

SHORT COMMUNICATION

ASSESSING WHITE COAT HYPERTENSION PREVALENCE AND ANXIETY LEVELS USING BECK ANXIETY INVENTORY: A STUDY IN OUTPATIENT SETTINGS**Muhammad Zohaib Rehman¹, Khushbakht Noor¹, Muhammad Shahid Bashir¹,
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This study aimed to determine the prevalence of white coat hypertension (WCH) compared to home-based blood pressure (BP) measurements and assess anxiety levels among individuals with WCH using the Beck Anxiety Inventory. An observational cross-sectional study was conducted from March 2021 to April 2022 on individuals visiting the Outpatient Departments (OPDs) of Khyber Teaching Hospital, Peshawar. In-hospital and home BP recordings were performed, and anxiety levels were assessed using the Beck Anxiety Inventory. A sample size of 213 normotensive individuals was selected using a non-probability convenience sampling technique. Data were collected using structured questionnaires, analyzed using IBM SPSS version 26 and MS Excel 2019, and presented in tables and charts. Among the 213 respondents aged 14-67 years, comprising 164 (77%) males and 49 (23%) females, 22 (10.3%) exhibited BP readings above 140/90 in the OPD, indicative of WCH, while registering normal readings below 140/90 at home. The Beck anxiety index scores of these 22 individuals revealed varying degrees of anxiety, with 2 (9.1%) classified as Minimal, 6 (27.3%) as mild, 12 (54.5%) as Moderate, and 2 (9.1%) as severe anxiety. The prevalence of WCH underscores its clinical significance in predicting prehypertension, cardiovascular diseases (CVDs), and target organ damage. However, the propensity for labile BP in clinical environments may lead to misinterpretation, prompting unnecessary pharmacological interventions and exacerbating physical, mental, and financial distress for patients. Thus, widespread education on WCH among healthcare professionals and the public is crucial. Additionally, home-based BP measurements and ambulatory BP monitoring are advocated as preferred alternatives to mitigate the potential risks associated with WCH.

Keywords: Anxiety, Hypertension, White coat hypertension, WCH, blood pressure determination

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INTRODUCTION

White Coat Hypertension (WCH) presents a perplexing phenomenon within the realm of cardiovascular health, characterized by elevated blood pressure readings in clinical settings despite normal measurements in everyday contexts.¹ The intricate relationship between WCH and anxiety levels has garnered increasing attention, yet remains relatively understudied.² This study endeavors to bridge this gap by exploring the prevalence of White Coat Hypertension and its association with anxiety levels among individuals visiting healthcare facilities. By delving into the psychophysiological mechanisms underlying this relationship, we aim to shed light on contributing factors and potential implications for cardiovascular well-being.

The term "white coat hypertension" was coined to describe the discrepancy in blood pressure readings observed between clinical and non-clinical settings.³ While initially associated with the stressors of medical environments, its precise diagnosis and implications have evolved over time.⁴ Recent definitions emphasize the importance of distinguishing WCH from the transient elevation in blood pressure known as the "white coat effect," underscoring the need for accurate diagnostic criteria.⁵

Numerous studies have explored the prevalence of WCH, with estimates ranging from 11% to 39%, highlighting its significant clinical relevance.⁶⁻⁸ Psychophysiological research suggests a link between anxiety and increased blood pressure in clinical settings, though findings have been mixed.⁹ Factors

such as age, gender, and hypertension status further complicate the picture, emphasizing the need for a nuanced understanding of WCH.

This study seeks to utilize home-based blood pressure monitoring to determine the prevalence of white-coat hypertension and evaluate its association with anxiety levels, as measured by the Beck Anxiety Inventory. By elucidating the interplay between anxiety and WCH, we aim to provide insights that inform more accurate diagnosis, tailored treatment strategies, and improved patient care.

METHODOLOGY

Study Design: The study employed an Observational Cross-Sectional design to investigate the prevalence and factors associated with white coat hypertension among adult males and females attending the Out-Patient Department (OPD) of Khyber Teaching Hospital and its nearby areas in Peshawar.

Setting: The research was conducted within the OPD of Khyber Teaching Hospital and its vicinity in Peshawar, ensuring a diverse representation of individuals from the local community.

Participants: Adult males and females visiting the OPD and residing nearby were included in the study. Exclusion criteria comprised individuals with pre-existing cardiovascular diseases and those undergoing long-term treatment.

Variables: The dependent variable under scrutiny was white coat hypertension. Independent variables encompassed anxiety/stress levels, physician competency, attitude, and frequency of hospital visits. Confounding (intervening) variables considered included socioeconomic status, educational background, cardiovascular ailments, infections, inflammations, and drug history. Gender and age were regarded as universal variables, while body mass index (BMI) was treated as a composite variable.

Data Sources/Measurement: Data collection involved a multifaceted approach including self-administered questionnaires distributed in the OPD, supplemented by home visits for additional information and blood pressure recordings. The Statistical Package for Social Sciences (SPSS) was utilized for data analysis. Ethical considerations were meticulously adhered to, ensuring confidentiality and informed consent from all participants.

Bias: Efforts were made to minimize bias through rigorous adherence to the study protocol, ensuring uniform data collection procedures and maintaining confidentiality. However, potential biases such as

selection bias and response bias were addressed through careful sampling techniques and questionnaire design.

Study Size: Sample size calculation was performed using the WHO formula, yielding a sample size of 213 with a confidence interval of 95% and a population proportion of 16.6%. This sample size was deemed adequate for robust statistical analysis and generalizability of findings.

Quantitative Variables: Quantitative variables included various demographic and clinical parameters such as age, gender, BMI, blood pressure readings, socioeconomic status, educational level, and frequency of hospital visits.

