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Frequency of Depressive Symptoms among Hypertensive Patients Attending Family Medicine Outpatient Clinic at Suez Canal University Hospitals

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Abstract

Background: **Hypertension has been among the most studied topics of the previous century and has been one of the most significant comorbidities.** ***Aim:*** **This study aimed at the estimating the frequency of depressive symptoms among hypertensive patients; in addition to, identifying the associated risk factors for depressive symptoms among the target population.** ***Patients and Methods:*** **The present study was designed as descriptive cross-sectional study that included 274 adult hypertensive patients attending family medicine outpatient clinic at Suez Canal University Hospitals.** ***Results:*** **The mean age of the patients was 49.89 ± 9.53 years and about half of the sample was females. About 60% of the patients discovered having hypertension after frequent headache complaint and about one quarter discovered the diagnosis preoperatively. About one quarter of the patients had developed complications (24.1%). There is an increase by 4 times in the odds of having depression among married and divorced patients compared to single patients (OR= 4.6, p=0.008) and (OR= 3.9, p=0.026), respectively. Higher educational level was associated with less likelihood to develop depression. Patients on B-blocker based regimen had an increase by 6.9 times in the odds of having depression compared to those on CCB+ ARBs combination (OR= 6.909, p=0.017).** ***Conclusion:*** **From the previous results, it can be concluded that depressive symptoms were common among adults with hypertension with prevalence 39.8%. The top three risk factors of depression found among hypertensive patients were financial hardship, death of a dear person and history of divorce/ separation in family.**

Keywords: *Depression, Family Medicine, Hypertensive.*

Introduction

Hypertension has been among the most studied topics of the previous century and has been one of the most significant comorbidities contributing to the development of stroke, myocardial infarction, heart failure, and renal failure. The current definition of hypertension (HTN) according to the American Heart Association guidelines is systolic blood pressure (SBP) values of 130mmHg or more and/or diastolic blood pressure (DBP) more than 80 mmHg[(1)]. Hypertension is defined as office systolic BP (SBP) values ≥ 140 mmHg and/or diastolic BP (DBP) values ≥ 90 mmHg. This is based on evidence from multiple RCTs that treatment of patients with

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these BP values is beneficial and it is classified into optimal (<120/<80), normal (120:129/ 80:84), high normal (130:139/ 85:89), grade 1 (140:159/90:99), grade2 (160:179/100:109), grade3 (>180/>110)[2]. Hypertension is one of the most leading causes of global mortality and disability. Approximately one fourth of adults have been diagnosed with HTN around the world, and the proportion will reach about one third by 2025[3]. Based on office BP, the global prevalence of hypertension was estimated to be 1.13 billion in 2015. [4] With a prevalence of over 150 million in central and eastern Europe. The overall prevalence of hypertension in adults is around 30-45%[5]. Hypertension is an urgent health problem in Egypt with the prevalence rate 40% among the adult population. Egyptians have an average daily salt intake of 9 grams[6]. Its incidence increases with aging around 50% of Egyptians over the age of 60 years have hypertension[6]. Depression is a heterogeneous condition and is classified into major depressive disorder (MDD), persistent depressive disorder (dysthymia), disruptive mood regulation disorder, premenstrual dysphonic disorder, depression secondary to general medical condition, substance or drug-induced mood disorder, other specified depressive disorder, and unspecified depressive disorder[7]. Depression is a significant contributor to the global burden of disease. The World Mental Health Survey conducted in 17 countries found that on average about 1 in 20 people reported having an episode of depression in the previous experience. It is estimated that depression affects 350 million people around the world[8]. with a lifetime risk of 7%[9]. It will be likely to increase 5.7% of global burden of disease by 2020 and become the second one after ischemic heart disease. and is to become the leading cause of disability worldwide by the year 2030[10][11]. Depressive disorders were present among 18.98% of Ismailia governorate's general population[12]. Prior studies have acknowledged the link between hypertension and depression, but the results vary. Several studies corroborate the hypothesis between the associations of depression among hypertensive patients[13]. Because hypertension is often accompanied by somatic symptoms, a lower quality of life, and role impairment[14-16]. And also, HTN is associated with psychological distress, as well as depression[17-20]. Many people with diagnosed hypertension have somatic complaints, poor quality of life and disturbances in daily functionality. These factors may cause a psychosocial distress, which increases the risk of developing depression[19]. Family physicians play a pivotal role in atherosclerosis cardiovascular disease (ASCVD) prevention in PHC settings, according to the 2016 European Guidelines on ASCVD prevention guideline. Psychosocial factors e.g., depression are ASCVD risks in addition to hypertension. Screening, treatment of depression in hypertensive patients and indicated referral for psychotherapy, medication or collaborative care may prevent ASCVD[21]. There was study conducted at Saudi Arabia and the study revealed that Depression was highly prevalent in hypertensive patients in Saudi Arabia. The prevalence of depression among hypertensive patients in Saudi Arabia was 20.7%[22]. Many other studies had reported the prevalence of depression in hypertensive patients, but quantitative estimation for the overall prevalence of depression is scarce. Little is known about depression prevalence in hypertensive patients. Although it has become more convenient to assess depression situation through self-rating scales[23]. Thus, estimating the prevalence of depression in hypertensive patients is the first step toward understanding the burden of disease. The research for depression among hypertensive patients in Egypt are scarce. Ismailia is the

