

Hypertension and Anxiety: Comorbidity, Treatment, and Access to Resources

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Abstract

Hypertension and its comorbidity with anxiety disorders is a global concern even more prevalent in developing countries. There is limited data from low-income countries. Existing literature has consistently exhibited a positive association between hypertension and anxiety, although the directional dependency between the two conditions is difficult to be determined. Studies have suggested a reciprocal relationship between the two, with hypertension symptoms such as headaches, shortness of breath, fear of complications, and dizziness triggering feelings of anxiety. Similarly, the pre-existing presence of anxiety may induce temporary, yet dramatic spikes in blood pressure as well as long-term issues with hypertension. This paper provides a review of the widely investigated association between hypertension and anxiety and describes the impact that one condition has on the other in terms of psychological and physical functioning, and risk factors. Additionally, a discrepancy between prevalence, ability to control, and treatment between affluent and developing countries are discussed. The most common and effective pharmacological and psychotherapeutic treatments are presented and reviewed. Evidence-based interventions include mindfulness-based treatments such as MBSR and MBCT, ABBTs such as ACT, cognitive behavioral therapy (CBT), and motivational interviewing. Suggestions for future treatment options and management of both conditions are presented, with an emphasis on populations in developing countries. To address discrepancies in access to resources, urbanization, and high illiteracy rates, a global risk approach is presented.

Keywords

Hypertension, Anxiety, Comorbidity, Treatment, CBT, Mindfulness, Risk factors, Accessibility, Resources.

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Introduction

Hypertension, otherwise referred to as high blood pressure, is a highly prevalent condition in which the force exerted by blood circulation against artery walls in the body is too high, resulting in an increased risk of cardiovascular disease, stroke, heart attack, and other life-threatening health complications [1]. Globally, this common condition has been the leading cause of premature death with some risk factors relating to age, sex, race, ethnicity,

socioeconomic status, geographical location, and lifestyle choices. A recently published pooled analysis with data from 1990-2019 and 104 million participants presented many comparative findings including improved control and treatment rates of hypertension in most countries since 1990, primarily observed in high-income countries due to access to analogous resources [2]. Additionally, hypertension-related health complications such as stroke, heart disease, and renal disease have been related to 8.5 million deaths

worldwide, disproportionately affecting developing countries [2]. Furthermore, the risk for hypertension increases with age, men have higher BP at younger ages while women have a higher risk after 60 years of age, and racial and ethnic minorities are at higher risk for hypertension compared to the Caucasian population [3]. The last finding, as reported, is believed to be attributed to sociodemographic and environmental factors, rather than genetic factors. High sodium intake, low potassium intake, lack of physical activity, obesity, an unhealthy diet, cigarette smoking, and sleep disorders are additional risk factors associated with the development of hypertension [3,4].

An analytic review by Ibrahim & Damasceno [4] demonstrated a strong correlation between urbanization and socioeconomic status and an increase in hypertension prevalence, such that patterns of food consumption, dietary changes, increased psychological stress, and disruption of “traditional family links” may be interrelated. Characteristically, urbanization affects food consumption with enhanced use of oils, fats, and animal products that were not previously consumed resulting in increased body weight, higher body-mass index (BMI), and higher blood pressure. According to another study, systolic blood pressure levels tend to be higher in low- and middle-income countries compared to North America [5]. Overall, in affluent countries, there is a greater prevalence of controlled hypertension, and this difference can be attributed to many factors, including but not limited to lack of awareness, scarce resources, and insufficient knowledge of health professionals about treatment in developing countries [4,6].

Hypertension and Anxiety

In addition to health consequences and health-related risk factors, the growing prevalence of hypertension has led to a wide array of psychiatric comorbidities and thus, impairment of quality of life [1]. One of the most commonly diagnosed comorbidities of hypertension are anxiety disorders, which is the primary focus of this paper. According to the Diagnostic and Statistical Manual v.5, there are multiple disorders under the bracket of ‘Anxiety Disorders’, many of them with the common diagnostic features of excessive worry, sleep disturbances, irritability, and restlessness [7]. Depending on the onset of the symptomatology, an analogous diagnosis can be provided. This reciprocal relationship can be illustrated as the following: hypertension symptoms such as headaches and dizziness can evoke anxiety symptoms while existing anxiety can result in physiological changes in the body and raise blood pressure [8]. The mechanism between hypertension and anxiety is multifaceted; anxiety has been shown to activate the sympathetic nervous system while constricting blood vessels and raising blood pressure [9]. Furthermore, although anxiety may increase blood pressure in the short term, it can also have long-term implications by affecting the renin-angiotensin system and decrease vascular variability such that vascular resistance persists over time and leads to hypertension [8]. From a neurobiological perspective, it can be understood that the presence of stress in the body increases cortisol levels, which results in “deposition of arteriosclerotic deposits in the intima of blood vessels” [1]. Thus, these depositions narrow the blood vessels over time which can

