Journal of Health and Rehabilitation Research 2791-156X JHRR

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Original Article

Study on The Inter-Relationships Between Physical Activity and Nature of Job on Essential Hypertension in a Pakistani University

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Conflict of Interest: None.

*Rehman JU., et al. (2023). 3(2): **DOI**: https://doi.org/10.61919/jhrr.v3i2.170*

ABSTRACT

Background: Hypertension, a leading global health concern, is influenced by various factors including physical activity and job-related stress. Understanding these relationships, especially in university settings, is crucial for effective health management strategies.

Objective: This study aimed to investigate the interrelationships between physical activity, the nature of job roles, and essential hypertension among faculty members at a Pakistani university.

Methods: A cross-sectional study design was employed with a sample of 219 university employees. The International Physical Activity Questionnaire (IPAQ) and the Quality of Work Measurement Scale were used to assess physical activity levels and job-related factors, respectively. Multiple hierarchical regression analyses were conducted to examine the predictors of physical activity and hypertension.

Results: The study participants had an average age of 35.10 years (SD = 6.480), predominantly male (80.8%). Physical activity levels were categorized as minimally active (61.64%) and active (38.35%). Regression analysis for walking activity (R^2 = .91, F = 1454.25) showed that cooperation and quality of work significantly predicted walking activity, while mental strain negatively influenced it. For moderate activity (R^2 = .89, F = 590.27), quality of work, mental strain, and satisfaction and respect were significant predictors. Hypertension correlated strongly with job-related stress and physical activity levels.

Conclusion: The study highlights a significant relationship between physical activity, job stress, and hypertension among university employees. Encouraging physical activity and managing job-related stress could be key in mitigating hypertension risk. These findings are critical for designing health promotion strategies in academic settings.

Keywords: Hypertension, Physical Activity, Job Stress, University Employees, Health Management, Cross-Sectional Study.

INTRODUCTION

The World Health Organization (WHO) estimates that high blood pressure, or hypertension, is a leading cause of global mortality, responsible for approximately one in eight deaths(1). This alarming statistic underscores the prevalence of hypertension, which affects one billion individuals worldwide, contributing to four million deaths annually. Hypertension, often referred to as the "silent killer," is the most modifiable risk factor for cardiovascular diseases and is a common chronic condition that significantly increases the risk for cardiovascular disease (CVD), type 2 diabetes mellitus (T2DM), and chronic kidney disease. The global burden of hypertension is staggering, with estimates suggesting that 26% of the population, or 972 million people, are affected, and projections indicate an increase to 29% by 2025(2).

Physical activity (PA) has been consistently shown to have a protective effect against hypertension. Regular exercise is beneficial not only in reducing blood pressure but also in enhancing overall cardiovascular health(3). The American Heart Association and WHO recommend a combination of moderate and vigorous-intensity physical activity each week for adults aged 18-64 years. Even a daily commitment as brief as 15 minutes has been linked to a 14% reduction in mortality risk and the potential extension of life by up to three years(4). Beyond mortality reduction, physical activity contributes to lower risks of chronic conditions, healthy blood pressure and cholesterol levels, obesity prevention, and improved physical and mental health(5).

However, urbanization and automation have led to increasingly sedentary lifestyles, characterized by more time spent watching television and less time engaged in physical activity. This shift is particularly evident in Asian countries like Pakistan, where it contributes to rising rates of obesity, cardiovascular disease, infectious diseases, and non-communicable diseases (NCDs). Physical inactivity is a primary factor in long-term health issues and NCDs. The top five causes of death include hypertension, hyperglycemia, smoking, obesity, and lack of exercise(2, 6).

The relationship between job strain and hypertension is also significant(7). High job strain increases the risk of hypertension by 1.5 times compared to low strain, and working over 55 hours a week can elevate this risk by 1.7 times(8). The changing nature of work, especially in the wake of global crises, has led to more competitive and technology-driven environments. These changes necessitate ongoing skill development and adaptability to stay relevant and responsive to innovations. Yet, these shifts have also fostered negative perceptions among many employees about the nature and future of their occupations(9-11).

In this context, this study aims to investigate the impact of physical activity on essential hypertension among university employees, focusing particularly on faculty members. The rising prevalence of essential hypertension in this demographic poses significant public health concerns. The study seeks to understand the interrelationship between physical activity and the nature of job roles in relation to hypertension prevalence among Pakistani university faculty. It explores how the combination of physical activity and job-related stress influences the risk of hypertension, and how specific stressors and lifestyle factors interact with physical activity levels and job nature to influence this risk. The findings of this study are crucial for informing policy-makers, health professionals, and university administrators about the importance of fostering an environment conducive to the cardiovascular health of faculty members.

