
Annals of Clinical and Analytical Medicine

Physical Activity and Heart Diseases in Saudi Arabia

Mohammed Ali Almrdef (1) *, Hamad Mahdi Alzamanan (2), Amal Mushabbab S Alqahtani (3), Abdullah Musleh Ali Almas (4), Nasser Hassan Almustaneer (5), Mohsen Mubark Ali Alsagoor (6), Hussain Mohammed Alsawar (7), Hussain Saleh Mohammed Alyami (8), Fatimah Ali Naji Al Mutlaq (9), Fares Hadi Almonajm (10)

1. *Social Worker, Najran General Hospital, Najran, Saudi Arabia.*
2. *Social Worker, Maternity and Children Hospital, Najran, Saudi Arabia.*
3. *General Nurse, Maternity and Children Hospital, Najran, Saudi Arabia.*
4. *Public Health, Maternity and Children Hospital, Najran, Saudi Arabia.*
5. *Nursing, Najran General Hospital, Najran, Saudi Arabia.*
6. *Emergency Medical Service, Dahdah Clinic, Najran, Saudi Arabia.*
7. *Radiology Technician, Alathaibah Primary Health Care Center, Najran, Saudi Arabia.*
8. *Health Information Technician, Aba Al Saud Clinic, Najran, Saudi Arabia.*
9. *Nursing Technician, PHCC Talaa, Najran, Saudi Arabia.*
10. *Health Management, Dental Center, Najran, Saudi Arabia.*

Received 14/9/2022; revised 30/9/2022; accepted 17/10/2022

*Corresponding author

Abstract

Introduction: Engaging in regular physical activity stands as a crucial strategy for managing and mitigating the adverse effects associated with hypertension. The objective of this investigation was to analyze the physical activity trends among individuals diagnosed with hypertension in Saudi Arabia.

Methods: This cross-sectional analysis encompassed hypertensive individuals attending outpatient clinics. Utilizing an online sample size determination tool, it was established that a minimum of 210 participants would be necessary to accurately assess the prevalence of physical activity among this group. Data collection was facilitated through a self-administered survey that delved into the respondents' sociodemographic details and their physical activity patterns, employing the Global Physical Activity Questionnaire (GPAQ) as the assessment tool.

Results: The study successfully enrolled 210 hypertensive patients from a clinic specializing in chronic conditions. The demographic breakdown revealed a nearly equal distribution between genders, with the majority of participants being under 50 years of age. A significant portion of the cohort (94%) engaged primarily in low-intensity activities, such as walking or cycling for a minimum of ten continuous minutes for transportation purposes. Activities of moderate intensity at the workplace were markedly higher among males and individuals younger than 40 years compared to their female and older counterparts ($p=0.038$ and $p<0.001$, respectively).

Conclusions: The overall engagement in physical activity within the hypertensive population in Saudi Arabia was found to be suboptimal. Notably, physical activity practices were predominantly observed among younger and male patients, suggesting demographic disparities in health behavior.

Keywords: *Exercise, Hypertension Management, Physical Exercise Trends, Saudi Arabian Health*

Introduction

Combatting cardiovascular diseases is a pivotal public health priority. Recent decades have witnessed compelling evidence indicating that engaging in physical activity can reduce mortality risks by 20-35%, particularly deaths associated with cardiovascular complications [1-3]. Moreover, an abundance of research supports the notion that regular exercise not only lowers blood pressure but also plays a crucial role in preventing the onset of hypertension [4, 5]. Current studies have further elucidated a time and dose-dependent relationship between physical activity levels and the risk of developing hypertension [6]. Despite these findings, there remains a gap in research regarding the prevalence and influencing factors on the exercise patterns among individuals with hypertension. This study is designed to uncover the prevalence and key determinants of physical activity among hypertensive patients, with a specific focus on the context within Saudi Arabia, where such data are scant.

Methods

This investigation was structured as a cross-sectional study targeting hypertensive individuals frequenting outpatient clinics. A sample size of 210 was determined to be the minimum required to accurately gauge the prevalence of physical activity among this demographic, as calculated using a standard online sample size calculator.

