Journal of Sports and Physical Education Studies
ISSN: 2788-788X
DOI: 10.32996/jspes
Journal Homepage: www.al-kindipublisher.com/index.php/jspes

JSPES
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

The Association of physical activity levels with high blood pressure in older men with metabolic syndrome of Kabul city

Ahmad Fawad Nazari[*1] Abdul Hasib Azad[2] Romal Akbari[3]
[12]Department of Sport Management, Faculty of Physical Education and Sports Science
[3]Department of Sport Medicine, Faculty of Physical Education and Sports Sciences
Corresponding Author: Ahmad Fawad Nazari, **Email**: fawad.farhan9@gmail.com

| ABSTRACT
Physical inactivity is a growing global concern, especially among the elderly, as it contributes significantly to various chronic health conditions such as obesity, cardiovascular dysfunction, and metabolic syndrome. This study aimed to investigate the association between physical activity levels and high blood pressure among elderly men with metabolic syndrome in Kabul, Afghanistan.This descriptive-analytical study involved 330 elderly men over the age of 50 who had been diagnosed with metabolic syndrome and visited public hospitals in Kabul in 2023 (1402 solar year). Participants were selected using purposive sampling. Metabolic syndrome was diagnosed using the International Diabetes Federation (IDF) criteria. Anthropometric data (height, weight, waist circumference, body mass index) and physiological indicators (systolic and diastolic blood pressure) were measured. Data were analyzed using SPSS version 26. One-way ANOVA was used to compare physical activity groups, and multiple linear regression analysis was conducted to examine the relationship between physical activity levels and blood pressure. A p-value of less than 0.05 was considered statistically significant.The results revealed a significant inverse relationship between moderate to high levels of physical activity and both systolic and diastolic blood pressure. Specifically, individuals engaging in higher physical activity levels exhibited lower blood pressure values. In contrast, low levels of physical activity were significantly associated with increased systolic and diastolic blood pressure ($P < 0.002$ for both measures). The study highlights the beneficial impact of regular moderate to high-intensity physical activity in lowering blood pressure among elderly individuals with metabolic syndrome. These findings underscore the importance of incorporating physical activity as a preventive and therapeutic strategy for managing blood pressure and promoting cardiovascular health in aging populations. Promoting active lifestyles in this demographic could contribute to better health outcomes and reduced burden on healthcare systems.

| KEYWORDS

Physical activity, Systolic pressure, Diastolic pressure, Metabolic syndrome, Anthropometry

| ARTICLE INFORMATION

ACCEPTED: 01 October 2025 **PUBLISHED:** 30 October 2025 **DOI:** 10.32996/jspes.2025.5.4.1

Introduction

High blood pressure (HBP) is a significant risk factor for cardiovascular diseases (CVD) and is associated with increased mortality and morbidity rates worldwide. Metabolic syndrome, which includes a cluster of conditions such as hypertension, diabetes, and obesity, exacerbates the risk of cardiovascular and other chronic diseases. As global populations age, the prevalence of HBP and metabolic syndrome is increasing, particularly among older adults. Regular physical activity has been shown to play a key role in managing HBP and metabolic health. However, the level of physical activity required to reduce these risks remains poorly understood, especially among older adults in developing regions like Kabul. This research aims to explore the relationship between physical activity levels and high blood pressure in older men with metabolic syndrome in Kabul, with the goal of identifying effective strategies for improving health outcomes in this population.

Copyright: © 2025 the Author(s). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) 4.0 license (https://creativecommons.org/licenses/by/4.0/). Published by Al-Kindi Centre for Research and Development, London, United Kingdom.

