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Outcomes of Brisk Walking on Systemic Arterial Hypertension in Young Males

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ABSTRACT

Background: Elevated blood pressure, or hypertension, is a main cause of cardiovascular disease and a major global health concern. Prehypertension, a precursor to hypertension, poses increased risks. It can be delayed in young adults with an emphasis on lifestyle modifications, especially physical exercise. **Objective:** To analyse the outcomes of brisk walking on systemic arterial hypertension in young males. **Methodology:** A six-month analytical cross-sectional study conducted at Lahore College of Physical Therapy, Lahore Medical and Dental College, involving 133 male participants aged 18-34 years, utilised a sphygmomanometer and a self-structured questionnaire to assess blood pressure and its related risk factors, ensuring ethical approval, informed consent, and rigorous data analysis using SPSS software. Exclusion criteria included active or passive smoking, or having quit smoking within the past six months; a diabetic history with fasting glucose >100mg/dL; and obesity, defined as a body mass index >30 or a waist circumference >40inches for men and >35inches for women. The study prioritized confidentiality, participant well-being, and transparent reporting of methods and findings. Continuous variables were presented as means and standard deviations, while categorical variables were shown as frequencies and percentages. The results were illustrated using graphs and charts. The ethical board of Lahore College of Physical Therapy approved the research. Confidentiality was maintained throughout the study, and informed consent was obtained from all participants. **Results:** The study, involved 133 male participants from different parks of Lahore, with an age range of 18 to 34 years. Findings show clear differences in the pre and post-values of BP, emphasizing the importance of brisk walking in controlling and managing hypertension and its related risk factors. The pairwise comparison yielded a p-value of 0.00, further confirming the statistical significance of the differences observed between the pre-systolic and post-systolic measurements. **Conclusion:** This study concluded that an active lifestyle benefits blood pressure and cardiac health in patients with systemic arterial hypertension. The results indicate that brisk walking positively impacts blood pressure control in those with systemic hypertension.

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INTRODUCTION

Hypertension (HTN), or high blood pressure, refers to abnormally high arterial blood pressure. According to the Joint National Committee 7 (JNC7), normal blood pressure is a systolic pressure below 120 mmHg and a diastolic pressure below 80 mmHg. Hypertension is defined as a systolic pressure of 140 mmHg or higher and/or a diastolic pressure of 90 mmHg or higher. "Prehypertension" describes blood pressure in the range of 120-139 mmHg systolic and 80-89 mmHg diastolic. Although prehypertension itself is not a medical condition, individuals with prehypertension are at increased risk of developing hypertension.[1] Resistant hypertension is defined as blood pressure that remains above the target despite the use of three or more antihypertensive medications at maximum tolerated doses or requires four or more medications to achieve control.

This condition has gained attention due to efforts to improve blood pressure control rates and the development of device-based therapies for hypertension.[2] Cardiovascular disease (CVD) is the leading cause of death in the United States and worldwide, accounting for about one in three deaths globally. Hypertension is the most common, costly, and treatable risk factor for CVD.[3] It is thought to be the main cause of mortality from cardiovascular (45%) and cerebrovascular (51%) diseases.[4] Hypertension prevalence is predicted to increase by 30% globally by 2025. Low- and middle-income countries (LMICs) may face a greater burden due to factors such as nutritional transition, increasing sedentary lifestyles, other modifiable risk factors, and inadequate healthcare systems.

Within the next decade, LMICs are expected to account for 75% of the world's hypertensive population.[5] The prevalence of hypertension in Pakistani adults over the age of 15 is 18%; in the rural population, it is 16.2%, and in the urban population, it is 21.6%.[6] The effects of hypertension if not controlled are devastating, and may include stroke, myocardial infarction, cardiac failure, and renal failure among others.[7] High blood pressure is responsible for about 13.5% of annual global deaths. Additionally, hypertension directly contributes to 54% of all strokes and 47% of all coronary artery disease cases worldwide.[8] Recent research identifies genetic, socio-demographic, and behavioural factors as risks for hypertension.[9,10] The risk of cardiovascular disease (CVD) doubles with each 20/10 mm Hg increase in blood pressure, starting from 115/75 mm Hg.[9] Early life exposure to high blood pressure can cause pathological changes in the vasculature and myocardium.[11] Risk factors for hypertension are classified as modifiable and non-modifiable. Modifiable factors include diet, physical activity, alcohol and cigarette use, and obesity. Non-modifiable factors include a family history of hypertension, age over 65, and comorbid conditions like diabetes and chronic kidney disease.[12] Hypertension is independently and continuously associated with various cardiovascular events, including stroke, myocardial infarction, sudden death, heart failure, peripheral artery disease, and end-stage renal disease. This association is observed across all ages and ethnic groups.[13]

