Prevalence of anxiety and depression among hypertensive patients: a systematic review

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ABSTRACT

Hypertension is the elevation in the blood pressure level, and it is responsible for cardiovascular diseases. Depression and anxiety diseases are the most common mental disorders globally. Depression is common among patients with chronic disorders, including hypertension, and there are conflicts regarding the correlation between hypertension and anxiety. To assess the prevalence of anxiety and depression among hypertensive patients. PubMed and Google Scholar databases were searched for articles on the current subject starting from 2017 to 2021. The included searching terms included “Prevalence of depression and hypertension, Prevalence of anxiety and hypertension, Anxiety among hypertensive patients, Depression among hypertensive patients.” The inclusion criteria included full original articles conducted on patients with hypertension and assessed the prevalence of anxiety, depression, or both.

We obtained 70 articles; only 10 articles were eligible for the inclusion criteria. The 10 studies included a total number of 2,581 participants and covered 6 countries. The findings of this systematic review showed that the overall prevalence of depression and anxiety ranged from 57.3% to 77.8%. The most-reported factors associated with the prevalence of depression and anxiety among hypertensive patients included gender and educational level. The prevalence of depression and anxiety among hypertensive patients varied based on several factors and the stage of hypertension; however, they were highly prevalent in general. Adequate control of blood pressure is necessary.

Keywords: Anxiety, depression, hypertension, prevalence.

Introduction

Hypertension is a global challenge with high rates of morbidity and mortality. The etiology of hypertension is multifactorial due to the combined impact of environmental and genetic factors [1]. The global prevalence of hypertension among adults of the age of 20 years and older is 40% [2]. Due to the population growth and aging, the prevalence of hypertension has been raised from 600 million to 1 billion from 1980 to 2008 [3]. Hypertension is a leading cause of cardiovascular disease, stroke, and premature death, globally; however, it is a preventable risk factor [4,5].

Psychiatric disorders also represent a significant public health problem [6]. Anxiety and depression disorders are the most prevalent mental disorders globally [7,8]. Anxiety disorders, including generalized anxiety and panic disorders, are the most prevalent psychiatric disorders in the world [8]. Almost one-third of the population in the world is expected to have anxiety during their lifetime [8,9]. A positive correlation has been suggested between anxiety and hypertension; however, a few cross-sectional studies reported an inverse correlation [10-12]. There were
several factors that led to the contribution of such conflict in results, including small sample size and lack of gender diversity [13]. Both depression and hypertension emerge from a complex interaction of biological, social, and behavioral factors [14,15]. Depression is common among patients with chronic disorders such as hypertension [16]; however, depression is underdiagnosed among patients with hypertension [17]. The co-existence of depression and hypertension may lead to a reduction in quality of life, reduced therapeutic compliance for antihypertensive therapy, and increased risk of suicide [16]. Therefore, this systematic review was performed to investigate the correlation and prevalence rates of anxiety and depression among hypertensive patients.

## Method

The PRISMA checklist guidance for systematic review and meta-analysis [18] was followed to write this systematic review. PubMed and Google Scholar databases were searched for articles related to our subject and to select eligible research articles between the year 2017 and 2021.

### Search strategy

Several keywords were used for searching purposes, including a combination of “Prevalence of depression and hypertension,” “Prevalence of anxiety and hypertension,” “Depression among hypertensive patients,” “Anxiety among hypertensive patients.” The titles of articles and abstracts were revised. The findings were then examined to choose only original research articles published in the recent 5 years evaluating the prevalence of depression, anxiety, or both among patients with hypertension. All original articles published between 2017 and 2021 were eligible. Only articles in English were defined as articles of relevance, which were then included in the second stage.

### Eligibility criteria

The second step was deciding on the inclusion criteria to select the eligible studies. Abstracts were assessed manually to select the relevant studies for revision. The inclusion criteria were studies conducted on hypertensive patients, assessed the prevalence of depression, anxiety, or both among hypertensive patients, and studies of any appropriate design, conducted on 100 patients and more. The final stage was gathering the information from the final eligible articles and summarized them. Exclusion criteria included articles published before 2017, studies containing overlapped data, unavailable full-text articles, and review articles. The full description of the search strategy is shown in Figure 1.

### Data review and analysis

A table was designed to summarize the chosen data from eligible research articles under specific titles (Table 1), then revised.