researcher's governorate of practice according to the distribution of family physicians in family medicine department, Suez Canal University, so this research will be carried out to estimate the prevalence of depression among adults with hypertension in Ismailia city. This study was conducted to improve the quality of life of hypertensive patients attending family medicine outpatient clinic at Suez Canal University Hospitals.

Patients and Methods

This descriptive cross-sectional study was carried out in family medicine outpatient clinic at Suez Canal University Hospitals. Adults who were diagnosed with hypertension in Ismailia city.

Study population

A simple randomly selected sample of adults with hypertension attending to family medicine outpatient clinic at Suez Canal University Hospitals, who meet the inclusion criteria.

Inclusion criteria

All adult above 19 years' hypertensive patients diagnosed as essential hypertension more than 6 months attending family medicine outpatient clinic at Suez Canal University Hospitals.

Exclusion criteria

1. Other chronic diseases (e.g., diabetes, chronic liver diseases, bronchial asthma, cancer, hypothyroidism) by evident investigations. 2. nearby social life event in the last 6 months as (operation, drug abuse, death of family member, breakup of beloved one, divorce). 3. All patients diagnosed as secondary hypertension. 4. complicated hypertension (CVD or CKD and dyslipidemia).

Data was taken from participants 2 days per week (days of chronic clinic) Sunday and Tuesday from 9 a.m. to 2 p.m for 5 months (from October to February). Interview questionnaires were used in this study, with the following order:

1- *Assessment of demographic data and the possible associated risk factors of depression:* A semi-structured interview questionnaire to collect information about the demographic data and the possible Associated risk factors for depression which happened more than 6 months ago was used.

2- *History of hypertension:* (present history, method of discovery, duration, and drug)

3- *Control of hypertension by measurement:* in patients less than 65 years old: a range of 120-129/<80 mmHg and those aged ≥65 years**:** a range of 130-139/<80 mmHg

4- *Depression scale:* By the Zung self-rating scale which was used to estimate the prevalence of depressive symptoms. It is an easy and reliable and validated tool for measuring the depressive symptoms and its degree among the target population. The internal consistency of the validated zung self-rating scale measured by Cronbach's alpha was 0.832[24]. It was translated into Arabic by Okasha[25]. It has 20 items for scale. Ten items are worded positively, and ten items are worded negatively. Each item is scored on a scale of 1, 2, 3 or 4 (a little of the time, some of the time, good part of the time or most of the time) with reverse scaling for the negatively worded items. This yields an overall score of 20-80. The score of each item is added together for the total 20 items then depression scale is calculated as follow: Below 50: within normal range. 50 - 59: minimal to mild depression. 60 - 69: moderate to marked depression. 70 and over: severe to extreme depression[24].

Statistical Analysis

were analyzed using SPSS version 20 (i.e., statistical package for social sciences) program.

Presentation of data was done in the form of numerical tabular and graphical when appropriate. The association between the two variables was done by (Chi) square test. The relationship between different groups was done by the student (T) and one-way ANOVA test. To estimate the independent association of each Family socioeconomic factors (age, sex, education level), job, smoking, Duration of hypertension and taking antihypertensive drugs, bivalent regression analysis will be done. Correlation analysis between Zung self-rating score and different clinical parameters was done by spearman's correlation. Relationship between hypertension control and Zung self-rating scale was done by Chi-square test.

