

## Appraisalment of Mental Health Manifestations among Hypertensive Patients

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### Abstract

**Background and objective:** Hypertension is a growing public health problem worldwide; hypertensive patients experience negative emotions, which in particular may increase the risk for mental health instabilities. The objective of the study was to find out the prevalence of anxiety and depression among hypertensive patients.

**Methods:** This was a cross-sectional study conducted in a clinic from May 1<sup>st</sup> to October 1<sup>st</sup> 2021 in the city of Erbil, Kurdistan Region of Iraq, among 286 hypertensive patients, for assessing the level of association of hypertension with depression and anxiety.

**Results:** A total of 286 participants were included, the mean age was  $61.2 \pm 12$  years, and the age range was 33 to 88 years. More than half (57.3%) of the patients were females, 55.9% of patients had a form of Ischemic Heart Disease (including stable and unstable angina, obstructive and non-obstructive coronary artery disease) and 39.9% of them were diabetic. It was found that depression was higher among females (26.3%) than male patients (18%) ( $P = 0.002$ ). Anxiety was more prevalent among females (24.4%), while only 8.2% of male hypertensive cases had anxiety ( $P = 0.001$ ).

**Conclusion:** A considerable proportion of the hypertensive patients had depression and anxiety. The rate was higher among women than men.

**Keywords:** Hypertension; Mental health; Anxiety; Depression.

### Introduction

The spectrum of the disease burdens has been changed currently from communicable to non-communicable diseases, lately, non-communicable diseases (NCDs) account for 71% of a total of 57.7 million deaths globally. By which, 80% were due to cardiovascular diseases, diabetes, cancers, and chronic respiratory diseases.<sup>1</sup> About 80% of these NCD deaths were among low and middle-income countries.<sup>2</sup> Globally, hypertension is regarded as one of the major precursors to cardiovascular health and one of the current contributors of death which account for approximately 7.5 million deaths per year: nearly 12.8% of the total deaths.<sup>3</sup> World health statistics 2012 has estimated the prevalence of hypertension to be 29.2% in males and 24.8% in females.<sup>4</sup>

The prevalence and absolute burden of hypertension are rising globally, especially in developing countries.<sup>5</sup>

Mental manifestations are quite common all over the world and have a great effect on socio-economic development and growth.<sup>6</sup> More than a quarter of the global population will develop a mental disorder at some point in their lives.<sup>7</sup>

During the last decade, Iraq and Kurdistan region- specifically, as one of the developing countries, has been in a state of continuous unrest, war, and other armed conflicts that have all resulted in an extra burden of mental health stresses, having many psychological impacts with many social, mental and health problems occurring during the period of conflicts and instability.<sup>8</sup>

Chronic forms of morbidity, including

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mental disorders and hypertension, play a central role in shaping the burden of disease in the developing world. The stress of having a chronic medical condition by itself may induce anxiety and depression for the patient. Identifying and characterizing modifiable risk factors of hypertension remain important for public health and clinical medicine.

Like patients with other comorbidities, hypertensive patients experience many profound emotions that in turn increase their risk for the development of mental health disorders, particularly anxiety and depression.<sup>9, 10</sup>

Empirical evidence showed the importance of stress in the onset and worsening of essential hypertension.<sup>11</sup> Drawing a causal relationship between anxiety and depression in hypertensive patients may not be as simple, as there are several studies demonstrating the association between hypertension and anxiety in developed countries, with conflicting results from some, although using the same design and measurements.

Some European and American studies have shown a positive link between hypertension and anxiety.<sup>12-16</sup> Conversely, some studies show no crude or adjusted association between hypertension and anxiety.<sup>17-19</sup> Less evidence is available on the relationship between hypertension and psychological symptoms. A handful of studies have suggested that depression may be more common among individuals with hypertension.<sup>20, 21</sup> Still, the evidence is inconclusive and does not always include adjustment for relevant confounding variables, particularly traumatic life experiences.