Literature Review

High blood pressure (HBP) is one of the leading causes of cardiovascular diseases (CVD), including stroke, heart attacks, and kidney disease. The Centers for Disease Control and Prevention (CDC, 2024) highlights the severe complications that can arise from untreated hypertension, making its management crucial for preventing or delaying cardiovascular diseases. In recent years, lifestyle modifications such as weight loss, increased physical activity, and dietary improvements have been shown to significantly reduce blood pressure levels and decrease the risk of associated diseases (Johns, 2023). Research has consistently demonstrated that maintaining a healthy lifestyle can lower hypertension, thereby improving cardiovascular outcomes and reducing the overall burden of cardiovascular diseases (Carey et al., 2018).

Metabolic syndrome, a cluster of risk factors that includes high blood pressure, high blood sugar, excess abdominal fat, and abnormal cholesterol levels, is another major contributor to cardiovascular diseases and type 2 diabetes. The prevalence of metabolic syndrome has been increasing globally, especially among older populations. It is closely linked with an elevated risk of developing serious health complications, including heart disease and stroke (Rahman et al., 2019). Managing metabolic syndrome requires a combination of pharmaceutical treatments and significant lifestyle modifications, including physical activity. Studies indicate that even moderate increases in physical activity can significantly reduce the risk factors associated with metabolic syndrome, including blood pressure (Johns, 2023).

Regular physical activity is widely recognized as an effective intervention for controlling hypertension and improving metabolic health. Physical activity has numerous benefits for individuals with metabolic syndrome, including reducing abdominal fat, improving insulin sensitivity, and enhancing overall cardiovascular health (Khorosh et al., 2018). Studies show that individuals who engage in regular physical activity have lower blood pressure, a reduced risk of obesity, and a decreased likelihood of developing diabetes (Nemati et al., 2010). In contrast, physical inactivity is associated with higher risks of hypertension, diabetes, and cardiovascular diseases (Naghii et al., 2011; Gidding, 2007). This underscores the importance of incorporating regular exercise into daily routines as a preventive and therapeutic measure for metabolic syndrome.

The prevalence of high blood pressure and metabolic syndrome is particularly concerning among older adults. As individuals age, they become more susceptible to these conditions due to changes in metabolism, hormonal shifts, and decreased physical activity levels (Johnson et al,2018) emphasize that high blood pressure is a leading cause of death among the elderly, particularly in relation to cardiovascular disease and stroke. Furthermore, older adults often experience barriers to physical activity, including mobility limitations and chronic illnesses. (Kim et al, 2019) point out that these barriers make it more challenging for elderly individuals to adopt or maintain regular exercise routines. Thus, targeted interventions that promote physical activity in older populations are crucial for improving their overall health outcomes.

This growing body of evidence highlights the importance of physical activity for managing blood pressure and preventing the onset of metabolic syndrome, particularly in older adults. However, there is a notable gap in research regarding the relationship between physical activity and blood pressure management in elderly populations in specific regions, such as Kabul. Understanding the local cultural and lifestyle factors that influence physical activity among older men in Kabul could provide valuable insights for designing interventions that are both effective and culturally appropriate.

MATERIALS AND METHODS

Study Area

This descriptive analytical study was conducted to investigate the relationship between physical activity level and high blood pressure in elderly men with metabolic syndrome in Kabul city in 1402. In this research, the study population included all elderly men over 50 years old with metabolic syndrome who had visited public hospitals in Kabul in the year 1402 for treatment and care. Out of them, 330 individuals who had the necessary information were purposefully selected. Because the size of the statistical population, that is, the population of Kabul city, was large. And it was not possible to refer to each and every member of this population, hence the sampling method of the statistical population of the present research was chosen to have indicators of metabolic syndrome in a simple and accessible way. The criteria for entering the research include being 50 years old and older, not using a certain lifestyle due to illness or other factors, not being hospitalized or at home at the time of completing the questionnaire, and not suffering from endocrine and metabolic disorders such as thyroid diseases, diabetes, pituitary gland disorders, adrenal gland disorders, osteoporosis, and bone metabolic disorders, and exclusion criteria included unwillingness to participate in the study. To comply with ethics in the research, the participation of the entire statistical population was voluntary and with informed consent.