lead to increased arterial pressure and hypertension. A literature review by Johnson [10] investigated the association between hypertension and anxiety and found a higher risk for developing hypertension after being diagnosed with an anxiety disorder. Additional literature has similarly exhibited a strong association between various mental health disorders including anxiety and a subsequent diagnosis of hypertension, highlighting the importance of early detection of physical and mental health problems [11]. A meta-analysis, pooling 59 related studies, demonstrated a significant anxiety-hypertension association while approximately 12% of hypertension patients reported anxiety symptoms [12]. A positive correlation between comorbid hypertension and anxiety has also been displayed in several other studies [10,13,14]. Another study investigating this association in an adult population in Hong Kong found that women and younger subjects with hypertension were more likely to report anxiety symptoms as compared to older subjects who were more likely to be depressed [15].

There are limited data from low-income countries; one study investigating hypertension and anxiety in South Africa and after adjusting for other variables demonstrated a strong association between the two conditions [16]. Furthermore, it was found that self-reported diagnosis of hypertension is commonly correlated with 12-month anxiety disorders and other comorbid mental disorders among South Africans as compared to those without hypertension. Delving further into socioeconomic and demographic risk factors, hypertension prevalence has been associated with low income, and specifically, the higher the income was in the cited study, the lower the prevalence of psychiatric comorbidity was in hypertension patients [1]. Thus, the risk of developing a mental disorder comorbid to hypertension appears to increase in low-income populations. Moreover, a study conducted by Hamrah and colleagues [17] found a high prevalence of comorbid anxiety disorders and symptoms among adult hypertensive outpatients in Afghanistan.

Treatment

Treatment options, both pharmacological and psychotherapeutic, will be presented for the two conditions, separately and combined. Firstly, in terms of pharmacological treatment, hypertension is usually managed with various antihypertensive drugs which aim to control blood pressure values. That being said, in a recently published article, a new anti-hypertensive medication has been developed to address various mechanisms involved in hypertension, including but not limited to: “a novel mineralocorticoid receptor antagonist, inhibitors of vasopeptidases, aldosterone synthase and soluble epoxide hydrolase, and agonists of natriuretic peptide A and vasoactive intestinal peptide receptor 2” [18]. Often, hypertension patients are prescribed diuretics which encourage the kidneys to get rid of excess water and salt in the body which in turn, lowers blood pressure [19]. Additionally, beta-blockers allow blood to flow through the patient’s vessels with less force, alpha-blockers relax the vessels to permit more room for blood to flow, and ACE (angiotensin-converting enzyme)-inhibitors hinder the formation of a hormone that tightens blood vessels, which allows them to remain open [20,21]. Thus, the main objective of antihypertensive

medication is to decrease blood pressure values short-term and ultimately, to prevent diseases induced by hypertension, a hypertensive emergency, and mortality in the future.

Regarding pharmacological treatment for anxiety, the following medications are commonly administered: antidepressants (SSRIs, tricyclics, MAOIs), SNRIs, benzodiazepines, buspirone, beta-blockers, and pregabalin [22,23]. Moreover, pharmacological treatment to target anxiety symptoms can be administered concurrently with antihypertensive medication in patients with comorbidity [24,25]. Existing literature has demonstrated that in patients with hypertension and anxiety disorders, antihypertensive therapy was more effective in combination with anxiolytic medication compared to antihypertensive therapy alone [26]. Interestingly, another study found that anti-anxiety treatment is effective in reducing blood pressure in hypertension patients, suggesting that it may target similar mechanisms in the two conditions [27]. With this in mind, medication adherence can be poor and pose a challenge in hypertension patients, especially when medication elicits unpleasant side effects, and this remains a global problem [28]. A recent study investigating the association between anxiety and medication adherence in hypertension patients, demonstrated a positive correlation, suggesting that anxiety works maladaptively in treatment adherence [29]. Adherence can be addressed with a physician and selecting the right medication for the patient, producing the least side effects and decreasing the amount of pills per day, can subsequently improve rates of adherence [30].