Limited evidence is on hand from developing countries. Furthermore, analyses need to consider important confounders such as trauma, economic instabilities, political crisis, states of war and non-peacefulness, and other chronic conditions. Trauma has not previously been adjusted for, despite its potential to be associated with both hypertension and

mental health disorders. Hypertension is often a risk factor for other chronic conditions, and therefore an observed association between hypertension and a mental health disorder may not persist after adjustment for other chronic conditions as the true association may be between more severe chronic conditions and the mental health disorder.

This study aims to find more links and associations between hypertension and the presence of psychological symptoms mainly anxiety and depression among both genders and age groups and to assess the relationship between the duration of diagnoses and other comorbidities.

## Methods

This is a cross-sectional study conducted in a clinic from May 1<sup>st</sup> to October 1<sup>st</sup>, 2021 in the city of Erbil, Kurdistan Region of Iraq.

Data were collected from 286 patients who have been diagnosed with hypertension alone or hypertension with other comorbidities, reporting prescription of at least one anti-hypertensive medication at a time for a minimum of one year of duration.

Exclusion criteria for participation were pregnant women due to the possibility of gestational hypertension, which may resolve postpartum, patients diagnosed with psychiatric illnesses and on regular anti-depressants/anti-psychotics, and lastly, patients who were hypertensive but mentally/physically not capable to participate. Inclusion criteria was the remaining of the hypertensive patients who have been diagnosed more than 1-year duration and was prescribed medication accordingly, from both genders at any age group.

After obtaining an informed consent, a standardized quantitative assessment tool was used to collect data concurrently from the hypertensive patients attending the outpatient. The information gathered covered two parts: in the first part demographic characteristics including their

age, gender, place of residence, marital status, educational level, presence of other medical comorbidities, and duration of hypertensive diagnosis were asked. From the second part, information on anxiety and depression measures was obtained using the Hospital Anxiety and Depression Scale (HADS).<sup>22, 23</sup>

The HADS is a questionnaire that is a reliable tool for detecting states of anxiety and depression in the setting of outpatient clinics. It consists of two subscales, each containing 7 self-reported questions.

The depression subscale assessed dysphoria, hopelessness, devaluation of life, self-deprecation, and lack of interest/involvement, and inertia. The anxiety subscale measured autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. History of trauma, loss of beloved ones, or grief has also been taken into consideration and asked from the patients.

Finally, participants were graded based on the score taken from the HADS. Patients scoring less than 8 points were ruled as non-cases, patients scoring 8 to 10 points as borderline cases, and patients scoring more than 10 points as cases. The grading and scoring were conducted separately for Depression and Anxiety.

Data were obtained through the completion of a questionnaire, ruled out by data collectors, through face-to-face interviews with each participant. The participants were selected specifically according to the inclusion criteria and after clarifying the aim and purpose of the study, they gave verbal consent to participate. Data was then coded and classified for the purpose of categorizing the response of the participants. Participants were also notified that they were able to withdraw from the study at any stage if preferred.

#### **Statistical analysis of data**

The statistical analysis was performed using IBM statistical package for the social sciences (SPSS, version 28) program, IBM Corp., Armonk NY. Baseline patients' characteristics were summarized.

All categorical data were presented as frequency and percentages. Comparisons between groups were made using Chi-square tests. A  $P < 0.05$  was considered statistically significant.

#### **Ethical consideration**

The study was conducted following the ethical principles that have their origin in the declaration of Helsinki. The study protocol and the subjects' information and consent form were reviewed and confirmed by a local ethics committee. The ethics committee approved this study at Hawler Medical University

#### **Results**

A total of 286 patients participated, who have been diagnosed with hypertension alone or hypertension with other comorbidities, reporting prescription of at least one anti-hypertensive medication at a time for a minimum of one year of duration.

The mean age  $\pm$  SD was  $61.2 \pm 12$  years, the maximum age was 88-year-old and the minimum was 33-year-old participant. About 57.3% (164) were female and 42.7% (122) were male.

