# Subclinical Anxiety: Presence and Implications in Hypertensive Patients

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**Abstract**

Hypertension is increasing in prevalence both in developed and in developing countries. It is a major cause of morbidity and mortality, responsible for approximately one half of the health burden and costs worldwide. Its etiology is multi-factorial, with many genetic, environmental, and lifestyle factors playing a role. Psychosocial factors such as anxiety and depression also appear to impact its clinical expression and direction. Anxiety and hypertension frequently coexist. Patients with clinically diagnosed anxiety appear to suffer from not only a higher overall mortality compared to non-anxious people, but they also suffer from a higher incidence of cardiovascular diseases (CVD). In patients with diagnosed cardiovascular events, anxiety levels are high and prognosticate worse outcomes. Research suggests that subclinical anxiety exhibits similar cognitive, neurobiological, and behavioral components when compared to clinical anxiety. However, the presence of subclinical anxiety in hypertensive patients has not been studied well. Our study finds that a significant number of patients with hypertension suffer from subclinical anxiety. This finding has therapeutic and prognostic significance.

## INTRODUCTION

Hypertension is a steadily growing health challenge in the United States. It is estimated that up to 50 million people in the United States suffer from hypertension.[1,2] Prehypertension, defined as systolic blood pressure 120-139 mm Hg and diastolic blood pressure 80-89 mm Hg, is even more prevalent. A 2005 survey of Americans found that in the population aged 20 years or older, an estimated 41.9 million men and 27.8 million women were suffering from pre-hypertension.[3] Prehypertension is not benign and is associated with twice the risk of future CVD as those with lower blood pressure. In spite of extensive research and widespread patient education, 30% of the adults are still unaware of their hypertension, 40% are not receiving treatment and almost 67% of the treated hypertensives not achieving a treatment goal of bringing the blood pressure to less than 140/90 mm Hg.[1] It remains a major cause of morbidity and mortality, being responsible for two thirds of all strokes and one half of all ischemic heart disease.[4] However, substantial improvements in treatment continue to reduce this hypertension related morbidity and mortality.

Hypertension has also reached epidemic proportions worldwide. Overall, approximately 20% of the world's adults are estimated to have hypertension.[5] The prevalence dramatically increases in patients older than 60 years and approaches 50%. It is responsible for approximately one half of the health burden and costs worldwide.[6] In 2001, approximately 54% of all strokes and 47% of all ischemic heart disease related deaths worldwide were attributable to systolic hypertension.[7] Further, these hypertension related deaths are expected to increase by over 60% by 2025, rising from 972 million to 1.56 billion worldwide.[8]

The development of primary hypertension is multi-factorial and complex. It is dependent on multiple genes with a largely unknown system of inheritance.[9,10] The exact mechanism on the over-expression or under-expression of several hypertension related genes and the intermediary phenotypes remains poorly understood.[11] However, the environmental and lifestyle factors that increase blood pressure are well known and include obesity, insulin resistance, high alcohol intake, high salt intake, aging, sedentary lifestyle, stress, low potassium intake, and low calcium intake. When present together, many of these factors have an additive and deleterious effect.[12,13] Primary hypertension accounts for 90-95% of all adult cases. The causes of secondary hypertension include renal disease, primary hyper-aldosteronism, Cushing's syndrome, pheochromocytoma, coarctation of the aorta, estrogen use, pregnancy and rare genetic causes, such as Liddle syndrome.

Psychosocial factors such as anxiety also play a role in the clinical course of primary hypertension. Anxiety is common in hypertensive patients.[14] A mechanistic link appears to exist between the presence of anxiety and increased risk of morbidity and mortality due to cardiovascular events in patients with hypertension.[15-18] Although symptomatic anxiety is usually diagnosed and treated, subclinical anxiety may remain undiagnosed. This study was undertaken to evaluate the presence of subclinical anxiety in treated hypertensive patients.