Statistical Methods: Statistical analysis was conducted using SPSS, employing appropriate tests such as the Chi-square test to examine associations between variables. Results were presented using charts, graphs, and tabulated forms to facilitate interpretation and dissemination of findings. Additionally, comparisons between OPD and home-based data were made to assess the reliability and consistency of results.

RESULTS

Participants: The study comprised a total of 213 participants, including 191 individuals classified as non-white coat hypertensives (Non-WCH) and 22 identified as white coat hypertensives (WCH). Baseline characteristics, including anxiety levels assessed using the Beck Anxiety Index, were evaluated across both groups.

Descriptive Data: Among the 22 participants with white coat hypertension, anxiety levels varied, with 2 (9.1%) exhibiting Minimal anxiety, 6 (27.3%) Mild anxiety, 12 (54.5%) Moderate anxiety, and 2 (9.1%) experiencing Severe anxiety.

Outcome Data: Table 1 illustrates the effect of anxiety on white coat hypertensives. The distribution of anxiety levels across both WCH and Non-WCH groups is presented, along with corresponding p-values indicating statistical significance.

Main Results: The analysis revealed a significant association between anxiety levels and white coat hypertension ($p < 0.01$). Among the WCH group, a higher proportion of individuals exhibited moderate to severe anxiety compared to the Non-WCH group. These findings suggest a potential link between anxiety and the phenomenon of white coat

hypertension, underscoring the importance of psychological factors in blood pressure management.

Table 1: Effect of anxiety on white coat hypertensive

	Total	Beck Anxiety Index				P-value
		Minimal (0-7)	Mild (8-15)	Moderate (16-25)	Severe (26-63)	
Non- white coat hypertension	191(89.7)	177	12	2	None	<0.01
White coat hypertension	22(10.3)	2(9.1%)	6(27.3%)	12(54.5%)	2(9.1%)	

P-values <0.05 is considered statistically significant.

DISCUSSION

Our study aimed to investigate the impact of hospital-induced anxiety on blood pressure measurements during outpatient department (OPD) visits, with a comparative analysis conducted by recording blood pressure (BP) of the same subjects at home. Among the 213 respondents aged 14-67 years, comprising 164 (77%) males and 49 (23%) females, 22 (10.3%) exhibited elevated BP readings above 140/90 in the OPD setting, indicative of White Coat Hypertension (WCH), while registering normal readings below 140/90 at home. Additionally, Beck Anxiety Inventory scores revealed varying degrees of anxiety among these WCH individuals, with 2 (9.1%) showing Minimal, 6 (27.3%) Mild, 12 (54.5%) Moderate, and 2 (9.1%) Severe anxiety levels.

Our findings resonate with previous studies on the prevalence of WCH, showcasing consistency with reports from various regions globally.¹⁰ Notably, studies conducted at Aga Khan University Hospital (AKUH) in Karachi and research by Dolan and Stanton presented similar prevalence rates, reinforcing the widespread occurrence of WCH across diverse populations.¹¹⁻¹³ However, it's essential to acknowledge the variability in prevalence rates, influenced by factors such as sample selection and criteria used for defining hypertension, as demonstrated by variations reported in studies from Lahore, Pakistan.

Our study contributes novel insights by elucidating the association between WCH and anxiety levels, a relationship previously underexplored. The significant role played by hospital-induced anxiety, possibly influenced by environmental stressors or physician attitudes, in elevating BP among WCH patients highlights the psychophysiological complexity underlying this phenomenon. The utilization of the Beck Anxiety Inventory allowed for a nuanced examination of anxiety levels among WCH individuals, shedding light on the psychological dimensions of hypertension management.

Prior research has provided valuable insights into the pathogenesis of WCH, elucidating its underlying mechanisms through sympathetic nervous system recordings and highlighting the role of alerting reactions mediated by reflex sympathetic nervous system stimulation.¹⁴⁻¹⁷ Furthermore, guidelines from the European Society of Hypertension Working Group on Blood Pressure Monitoring emphasize the importance of distinguishing patients presenting with office BP elevations from those with awake ambulatory BP measurements.¹⁸

Moreover, our study echoes the potential therapeutic implications of addressing anxiety in the management of WCH, as evidenced by the efficacy of cognitive behavior therapy demonstrated in a randomized controlled trial conducted in a kidney center in Sialkot, Pakistan. This underscores the clinical significance of our findings, emphasizing the need for holistic approaches encompassing both physiological and psychological dimensions in the management of WCH.

LIMITATION

Despite the valuable insights provided by our study, several limitations warrant consideration. Firstly, the cross-sectional nature of our research design limits our ability to establish causality between anxiety and White Coat Hypertension. Additionally, our study population was limited to individuals from a specific geographic region, potentially limiting the generalizability of our findings to broader populations. Moreover, the subjective nature of anxiety assessment through the Beck Anxiety Inventory may introduce bias, and other psychosocial factors influencing blood pressure readings warrant further exploration.

CONCLUSION

Our study underscores the direct association between White Coat Hypertension and anxiety, revealing its high prevalence within our population. The elevation in blood pressure observed in clinical settings is attributed to sympathoadrenal stimulation induced by

anxiety, exacerbated by various factors including fear of the hospital environment, communication barriers, and stress about health. These findings emphasize the importance of addressing anxiety-induced hypertension through targeted interventions, such as promoting alternatives like home-based blood pressure monitoring and fostering positive patient-doctor communication, to mitigate the potential detrimental effects of false positive diagnoses and inappropriate prescriptions.

AUTHORS' CONTRIBUTION

MZR, KN, MSB, and MK: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be accountable for all aspects of the work. MZR, KN, MSB, and MK: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

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