Samples Collection

The diagnosis of metabolic syndrome was considered based on the IDF (International Diabetes Federation) index as follows: definition of waist circumference (more than 88 cm) two indicators: increased blood pressure (systole equal to or more than 130 mm meters of mercury and diastolic blood pressure equal to or greater than 85 mm Hg), decrease in HDL cholesterol (less than 50 mg/dL), increase in blood triglycerides (equal to or greater than 150 mg/dL) and increase Blood sugar (morning blood sugar is sometimes equal to or more than 100 mg/dL) (Jackson & Pollock, 1978). To measure body weight, a digital scale of Burro company model GS22 with a sensitivity of 0.1 kg was used. In this way, the person without shoes and with minimal clothes,

without moving, stood on the digital scale and his weight was measured in kilograms, and a plastic (tailoring) tape measure was used to measure the standing height. A tape measure was installed vertically on the wall from the flat surface of the ground upwards. Then the volunteers were asked to stand with their backs against the wall and in line with the tape measure without shoes. When standing, the weight of the body was equally distributed on both legs and the viewing angle was parallel to the horizon. While Kori's legs, hips, back of shoulders, and back of head were in contact with the wall. The height from the ground (ground contact with the sole) to the top of the skull (parallel and tangent to the highest height) was measured in centimeters. Body mass index was calculated using the formula of dividing weight in kilograms by square height. Waist circumference in a standing position was measured using a plastic tape measure as the minimum waist circumference at the end of natural exhalation and in the area between the last rib bone and the upper pelvis in centimeters. In this research, Omron (Made in Japan) model CP-705 digital sphygmomanometer was used to measure systolic and diastolic pressure, so that after five minutes of resting, the person sat on a stool and the sphygmomanometer cuff was closed on the subject's left arm; So that its lower edge was 2.5 cm above the elbow line and the tubing of the device was placed exactly in the middle of the arm so that the sensor was fixed in the right place, then the number specified by the sphygmomanometer was recorded by the researcher. The physical activity questionnaire of Beck et al. was used to evaluate the level of physical activity. This questionnaire contains 16 questions, which are organized into three parts: physical activity related to work, sports activity, and leisure time physical activity, according to the relevant expressions and answers, it was evaluated on a five-point Likert scale (1-5) and the reliability of this questionnaire was evaluated. The questionnaire was reported with alpha Cronbach's of 0.73 (Baeck et al, 1982). For biochemical analysis, about 3 ml of venous blood was taken from the right arm of each person in the morning immediately transferred to the laboratory, and centrifuged in a centrifuge at 4000 revolutions per minute. After 5 minutes of centrifugation, the separated serum was transferred to micro tubes and stored at minus 80 degrees Celsius.

Statistical Analysis

SPSS version 26 statistical software was used to describe and analyze the data. After collecting the information and entering the information in the statistical software environment; Indices of central tendency and data dispersion were calculated. The Kolmogorov-Smirnov test was used to check the normality of the data and the Lune test was used to ensure the normality of the data. To determine the difference between groups, a one-way analysis of variance was used, and a multiple linear regression model was used to investigate the relationship between physical activity score and blood pressure. The statistical decision rule for the hypotheses was set at a significance level of $P<0.05$.

RESULTS

Describe the parameters

Table 1. Shows that the descriptive characteristics of the anthropometric indicators of the statistical sample. Meanwhile, the average body mass index of the statistical population shows that all the people participating in this research are in the obese category.

Table 1. Descriptive characteristics of the anthropometric indicators of the statistical sample.

Variables	Mean	Standard deviation
Age (years)	65.31	1.04
(Body weight (kilogram)	63.32	2.86
Standing height (cm)	170.12	3.83
Body mass index (kg/m2)	24.44	1.31
Waist circumference (cm)	98.03	7.4

Table 2. It shows the descriptive characteristics of the metabolic syndrome index of the statistical sample. At the same time, the average body mass index of the statistical population shows that all the participants in the present study had indicators of metabolic syndrome.