## METHODS

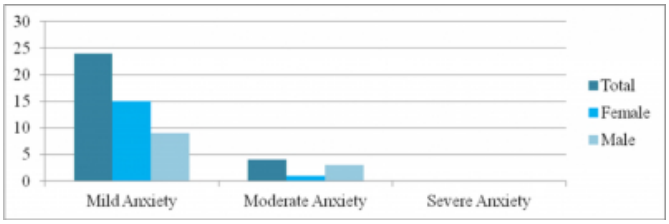
One hundred consecutive hypertensive patients under treatment were evaluated. Hypertension had been diagnosed when the average of 2 or more diastolic BP measurements on at least 2 subsequent visits was ≥90 mm Hg or when the average of several systolic BP readings on 2 or more subsequent visits was consistently ≥140 mm Hg. Anti-hypertensive treatment was prescribed according to established therapeutic guidelines. Patients without clinically diagnosed anxiety were given the self administered Zung Self-Rating Anxiety Scale test (SAS). (19) Designed by William W. K. Zung, from Duke University, it is a reliable self administered method to quantify a patient's level of anxiety. All patients were given the 20 item SAS exam during their routine office visit. The test allows the patients to self-report measures of anxious symptoms experienced within the last week. Each item was recorded on a four-point Likert scale, ranging from occurring none or a little of the time to most of the time. Responses were then summed to calculate a total score. The scores (20-80) are classified as follows: normal range: 20-44; mild anxiety: 45-59; moderate anxiety: 60-74 and severe anxiety: 75-80.

## RESULTS

Of the 100 patients, there were 52 (52.0%) females and 48 (48.0%) males. Their ages ranged from 29 to 95 years. Of these, 28 (28.0%) [16 (57.1%) females; 12 (42.9%) males] had anxiety scores over 45, indicating presence of anxiety. Of these 28 patients, 24 (85.7%) [15 (62.5%) females; 9 (37.5%) males] had mild anxiety and 4 (14.3%) [1 (25.0%) female; 3 (75.0%) males] had moderate anxiety. None had severe anxiety. (Figure 1) The absence of severe anxiety in this group was expected as these patients had probably been diagnosed with overt clinical anxiety and were probably excluded at the outset.

**Figure 1**

Figure 1. Distribution of Anxiety




## DISCUSSION

Anxiety is a negative emotion characterized by an emotional paralysis when confronted with a threat. This inability to predict, control or gain preferred results may be to external or internal threats, and can be real or imagined.[20-22] Patients with subclinical anxiety manifest increased neurobiological complications.[20-23] and also suffer from a higher incidence of cardiovascular events.[24] Patients with clinically diagnosed anxiety appear to suffer from a higher overall mortality when compared to non-anxious people. [25-27] This is partly due to an increased incidence of cardiovascular disease in these patients.[15, 28-29] There is a strong association between anxiety and the risk of fatal coronary artery disease.[30,31]

The presence of anxiety is common in hypertensive patients.[14] It may play a role in the pathogenesis of 'white coat hypertension' [32] It is present in about 20% to 25% of patients diagnosed with a cardiovascular disease, even in the absence of an adverse events or invasive interventions.[33] Its presence appears to hasten the development of future cardiac events. Anxiety prevalence approaches 70% to 80% amongst patients who have experienced an acute cardiac event and it persists over the long term in about 20% to 25% of these patients.[18,34,35] Anxiety has negative prognostic consequences in these patients with poor outcomes.[36-40] It interferes with medication, diet and activity compliance and self care abilities.[41-43] Its interferes with their sexual activity.[44] They are more likely to remain disabled and not return to work.[45] Although not well studied, it would appear that subclinical anxiety may be associated with similar consequences.

The mediating mechanisms between the negative consequences of anxiety on cardiovascular system are several, including an over-activity of the sympathetic nervous system, an increase in inflammatory markers, frequent sleep interruption and abnormalities of endothelial function. Additionally, behavioral mechanisms including non-compliance with treatment also results in poor outcomes in these patients.

## CONCLUSIONS

Physicians need to be cognizant of the deleterious effects of anxiety on the heart. Clinical assessment of anxiety may be relevant in the management of hypertensive patients. Subclinical anxiety is occult, but can be recognized by performing a simple office based psychological assessment. Our study shows that almost one out of three hypertensive patients demonstrate sub-clinical anxiety on testing. Diagnosis of subclinical anxiety in hypertensive patients and early therapeutic interventions may decrease the risk of subsequent cardiac events in this population. In patients with a history of cardiovascular events, it may help enhance recovery and reduce the risk of future recurrent events.

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