TRIDHA
Journal of Clinical Cases & Reports
Volume 2024, Issue 3, 8 pages
https://doi.org/10.46619/joccr.2024.7-1160

CLINICAL RESEARCH

Assessing Anxiety Levels among Individuals with White Coat Hypertension Using the Beck Anxiety Inventory

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Received: 05 April 2024; Accepted: 29 April 2024; Published: 6 May 2024

ABSTRACT

OBJECTIVE

To find the prevalence of white coat hypertension in its comparison to Home based BP measurement, and anxiety level of white coat hypertensives using the Beck anxiety inventory.

METHODS

An observational Cross-section study was conducted from March 2021 to April 2022 on people visiting OPDs in Khyber Teaching Hospital, Peshawar. In-hospital and home blood pressure recording with anxiety inventory filling was done with a sample size of 213 normotensives using a non-probability convenience sampling technique. Data was recorded on a structured questionnaire with an Anxiety Scale, analyzed by IBM SPSS version 26 and MS Excel 2019. Data was represented in the form of tables and Charts.

RESULTS

Among 213 respondents of 14 years - 67 years [164 (77%) male & 49 (23%) females], 22 (10.3%) had BP above 140/90 in OPD, called White Coat Hypertension and below 140/90 at Home.

Beck anxiety index score of these 22 showed 2 (9.1%) Minimal, 6 (27.3%) Mild, 12 (54.5%), Moderate and 2(9.1%) had Severe anxiety.

CONCLUSION

WCH has a profound value due to its high incidence, prediction of prehypertension, CVDs and mTOD. This labile BP in clinical environment can be falsely interpreted causing un-needed pharmacological interventions raising

physical, mental and financial agony of patients. So, it should be widely educated to both medicals and public. Home-based BP measurements and Ambulatory BPs may be preferred over them.

KEYWORDS

Anxiety; Hypertension; White coat hypertension; WCH; Blood pressure determination

INTRODUCTION

White Coat Hypertension (WCH), characterized by elevated blood pressure readings in a clinical setting despite normal readings in everyday environments, has been a subject of increasing concern in the realm of cardiovascular health. While the phenomenon itself has been recognized, the intricate relationship between WCH and anxiety levels remains an understudied aspect. This study aims to address this gap by delving into the prevalence of White Coat Hypertension and its association with anxiety. The overarching goal is to unravel the complexities surrounding the interplay between anxiety and WCH, examining contributing factors and potential implications for cardiovascular well-being. As we embark on this investigation, a deeper understanding of the psychophysiological mechanisms at play may pave the way for more targeted interventions and improved patient care.

The term "white coat hypertension" (WCH) was introduced in 1984 by Kleinert and associates to describe a condition in which individuals in a clinical office environment have increased blood pressure (BP) even when their typical daily BP is within acceptable limits [1].

Pickering and his team then published a more thorough description of this disease, stating that WCH is often characterized as the presence of a blood pressure measurement of ≥140 by 90 mmHg in clinic, while maintaining blood pressure readings <135 by 85 mmHg out of clinic [2].

At first, this disorder was associated with the stressful aspect of doctor's appointments, but its precise diagnosis was still a little unclear.

A specific definition for WCH has been provided by the European Society of Hypertension guidelines, which state that it involves a high office blood pressure of 140/90 mmHg or higher combined with a 24-hours ambulatory blood pressure (ABP) reading of less than 130/80 mmHg (with an awake ABP of less than 135/85 and a sleep ABP of less than 120/70) or a blood pressure reading at home that is less than 135/85 [3]. It is crucial to distinguish WCH from the "white coat effect" (WCE), which refers to the brief elevation in blood pressure that takes place in a clinical context, independent of the patient's ambulatory blood pressure or the use of hypertension drugs [4].

According to European criteria, the general incidence of WCH is estimated to be 13% [5]. However, numerous research studies suggest prevalence rates that range from 11% to 39% [6-8].

Mancia et al. [9] identified WCE as a sudden rise in both systolic and diastolic blood pressure following the entrance of a doctor at the patient's bedside.

Research by Grassi et al. [10] has demonstrated that when a healthcare provider takes a patient's blood pressure, skin nerves become stimulated and sympathetic suppression of muscular nerve activity is triggered concurrently.

This reaction is similar to a "defence reaction" controlled by the same diencephalic areas that control the body's reaction to worry and other emotional states [11].

Examining the relationship between anxiety and increased clinic blood pressure, Jhalani and colleagues discovered a link between anxiousness during healthcare visits and WCE, a conclusion that has been embarked by several researches [12,13]. It is notable, however, that certain research has not been able to definitively prove a link between anxiety and WCE [14].

