Prevalence of depressive symptoms in hypertensive patients in Taif city

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Abstract

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

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

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

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

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

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

Introduction

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

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

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

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

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

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

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

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

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

Subjects and Methods

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

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

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

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

The First part of the questionnaire was about hypertension and BMI. We classified participants with hypertension according to the American Heart Association with normal less than 120/80 mm Hg, elevated top number (systolic) between 120-129 and bottom number (diastolic) less than 80, Stage one systolic between 130-139 or diastolic between 80-89, Stage two systolic at least 140 or diastolic at least 90 mm Hg. Also, we asked participants about the adherence of medications and complications of hypertension.

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

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

Data analysis: Data were analyzed using (SPSS) version 26. Qualitative data was expressed as numbers and percentages, and Chi- squared test (χ2) was applied to test the relationship between variables. Quantitative data was expressed as mean and standard deviation (Mean ± SD), where Mann-Whitney (U) test was used for non-parametric variables. Multivariate logistic regression analysis was done to assess the the independent predictors (risk factors) of depression among studied patients and the Odds ratio was determined at a confidence interval (CI) of 95%. A p-value of <0.05 was statistically significant.

Results

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

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

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

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

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

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

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

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

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

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

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

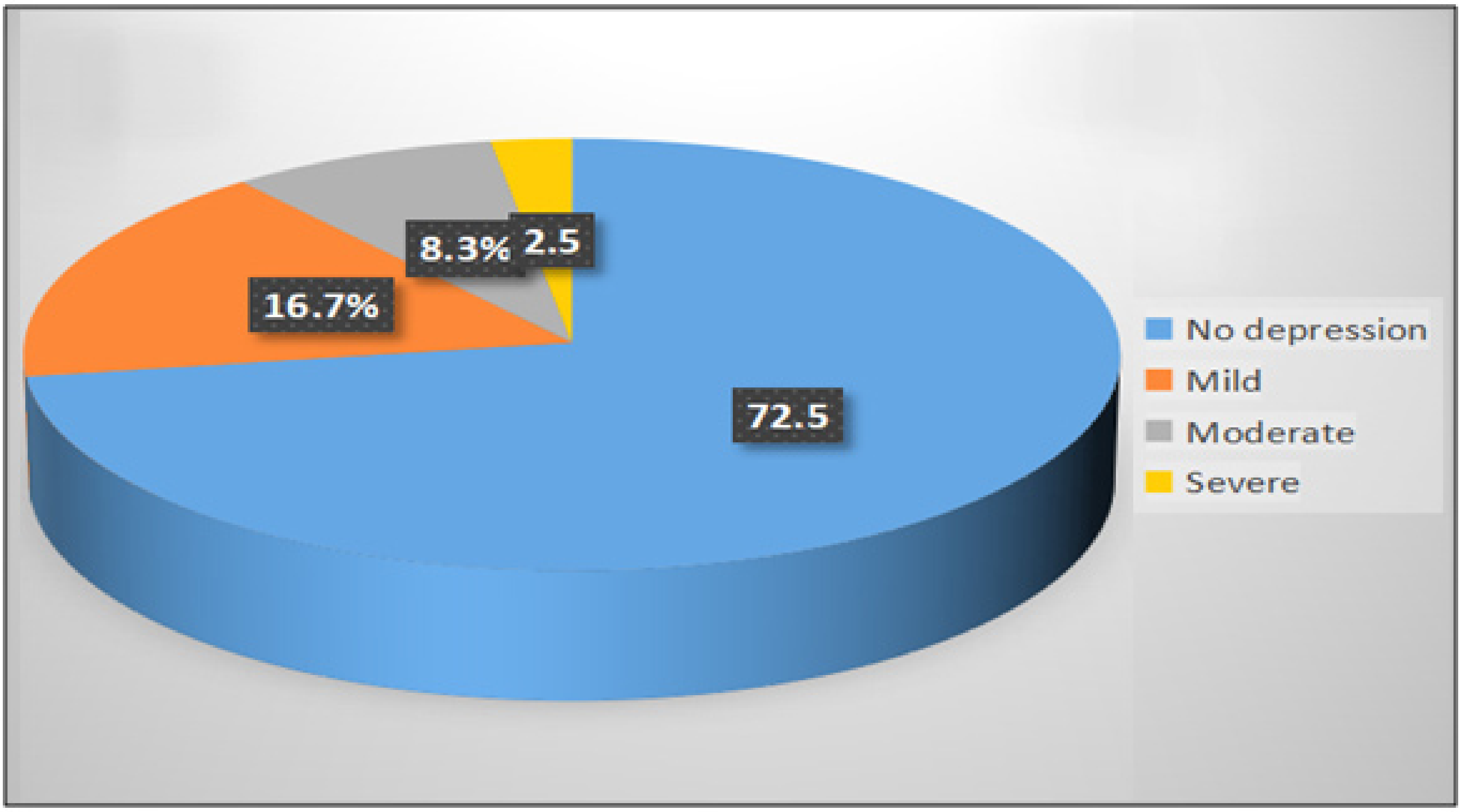
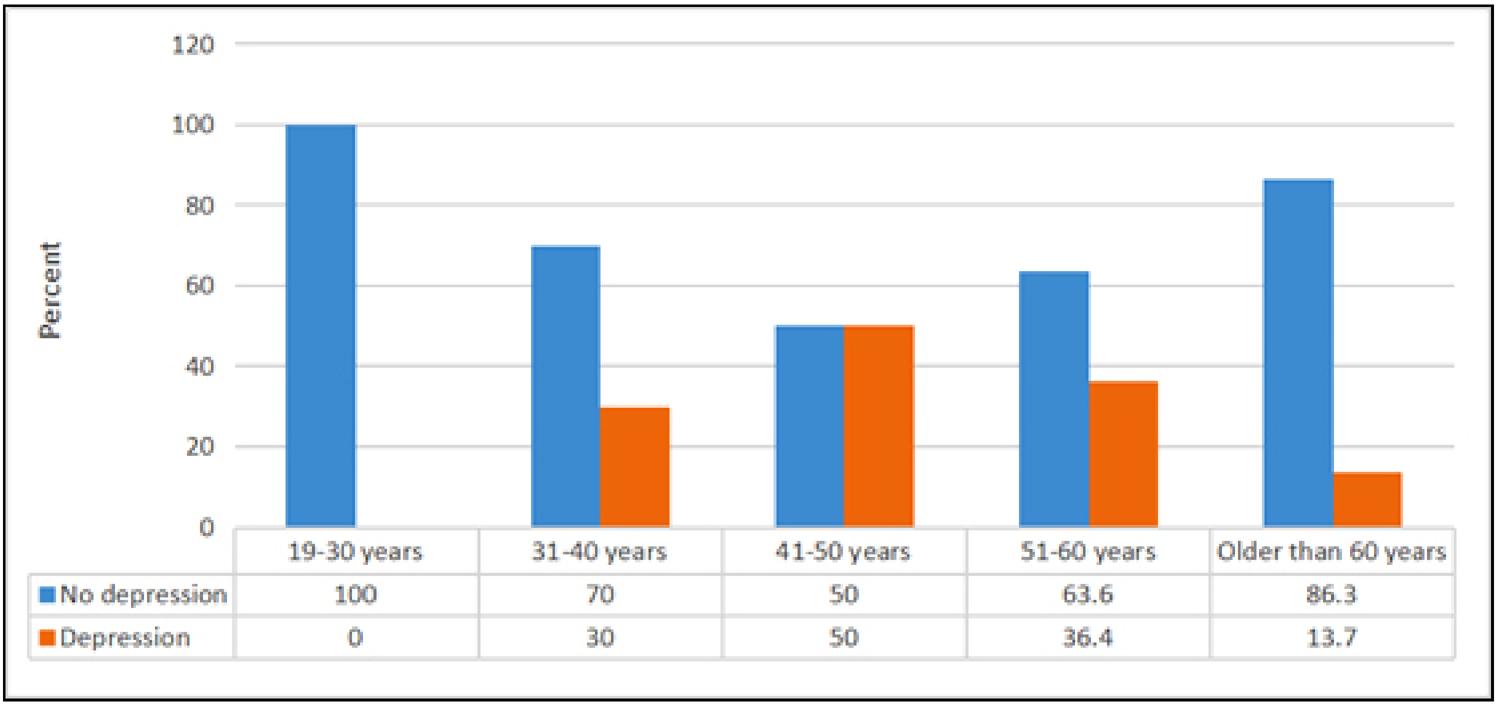


Figure 2. Relationship between depression and patients' age groups



N.B. (χ2 = 10.55, p-value = 0.032)

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

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

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

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

Discussion

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

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

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

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

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

Limitations

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

Conclusion

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

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Conclusion

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

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

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

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

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

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

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

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

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

Limitations

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

Conclusion

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

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