Data collection was facilitated through a meticulously crafted self-administered questionnaire, segmented into two primary sections. The first section gathered detailed sociodemographic information from participants, including age, gender, marital status, educational attainment, employment status, hypertension history, and smoking habits. The second section focused on physical activity levels, utilizing the Arabic version of the Global Physical Activity

Questionnaire (GPAQ). This segment of the questionnaire aimed to capture a comprehensive view of the participants' physical activity, detailing the intensity, duration, and frequency across various domains such as work-related, transportation-related, and leisure time physical activities.

The GPAQ, developed by the World Health Organization for the purpose of global physical activity surveillance, has undergone extensive validation and reliability testing, proving its efficacy in accommodating diverse cultural contexts and lifestyle variances. It is widely implemented in over 100 countries, predominantly through the WHO's Stepwise approach to non-communicable disease risk factor surveillance [8]. Prior to participation, individuals were briefed on the study's objectives and the importance of their contribution, with an emphasis on the confidentiality of the data collected. Written informed consent was then obtained from all participants, ensuring their understanding and voluntary involvement in the study.

Results

A total sample of 210 hypertensive patients who registered in the clinic of chronic diseases in . About half of the patients were males and more than half aged less than 50 years old, while only 19% were older than 60 years old. The majority of the patients had a university degree (58.9%) and most of them were married (93%). About 3 quarters of the patients had an income higher than 5,000 SAR per month. The prevalence of smoking among the respondents was 33.7% (table 1). Only 2 patients (less than 1%) had a job work involve vigorous-intensity activity that causes large increases in breathing or heart rate for at least 10 minutes continuously. A slightly higher percentage of patients (3.1%) worked in a job with moderate-intensity activity, that causes small increases in breathing or heart rate such as brisk walking for at least 10 minutes continuously. However, most patients (about 94%) had a light on

Table (1): Background characteristics of the hypertensive patients (n = 263)

<i>Characteristics</i>	<i>Frequency</i>	<i>Percent</i>
Gender		
<i>Male</i>	107	51.1
<i>Female</i>	102	48.9
Age		
<i>30-40</i>	78	36.9
<i>41-50</i>	51	24.3
<i>51-60</i>	42	19.8
<i>>60</i>	40	19.0
Education		
<i>Secondary school</i>	73	35.3
<i>University level</i>	122	58.9
<i>Other</i>	12	5.8
Marital status		
<i>Married</i>	190	93.0
<i>Not married</i>	14	7.0
Income		
<i><5000 SAR</i>	155	74.3
<i>≥5000 SAR</i>	54	25.7
Smoking		
<i>Yes</i>	70	33.7
<i>No</i>	137	66.3

physical activity such as walking or using a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places. Twenty two percent of the patients had moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate for at least 10 minutes continuously (table 2). Tables 3 presented the association between patients' characteristics and

moderate physical activity in hypertensive patients. Moderate-intensity activity during work was significantly more common in male gender and patients younger than 40 years old than females or those 40 years or older ($p=0.038$ and <0.001 , respectively). Education, income, or smoking were not significantly associated with practicing moderate-intensity activity during work.

Discussion

Prevention of cardiovascular diseases is considered as a major public health challenge. In the last decades, studies found that physical exercise reduced the risk of mortality by 20-35%, mainly death related to cardiovascular diseases [1-3]. There is a substantial evidence suggesting that physical activity and exercise reduces blood pressure as well as prevention of

development of hypertension [4, 5]. The recent evidence demonstrated the temporal and dose-response relation between physical activity and hypertension [6]. However, the prevalence and factors influencing the pattern of physical activity among hypertensive patients have been not well studied. This study aimed to assess prevalence and determinants of physical activity in hypertensive patients.

In the hypertensive patients, included in this study, only 2 patients (less than 1%) had a job involves vigorous-intensity activity that causes large increases in breathing or heart rate for at least 10 minutes continuously. This finding seems to be reasonable since patients with hypertensive are either have non-physical work or opted to non-physical work after being diagnosed with hypertension or associated cardiovascular diseases [7]. However, the majority of the respondents (about 94%) had a light physical activity such as walking or using a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places.