A number of indicators suggest that untreated persons with simple hypertension are more likely to get WCH [2,3,5,8,15-17] clinic systolic blood pressure measurements between 140 mmHg and 159 mmHg or diastolic blood pressure measurements between 90 mmHg and 99 mmHg; female gender; ageing; not smoking; recent onset of hypertension; limited number of blood pressure readings in a clinical setting; people without target organ damage; and people with a normal left ventricular mass. Among these variables, age has a significant impact on the occurrence of WCH, with effects that are more noticeable on blood pressure readings taken in clinics as opposed to at home or via ambulatory blood pressure monitoring (ABPM) [18].

The Group of Experts on the Prognostic Importance of Ambulatory Blood Pressure Surveillance suggests employing ambulatory monitor to rule out white coat hypertension in those who are not receiving treatment [19].

Three separate clinic visits are needed for the reading of blood pressure to be at least 140/90 mmHg.

At least two readings obtained outside the clinic, frequently with home blood pressure monitoring, remain under 140/90 mmHg and no convincing proof of hypertensive damage to target organs is observed.

The British National Institute for Clinical and Health Excellence, or NICE, released clinical guidelines which say that if the clinic blood pressure is 140/90 mmHg or above, an ABPM should be taken to verify the diagnosis of hypertension and rule out white coat hypertension.

This method can reduce office visits, prevent the negative consequences of incorrect therapy, and is cost-effective because it is carried out before patients begin taking medicine. Accurate WCH diagnosis is crucial for treating these individuals. A misdiagnosis of WCH may result in the improper prescription and usage of antihypertensive drugs, which might have negative consequences on the elderly and patients with several comorbidities. Additional costs and expenses for medication and office visits could also result from this. Altogether combined office and out-of-office BP measurements allow to identify four BP phenotypes:

- True normotension (i.e., normal office and out-of-office BP),
- Sustained hypertension (elevated in-office and out-of-office BP),
- White coat hypertension (elevated office and normal out-of-office BP) and
- Masked hypertension (normal office and elevated out-of-office BP).

It has been demonstrated that there are significant differences between these blood pressure phenotypes with regard to their prevalence, characteristics, clinical traits, level of extra- and subclinical cardiac and heart damage, and risk of incident cardiovascular events [3,20].

It is critical to investigate the impact of anxiety produced by hospitals on blood pressure readings as measured by the Beck Anxiety Index. This is due to the fact that it has important clinical ramifications for guaranteeing accurate diagnosis, making knowledgeable treatment decisions, improving patient welfare, allocating resources as efficiently as possible, and encouraging patient-centered healthcare. The aforementioned research fills a significant gap in our present understanding and may give guidance on how to reduce the aberrations in blood pressure measurements that are linked to anxiety. By doing this, it has the potential to give real advantages to hospital patients as well as healthcare professionals.

Our study aimed to use home-based blood pressure monitoring to determine the prevalence of white-coat hypertension and to assess its link to anxiety using the level of anxiety of white-coat hypertensives using the Beck Anxiety Inventory.

RESEARCH AND METHODOLOGY

The study was set in the Out-Patient Department (OPD) of Khyber Teaching Hospital and its nearby areas in Peshawar, focusing on adult males and females attending the OPD. Employing an Observational Cross-Sectional Study design.

WHO formula was used for sample size calculation, with a confidence interval of 95% and population proportion of (16.6%)28, 213 sample size.

The inclusion criteria involve individuals visiting the OPD and residing nearby, while those with cardiovascular diseases, and those on long-term treatment are excluded.

Various variables are explored, with white coat hypertension as the dependent variable. Independent variables encompass anxiety/stress, physician competency, attitude, and the frequency of hospital visits. Confounding (intervening) variables include socioeconomic status, educational background, ailments related to the cardiovascular system, infections, inflammations, and the drug history of the subjects. Gender and age are considered universal variables, while body mass index (BMI) is a composite variable.

Data collection involves self-administered questionnaires in the OPD, complemented by home visits and blood pressure recordings. The analysis is conducted using the Statistical Package for Social Students (SPSS) with statistical tests like Chi-square test, and results are presented through charts, graphs, and tabulated forms. The study plan includes dividing the research team into two groups, each assigned an equal number of questionnaires. Data is recorded in OPDs of KTH, and participants' residences are traced with informed consent. Blood pressure is recorded in their homes, and both sets of results are compared and analyzed using SPSS. Throughout this process, the confidentiality of each individual is rigorously maintained.

This research declares an absence of any conflict of interest and highlights its self-funded nature, with resources equally distributed among the researchers and no external financial support sought. Ethical considerations were paramount, as evidenced by the ethical approval granted by the Institutional Review Board (IRB) No. 582/DME/KMC. The study placed a strong emphasis on maintaining patient confidentiality, ensuring informed consent from every participant, and strictly adhering to voluntary participation. Importantly, the questionnaire

employed in the research was carefully crafted to avoid any offensive or intrusive queries, upholding ethical standards throughout the investigative process.

Time Frame: March 2021 to April 2022.

