0.66–1.37)
Obese	1.11(0.74–1.67)
Diet	
Healthy diet	1.23(0.90–1.68)
Comorbidity	
Hypertension	2.19(1.54–3.13)

CI: confidence interval; OR: odds ratio; BMI: body mass index.

4. DISCUSSION

The management of hypertension (HTN) as well as diabetes mellitus (DM) not only requires prescription of pharmacological agents by the physician but also intensive education about nutrition and psychoanalysis of the patients (Tahir et al., 2018; Buang et al., 2018). This survey was conducted to understand the present status of awareness of HTN and DM, and their associated risk factors. In the present study the knowledge of hypertension as well as diabetes mellitus patients towards their disease and life style was assessed. 320 DM and HTN patients were recruited for the study, out them 143 were men and 177 were women and majority of the participants fell within the age group of 61-70 years (27.5%). These findings are analogous to findings from another study (Azubuike & Kurmi, 2014; Asiri et al., 2020). This reveals the fact that hypertension as well as diabetes mellitus usually has its onset after the age of 50 years. The hypertensive group and the diabetic group had a substantial number of participants had a good

understanding of the condition, and they were knowledgeable about the meaning of HTN and DM and the seriousness of the illness to their health.

In the present study, most of the respondents (over 80%) knew that high blood pressure affects the heart. These findings were in agreement with those of (Tahir et al., 2018) who found that 90 percent of study respondents were aware that high blood pressure affects the heart and leads to complications. They also were in agreement with (Buang et al., 2018) who reported that most of the respondents had good knowledge regarding hypertension. The majority of the respondents (85%) in this study knew that diet rich in salt is a major cause of hypertension, and knew the benefits of regular exercise for controlling hypertension, while about half of the participants knew that obesity is a risk factor for hypertension. This was in line with (Tahir et al., 2018; Azubuike & Kurmi, 2014; Asiri et al., 2020). On the other hand, only about third of the participants knew about the hypertension complications. This was in disagreement with (Tahir et al., 2018) who reported that about 90% of the respondents were knowledgeable about the hypertension complications, and (Rashidi et al., 2018) who reported that about 60% of the respondents were knowledgeable about the hypertension complications. Also, about 66% of the respondents knew the normal blood pressure levels. This could be attributed to the education level which was found to be a risk factor associated with awareness about hypertension where the most of participants were illiterate (27.5%) and of primary school educational level (28.1%). Likewise, (Bollu et al., 2015) reported that 84% of the respondents knew about the symptoms of hypertension. Also, (Busari et al., 2010) reported that 70% of the respondents were knowledgeable about the normal blood levels pressure.

Additionally, age was found to be a risk factor for hypertension as elder age were more affected. Also, gender plays a role in presence of hypertension where females were more aware than males, and this could be attributed to lesser going to health care centers, employment, and lower notice to their health. This was in agreement with (Shukuri et al., 2019), (Tromp et al., 2021). In the present study, obesity, healthy diet, and moderate or high physical activity were shown to be factors affecting hypertension. These findings were in line with (Li et al., 2017) and (Jiang et al., 2016). Regarding the diabetic group, most of the respondents (70%) knew about diabetes condition. These results were better than that of the study by (Gillani et al., 2018) who reported that only 47.4 percent had adequate knowledge about diabetes. These results were harmony with (Tahir et al., 2018), who reported that 68.8%, and (Yacoub et al., 2014) and also were in agreement with (Herath et al., 2017) who reported adequate knowledge about DM (77%).

In the present study, most of the participants had an adequate knowledge about obesity which can develop T2DM. These findings were in line with (Obirikorang et al., 2016). Also, 65 % of the respondents within this study knew the effect of long term diabetes in developing nephropathy and retinopathy, and a great percentage of them (73.7%) knew the accurate method for diabetes monitoring is a healthy diet and exercise. In addition, 73.1% knew the importance of monitoring blood pressure for patients with DM. These findings were in agreement with (Tahir et al., 2018) who reported that 75% respondents were aware about the importance of proper balanced diet and exercise for DM. This study also reported that 72.5% respondents were aware about the importance of proper management of blood pressure. The findings were also in agreement with the study by (Jackson et al., 2014). This could be attributed to the education level which is considered a risk factor as high education level (graduate) affected DM and the management of the disease. Older age is also considered a risk factor for diabetes. This was in agreement with (Peng et al., 2010; Kirkman et al., 2012; Selvin & Parrinello, 2013; Hu et al., 2017). In the present study, presence of comorbidity of hypertension is also a risk factor on diabetic patients. This was in line with (Hartayu et al., 2012; Petrie et al., 2018).

5. CONCLUSION

From this study, it is concluded that, that both groups have a good understanding and awareness of HTN and DM, as well as the risk factors, obesity, dietary changes, physical activity, and comorbidities. Both groups agreed that exercise and a healthy diet are crucial for hypertensive and diabetic patients. Education was found to play a key role in increasing awareness. In order to properly manage their disease, patients with chronic diseases such as HTN and DM should be encouraged to develop healthy behaviors. Awareness about these diseases should be increased. The implementation of a family physician program can support the achievement of these targets.

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Author Contributions

Mohammed Khalid and Turki Alayed conceived of the presented idea. Ali Alharbi and Faisal Almutairi and Muath Almutairi developed the theory and performed the computations, Turki Alharbi and Ziyad Alawaji and Turki Alayed contributed in Introduction Writing, Muath Almutairi performed analytical calculations, Data collection in the field was divided among the authors in each region in Qassim Province, all authors discussed results and contributed to final manuscript.

Ethical Approval

The study was approved by the manager of the hospitals in Qassim region and Regional Research Ethical Committee – Qassim Province coded (20181206). After explaining the purpose of the study to the participants, a verbal or written consent was requested and confidentiality was ensured. The participants had the right to withdraw from the study at any time. The questionnaire is anonymous

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Conflicts of interest

The authors declare that they have no conflict of interest.

Data and materials availability

All data associated with this study are present in the paper.

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