Delving into psychotherapeutic treatment options, many approaches target both hypertension and anxiety symptomatology, simultaneously. Vast existing literature has demonstrated the efficacy of mindfulness-based treatments, ABBTs, and CBT in treating both conditions. Firstly, mindfulness-based treatments target anxiety symptoms by promoting awareness of the present moment, better emotion regulation, attention to the breath, and introspection [31,32]. Such techniques discourage maladaptive habits such as cognitive rumination which refers to uncontrolled patterns of thinking which are often self-referential and negative [33,34]. Mindfulness-based stress reduction (MBSR) is an 8-week, evidence-based, mindfulness intervention program founded by Jon Kabat-Zinn, which is highly experiential, and it focuses on stress management and individual mindfulness practice [35]. A comprehensive meta-analysis further examined mindfulness-based therapy (MBT) as an intervention for various psychological problems such as anxiety and depression; results from 209 studies similarly displayed high efficacy [36]. In addition to evidence supporting mindfulness as an effective treatment for anxiety, it has also been shown to address hypertension symptoms. A literature review published in 2012 exhibited clinically significant reductions in both systolic and diastolic blood pressure values as a result of mindfulness-based treatment [37]. The same review also found that MBSR, which was originally used in patients with chronic pain, has been consistently effective in lowering blood pressure. Another study by Lu and colleagues (2017) meta-analyzed the impact of meditation on blood pressure with results aligning with existing

findings and supporting its efficacy in treating hypertension.

With a similar underlying notion as mindfulness-based treatments, acceptance-based behavioral therapies (ABBTs) provide an umbrella term encompassing mindfulness-based cognitive therapy (MBCT), acceptance and commitment therapy (ACT), integrative behavioral couple therapy (IBCT), and dialectical behavioral therapy (DBT). The essence of these treatments is to increase awareness, increase acceptance, and attribute meaning to life by identifying one's core values [38]. Acceptance and commitment therapy has been revealed to be effective in improving patients' acceptance of their hypertension condition as well as their commitment to alleviating their anxiety symptoms [39]. Fundamentally, ABBTs are utilized to treat anxiety disorders by incorporating psychoeducation, mindfulness practices, values articulation, and self-monitoring, which have shown high efficacy in multiple studies [38, 40,41]. In terms of treating hypertension, acceptance and commitment therapy has been demonstrated as effective according to a semi-experiential study [42]. Specifically, the aforementioned study revealed a significant difference in hypertension and cognitive emotion regulation between the experimental and control groups after implementing acceptance and commitment therapy.

Another study revealed that illness acceptance was an important factor regarding adherence to non-pharmacological therapy of hypertension, with no influence on pharmacological treatment [43]. In addition to acceptance of one's condition, the previous study also noted the sociodemographic and psychosocial factors that may interfere with adherence to treatment such as geographical location, race, perception of illness, low quality of life, lack of knowledge, and lack of resources to address the condition. Thus, the effectiveness of acceptance-based treatments may vary in other countries, depending on the level of affluence, access to medical care, and cultural differences [44]. Along these lines, a recent study was conducted in Indonesia and showed that ACT, which promotes a healthy way to approach fear and anxiety, was indeed effective in reducing anxiety in hypertensive patients who were specifically anxious about their medical condition [45]. However, it can be argued that an acceptance-based approach is not always well-received in the face of adversity, especially in diverse populations with limited resources and if implemented, it must be carried out with caution and cultural sensitivity [46,47].