According to revised hypertension guidelines, individuals with hypertension should receive at least non-pharmacological treatment.[14] Walking is a popular physical activity globally. The World Health Organization (WHO) recommends about 150 minutes of moderate-intensity physical activity per week to reduce the risk of death from cardiovascular disease.[15] The American College of Sports Medicine recommends 30 minutes of continuous or accumulated moderate-intensity aerobic activity most days of the week to help reduce blood pressure.[16] Studies show that modifying lifestyle factors, such as increasing physical activity and losing weight, can significantly lower blood pressure and reduce the prevalence of hypertension.[17]

Non-pharmacological lifestyle changes, including increased physical activity, are the first line of therapy for both primary and secondary prevention of hypertension. This recommendation is supported by both national and international treatment guidelines.[18] Additionally, detecting high blood pressure and providing optimal medical care is challenging due to the disease's persistent and asymptomatic nature.[10] Previous research on hypertension has revealed a gap in the literature concerning sample collection methods. This study aims to highlight the importance of an active lifestyle for hypertension patients, as high blood pressure is a major cause of cardiovascular problems. Regular exercise benefits include

increasing heart rate, improving blood flow, reducing peripheral resistance, enhancing lean body mass, and boosting functional capacity, all of which contribute to a reduction in cardiovascular disease risk factors.

METHODOLOGY

An analytical cross-sectional survey was conducted from June 2023 to December 2023 at Lahore College of Physical Therapy, Lahore Medical and Dental College. Data was collected from several parks in Lahore, including Race Course Park, Jinnah Park, and Shadman Colony Park, using non-probability convenient sampling. The sample size of 133 participants was determined with a 95% confidence interval using the Epi Tool, targeting young males aged 18-34 years who met specific criteria. Participants needed to have a documented history of systemic arterial hypertension, a baseline blood pressure of 139/89 mmHg, a cardiac history, and a completed lipid profile.

Exclusion criteria included active or passive smoking, or having quit smoking within the past six months; a diabetic history with fasting glucose >100 mg/dL; and obesity, defined as a BMI >30 or a waist circumference >40 inches for men and >35 inches for women. For data collection, a sphygmomanometer was used to measure blood pressure, and participants completed a self-structured questionnaire designed to assess blood pressure and related risk factors. The study focused on gathering information from young males with systemic arterial hypertension who met the eligibility requirements. The data was entered and analyzed using the Statistical Package for the Social Sciences (SPSS). Continuous variables were presented as means and standard deviations, while categorical variables were shown. As frequencies and percentages. The results were illustrated using graphs and charts. The ethical board of Lahore College of Physical Therapy approved the research. Confidentiality was maintained throughout the study, and informed consent was obtained from all participants.

RESULTS

The study included participants with ages ranging from 19 to 34 years, with a mean age of approximately 25.11 years and a standard deviation of 3.26 years. The pre-systolic blood pressure measurements varied between 123 and 135 mmHg, yielding a mean of 128.13 mmHg and a standard deviation of 2.94 mmHg. In contrast, the post-systolic blood pressure ranged from 82 to 124 mmHg, with a mean of 120.72 mmHg and a standard deviation of 3.51 mmHg. For diastolic blood pressure, the pre-diastolic values fell between 81 and 120 mmHg, averaging 83.61 mmHg with a standard deviation of 3.44 mmHg. The post-diastolic blood pressure showed a narrower range, from 80 to 82 mmHg, with a mean of 80.53 mmHg and a standard deviation of 6.91 mmHg. Glucose levels among participants ranged from 80 to 96 mg/dL, with a mean of 85.89 mg/dL and a standard deviation of 2.24 mg/dL. Participants' weights varied between 50.00 and 99.00 kg, resulting in a mean weight of 75.95 kg and a standard deviation of 9.50 kg. Lastly, waist sizes ranged from 28.00 to 343.00 cm, with an average waist size of 36.68 cm and a standard deviation of 2.71 cm (Table 1).