Results

Table 1 summarizes the socio-demographic characteristics of the studied patients. The mean age of the patients was 49.89±9.53 years and about half of the sample was females. About 60% of the sample came from urban areas. Each of divorced and widowed participants formed more than 20% of the sample (figure 1). University educated participants formed about 41.2 % of the total sample. Moreover, about 60% of the sample had positive smoking history.

Table 1: Socio-demographic characteristics of the patients

Variables	n= 274 (%)
Age (years), mean ± SD	49.89 ± 9.53
Gender	
Male	136 (49.6)
Female	138 (50.4)
Residency	
Rural	109 (39.8)
Urban	165 (60.2)
Occupation	
Non/Housewife	64 (23.3)
Manual worker/ Farmer	78 (28.5)
Semiprofessional/clerk	132 (48.2)
Education Level	
Illiterate	37 (13.5)
Read and write	74 (27.1)
Intermediate/ High	50 (18.2)
University	113 (41.2)
Smoking history	
Present	110 (40.1)
Absent	164 (59.9)

Data are presented as number (%) or mean and SD

Figure (1) shows that single patients 31 (11.3), married 128 (46.7), divorced 57 (20.8) and widow 58 (21.2). Table 2 summarizes the risk factors associated with depression during the last 6 months among the patients. The top three risk factors found among the participants were financial hardship (58.8%), death of a dear person (50.4%) and history of divorce/ separation in family (46.4%). It is worth noting history of depression was found among 17.2% of the participants only.

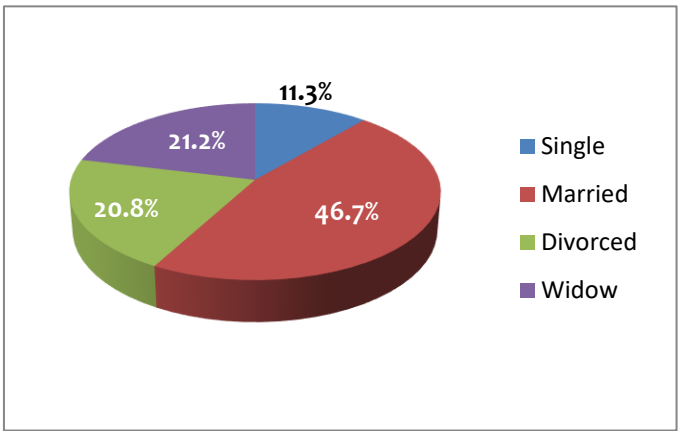

Figure 1: Distribution of martial status among the studied patients

Table 3 describes the disease profile of the studied participants. The mean disease duration was 8.78 ± 4.81 years. About 60% of the patients discovered having hypertension after frequent headache complaint and about one quarter discovered the diagnosis preoperatively. Moreover, about one quarter of the patients had developed complications (24.1%). Regarding medications, about (51.4%) of the patients were on ACEIs based regimen, about (36.5%) of the patients were on β-blocker based regimen and about (12.1%) of the patients were on combination of CCB and ARBs. Table 4 summarizes the descriptive details of the Zung self-rating Depression scale. The mean total score of depression was 48.63 ± 2.63 points. Figure 2 shows that only about 40% of the participants (n=109) had minimal to mild depression based on Zung self-rating scale. No reported cases with moderate or severe depression. Table 5 shows that patients with uncontrolled hypertension were found to be more associated with depression symptoms (73.4%) than controlled ones (36.6%) (p<0.001). Table 6 shows that hypertensive males (58%) were found to be more associated with mild depression symptoms than females (42.2%) (p=0.028). Meanwhile, there was a statistically significant difference between patients with and without depression regarding occupation type (p=0.03), marital status (p=0.024) and their educational level (p=0.021).

Table 2: Risk factors associated with depression during the last 6 months among the patients

Variables	**n= 274 (%)**
History of:	
Financial Hardship	161 (58.8)
Dear Person Death	138 (50.4)
Divorce in Family	127 (46.4)
Family Member Treatment	115 (42)
Child Academic Failure	106 (38.7)
Job Losing	80 (29.2)
Family Humiliation	79 (28.8)
Depression	47 (17.2)

Data are presented as number (%) or mean and SD.