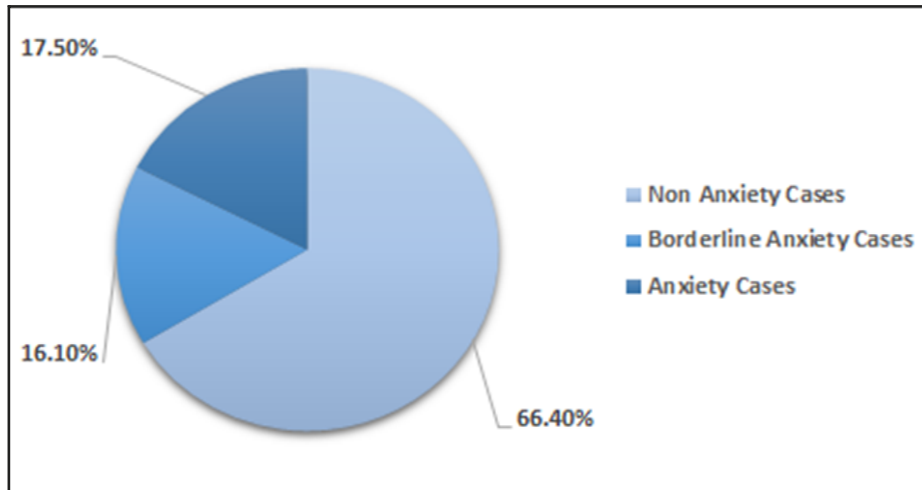
About the age group distribution, 2.8% (8) were among 30-39 years of age, 13.3% (38) were among 40-49 years of age, 27.3% (78) were among 50-59 years of age, 32.2% (92) were among 60-69 years of age and 24.5% (70) were more than 70 years old.

Regarding the residency of the participants, 77.6% (222) were from urban areas and the remaining 22.4% (64) were living in rural areas. Focusing on the socio-economic state of participants, based on a regular amount of monthly salary, 31.5% (90) of participants stated that they were in a poor socio-economic state, 62.9% (180) of them claimed that they had a fair socioeconomic state and only 4.9% (14) stated that they had a good socioeconomic state.

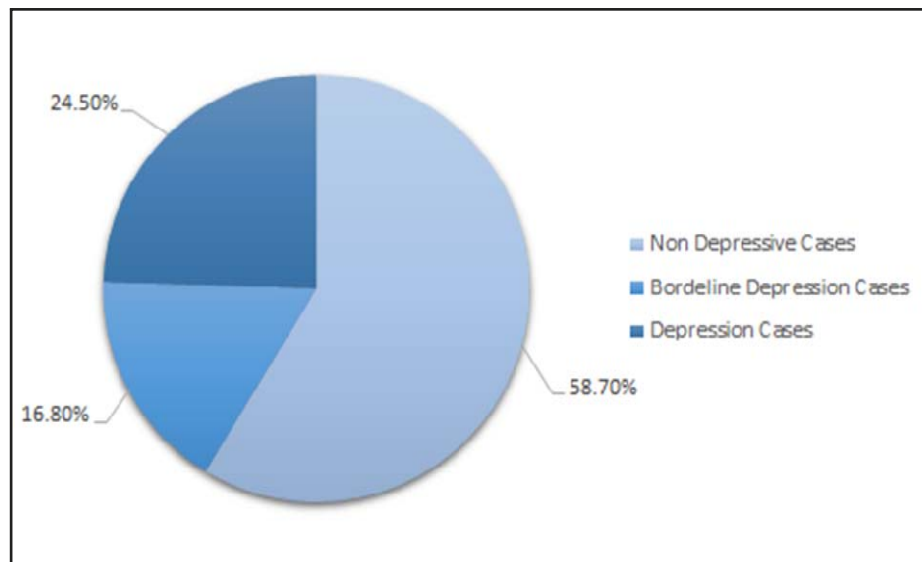
Regarding the medical profile of participants, 39.9% (114) were diabetic and 55.9% (160) were diagnosed as

different forms of coronary artery disease (CAD), including the previous history of Myocardial Infarction (+/- Undergoing Percutaneous Coronary Intervention), Stable and Unstable angina. According to the HADS system, among all the hypertensive participants, 66.4% (190) were non-anxiety cases, 16.1% (46) were borderline cases of anxiety and the

remaining 17.5% (50) were regarded as cases of anxiety as shown in Figure 1. Regarding the scoring of depression, 58.7% (168) were non-depression cases, 16.8% (48) were regarded as borderline cases and the remaining 24.5% (70) were counted as depressed cases as shown in Figure 2.