This study found a 22% prevalence of moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate for at least 10 minutes continuously in hypertensive patients. This is better than the level of physical activity reported, by Al-Nozha et al., in

Table (2): Pattern of physical activity among hypertensive patients

<i>Responses</i>	<i>Frequency</i>	<i>Percent (%)</i>
<i>Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate, such as carrying or lifting heavy loads, digging or construction work, for at least 10 minutes continuously?</i>		
Yes	2	0.8
No	257	99.2
<i>Does your work involve moderate-intensity activity, that causes small increases in breathing or heart rate, such as brisk walking or carrying light loads, for at least 10 minutes continuously?</i>		
Yes	8	3.1
No	246	96.9
<i>Do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from place?</i>		
Yes	244	93.8
No	16	6.2
<i>Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate, such as brisk walking, cycling, swimming, or volleyball, for at least 10 minutes continuously?</i>		
Yes	56	22.0
No	198	78.0

general Saudi population as 4% found to be physically active. However, the assessment of physical inactivity by Al-Nozha et al. was strict and only those who reported 150 minutes of moderate-intensity activity per week were considered physically active [8]. Similar prevalence of moderate physical activity (23.3%) was reported by Al-Hamdan et al. who recruited Saudi hypertensive patients in a large scale comparative cross-sectional community-based study [9]. The prevalence of moderate physical activity

among Indonesian middle aged men was 13.4% but 57.2% had a high level of physical activity [10]. Despite the majority of these Indonesian men were either prehypertensive (39%) or hypertensive (44%), the effect of physical activity on reduction of progression to hypertension stage was significant. The identification of high-risk groups who have low level of physical activity such as women and elderly are important in order to develop targeted interventions focusing on high-risk people. In the literature, it has always been a challenge to quantify the level of physical activity suitable for these demographic groups [11].

We found that both moderate-intensity activity during work and moderate-intensity sports, fitness or recreational (leisure) activities were significantly more common in male gender and patients younger than 40 years old than females or those 40 years or older. This gender and age differences are commonly reported by clinical or epidemiological studies [12]. A longitudinal study, recruited 3,001 Australian women with hypertensive, found a 28% higher odds of hypertension in women who reported no physical activity in comparison to those who reported high physical activity [13]. Moreover, physical activity seems to reduce the effect of obesity on the development of hypertension. In Saudi women, the level of physical activity was significantly lower than that in men [8].

Effect of age on the likelihood of physical practices and subsequently on the risk of cardiovascular disease were reported by several studies [14, 15]. Elderlies with moderate physical activity had 31% reduction in the risk of hospital admission from cardiovascular diseases regardless of gender [16]. The self-assessment of the physical activity is the main limitation of the present study which may lead to misclassification error but this error is usually random. The random error can dilute the strength of the associations but it does not lead to bias during identification of determinants of physical activity. Moreover, it is recommended to assess the determinants using prospective study designs to reduce recall bias. This variation in physical activity prevalence underscores the need for targeted health promotion strategies that

are sensitive to the demographic differences within the hypertensive population. For instance, interventions aimed at increasing physical activity levels may need to be specifically tailored to address the barriers and motivations unique to older individuals and women with hypertension. Moreover, the findings indicate a potential gap in awareness or accessibility of physical activity opportunities for these subgroups. Healthcare providers and public health initiatives must therefore prioritize the development of inclusive, accessible, and appealing programs that encourage all hypertensive patients, regardless of age or gender, to incorporate more physical activity into their daily routines. Addressing these disparities and enhancing the overall rates of physical activity among hypertensive patients can significantly contribute to better health outcomes, improved quality of life, and a reduction in the healthcare burden associated with hypertension and its complications.

Conclusions

The investigation into physical activity levels among hypertensive patients revealed a concerning trend: the overall engagement in such health-promoting behaviors was found to be below the recommended standards. This shortfall highlights a critical area for intervention, as regular physical activity is known to play a vital role in managing hypertension and reducing the risk of associated health complications. A deeper analysis of the data uncovered significant demographic disparities in physical activity practices. Specifically, males and younger individuals diagnosed with hypertension were more likely to participate in regular physical activity compared to their female and older counterparts. This distinction suggests that gender and age are influential factors in the likelihood of engaging in exercise or physical activities among those diagnosed with hypertension.

Conflict of interests

The authors declared no conflict of interests.