RESULTS

Comparison of hospital and home-based blood pressure reading showed 22 (10.3%) out of 213 had WCH, other were normal.

Table 1: Comparative frequencies of WCH and Non-WCH in study.

Valid	Non-White Coat Hypertensives	191	89.7	89.7	89.7
	White Coat Hypertensives	**22**	**10.3**	10.3	100.0
	Total	213	100.0	100.0	

T Effect of Anxiety on White Coat Hypertensives

Beck anxiety index score of these 22 showed 2 (9.1%) Minimal, 6 (27.3%) Mild, 12 (54.5%), Moderate and 2 (9.1%) had Severe anxiety.

Table 2: Anxiety analysis of person with WCH using BAI.

		Beck Anxiety Index				Total
		Minimal (0-7)	Mild (8-15)	Moderate (16-25)	Severe (26-63)	
White coat hypertension	Count	2_a	6_a	12_a	2_a	22
	% Within whitecoat hypertension	9.1%	27.3%	54.5%	9.1%	100.0%
Total	Count	2	6	12	2	22
	% Within whitecoat hypertension	9.1%	27.3%	54.5%	9.1%	100.0%

Table 3: Statistical analysis.

	Value	df	P-value
Pearson Chi-Square	79.113[a]	3	.0001

P values less than 0.0001. Result is statistically significant.

DISCUSSION

This research was conducted by a group of students from KMC, Peshawar to determine the effect of hospital-induced anxiety on a patient's blood pressure measurements during OPD visit, a comparative analysis was also done by recording the BP of the same subject at home.

According to our study out of 213 respondents of age 14 years - 67 years [164(77%) male and 49(23%) females], 22(10.3%) had BP above 140/90 in OPD, which is called White coat Hypertension and Below 140/90 at Home, and beck anxiety inventory score was also calculated showing among 22 White coat hypertensives 2(9.1%) had Minimal, 6(27.3%) had Mild, 12(54.5%) had Moderate and 2(9.1%) had Severe anxiety,

Our research aligns with previous studies on the prevalence of White Coat Hypertension (WCH). In a descriptive cross-sectional study conducted at Aga Khan University Hospital (AKUH) in Karachi, Pakistan, from 2011 to 2014, they found that WCH had a prevalence of 16.6% among participants aged over 15 years. This finding closely mirrors the results of Dolan and Stanton's extensive study involving 5716 patients, which reported a WCH

prevalence of 15.4% [21]. Various other studies have also reported similar prevalence rates, ranging from 12% to 54% [22-24].

However, it's worth noting that the prevalence of WCH can vary considerably, influenced by factors such as the selection of patient groups and the specific definitions used to classify hypertension. For instance, a study conducted in Lahore, Pakistan, by Aziz et al. [25] reported a higher prevalence of WCH in their local society at 26.6%. This discrepancy may be attributed to different criteria used in defining hypertension.

Our study indicated that Hospital Anxiety, possibly stemming from environmental stress or physician attitude, played a significant role in the observed increase in blood pressure among patients with White Coat Hypertension (WCH). A further analysis using the Beck Anxiety Inventory (BAI) demonstrated that most individuals with WCH exhibited varying degrees of anxiety when visiting the outpatient department (OPD). This observation is noteworthy because, before our research, no study had explored the connection between WCH and anxiety scores.

While prior studies had delved into the pathogenesis of WCH, it was in July 1999 that researchers investigated this phenomenon by conducting sympathetic nervous system recordings on 16 patients. Their findings suggested that the white-coat effect is essentially an alerting reaction operating through reflex sympathetic nervous system stimulation [26,27].

European Society of Hypertension Working Group on Blood Pressure Monitoring gave the magnitude patients presenting with an office BP at least 20 mm Hg systolic and/or 10 mm Hg diastolic higher than the awake ambulatory BP [28].

A randomized controlled trial in a kidney center in Sialkot, Pakistan in 2018 proved that cognitive behavior therapy improves blood pressure-oriented latrophobia in adults to manage white coat hypertension [28] which embarks on the anxiety link of white coat hypertension [29].

CONCLUSION

Analysis of our collected data shows that there is a direct link between White coat hypertension with anxiety with its high prevalence among our population, anxiety causes sympathoadrenal stimulation which raises BP.

Anxiety is due to fear of the hospital environment, agony, haste, fear of getting the disease, and most commonly attitudes of health professionals, ineffective communication, multiple visits, and stress about health.

So, these may give false positive results to hypertension leading to injudicious prescriptions by health care providers enhancing physical, mental, and financial detrimental side effects of drugs.

For that purpose, the concept of White coat hypertension may be widely educated, and alternatives to it like Home-based Blood Pressure monitoring and Ambulatory BP monitoring may be promoted, or Patient-doctor communication may be made more positive to eliminate altruizing response of patients in the form of raised BP.

DISCLOSURE

The authors declare no competing interests in this work.

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