Table 3: Variables related to hypertension among the patients	
Variables	**n= 274 (%)**
Disease duration (years), mean ± SD	8.78 ± 4.81
Method of detection	
Headache	161 (58.8)
Preoperative assessment	63 (23)
Suddenly	39 (14.2)
Regular checkup	11 (4)
Method of diagnosis	
3 measurements	142 (51.8)
Measurements	127 (46.4)
Random	5 (1.8)
Treatment	
B-blocker based regimen	100(36.5)
ACEIs based regimen	141(51.4)
CCB+ ARBs	33 (12.1))
Complications	
Present	66 (24.1)
Absent	208 (75.9)

Data are presented as number (%) or mean and SD

Table 4: Descriptive characteristics of Zung self-rating Depression scale		
Variables	**mean ± SD**	**median (IQR)**
I feel downhearted and blue	1.70 ± 0.74	2 (1 – 2)
Morning is when I feel the best	3.25 ± 0.75	3 (3 – 4)
I have crying spells or feel like it	1.64 ± 0.82	1 (1 – 2)
I have trouble sleeping at night	1.57 ± 0.83	1 (1 – 2)
I eat as much as I used to	2.96 ± 0.76	3 (3 – 3)
I still enjoy sex	3.30 ± 0.98	4 (3 – 4)
I notice that I am losing weight	1.84 ± 0.74	2 (1 – 2)
I have trouble with constipation	1.40 ± 0.79	1 (1 – 1)
My heart beats faster than usual	1.51 ± 0.89	1 (1 – 2)
I get tired for no reason	1.72 ± 0.86	2 (1 – 2)
My mind is as clear as it used to be	2.93 ± 0.85	3 (3 – 3)
I find it easy to do the things I used to	3.42 ± 0.92	4 (3 – 4)
I am restless and can't keep still	1.87 ± 0.91	2 (1 – 2)
I feel hopeful about the future	3.15 ± 0.86	3 (3 – 4)
I am more irritable than usual	1.88 ± 0.84	2 (1 – 2)
I find it easy to make decisions	3.05 ± 0.73	3 (3 – 4)
I feel that I am useful and needed	3.25 ± 0.89	3 (3 – 4)
My life is pretty full	3.41 ± 0.90	4 (3 – 4)
I feel that others would be better off if I were dead	1.72 ± 0.82	2 (1 – 2)
I still enjoy the things I used to do	3.06 ± 0.73	3 (3 – 4)
Total score	48.63 ± 2.63	48 (47 – 50.25)

Data are presented as number (%), mean ± SD and median (IQR)

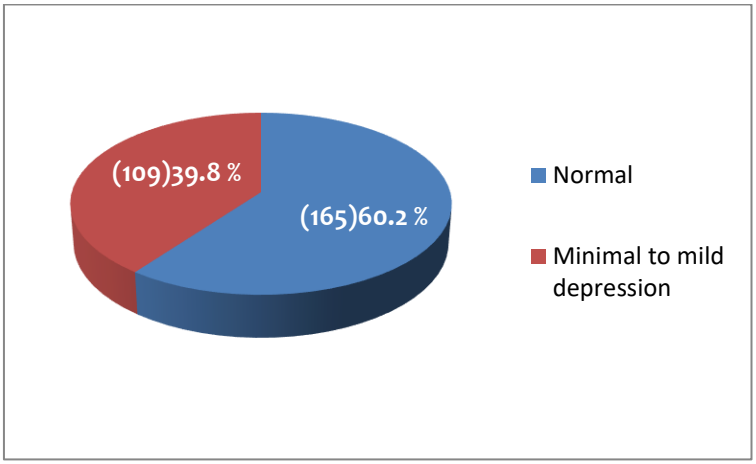

Figure 2: Grades of depression among participants

Table 5: Relationship between hypertension control and Zung self-rating scale

Variables	Zung self-rating scale		test value	p-value
	No depression N=165	Mild depression N= 109		
Hypertension control				
Controlled	105 (63.6)	29 (26.6)	36.021	**<0.001** [b]
Uncontrolled	60 (36.4)	80 (73.4)		

[b] *P values are based on Chi-square test as appropriate. Statistical significance at P < 0.05*