## Results

This systematic review included 10 articles that met the eligible criteria [19-28] and were published between 2021 and 2017. There was one study published in 2021 [19], three studies published in 2020 [20-22], two studies published in 2019 [23,24], two published in 2018 [25,26], and the remaining two articles were published in 2017 [27,28]. Regarding the study design, there was one study that didn’t mention the design [20], one study was prospective [26], whereas the remaining eight studies were cross-sectional [19,21-25,27,28]; of the eight studies, one study was an institutional-based cross-sectional study [21], and another one was a hospital-based cross-sectional study [22]. The total number of participants in the included studies was 2,581; there was one study that didn’t report the gender proportions and instead classified the participants based on the stage of hypertension into three groups [26], whereas the remaining nine studies reported the proportions of gender and the females were more predominant in eight studies [19,20,22-25,27,28], whereas males were more predominant in only one study [21].

Regarding the country at which the study was performed, one study did not state the country of study [26], whereas the other nine studies covered six countries; there were two studies from Saudi Arabia [19,27], three studies from India [23,24,28], one from Ghana [20], one from Ethiopia [21], one from Nigeria [22], and one from Afghanistan [25]. The studies were either conducted to assess the prevalence of anxiety and depression among hypertensive patients [22,25,26,27], to assess the prevalence of depression among hypertensive patients [19-21,23,], or to assess the prevalence of undiagnosed depression among hypertensive patients [24]. However, all the studies reported the rates of depression, so they were included in this systematic review.

The findings of the included studies reported that the prevalence of depression ranged from 1.2% [22] to 58.1% [25], whereas the prevalence of anxiety ranged from 4.1% [22] to 42.3% [25], and the overall prevalence was reported in two articles and it ranged from 57.3% [27] to 77.8% [22]. Regarding the degrees of depression, mild degree ranged from 4.49% [19] to 39.8% [27], whereas severe depression ranged from 1.8% [27] to 9% [24]. There was one [26] study that did not report the prevalence of depression or anxiety as it assessed the prevalence of anxiety and depression based on the degree of hypertension. There were several factors reported to be associated with depression and anxiety; these factors varied between the different studies included; however, the most reported factors included gender [21,23,25,28], educational level [20,21,28], age [19,21,25], socioeconomic status [19,23,28], the status of physical activity or lifestyle [19,20,28], and marital status [20,28]. There were three studies that didn’t report the factors associated with the presence of anxiety and depression among hypertensive patients [22,24,26].
Discussion

The current systematic review was conducted to find out the prevalence of anxiety and depression among hypertensive patients. We included 10 studies, and we found that there was a high prevalence of anxiety and depression among hypertensive patients as the overall prevalence of depression and anxiety among hypertensive patients was found to be ranged from 57.3% [27] to 77.8% [22]. The prevalence of depression and anxiety varied between the different studies, where the prevalence of depression ranged from 1.2% [22] to 16% [22].
## Table 1. Table of the included articles.