Furthermore, cognitive behavioral therapy (CBT) is considered the "gold standard" of psychotherapeutic treatment for a wide array of disorders and maladaptive behaviors. The primary objectives of CBT are to promote self-awareness, change thinking and behavioral patterns, and acquire adaptive coping strategies [48]. Vast research has exhibited positive outcomes of CBT for anxiety patients, by targeting changes in maladaptive thinking and behaviors [49]. In addition to treating anxiety symptoms, CBT can be an effective and complementary therapy for hypertension, especially in patients with poor medication and treatment adherence [50,51]. To elaborate on this, a systematic review and meta-analysis on the efficacy of CBT demonstrated an overall positive effect of CBT interventions on health outcomes in hypertensive patients [51]. Specifically, results

showed a significant reduction in sleep disturbances, cholesterol levels, and improved values of systolic and diastolic blood pressure values. Other research has demonstrated similar findings [52,53]. Therefore, CBT appears to be an effective, short-term treatment option to address symptoms of both hypertension and anxiety in patients with comorbidity. Additionally, motivational interviewing is a psychotherapeutic approach that aims to enhance a patient's motivation to make positive behavior changes. Research has shown that this approach can be effective in improving blood pressure control, and adherence to treatment and medication in hypertension patients [54,55].

Global Risk Approach

As supported by existing studies stated in this paper, hypertension and its comorbidity with anxiety disorders is a global concern, and even more prevalent in developing countries. Primarily, means of assessment should be addressed, as one major constraint is the inability to assess patients' risk of hypertension [4]. In developing countries, measurements of blood glucose and cholesterol are often not possible to be obtained. The development of accessible tools must be prioritized, such as an affordable sphygmomanometer that can be distributed and utilized in primary healthcare settings. Educational programs and additional training must also be provided to healthcare professionals to assess, control, and appropriately care for their patients, as well as to detect signs of psychiatric comorbidities. Additionally, hypertension guidelines should be modified and specifically address resource-poor populations since guidelines for high-income countries may be impractical and non-applicable. Furthermore, anti-hypertensive drugs can become subsidized by the government or organizations and community-based programs can aim to inform the public, encourage self-referral, and provide psychoeducation. A study conducted in Cuba by Ordunez-Garcia and colleagues [56] attempted to control hypertension in a low-resource setting by improving detection and treatment, which was effective and deemed feasible in similar settings. Moreover, a comprehensive review revised data on control and strategies in developing countries in Asia with the objective of prevention. It was demonstrated that due to genetic and environmental factors that are unique to developing countries, there is a need for "cost-effective pharmacological treatment, accessibility to low-cost interventions, and counseling for lifestyle modifications" [57]. Anxiety can be addressed through counseling. Trained physicians on basic counseling techniques, ex. relaxation techniques and mindfulness, can improve the health awareness of their patients. Reducing anxiety is one of the first steps towards reducing the stress on the body. Blood pressure can either be lower due to hyperventilation or higher due to chronic anxiety and the experience of blood pressure spikes. Teaching a patient to recognize the connection of blood pressure and anxiety is the first step to wellness. Detecting resources (medical doctors, counsellors, and medication) is the second step when self-care is not enough. Dealing with hypertension remains a long-term goal as it is affected by multiple factors. The involvement of a multidisciplinary team (physician, nutritionist, counselor, trainer, nurse) might be impossible. Yet, training the first aid people in basic skills could be a solution.

Discussion

Worldwide, hypertension is a prevalent condition that affects millions of people and is often described as "the silent killer", often displaying minimal to no symptoms. There are serious health implications linked to hypertension such as cardiovascular disease, stroke, heart attack, and kidney disease. The most common psychiatric comorbidity consists of anxiety disorders, which can either contribute to the onset of hypertension, or develop concurrently. Nevertheless, the presence of this comorbidity can significantly increase health risks and ameliorate psychological distress. Various pharmacological and evidence-based psychotherapeutic treatments can target symptoms of the two conditions, separately and together. Mindfulness and acceptance-based treatments are commonly implemented as a combined approach. Motivational interviewing and CBT are also widely studied and tested treatment options to improve adherence, evoke internal motivation for change and provide psychoeducation to patients. However, it is important to note that acceptance and mindfulness-based treatments are not effective in all diverse populations, which suggests the need for clinical considerations. For instance, some studies have assessed the efficacy of such treatments in non-dominant and marginalized populations, and some elements may or may not be congruent [26,44,47]. Thus, more research must be conducted to further explore these discrepancies and develop treatment options tailored to diverse populations as well as provide access to such resources to patients in developing countries. To address this concern, a global risk approach must be considered, targeting accessibility, education, and cost-effective options.

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