2022, Volume 2, Issue 1, Page No: 43-49
ISSN: 3108-4826

Society of Medical Education & Research

Journal of Medical Sciences and Interdisciplinary Research

A Comprehensive Review of Current Findings Linking Hypertension in Adults with Stress and Anxiety Conditions

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Abstract

According to projections from the W.H.O., ischemic heart disease was expected to emerge as the leading global cause of illness by 2020, closely followed by major depressive disorders as the second most important cause. The future landscape of global health will likely be shaped by the complex interplay between cardiovascular disease and psychiatric conditions. There is a strong association between an individual's mental health and their lifestyle choices, both of which can significantly influence the onset and progression of ischemic heart conditions. Disorders such as depression and anxiety have been identified as independent risk factors contributing to the development of hypertension. This review synthesizes findings from a wide array of studies and literature that investigate the link between anxiety and hypertension, with the conclusion that a consistent association exists between the two. Several studies suggest that heightened anxiety may contribute to the emergence of hypertension, and various factors appear to co-drive the onset of both conditions. In this analysis, we examine this association from different angles. Long-term observational studies and conceptual frameworks suggest that anxiety may precede the development of hypertension, underscoring the need for early identification and intervention strategies in clinical settings. This article also outlines directions for future research to further understand this association.

Keywords: CVD, GAD, Anxiety, Hypertension

Introduction

Hypertension ranks among the most widespread chronic conditions globally, impacting nearly 25% of the adult population. It is recognized as the primary cause of death and holds the third-highest position in terms of disability-adjusted life years worldwide. Although hypertension has a complex origin, involving genetic predispositions, emerging evidence highlights the potential influence of psychosocial and environmental contributors. Despite this, the exact biological mechanisms that link psychosocial elements to the development of hypertension remain insufficiently understood. Anxiety, a prevalent psychiatric disorder among adults, poses a substantial public health burden in many nations, significantly impairing both individual health and quality of life. Given the considerable health risks posed by both hypertension and anxiety, growing research attention has been directed toward their possible interconnection [1]. Some studies have found that individuals suffering from Anxiety are more prone to developing hypertension, and conversely, those diagnosed with hypertension appear to face a heightened risk of developing anxiety when compared to people without the condition [2].

Research from various parts of Europe and North America consistently reports a greater occurrence of chronic physical illnesses among individuals with psychiatric disorders. However, the evidence regarding the link between hypertension and anxiety across high-income countries has been inconsistent. Studies that

Access this article online https://smerpub.com/

Received: 22 March 2022; **Accepted:** 02 June 2022

How to cite this article: Saeed H, Eslami A, Nassif NT, Simpson AM, Lal S. A Comprehensive Review of Current Findings Linking Hypertension in Adults with Stress and Anxiety Conditions. J Med Sci Interdiscip Res. 2022;2(1):43-9. https://doi.org/10.51847/VNYCkNDGjE

employed similar methodologies and assessment tools have produced contradictory outcomes. While some investigations have identified a significant association between hypertension and anxiety, both in unadjusted and adjusted models, others have failed to detect any clear link. A subset of these analyses observed an apparent connection in initial evaluations that disappeared after accounting for other variables [3].

In this review, we aim to reanalyze and critically assess the potential association between anxiety and hypertension. Our discussion draws upon a broad spectrum of scholarly articles to better understand how these two conditions might be interrelated. In addition, we examine the physiological pathways that may underpin the correlation between hypertension and anxiety.

Results and Discussion

What is hypertension?

Hypertension refers to abnormally high blood pressure within the arterial system, typically defined as exceeding 120/80 mmHg. When arterial pressure remains persistently elevated—particularly with a systolic reading above 135–140 mmHg or a diastolic measurement over 90 mmHg—it is categorized as hypertension. Clinically, a mean arterial pressure surpassing 110 mmHg at rest is often used as a diagnostic threshold. Although hypertension usually develops silently without noticeable symptoms, it significantly increases the likelihood of serious health complications, including cardiovascular events such as stroke and heart attacks, as well as non-cardiac issues like progressive kidney injury and end-stage renal failure [4–10].