Table 2. Descriptive characteristics of the anthropometric indicators of the statistical sample.		
Variables	**Mean**	**Standard deviation**
TC $\frac{mg}{dc\ liter}$	196.05	13.5
TG $\frac{mg}{dc\ liter}$	154.8	10.7
LDL-C $\frac{mg}{dc\ liter}$	115.12	10.19
HDL-C $\frac{mg}{dc\ liter}$	26.9	3.09
Breakfast blood sugar $\frac{mg}{dc\ liter}$	175.11	7.7
Systolic blood pressure (mmHg)	145.8	1.65
Diastolic blood pressure (mmHg)	95.5	1.23
TC: Total Cholesterol TG: Triglycerides LDL: Low density lipoprotein HDL: High density lipoprotein		

Table 3. Based on the results of the present study, most of the statistical sample of the study had a low level of physical activity (85 percent); if (9%) had an average level of physical activity and only (6%) had a high level of physical activity; Meanwhile, the results of the one-way analysis of variance test showed that there is a significant difference between the levels of physical activity (low, medium and high) among the statistical sample (P<0.003).

Table 3. Physical activity level of the statistical sample.			
Physical activity level	**Frequencies**	**Percent**	**The significance level**
Low	281	85	(P< 0.003)
Medium	30	9	
High	19	6	

Table 4. Based on the results of the multiple linear regression model, there is an inverse and significant relationship between high and moderate physical activity levels and systolic and diastolic blood pressure; There is a positive and significant relationship between low physical activity level and systolic blood pressure (P<0.002) and diastolic blood pressure (P<0.002).

Table 4. Relationship between physical activity level and blood pressure.				
Physical activity level	**blood pressure**			
	systolic		**diastolic**	
	β1	**1P**	**β1**	**1P**
Low	0.71	0.002*	0.60	0.002*
Medium	-0.41	0.039*	-0.40	0.043*
High	-0.54	0.001*	-0.45	0.021*

DISCUSSION

The range of low systolic and diastolic blood pressure for the elderly is between 80-120 mm Hg, and ideal systolic and diastolic blood pressure for the elderly is between 80 and 120-129 mm Hg. The first stage of systolic and diastolic high blood pressure for the elderly is 80-89 to 130-139 mm Hg, and the second stage of systolic and diastolic high blood pressure for the elderly is 90 mm Hg or higher to 140 mm Hg or higher (Cardiology, 2017).In this regard, the results of our research show that there is an

inverse and significant relationship between high and moderate physical activity levels and systolic and diastolic blood pressure; There is a positive and significant relationship between low physical activity level and systolic blood pressure (P<0.002) and diastolic blood pressure (P<0.002). Several factors can play a role in changes in people's resting blood pressure; however, in many cases, the causes of blood pressure changes are unclear (Akbarpour et al., 2014). Heredity, lifestyle, and psychological conditions of people are among the known factors affecting the changes in people's blood pressure. Among these, an active lifestyle and a healthy diet can in most cases have a preventive role and also a modulating role on blood pressure (Akbarpour et al., 2014). Studies have shown that the level of physical activity reduces blood pressure in people with mild and moderate blood pressure, but it does not affect people with high blood pressure (Siahaan et al., 2021). However, in the findings of other studies, it has been reported that aerobic activities can reduce blood pressure by five to seven millimeters of mercury in people with high blood pressure (Siahaan et al., 2021). The results of studies consistent with the results of the present study confirm the favorable effect of physical activity on lowering blood pressure (Karakhanlou et al., 1390). As Ying Tian et al. (2022) According to the study's findings, high levels of physical activity have an inverse and substantial link with high blood pressure (Tian et al, 2022). Also, Ryan C. Vecheks et al. revealed in the study's findings that older Afro-Caribbean men's blood pressure and risk of getting hypertension are both lowered when they engage in physical activity instead of sedentary time (Cvejkus et al., 2021). In this regard, Gidding et al. (2007) reported that physical activity is associated with lowering blood pressure and reducing the risk of cardiovascular risk factors (Gidding, 2007). The most commonly explained mechanism is the effect on the sympathetic nervous network; Several studies have shown that a decrease in adrenergic tone is associated with a decrease in blood pressure (the level of blood serum catechol amines was used as an indicator of adrenergic tone in some of these studies), a decrease in sympathetic tone, which causes an increase in blood pressure through different mechanisms. ; Probably one of the most important causes of blood pressure reduction following physical activities; reducing the environmental resistance to insulin, which in this way reduces blood serum insulin; In addition, weight loss caused by physical activity has also been proposed as one of the possible mechanisms; which is probably the reduction of body fat is the important pillar of this weight loss (Alves et al., 2016).