Moreover, non-smokers were significantly associated with lesser depressive symptoms (p=0.01). Table 7 shows that there is no statistically significant association between depressive symptoms among hypertensive patients and any of the depression risk factors. Table 8 shows that there was a statistically significant difference between patients with and without depression in regard to the method of detection (p=0.016), and the treatment regimen (p=0.001). Table 9 shows that there is no statistically significant correlation between patients' depression score and their age (r=0.026) (p= 0.664) and disease duration (r= -0.033) (p= 0.583). Logistic regression analysis was used to assess predictors of depression among hypertensive patients (Table 10). There is an increase by 4 times in the odds of having depression among married and divorced patients compared to single patients (OR= 4.6, p=0.008) and (OR= 3.9, p=0.026), respectively. On the other hand, higher educational level was associated with less likelihood to develop depression. Finally, patients on B-blocker based regimen had an increase by 6.9 times in the odds of having depression compared to those on CCB+ ARBs combination (OR= 6.909, p=0.017).

Discussion

The present study included 274 hypertensive patients with mean age of 49.89±9.53 years and mean disease duration was 8.78±4.81 years. About half of the sample was females. About 60% of the sample came from urban areas.

Table 6: Relationship between patients' socio-demographic characteristics and Zung self-rating scale				
Variables	Zung self-rating scale		test value	p-value
	No depression N=165	Mild depression N= 109		
Age	49.39 ± 9.89	50.64 ± 8.93	8356	0.321 [a]
Gender				
Male	73 (44.2)	63 (57.8)	4.83	**0.028** [b]
Female	92 (55.8)	46 (42.2)		
Residency				
Rural	62 (37.6)	47 (43.1)	0.84	0.36 [b]
Urban	103 (62.4)	62 (56.9)		
Occupation				
Non/Housewife	46 (27.9)	18 (16.5)	7.04	**0.03** [b]
Manual worker/ Farmer	39 (23.6)	39 (35.8)		
Semiprofessional/clerk	80 (48.5)	52 (47.7)		
Marital status				
Single	25 (15.2)	6 (5.5)	9.71	**0.024** [b]
Married	68 (41.2)	60 (55)		
Divorced	33 (20)	24 (22)		
Widow	39 (23.6)	19 (17.5)		
Education Level				
Illiterate	14 (8.5)	23 (21.1)	9.73	**0.021** [b]
Read and write	50 (30.3)	24 (22)		
Intermediate/ High	30 (18.2)	20 (18.3)		
University	71 (43)	42 (38.5)		
Smoking history				
Present	56 (33.9)	54 (49.5)	6.65	**0.01** [b]
Absent	109 (66.1)	55 (50.5)		

[a] *P values are based on Mann Whitney U test as appropriate. Statistical significance at P < 0.05*
[b] *P values are based on Chi-square test as appropriate. Statistical significance at P < 0.05*

The top three risk factors during the last 6 months among the patients to have depression were financial hardship (58.8%), death of a dear person death (50.4%) and history of divorce/ separation in family (46.4%). Moreover, about one quarter of the patients had developed complications (24.1%). The current study reported that 39.8 % of the participants (n=109) had minimal to mild depression based on Zung self-rating scale. No reported cases with moderate or severe depression. Hypertensive males (58%) were found to be more associated with mild depression symptoms than females (42.2%) (p=0.028). Meanwhile, there was a statistically significant difference between patients with and without depression regarding marital status (p=0.02) educational level (p=0.021) and smoking status (p=0.001) with percent of divorce, illiterate and smokers were significantly associated with depressive symptoms. We also found that patients with uncontrolled hypertension were more associated with depression symptoms (73.4%) than controlled ones (36.6%) (p<0.001). In the present study, there was no significant correlation between patients' depression score and their age (r=0.02, p= 0.66) and disease duration (r= -0.03, p= 0.58).