Despite its widespread prevalence and potentially life-altering consequences, hypertension frequently remains undetected until advanced stages, as it tends to present without clear warning signs. Persistently elevated systolic pressure beyond 140 mmHg or diastolic pressure over 90 mmHg is clinically indicative of hypertension. The majority of cases—estimated at 90–95%—are considered essential or primary, meaning they lack a specific underlying cause and may not immediately shorten lifespan unless complications like myocardial infarction or cerebrovascular incidents occur. The remaining cases are categorized as secondary hypertension, often resulting from renal pathology or, less commonly, narrowing of the renal artery due to atherosclerotic plaques. Rarely, endocrine disorders such as primary aldosteronism, Cushing's syndrome, pheochromocytoma, and similar conditions may be responsible. In addition to high blood pressure itself, a variety of contributing elements play crucial roles in shaping the broader cardiovascular risk profile associated with hypertension [11–15].

Stages of hypertension

Table 1. Stages of hypertension

Category pressure	Systolic pressure (mm Hg)	Diastolic pressure (mm Hg)
Normal	120	80
Pre-hypertension	130 to 139	80 to 89
Stage 1	140 to 159	90 to 99
Stage 2	≥ 160	≥ 100
Isolated systolic hypertension	≥ 140	< 90

Under typical conditions, blood pressure is considered to be within a healthy range when systolic pressure is around 120 mm Hg and diastolic pressure is about 80 mm Hg. When values begin to rise slightly above this threshold, the condition is termed pre-hypertension, where systolic pressure ranges from 130 to 139 mm Hg and diastolic from 80 to 89 mm Hg (**Table 1**). This preliminary phase is further split into two distinct levels: stage 1 hypertension, defined by systolic readings between 140 and 159 mm Hg and diastolic between 90 and 99 mm Hg; and stage 2, where systolic values reach or exceed 160 mm Hg and diastolic readings are ≥ 100 mm Hg. In cases of isolated systolic hypertension, the systolic pressure is elevated to ≥ 140 mm Hg, while diastolic pressure remains below 90 mm Hg (**Table 1**). Broadly, hypertension is categorized into two main types: primary hypertension, also called essential hypertension, and secondary hypertension, also referred to as non-

essential hypertension. Essential hypertension may manifest as benign hypertension, where blood pressure reaches as high as 200 mm Hg systolic and over 100 mm Hg diastolic, but tends to return to normal at rest. Alternatively, it may present as malignant hypertension, characterized by dangerously elevated levels such as 250 mm Hg systolic and 150 mm Hg diastolic. On the other hand, secondary hypertension includes multiple subtypes based on underlying causes, such as cardiovascular, renal, endocrine, and neurogenic hypertension [16–19].

Regional Variations in Hypertension

In Africa, disparities in economic development and large-scale population shifts from rural to urban areas have contributed to health inequities. The region faces a serious lack of structured cardiovascular screening and treatment initiatives, with limited access to healthcare services. Recent data from urban areas in South Africa have revealed that hypertension, often paired with obesity, stands as one of the most prevalent cardiovascular risk factors.

In Asia, the widespread impact of hypertension and its close association with stroke is striking, especially given the region's diverse stages of health and demographic transition. As early as 2000, countries such as India, China, the Philippines, Thailand, Sri Lanka, Iran, Pakistan, and Nepal began experiencing a rapid rise in both hypertension rates and stroke-related deaths. Among city-dwelling adults, the prevalence of hypertension ranged significantly, from 15% to 35%. Similar to sub-Saharan Africa, urban populations in Asia showed much higher rates of Hypertension compared to their rural counterparts.

In the United States, hypertension remains more widespread among economically disadvantaged groups and is particularly prevalent in the black population. Moreover, treatment and control of hypertension are less effective within these communities. A contributing factor is dietary habits—especially high sodium intake, with a substantial amount of salt coming from processed foods [20–24].