CONCLUSION

The findings of this research showed that there is an inverse and significant relationship between high and moderate physical activity levels and systolic and diastolic blood pressure; while there is a positive and significant relationship between low physical activity levels and systolic and diastolic blood pressure. According to the findings of this research, it can be concluded that physical activity can be used as an effective solution to reduce systolic and diastolic blood pressure. Also, for people who have a low level of physical activity, increased physical activity can increase blood pressure. Therefore, to maintain cardiovascular health, engaging in regular physical activity in daily life and staying away from an inactive and sedentary lifestyle not only plays an essential role in improving the blood pressure of elderly men but also increases the level of general health. However, to make the results more accurate, there is a need to conduct more research in this field and examine the effects of physical activity in various cases, including age, gender, health status, diet, and the desired type of physical activity. Also, to ensure the effectiveness of physical activity in lowering blood pressure, it is recommended that people consult with their respective doctors and sports trainers and carry out a proper physical activity program.

Funding: No funding was received for this study.
Conflict of Interest: The researchers do not have any conflicts of interest of this study.
Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers.

REFERENCES

[1] Akbarpour, S., Lotfalian, M., Mozafary, A., Boloukat, R. R., Azizi, F., & karimian, S. m. (2014). Ten-year incidence of cardiovascular events and mortality in middle-aged and elderly people living in Tehran - the effect of different blood pressure groups **.***Medical*, 39(2), 60-68.
[2] Alves, A. J., Viana, J. L., Cavalcante, S. L., Oliveira, N. L., Duarte, J. A., Mota, J., . . . Ribeiro, F. (2016). Physical activity in primary and secondary prevention of cardiovascular disease overview updated. *World J Cardio*, 1(8),575-582.
[3] Baecke, J. A., Burema, J., & Frijters, J. E. (1982). A short questionnaire for the measurement of habitual physical activity in epidemiological studies. *The American journal of clinical nutrition*, 36(5), 936–942.
[4] Cardiology, A. C. o. (2017). New ACC/ AHA high blood pressure guidelines lower definition of Hypertension.
[5] Carey, R. M., Whelton, P. K., & Committee, A. A. H. G. W. (2018). Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: Synopsis of the 2017 American College of Cardiology/American Heart Association Hypertension Guideline. *Annals of internal medicine*, 168(5), 351–358.
[6] CDC. (2024, May15). High Blood Pressure Maps and Data Resources. https://www.cdc.gov/high-blood-pressure/about/index.html.
[7] Cvejkus, R. K., Miljkovic, I., Gibbs, B. B., Zmuda, J. M., Wheeler, V. W., & Kuipers, A. L. (2021). Association of physical activity with blood pressure in African ancestry men. *Preventive medicine reports*, 23(10), 14-58.

[8] Damirchi, A., Mehrabani, J., Mohebbi, H., & Sharifi, H. (2016). Evaluation of Physical Activity Level, Obesity, Dietary Patterns, and General Health among Males in Arak. *Tabari J Prev Med*, 2(2), 9-18.