<table>
<thead>
<tr>
<th>Author and publication year</th>
<th>Study design</th>
<th>Sample size, &amp; patients</th>
<th>Country</th>
<th>Aim</th>
<th>Results and main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albasara et al. 2021 [19]</td>
<td>Cross-sectional</td>
<td>-342 hypertensive patients -44.2% males, 55.8% females</td>
<td>Dammam, Saudi Arabia</td>
<td>To determine the prevalence of depression and its associated factor among hypertensive patients in Dammam.</td>
<td>The prevalence of depression with various degrees was prevalent among 19.6% Mild 4.97%, moderate 11.69%, severe 2.94% Depression was common among hypertensive patients Older age, low income, physical inactivity, ever smoker, long standing hypertension &gt; 3 years were significantly associated with depression among hypertensive patients</td>
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<tr>
<td>Boima et al. 2020 [20]</td>
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<td>-149 individuals (data from the World Health Organization Study on Global AGEing and Adult Health wave 2 (2014/2015) -38.25% males, 61.74% females</td>
<td>Ghana</td>
<td>To assess the prevalence and factors associated with depression among young and older adult hypertensive patients in Ghana</td>
<td>The overall prevalence of depression was 6.3%. Older hypertensive patients had almost twice the prevalence of depression compared with younger patients. The factors which predicted depression among hypertensive patients were educational level, marital status, religion, region of residence, work status, self-rated health, and unhealthy lifestyle.</td>
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<tr>
<td>Gebre et al. 2020 [21]</td>
<td>An institutional-based cross-sectional study</td>
<td>-295 patients -64.1% males, 35.9% females</td>
<td>Hawassa, Southern Ethiopia</td>
<td>To assess the magnitude and factors associated with depression among hypertensive patients attending treatment follow up in the chronic OPD at Hawassa University Comprehensive Specialized Hospital</td>
<td>Depression among hypertension patients was 73 (24.7%) The independent predictors were sex, age educational status, social support, family history of depression, hypertension, and medication adherence The magnitude of depression among HPN patients was high.</td>
</tr>
<tr>
<td>Ebirim et al. 2020 [22]</td>
<td>A hospital based cross sectional</td>
<td>-334 participants -43.1% males, 56.9% females</td>
<td>Nigeria</td>
<td>To determine the prevalence of depression and anxiety among hypertensive’s attending Imo Specialist Hospital Owerri, Nigeria</td>
<td>The Overall prevalence of depression and anxiety among the hypertensive patients was 77.8%. 4.1% were anxious but not depressed while 1.2% were depressed but not anxious. A combination of hypertensive medications with psychotherapy and antidepressants can definitely help prevent severe attacks of high blood pressure. The study recommends the need for psychiatric evaluation, counseling, and support services for hypertensive patients as an important component for the management of hypertension especially at advanced stage.</td>
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<tr>
<td>Ashok &amp; Ghosh 2019 [23]</td>
<td>Cross-sectional</td>
<td>-200 patients -35% males, 65% women</td>
<td>India</td>
<td>To study the prevalence of depression among hypertensive patients and its associates factors.</td>
<td>The prevalence of depression was 41% Mild 28.5%, moderate 7%, moderately severe 3%, severe 2.5% Female gender, low socio economic status, positive family history were found to be significantly associated with depression There was high prevalence of depression among hypertensives.</td>
</tr>
<tr>
<td>Author and publication year</td>
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<tr>
<td>Kulkarni &amp; Lingappa 2019 [24]</td>
<td>Cross-sectional</td>
<td>-100 participants -30% males, 70% females</td>
<td>India</td>
<td>To study the prevalence of undiagnosed depression in hypertensive cases.</td>
<td>Prevalence of depression was 40%. 18 participants had mild depression, 13 had moderate, and 9 had severe depression. The prevalence of undiagnosed depression in hypertensive patients was 40% which is extremely high when compared to the prevalence of depression in the general population. The underlying causes of depression need to be addressed, and community programs need to be initiated to raise awareness regarding long-term complications of untreated depression.</td>
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<td>Hamrah et al. 2018 [25]</td>
<td>Cross-sectional</td>
<td>-234 patients -34.6% males, 65.4% females</td>
<td>Afghanistan</td>
<td>To determine the prevalence and factors associated with anxiety and depression among adult hypertensive outpatients in Afghanistan.</td>
<td>The prevalence of anxiety and depression (42.3% vs. 58.1%) among hypertensive persons. Anxiety (42.3%), depression (58.1%), and (28.2%) comorbid anxiety-depression. For anxiety age, female gender, smoking, diabetes mellitus, and 2 or more chronic diseases had a significant association. For depression, age and diabetes mellitus had a significant association, and for comorbid anxiety, depression, age, diabetes mellitus, and 2 or more chronic diseases had a significant association. Anxiety and depression are highly prevalent among hypertensive patients in an outpatient clinic in Afghanistan.</td>
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<td>Mermerelis et al. 2018 [26]</td>
<td>Prospective</td>
<td>-127 participants -Participants were divided in three groups based on the stage of hypertension; group 1 (n = 33 patients with stage 1 HTN), group 2 (n = 30 patients with stage 2 HTN) and group 3(n = 30 patients with stage 3 HTN).</td>
<td>------</td>
<td>To assess the prevalence of anxiety and depression among essential hypertensive patients in different stages of hypertension compared to normotensives.</td>
<td>There was a significant increase in the prevalence of depression as the stages of hypertension evolved. There was a clear burden of both anxiety and depression in higher levels of hypertension compared to normotensives. Anxiety and depression are both linked to higher arterial stiffness levels among essential hypertensive patients irrespectively of the blood pressure levels.</td>
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<tr>
<td>Alkbatbami et al. 2017 [27]</td>
<td>Cross-sectional</td>
<td>-368 primary health care (PHC) patients -48.6% males, 51.4% females</td>
<td>Saudi Arabia</td>
<td>To measure the frequency and identify risk factors of depression and anxiety among diabetic and hypertensive PHC patients</td>
<td>Overall prevalence of depression or anxiety was 57.3%. Depression comprise 48.7% (39.8% mild, 7.1% moderate, 1.8% severe). Anxiety comprise 38.4% (25.1% mild, 8.8% moderate, 4.4% severe). Depression or anxiety among diabetic and hypertensive patients have a high morbidity, but with low detection rate.</td>
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<tr>
<td>Prathibha et al. 2017 [28]</td>
<td>Cross-sectional</td>
<td>-432 patients -35% males, 65% females</td>
<td>India</td>
<td>To explore the epidemiology of depression among hypertensives patients</td>
<td>The prevalence of depression was 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 prevalence of depression among hypertensive individuals was high. Adequate control of BP along with awareness among primary care physicians in identifying those with hypertension and co-morbid depression is essential.</td>
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</tbody>
</table>
Anxiety and depression among hypertensive patients