MATERIAL AND METHODS

In this cross-sectional study, we explored the relationship between physical activity (PA), the nature of the job, and essential hypertension among university employees. The research was conducted with the approval of the Islamia University Bahawalpur and involved the use of survey questionnaires to gather data. Participants, comprising 392 adults (177 males and 42 females), were selected based on an online statistical calculator, considering factors like the expected effect size, statistical power level, minimum number of predictors, and probability threshold. To account for potential attrition, an oversampling of 10% was conducted, leading to the final sample size of 392. From these, 219 participants diagnosed with hypertension were included in the analysis(12, 13).

The International Physical Activity Questionnaire (IPAQ) short form was utilized to assess the physical activity levels of participants. This questionnaire classifies physical activities into walking, moderate-intensity exercise, and vigorous exercise, with energy expenditure computed using metabolic equivalents (METs). The IPAQ score, incorporating walking METs, moderate METs, and vigorous METs, helped categorize participants into low, moderate, and high physical activity groups. Additionally, its reliability and validity have been established in multiple languages, including Urdu, making it a suitable tool for this demographic(14-16).

To gauge the nature of the participants' jobs, the Quality of Work Measurement Scale was employed. This scale includes various domains such as satisfaction and respect, mobbing, mental strain at work, communication and feedback, cooperation, and appraisal. Each domain consists of items rated on a five-point Likert scale, offering insights into different aspects of the work environment and its impact on employees(17).

For the assessment of essential hypertension, a scale developed by Ralapanawa et al. (2020) was used. This scale features knowledge and attitude questions with fixed answering options, alongside close-ended questions to assess practices related to hypertension(8). The survey method was chosen for data collection, targeting employees of the Islamia University of Bahawalpur. Participants were required to complete demographic information, the Hypertension scale, the nature of the job scale, and the IPAQ. Following data collection, descriptive statistics such as mean, standard deviation, and percentage, along with inferential analyses like Pearson's correlation analysis and multiple linear regression analysis, were applied. These statistical methods enabled us to examine the relationships among hypertension, the nature of the job, and physical activity levels.

The data analysis procedure involved using the Social Science Statistical Software (SPSS) for Windows, Version 26. Initially, descriptive statistics for demographic characteristics were computed. Subsequently, Pearson's product correlations were used to analyze the associations between hypertension, the type of employment, and the IPAQ scales and subscales. This approach provided a comprehensive understanding of the interplay between physical activity, job nature, and essential hypertension among the studied population.

RESULTS

Table 1 provides a demographic breakdown of the study participants. The average age of the participants is 35.10 years, with a standard deviation of 6.480 years, indicating a middle-aged group. In terms of gender distribution, a majority of the participants are male (80.8%), while females constitute 19.2% of the sample. Regarding physical activity levels, 61.64% of participants are classified

as minimally active, and 38.35% are considered active. This table highlights a significant gender imbalance and a tendency towards lower physical activity among the study's participants.

Table 1 Demographic Characteristic

Demographic Characteristic	Frequency (F)	Percentage (%)	Mean ± SD
Age (Years)			35.10 ± 6.480
Gender			
Male	177	80.8	
Female	42	19.2	
Physical Activity Level			
Minimally Active	135	61.64	
Active	84	38.35	

Table 2 presents the mean and standard deviation for various factors related to nature of job and physical activity. Notably, both hypertension and vigorous activity share the same mean and standard deviation (43.53 and 7.521, respectively). Moderate activity shows a high mean (4070.44) with a substantial standard deviation (6359.01), suggesting wide variability among participants. Walking activity and sitting time also show a considerable range in participant responses. In the job-related factors, all the means are closely clustered around the mid-40s, with standard deviations around 7.2, indicating a moderate level of agreement or prevalence among the participants in these areas.

Table 2 Factors

Factors	Mean (M)	Standard Deviation (SD)
Hypertension	43.53	7.521
Vigorous Activity	43.53	7.521
Moderate Activity	4070.44	6359.01
Walking Activity	359.82	732.01
Sitting Time	2720.32	1762.12
Satisfaction and Respect	45.36	7.604
Quality of Work at Mobbing	44.73	7.441
Mental Strain at Work	45.68	7.214
Communication and Feedback	43.87	7.307
Cooperation	44.30	7.237
Appraisal	43.85	7.236

Table 3 explores the correlations among various factors. Hypertension shows significant correlations with most other variables, particularly with vigorous activity, quality of work, and mental strain at work. These correlations suggest that higher physical activity levels and better quality of work environments are associated with lower hypertension levels. The negative correlation with mental strain at work indicates that increased mental strain might be linked with higher hypertension levels. The correlations are mostly significant at the 0.01 level, underscoring the strength of these associations.