Table 7: Relationship between depression risk factors and Zung self-rating scale				
Variables	Zung self-rating scale		Test value	p-value
	No depression N=165	mild depression N= 109		
History of divorce				
Present	77 (46.7)	50 (45.9)	0.017	0.89 [a]
Absent	88 (53.3)	59 (54.1)		
History of financial hardship				
Present	97 (58.8)	64 (58.7)	0.001	0.99 [a]
Absent	68 (41.2)	45 (41.3)		
History of dear person death				
Present	82 (49.7)	56 (51.4)	0.074	0.79 [a]
Absent	83 (50.3)	53 (48.6)		
History of family humiliation				
Present	43 (26.1)	36 (33)	1.5	0.21 [a]
Absent	122 (73.9)	73 (67)		
History of job losing				
Present	53 (32.1)	27 (24.8)	1.72	0.19 [a]
Absent	112 (67.9)	82 (75.2)		
History of child academic failure				
Present	59 (35.8)	47 (43.1)	1.5	0.22 [a]
Absent	106 (64.2)	62 (56.9)		
History of child treatment				
Present	47 (28.5)	43 (39.4)	3.57	0.06 [a]
Absent	118 (71.5)	66 (60.6)		
History of family member treatment				
Present	63 (38.2)	52 (47.7)	2.4	0.12 [a]
Absent	102 (61.8)	57 (52.3)		
History of depression				
Present	27 (16.4)	20 (18.3)	0.18	0.67 [a]
Absent	138 (83.6)	89 (81.7)		

[a]P values are based on Chi-square test as appropriate. Statistical significance at P < 0.05

In the present study, logistic regression analysis was used to assess predictors of depression among hypertensive patients (Table 10). There is an increase by 4 times in the odds of having depression among married and divorced patients compared to single patients (OR= 4.6, p=0.008) and (OR= 3.9, p=0.026), respectively. On the other hand, higher educational level was associated with less likelihood to develop depression. Finally, patients on B-blocker based regimen had an increase by 6.9 times in the odds of having depression (OR= 6.909, p=0.017). The current study results also agreed with a cross sectional study conducted at urban Trivandrum[26] which was a cross sectional survey included hypertensive adults more than 18 years. The mean age of the study subjects was 62.47 years. Among the study subjects the blood pressure was under control among only 33.8% of the study population.

Table 8: Relationship between disease characteristics and Zung self-rating scale				
Variables	**Zung self-rating scale**		test value	p-value
	No depression N=165	mild depression N= 109		
Disease duration	8.89 ± 4.82	8.62 ± 4.83	8655	0.59 [a]
Method of detection				
Headache	96 (58.2)	65 (59.6)		
Preoperative assessment	30 (18.2)	33 (30.3)		
Suddenly	31 (18.8)	3 (2.8)	12.15	**0.016** [b]
Regular checkup	8 (4.8)	3 (2.8)		
Method of diagnosis				
3 measurements	85 (51.5)	57 (52.3)		
Measurements	77 (46.7)	50 (45.9)	0.017	0.99 [b]
Random	3 (1.8)	2 (1.8)		
Treatment				
B-blocker based regimen	50 (30.3)	50 (45.8)		
ACEIs based regimen	93 (56.3)	53 (48.6)	17.95	**0.001** [c]
CCB+ ARBs	18 (11.2)	2 (1.9)		

[a] *P values are based on Mann Whitney U test as appropriate. Statistical significance at P < 0.05*
[b] *P values are based on Chi-square test as appropriate. Statistical significance at P < 0.05*
[c] *P values are based on Fisher Exact test as appropriate. Statistical significance at P < 0.05*

The prevalence of depression was found to be 33.3%. Gender, Socio economic status, marital status, low educational status, regular physical activity, duration of hypertension, uncontrolled BP, were found to be significantly associated with depression. The Egyptian study done by Al Madany[27] included 60 hypertensive patients with their age range from 20 to 63. About 35 % had prehypertension, 43.3% were stage 1 hypertension and 21.7% were stage 2 hypertension.

Table 9: Correlation analysis between Zung self-rating score and different clinical parameters		
Variables	**Zung self-rating score**	
	Correlation coefficient (r)	p-value
Age of the patients	0.026	0.664 [a]
Disease duration	-0.033	0.583 [a]

[a] *P values are based on Spearman's correlation test as appropriate. Statistical significance at P < .05*

There was a statistically significant difference between the stage of hypertension and degree of depression (p=0.011). All patients with severe hypertension had a degree of depression. Patients with complications were more depressed than those without complications. Also, the results of a systematic review and meta-analysis study about the prevalence of depression in hypertensive patients revealed similar results. The prevalence of depression among hypertensive patients was 26.8%. Subgroup analysis shows that the prevalence in male was 24.6% and in female was 24.4%. The prevalence of depressive symptoms adjudicated by self-rating scales was 29.8%[28].