**Figure 1** Prevalence of anxiety among hypertensive participants



**Figure 2** Prevalence of depression among hypertensive participants.

The effect of negative mental health impacts among hypertensive patients was higher specifically among female patients, it was found that 26.3% (48) of the female hypertensive patients were regarded as depressed patients compared to the lower prevalence among male hypertensive patients, which counted as 18% (22), this finding was statistically significant with a *P* value of 0.002. Focusing on the other negative emotion among hypertensive patients, it was found that anxiety was more present among female hypertensive patients than male patients. There was a huge difference between both genders, female cases of anxiety were about 24.4% (40), while only 8.2% (10) of male hypertensive cases were noted to have anxiety. This finding was statistically significant with a *P* value of 0.001. All the related findings are summarized in Table 1. There was a relation between the duration

of taking chronic medications by the participants with the presence of depression. About 45% (26) hypertensive patients who were on chronic medications for about 10-20 years duration, were counted as depressed cases, while the prevalence of depressed cases was much lower 19.4% (12) among those who took medications for less than 2 years of duration, and 14.3% (18) among those who took chronic medications for 2-9 years duration. This finding was statistically significant with a *P* value of <0.005.

The prevalence of having anxiety was highest 24.1% (14) among hypertensive patients who take medications for about 10-20 years duration, 12.7% (16) among those who took chronic medications for 2-9 years, and 16.1% (10) among those who took less than 2 years duration. This was statistically not significant, with a *P* value of 0.148 as shown in Table 2.

**Table 1** Mental health impacts among hypertensive patients by gender

Mental Health Impact	Female (n = 164)	Male (n = 122)	<i>P</i> value
	No. (%)	No. (%)	
Depression	48 (29.3)	22 (18.0)	0.002
Anxiety	40 (24.4)	10 (8.2)	0.001

**Table 2** Association of anxiety with duration of chronic medication among hypertensive patients

	Time of taking medication			<i>P</i> value
	Less than 2 years (n = 62)	2-9 years (n = 126)	10-20 years (n = 58)	
	No. (%)	No. (%)	No. (%)	
Cases of Anxiety	10 (16.1%)	16 (12.7%)	14 (24.1%)	0.148
Cases of Depression	12 (19.4%)	18 (14.3%)	26 (44.8%)	< 0.001

The history of having trauma, loss of a loved one, and grief has been taken into consideration, 32.9% (94) had a history of trauma and 67.1% (192) did not claim any history of mental trauma. The proportion was almost the same among male and female patients 31.1% and 34.1%, respectively, with slightly higher levels among females, however, this was not statistically significant.

Comorbid depression and anxiety have been found to be highly present among patients suffering from diabetes mellitus and hypertension

There was a significant relation between patients' comorbidity with Diabetes mellitus (DM) and Hypertension with depressive symptoms.

DM was associated with depression (15.1%,  $P < 0.001$ ). However, there was no significant association between Diabetes Mellitus and anxiety (17.5% among diabetics vs. 17.4% among non-diabetics,  $P = 0.982$ ) as shown in Table 3.

### Discussion

To our best knowledge, this represents the first study conducted in Iraq about the prevalence of anxiety and depression among hypertensive patients using the HADS questionnaire, as mental health services are limited in Iraq.