Table 3 Correlation among Hypertension scale, nature of the job scale, and IPAQ (N=219)

	1	2	3	4	5	6	7	8	9	10	11	12
Hypertension_3		1.000**	.215**	.200**	0.105	.928**	.937**	.899**	.308**	.958**	.305**	.245**
Vigorous_3			.215**	.200**	0.105	.928**	.937**	.899**	.308**	.958**	.305**	.245**
Moderate_3				.853**	0.010	.208**	.222**	.193**	.170*	.193**	.168*	.767**
Walking_3					0.037	.194**	.211**	.166*	.135*	.180**	.133*	.707**
Sitting_Time_3						0.126	0.105	0.125	0.067	.138*	0.064	-0.026
Satisfaaction_and_Respect							.962**	.928**	.319**	.934**	.318**	.214**
Quality_of_Work_Mobbing								.914**	.319**	.934**	.315**	.237**

Mental_Strain_at_Work									.292**	.943**	.288**	.219**
Communication_and_Feedback										.312**	.998**	.203**
Cooperation											.311**	.241**
Appraisal												.206**
Physical_Activity_3												

*p<.05, **p<.01

Table 4 presents a regression analysis predicting walking activity. In step 1, cooperation and quality of work predict walking activity with R^2 = .91, indicating a strong model fit. In step 2, these predictors remain significant, with mental strain at work also emerging as a significant predictor (though negatively associated), with the model fit slightly reduced (R^2 = .90). This suggests that while cooperative work environments and high-quality work are associated with increased walking activity, mental strain at work might reduce it.

Table 4 Multiple Hierarchical Regression Analysis (Walking Activity):

Variable	R^2	F	B	95% CI
Step 1	.91	1454.25		
Cooperation			.674	.571, .777
Quality of Work			.335	.234, .435
Step 2	.90	1363.17		
Cooperation			.781	.653, .910
Quality of Work			.373	.270, .470
Mental Strain at Work			-.154	-.267, -.040
Significance				*p < .05; **p < .05

In Table 5, the regression analysis predicts moderate activity levels. Initially, quality of work and mental strain at work are significant predictors with a high model fit (R^2 = .88). In the next step, satisfaction and respect emerge as an additional significant predictor alongside the earlier two, with the model fit slightly improving (R^2 = .89).

Table 5 Multiple Hierarchical Regression Analysis (Moderate Activity):

Variable	R^2	F	B	95% CI
Step 1	.88	861.60		
Quality of Work			.708	.597, .819
Mental Strain at Work			.270	.155, .385
Step 2	.89	590.27		
Quality of Work			.549	.382, .716
Mental Strain at Work			.199	.072, .325
Satisfaction & Respect			.226	.042, .404
Significance				p < .01

This indicates that a high-quality work environment, lower mental strain, and higher satisfaction and respect at work are associated with higher levels of moderate physical activity among participants.

DISCUSSION

The primary objective of this research was to examine the effect of essential hypertension on the direct relationship of physical activity and the nature of the job among faculty members at Bahawalpur University. The study achieved its objectives, providing valuable insights into how lifestyle factors, specifically physical activity, and job-related stressors, influence hypertension.

Extensive research, including studies by Pescatello et al. (2004, 2015), has underscored the beneficial impact of physical activity on blood pressure levels. Regular physical activity is a critical element in managing hypertension, recommended alongside a healthy diet, weight management, and smoking cessation(18). Engaging in physical activities daily can significantly reduce blood pressure, enhancing overall health and wellbeing. The relationship between physical activity and essential hypertension is well-documented, with evidence suggesting that a combination of aerobic exercise and resistance training can be particularly effective. This research

supports these findings, highlighting the importance of promoting regular physical activity as a fundamental strategy in hypertension management(19, 20).

Furthermore, the nature of one's job emerges as a critical factor in the development of essential hypertension. University employees, often subjected to high workload, job insecurity, and extended working hours, are at an increased risk of developing hypertension. Studies from the Journal of Hypertension (2017) and the Journal of Applied Psychology (2002) corroborate this, showing that high job demands, low job control, and long working hours are significant risk factors for hypertension among university staff. The findings indicate that job-related stress, particularly in academic settings, can exacerbate the risk of hypertension. Consequently, addressing job stress through social support and stress management techniques is crucial for hypertension prevention and management(14, 21).

CONCLUSION

The conclusion of this study is that hypertension is prevalent among individuals engaged in prolonged sedentary work and experiencing substantial job insecurity. These findings underscore the need for employers to foster an environment that encourages physical activity and mitigates job-related stress. By promoting a culture of physical activity and providing supportive workplace policies, employers can contribute significantly to reducing the risk of hypertension and enhancing overall employee health. However, the generalizability of these findings is limited, as the study sample was confined to the employees of Islamia University of Bahawalpur. Future research should aim to replicate these findings in diverse settings to strengthen the understanding of the complex interplay between physical activity, job nature, and hypertension.

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