[9] Etemad, Z., & Esmailnasab, N. (1391). Relationship between physical activity level and some coronary heart risk factors in college students. *Scientific Journal of Kurdistan University of Medical Sciences*, 17(1), 25-35.

[10] Gidding, S. S. (2007). Physical Activity, Physical Fitness, and Cardiovascular Risk Factors in Childhood. *American Journal of Lifestyle Medicine*, 1(6), 499-505.

[11] Heravi, M. D., Moeini, B., Hazavehei, M. M., Moghimbeigi, A., Homayonfar, S., Moslem, A., & Mirmoosavi, S. J. (2018). Relationship between blood pressure and physical activity in adults 20 to 65 years old. *Amazonia Investiga*, 7(17), 285-294.

[12] JOHNS HOPKINS MEDICINE. (2023). METABOLIC SYNDROME. HTTPS://WWW.HOPKINSMEDICINE.ORG/HEALTH/ CONDITIONS-AND-DISEASES/METABOLIC-SYNDROME

[13] Johnson, K. C., Whelton, P. K., Cushman, W. C., Cutler, J. A., Evans, G. W., Snyder, J. K., Jr, J. T. W. (2018). Blood Pressure Measurement in SPRINT (Systolic Blood Pressure Intervention Trial). *Hypertension*, 71(5), 848–857.

[14] Karakhanlou, R., Gaini, A. A., & Alizadeh, M. H. (1390). Tests to measure physical, skill and mental fitness. Definitely (Vol. 2nd edition). Iran: Ministry of Education and Sports**.**page 54.

[15] Khorosh, M., Alam, S., & Shekan, M. (2018). The relationship between physical activity and job burnout in academic staff members of Islamic Azad Universities in the four countries region. *Sports management and movement behavior*, 10, 60-49.

[16] Kim, Y. J., Hwang, J.-Y., Kim, H., Park, S., & Kwon, O. (2019). Diet quality, physical activity, and their association with metabolic syndrome in Korean adults. *Nutrition*, 5(9), 138–144.

[17] Kris-Etherton, P **,.**Daniels, S. R., Eckel, R. H., Engler, M., Howard, B. V., Krauss, R. M., Clark, J. (2001). Summary of the scientific conference on dietary fatty acids and cardiovascular health: conference summary from the nutrition committee of the American Heart Association. *Circulation*, 103(7), 1034–1039.

[18] Naghii, M. R., Aref, M. A., Almadadi, M., & Hedayati, M. (2011). Effect of regular physical activity on non-lipid (novel) cardiovascular risk factors. *International journal of occupational medicine and environmental health*, 24(4), 380–390.

[19] Neinstein, L. s., Sherer, S., & Radzik, M. (2008). Adolescent Health Care: A Practical Guide Psychosocial development in normal adolescents.Adolescent Health Care: *A Practical Guide*,*4*, 27-31.

[20] Nemati, R., Nia, F. R., & Mohibi, H. (1390). Are elite athletes more prone to eating disorders than non-athletes. Sport *physiology*, 3(12), 131-146.

[21] Rahman, F., McEvoy, J **.**W., Ohkuma, T., Marre, M., Hamet, P., Harrap, S., . . . Woodward, M. (2019). Effects of Blood Pressure Lowering on Clinical Outcomes According to Baseline Blood Pressure and Cardiovascular Risk in Patients with Type 2 Diabetes Mellitus. *Hypertension*, 73(6), 1291-1299.

[22] Siahaan, P. P., Purwanto, B., Budiarto, R. M., & Irwadi, I. (2021). Physical Activity Level and Resting Heart Rate. *Journal Ilmiah Kesehatan*, 3(1), 16-22.

[23] Tian, Y., & Zhang, Y. (2022). The relationship between hypertension and physical activity in middle-aged and older adults controlling for demographic, chronic disease, and mental health variables. *Medicine*, 101(47), e32092.