Understanding Anxiety and Its Management

Anxiety plays a pivotal role in activating perception and awareness, acting as an evolutionary trait tied to acute stress responses, information gathering, and behavioral reactions based on previous experiences. This mechanism engages a network of neurons and glial cells, using ionic elements such as sodium, potassium, and calcium, along with neurotransmitters, to transmit signals through sensory and motor pathways in the central nervous system (CNS). The CNS, particularly the unconscious segment, orchestrates reflexive responses—including acute stress—without storing the experience unless it requires learning. Therefore, anxiety governs both how information is received and how it is retrieved [25-31].

Investigating the Link between Anxiety and Hypertension: Evidence from Literature

A recurring question in the literature is whether a relationship exists between anxiety and hypertension. Through analysis of multiple scholarly sources, we discovered diverging views. Some studies suggest that the correlation is either nonexistent or insignificant, while others assert a substantial connection. Our review primarily concentrates on literature that establishes a correlation between anxiety and hypertension, although we did not entirely dismiss studies with contrary findings.

Notably, Marty S [32-35], along with Player and Lars E. Peterson, delved into the interaction between anxiety and hypertension, underscoring its clinical relevance. Research spanning various global contexts reflects varied conclusions. In Hong Kong, for instance, anxiety appeared to be linked with hypertension but not with depressive disorders. A study conducted on U.S. veterans indicated that GAD and major depressive disorder, along with their co-occurrence, correlated with Hypertension. Similarly, Danish individuals with psychiatric diagnoses of anxiety demonstrated increased hypertension rates compared to the general population.

Conversely, a New York-based cohort study led by Friedman observed no statistical differences in hypertension prevalence among participants with varied psychological profiles. Based on their findings, the researchers proposed that biological, environmental, and behavioral elements may play a more pivotal role in the onset of hypertension than mental traits or coping styles. However, as their analysis was cross-sectional, it remains unclear whether anxiety causes or results from hypertension, thus highlighting the necessity for longitudinal studies [36-41].

Further evidence comes from Heather M. Johnson's review, which discusses the linkage between anxiety and hypertension. His work suggests that even after adjusting

for variables like BMI, age, gender, tobacco use, and psychiatric medication, a notable association remains between anxiety (including diagnoses like panic disorder, social anxiety, and specific phobia) and new-onset hypertension.

Johnson's work also identifies a bidirectional relationship, where individuals with anxiety are more prone to hypertension, and hypertensive individuals tend to report higher anxiety levels, irrespective of other known risk factors [42-45]. In elaborating on the physiological mechanisms underlying this connection, Johnson describes anxiety as a negatively valenced emotional state that encompasses both cognitive symptoms (like tension and worry) and somatic manifestations (such as palpitations and chest tightness), largely driven by autonomic nervous system hyperactivation. Stress-induced anxiety often involves HPA axis dysregulation and elevated catecholamine release [46].

Altered autonomic activity and catecholamine surges have been implicated in a cascade of conditions, including insulin resistance, endothelial dysfunction, systemic inflammation, and ultimately hypertension, all of which elevate cardiovascular disease risk [47-54].

In addition, Kretchy et al. examined the presence of anxiety among hypertensive patients and found it to be significantly prevalent, with 57 individuals in their cohort showing signs of anxiety. This trend is consistent across diverse populations in countries like China, Argentina, and South Africa, suggesting a global occurrence of anxiety among hypertensive individuals. Such comorbidity has been associated with a heightened risk of adverse cardiovascular outcomes and increased mortality [55-62].

Conclusion

Understanding how anxiety influences hypertension over both short and extended periods is of crucial importance. It is equally vital to recognize and address the reciprocal nature of the anxiety and hypertension relationship, especially when considering therapeutic strategies for managing hypertension. Furthermore, this meta-analysis acknowledges that the association between anxiety and elevated hypertension risk might be influenced by a range of confounding variables. As a result, large-scale, rigorously designed randomized controlled trials are necessary to accurately evaluate how anxiety contributes to the development and progression of hypertension.

Acknowledgments: The authors extend their sincere appreciation to the administrative bodies of their affiliated institutions for their continued support and assistance.

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

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