58.1% [25], whereas the prevalence of anxiety ranged from 4.1% [22] to 42.3% [25].

In a previous study, the prevalence of depression symptoms was prevalent among 10%, whereas anxiety was found among 70% of hypertensive patients [1]. On the other hand, this systematic review found that depression tended to be more prevalent and more reported in studies compared to anxiety. A systematic review conducted in 2015 and reported the prevalence of depression only among hypertensive patients revealed that there was a heterogeneity in the prevalence of depression among hypertensive patients [29], which was similar to our findings. The previous systematic review related this heterogeneity to variation in the method of evaluation.

The variation in the prevalence of depression and anxiety can return to many factors, such as the country of the study, as each country varies in the prevalence of hypertension, depression, and anxiety; this prevalence, in turn, varies based on several factors. The factors that affect the prevalence of depression and anxiety have been investigated in several studies in the current systematic review, but each study investigated various factors. However, we found that the most common and the most reported factors affected the prevalence of depression and anxiety among hypertensive patients, included gender [21,23,25,28], educational level [20,21,28], age [19,21,25], socio-economic status [19,23,28], the status of physical activity or lifestyle [19,20,28], and marital status [20,28]. Female gender [23,28] was associated with a higher prevalence of depression and anxiety among hypertensive patients, also low educational level, older age, and low socio-economic status. A previous study also reported that the female gender was a risk factor for the development and severity of anxiety among hypertensive patients [30].

It was reported that there were conflicts in studies regarding the correlation between hypertension and anxiety [31-35]. A few small studies reported an inverse correlation between anxiety and hypertension [10-12]. However, one study in this systematic review showed that anxiety and depression significantly increased in prevalence among hypertensive patients as the stage of hypertension increases [26]. However, further studies are recommended to investigate such positive association with more details and more analysis, and a larger sample size as the study included only 127 hypertensive patients [26].

Among patients with undiagnosed hypertension [24], there was a high prevalence of depression, which reflects another additive problem, and it is undiagnosed hypertension, where the patient suffers from hypertension and may develop depression with no detection. This encourages us to suggest that patients should be monitored for hypertension periodically, and once they are diagnosed with hypertension, they should seek psychological check-ups for early detection of depression and anxiety. A previous study from Nepal conducted on undiagnosed depression among hypertensive patients reported that age, gender, education, smoking, and adherence to antihypertensive medication were associated with undiagnosed depression [16]. The study recommended screening programs to assist early intervention and detection of sub-clinical depression [16].

The impact of depression and anxiety among hypertensive patients is various. Comorbid hypertension and anxiety combined with or without depression have been associated with lower levels of daily functioning, lower adherence to treatment, higher healthcare-associated costs, and lower health-related quality of life [36,37].

**Conclusion**

The prevalence of depression and anxiety among patients with hypertension was generally high compared to individuals with no hypertension; however, the prevalence varied based on the stage of blood pressure and various other factors. As the stage of hypertension evolved, the prevalence of anxiety and depression increases. Another problem found was the high prevalence of undiagnosed depression; this indicates that hypertensive patients require a psychological check-up in order to detect undiagnosed depression. The factors associated with increased depression and anxiety prevalence included older age, female gender, low socio-economic status, physical inactivity, and marital status. There are other factors related to the prevalence of depression and anxiety among hypertensive patients; however, these factors were less common and less reported in the studies.

**Recommendations**

Continuous monitoring of blood pressure is necessary, as well as an adequate control. The patients should be aware of the psychological impact of blood pressure and understand the risk factors of developing depression and anxiety in order to avoid further psychological medication for anxiety or depression that may act as a further load on the patients, especially those having other co-morbidities. Further studies are recommended to assess the impact of depression and anxiety among patients with hypertension and to investigate if the early intervention and continuous check-up of depression and anxiety can provide protection against suffering depression or anxiety.

**List of Abbreviations**

HTN : Hypertension

**Conflict of interest**

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Not applicable.

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