The mechanism between anxiety and hypertension is complex. Generally, anxiety increases blood pressure in the short term<sup>24,25</sup> increases systemic vascular resistance by its close relationship with the renin-angiotensin system, and hence increases the level of angiotensin II.<sup>26,27</sup>

Long-term mental instability may lead to reduced vascular variability, and by that persistent vascular resistance leads to higher blood pressure.<sup>28</sup> Anxiety also leads to increased sympathetic activity, plasma renin activity, the homeostasis model, and blood lipids, by each of these mechanisms the current cardiovascular condition of each patient may worsen more.<sup>29-32</sup>

Anxiety and depression were found to be common among hypertensive patients in an outpatient clinic in the northern part of Iraq. Of the 286 hypertensive patients studied, 17.5% had anxiety disorders and 24.5% demonstrated depressive disorders, being lesser than a previous study among patients in a cardiovascular outpatient clinic in Iran and Afghanistan. The prevalence of depression and anxiety disorders in Iran were about 42.1%, and 27.1%, respectively<sup>33</sup> and in Afghanistan were about 58.1% and 42.3%, respectively.<sup>34</sup>

The findings of this study also indicate a higher prevalence of anxiety and depressive symptoms among the female gender (24.4% and 26.3% respectively) than the male gender (8.3% and 18% respectively) and this supports the usual pattern of higher prevalence of mental health manifestations among females compared to males. It should be noted that this high prevalence can be the consequence of psychological trauma secondary to cardiovascular conditions and other distressing somatic situations. This association may partly be explained by the fact that hormonal changes associated with the pregnancy,

**Table 3** Co-morbid patients with DM and Hypertension and Frequency of Mental Health Impacts

	Diabetic (n = 114)	Non-Diabetic (n = 172)	P value
	No. (%)	No. (%)	
Cases of Anxiety n (%)	20 (17.5%)	30 (17.4%)	$P = 0.982$
Cases of Depression n (%)	44 (38.6%)	26 (15.1%)	$P < 0.001$

postpartum, and postmenopausal periods of women's lives have been linked to anxiety.<sup>35</sup> From another point of view, females are more sensitive to psychological trauma, and cardiovascular events can result in vulnerability to trauma or deterioration of the previous psychological trauma or anxiety/depressive symptoms as claimed by Shin and colleagues.<sup>36</sup>

Regarding the use of chronic medications duration, our study linked the more the duration with the higher the prevalence of depressive and anxiety symptoms. This was similar to another study conducted in America that claimed that longer duration on chronic medications is directly proportional to higher prevalence of mental health manifestations.<sup>37</sup>

The analysis indicated a positive association between diabetes mellitus and anxiety among hypertensive patients. This association has also been demonstrated in a study in primary health centers of the Supreme Council of Health, in Qatar.<sup>38</sup> It is believed that there has been a positive contribution of type 2 diabetes in increasing the occurrence of anxiety disorders in patients with hypertension.<sup>39</sup>

There was an approximately similar rate of depression among all participants, with the highest rate among patients within 60-69 years of age in this study, and this corresponds with the research conducted in Ghana which concluded that older adult hypertensive patients were more likely to experience depressive symptoms.<sup>40</sup>

The similarity of the prevalence among our participants might be due to the global health conditions regarding COVID-19, by which people had lost their family members, financial decline, negative impacts of lockdowns, and the mental instability regarding this era of COVID-19, these points faced almost anyone regardless of their age group and all of these conditions might increase the prevalence of depression among older participants. As in another part of our study, it was found that 32.9% (94) had

a history of trauma, loss of a beloved one/grief for the past one year during COVID-19 era might contribute to their anxiety/depression state as well. Another study by *Mario GM, et al.* found that, families with COVID-19 survivors and those who lost family members presented a high prevalence (55%) of emergent psychiatric sequelae including depression and anxiety symptoms.<sup>41</sup>

### Limitations and strength

Some limitations in the study should be discussed. First, the sample size consisted of a single-center data source. The single-center nature of this study may affect its generalizability to the entire population of Erbil city-Kurdistan Region of Iraq. Second, this research was done during the COVID-19 pandemic, and its impact was not appraised on the mental health of hypertensive patients.

The results are in agreement with other studies and should be beneficial to the accumulation of data regarding this issue.

### Conclusion

In conclusion, the prevalence of anxiety and depression among patients with hypertension was of note and high. Anxiety and depression were significantly associated with some clinical profiles of patients. Therefore, we recommend the need for more research on the national level to develop strategies for the prevention and control of psychological distress among hypertensive patients.

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### Competing interests

The author declares that he has no competing interests.

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