Table 1: Descriptive statistics

	Minimum	Maximum	Mean	Std. deviation
Age	19.00	34.00	25.1053	3.26428
Pre-systolic BP	123	135	128.1278	2.93983
Post-systolic BP	82	124	120.7218	3.50838
Pre-diastolic BP	81	120	83.6090	3.44180
Post-diastolic BP	80	82	80.5338	6.9138
Glucose level	80	96	85.8872	2.23828
Weight	50.00	99.00	75.9474	9.49906
Waist size	28.00	343.00	36.6842	2.706

Table 2: Inferential statistics

Pairs	Timeline	Mean	Std. deviation	Degree of freedom	P-value
Pair-I	Pre-systolic & post-systolic BP	7.41	3.81	132.00	0.00
Pair-II	Pre-systolic & post-systolic BP	3.08	3.21	132.00	0.00

Inferential statistics: The analysis of the paired data for pre-systolic and post-systolic blood pressure revealed significant differences. In the first comparison, the mean difference between pre-systolic and post-systolic blood pressure was 7.41 mmHg, with a standard deviation of 3.81 mmHg, and a degree of freedom of 132. The p-value for this comparison was 0.00, indicating a statistically significant difference. In the second comparison, the mean difference was 3.08 mmHg, with a standard deviation of 3.21 mmHg, also with a degree of freedom of 132. Similarly, this comparison yielded a p-value of 0.00, further confirming the statistical significance of the differences observed between the pre-systolic and post-systolic measurements (Table 2).

DISCUSSION

The primary objective of this study was to analyze the effects of brisk walking on young males with systemic arterial hypertension. By transitioning from a sedentary lifestyle to an active one, patients can improve their modifiable risk factors for hypertension. Despite this, public awareness of the benefits of physical activity remains limited. This study aims to address this gap by measuring the blood pressure of young male patients with systemic arterial hypertension who engage in regular brisk walking. The investigation focuses on evaluating the outcomes of incorporating brisk walking into their lifestyle. The sample consisted of 133 participants with a mean age of 25.11±3.26 years. Blood pressure was measured using a sphygmomanometer before and after walking. Risk factors were assessed with a self-structured questionnaire.

Analysis using the paired sample t-test revealed a significant difference in both systolic and diastolic blood pressure. The mean reduction in systolic blood pressure was 7.40±3.8 mmHg, and in diastolic blood pressure, it was 3.07±3.21 mmHg, indicating that brisk walking positively influences blood pressure control. Our findings align with existing research showing exercise's beneficial effects on blood pressure, though results can vary based on participant characteristics and study methodologies. Previous studies also provide strong evidence that physical activity effectively lowers blood pressure in adults, including those with prehypertension and in the general population.[3] Our findings of improved blood pressure with brisk walking are consistent with several studies that have reported reductions in blood pressure or arterial stiffness. However, a study by Ko et al. in 2020 suggested that stretching may be more effective than walking in controlling blood pressure, highlighting a contrast with our results where significant improvements in blood pressure were observed after brisk walking.[16] Furthermore, a previous study by Sun et al. in 2021 underscored the importance of waist circumference as a biomarker for assessing the risk of prehypertension and hypertension. This study confirms that, when evaluating cardio-metabolic risk related to fat distribution, waist circumference should be measured in addition to BMI. This emphasis on waist circumference provides additional context for assessing hypertension risk beyond just changes in blood pressure measurements.[19]

This study supports our finding that the average waist circumference of participants is higher than normal. From a clinical perspective, incorporating brisk walking as an adjunct therapy for young males with systemic arterial hypertension appears promising. Healthcare professionals might consider recommending structured walking programs for this population. Brisk walking is an accessible, cost-effective intervention that can be easily integrated into daily routines, making it a practical addition to hypertension management strategies. Reliance on self-reported physical activity levels may introduce bias, as participants might either exaggerate or underreport their engagement in brisk walking. Additionally, the absence of a well-matched control group not engaging in brisk walking makes it challenging to

attribute observed changes solely to this activity. The blood pressure measurements taken with a sphygmomanometer may also introduce variability due to factors such as participant positioning and observer bias. Moreover, individuals with specific cardiovascular conditions might respond differently to brisk walking compared to those without such conditions. To address these limitations, future research could benefit from conducting a longitudinal study to assess the sustained effects of brisk walking over an extended period. Expanding the scope of the study to include a more diverse sample in terms of age, ethnicity, and socioeconomic background would enhance the external validity of the findings. Utilizing advanced monitoring techniques, such as wearable devices, could provide more precise data on participants' physical activity levels. Additionally, integrating patient-reported outcomes could help evaluate the impact of brisk walking on participants' quality of life, mental health, and overall well-being.

CONCLUSION

This study concluded that an active lifestyle benefits blood pressure and cardiac health in patients with systemic arterial hypertension. The results indicate that brisk walking positively impacts blood pressure control in those with systemic hypertension.

DECLARATIONS

Consent to participate: Written consent had been taken from patients. All methods were performed following the relevant guidelines and regulations.
Availability of data and materials: Data will be available on request. The corresponding author will submit all dataset files.
Competing interests: None
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