References

1. Stamatakis, E., et al., Sitting time, physical activity, and risk of mortality in adults. *Journal of the American College of Cardiology*, 2019. 73(16): p. 2062-2072.
2. Brook, R.D., et al., Beyond medications and diet: alternative approaches to lowering blood pressure: a scientific statement from the American Heart Association. *Hypertension*, 2013. 61(6): p. 1360-1383.
3. Myers, J., et al., Fitness versus physical activity patterns in predicting mortality in men. *The American journal of medicine*, 2004. 117(12): p. 912-918.
4. Kokkinos, P.F., et al., Physical activity in the prevention and management of high blood pressure. *Hellenic J Cardiol*, 2009. 50(1): p. 52-9.
5. Börjesson, M., et al., Physical activity and exercise lower blood pressure in individuals with hypertension: narrative review of 27 RCTs. *British journal of sports medicine*, 2016. 50(6): p. 356-361.
6. Lee, J.-Y., S. Ryu, and K.-C. Sung, Association of baseline level of physical activity and its temporal changes with incident hypertension and diabetes mellitus. *European journal of preventive cardiology*, 2018. 25(10): p. 1065-1073.
7. Guillevin, L., et al., Understanding the impact of pulmonary arterial hypertension on patients' and carers' lives. *European Respiratory Review*, 2013. 22(130): p. 535-542.
8. Al-Nozha, M.M., et al., Prevalence of physical activity and inactivity among Saudis aged 30-70 years. *Saudi Med J*, 2007. 28(4): p. 559-568.
9. Al-Hamdan, N.A., A.H. Al-Zalabani, and A.A. Saeed, Comparative study of physical activity of hypertensives and normotensives: A cross-sectional study of adults in Saudi Arabia. *Journal of family & community medicine*, 2012. 19(3): p. 162.
10. Diana, R., et al., Smoking Habit, Physical Activity and Hypertension Among Middle Aged Men [Kebiasaan Merokok, Aktifitas Fisik, dan Hipertensi pada Laki-laki Dewasa]. *Media Gizi Indonesia*, 2018. 13(1): p. 57-61.

11. Pate, R.R., et al., Physical activity and public health: a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *Jama*, 1995. 273(5): p. 402-407.
12. Egan, B.M., Physical Activity and Hypertension: Knowing Is Not Enough; We Must Apply. Willing Is Not Enough; We Must Do—von Goethe. 2017, Am Heart Assoc.
13. Jackson, C., G.-C. Herber-Gast, and W. Brown, Joint effects of physical activity and BMI on risk of hypertension in women: a longitudinal study. *Journal of obesity*, 2014. 2014.
14. Lee, I.-M., H.D. Sesso, and R.S. Paffenbarger Jr, Physical activity and coronary heart disease risk in men: does the duration of exercise episodes predict risk? *Circulation*, 2000. 102(9): p. 981-986.
15. Shiroma, E.J. and I.-M. Lee, Physical activity and cardiovascular health: lessons learned from epidemiological studies across age, gender, and race/ethnicity. *Circulation*, 2010. 122(7): p. 743-752.
16. LaCroix, A.Z., et al., Does walking decrease the risk of cardiovascular disease hospitalizations and death in older adults? *Journal of the American Geriatrics Society*, 1996. 44(2): p. 113-120.

Table (3): Association between respondents' characteristics and moderate intensity activity during work

<i>Factors</i>	<i>Moderate physical activity</i>		<i>Chi-square</i>	<i>P value</i>
	Yes	No		
<i>Gender</i>				
<i>Male</i>	7 5.4%	123 94.6%	4.3	0.038*
<i>Female</i>	1 0.8%	122 99.2%		
<i>Age</i>				
<40	4 13.8%	25 86.2%	12.2	<0.001*
≥50	4 1.8%	221 98.2%		
<i>Marital status</i>				
<i>Married</i>	7 3.0%	223 97.0%	0.407	0.523
<i>Not married</i>	1 5.9%	16 94.1%		
<i>Education</i>				
<i>Secondary school</i>	3 3.4%	84 96.6%	0.527	0.768
<i>University degree</i>	5 3.4%	144 96.6%		
<i>Other</i>	0 0.0%	15 100.0%		
<i>Income</i>				
<5000 SAR	5 2.7%	180 97.3%	0.5	0.478
≥5000 SAR	3 4.5%	64 95.5%		
<i>Smoking</i>				
<i>Yes</i>	5 5.9%	80 94.1%	2.9	0.084
<i>No</i>	3 1.8%	162 98.2%		