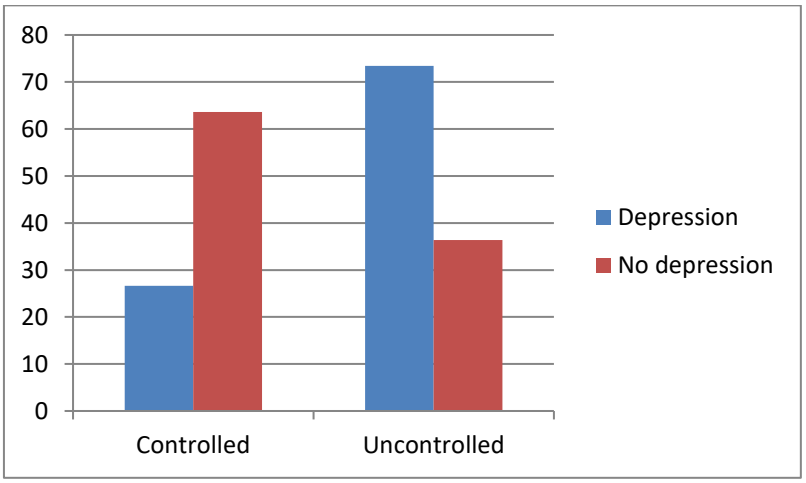

Figure 1: Association between hypertension control and depression

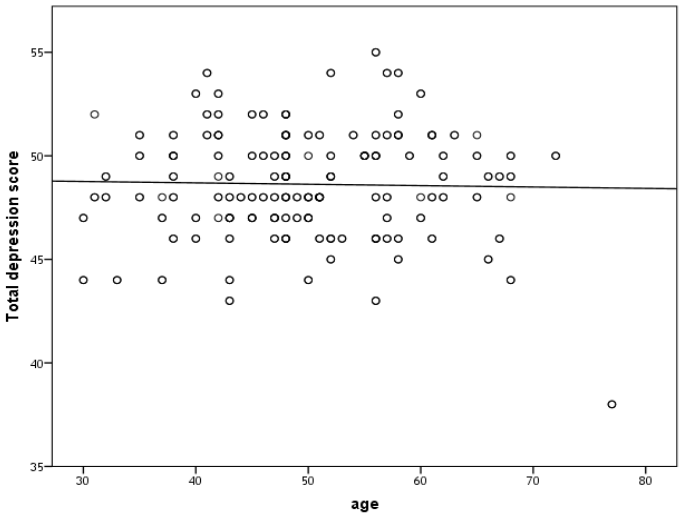

Figure 2: Correlation between age and total depression score

There was a cross-sectional study conducted at Saudi Arabia and the study revealed that Depression was highly prevalent in hypertensive patients in Saudi Arabia. The prevalence of depression among hypertensive patients in Saudi Arabia was 20.7%[22]. The present study results agreed with a case-control study from Karachi, Pakistan[29] which reported an association between uncontrolled hypertension and depression that was independent of any other factors as socio-demographic factors and other comorbidities. The mean age of the studied population was 54.98 (12.38) years and (38%) were males. Odds ratio (OR) of having uncontrolled hypertension and being depressed was 2.02, p value ≤ 0.001. The association remained significant even after adjusting other factors. A study conducted at rural china[30] also revealed that high rates of depressive symptoms were reported among hypertensive patients with 12.8% of hypertensive patients had significant depressive symptoms. Higher rates of depressive symptoms were reported among patients with uncontrolled hypertension with rates of significant depressive symptoms were 5.3% and 32.8% among patients with controlled and uncontrolled hypertension (p<0.001).

Table 10: Logistic regression analysis of hypertensive patients with mild depression					
Variables	***β***	***SE***	**OR**	**(95% CI)**	**p-value**
Constant	-2.064	1.020	0.127		**0.043***
Gender					
Male vs female	0.257	0.517	1.292	(0.470 – 3.558)	0.62
Occupation					
Manual worker/Farmer vs unemployed	0.183	0.511	1.201	(0.441 – 3.270)	0.72
Semiprofessional/clerk vs unemployed	0.527	0.601	1.693	(0.521 – 5.502)	0.38
Marital status					
Married vs single	1.531	0.577	4.623	(1.491 – 14.335)	**0.008***
Divorced vs single	1.382	0.619	3.982	(1.184 – 13.395)	**0.026***
Widow vs single	0.763	0.620	2.144	(0.636 – 7.232)	0.22
Education Level					
Read and write vs illiterate	-1.755	0.511	0.173	(0.063 – 0.471)	**0.001***
Intermediate/ High vs illiterate	-1.855	0.621	0.156	(0.046 – 0.528)	**0.003***
University vs illiterate	-2.063	0.713	0.127	(0.031 – 0.514)	**0.004***
Smoking history					
Present *vs.* absent	0.193	0.476	1.213	(0.478 – 3.082)	0.69
Treatment					
B-blocker *vs.* CCB+ ARBs combination	1.933	0.809	6.909	(1.415 – 33.729)	**0.017***
ACEIs *vs.* CCB+ ARBs combination	1.612	0.808	5.012	(1.029 – 24.428)	0.056

*ANOVA<0.01, R^2 = 0.176, * Statistical significance < 0.05.*

Also, those older age group (≥70 years) had higher rates of significant depressive symptoms than those who were younger. These results support the development and dissemination of integrative care approaches for older adults with hypertension. A Cross-sectional Survey from Palestine[31] reported that the prevalence of undiagnosed clinical depression was 11.6%. In addition, the prevalence of 15.4% was found for mild depression symptoms. Non-adherent to antihypertensive medications and number of medications remains significantly positive associated with higher depression score. A cross-sectional study in a primary care population conducted at Scandinavia[32] investigated the association of hypertension awareness and depressive symptoms by cross-sectional design included 2676 middle-aged risk persons. Hypertension was diagnosed in 47.9% of the subjects, of whom 34.5% had previously undetected hypertension. Depressive symptoms were reported by 14% of the subjects previously aware of their hypertension, and by 9% of both unaware hypertensive and normotensive subjects. In the logistic regression analysis, both the normotensive and the unaware hypertensive subjects had lower risk for depressive symptoms than the previously diagnosed hypertensive patients. Among these known as hypertensive, female gender (OR 3.61), and obesity (OR 2.50) predicted depressive symptoms. Non-smoking and physical activity seemed to protect against depressive symptoms. The cross sectional study conducted at Nigeria hospital investigating depression and anxiety among hypertensive patients[33]. A total of 334 respondents were recruited for the study and the overall prevalence of depression and anxiety among the hypertensive patients was 77.8%. The result indicated that among the hypertensive, (72.5%) had both conditions of depressed and anxious, (22.2%) were neither depressed nor anxious, while 4 (1.2%)

were depressed only. The study recommended a combination of hypertensive medications with psychotherapy and antidepressants can definitely help prevent severe attacks of high blood pressure. The study conducted at Saudi Arabia[34] measured the frequency and risk factors of depression and anxiety among diabetic and hypertensive primary health care (PHC) patients. The study was cross-sectional study of 368 PHC patients. Patient's perception of chronic diseases control was significantly associated with the presence of depression and anxiety, while it was not seen in the controlled patients. Overall prevalence of depression or anxiety was 57.3% and detected cases were 23%. Depression comprises 48.7% (39.8% mild, 7.1% moderate and 1.8% severe). Low income had an independent significant effect on depression and anxiety. The current study results also agreed with the Study conducted at Urban Nepal[19] which was a cross-sectional study included 321 hypertensive patients with mean age 52.70 ± 13.30. The prevalence of patients with undiagnosed depression was 15%. Females had a 22% prevalence rate for depression compared to males who had only 9%. Factors associated with increased risk of depression included age, being female, smoking and being hypertensive with no anti-hypertensive medication. The study recommended screening programs for early and proper intervention in hypertensive patients with sub clinical depression. Different reported prevalence rates and different risk factors may be associated with different assessment scales used in addition to different countries with different social status.

Conclusion

From the previous discussion, we can conclude that there is a need for psychiatric evaluation, counseling, and support services for hypertensive patients as an important component for the management of hypertension. These results support the development and dissemination of integrative care approaches for adults with hypertension. Clinicians must pay attention to negative emotions and their role in medication non-adherence.

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