



## Original Article

### Association of Hypertension with Sedentary Lifestyle Among Elderly in Urban Population

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#### ABSTRACT

**Background:** Hypertension or high blood pressure, is a non-communicable disease that is a major contributor to develop cardiovascular disease and mortality worldwide. A sedentary lifestyle characterized by limited physical activity has been known as a risk factor for hypertension. **Objective:** To explore the relationship between hypertension and sedentary behavior among the elderly in an urban population. **Methods:** A cross-sectional survey was conducted on older adults diagnosed with hypertension in urban areas. A sample of 172 participants was recruited using non-probability convenient sampling. Data was collected from various hospitals in urban areas and analyzed using SPSS version 25. The modified WHO STEPS instrument was used to gather information on physical activity and blood pressure. The non-parametric tests were performed due to non-homogenous and non-normally distributed data. The chi-square test was used to compare categorical variables and a 5% level of significance (p-value less than 0.05) was applied. **Results:** The study found that 91.3% of the 172 participants had been diagnosed with hypertension within the last 12 months. Among those with hypertension, 61.8% spent 12-17 hours in sedentary behavior, 30.6% spent 7-11 hours, 7% spent 18-24 hours, and only 0.6% spent 0-6 hours in sedentary behavior. In contrast, among those without hypertension, 60% spent 0-6 hours in sedentary behavior. The study also found that 88.5% of participants with hypertension performed less than 600 METS minutes/week of physical activity, while only 9.6 and 1.9% performed 600-3000 METS minutes/week and  $\geq 3000$  METS minutes/week respectively, while 88.5% were physically inactive. **Conclusion:** The study found a positive association between hypertension and a sedentary lifestyle among the elderly in urban areas, with most participants being diagnosed with hypertension and physically inactive. The study also found an increase in sedentary behavior with age and higher levels of physical activity among women.

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## INTRODUCTION

Hypertension is a condition that is classified into four stages according to the 2020 ACC/AHA guidelines: normal blood pressure, elevated blood pressure, Stage 1 and Stage 2 hypertension.<sup>1</sup> In elderly patients, the onset of hypertension may be attributed to several causes, including vascular stiffness, renal failure, and autonomic neurohormonal dysregulation.<sup>2</sup> Most cases of hypertension are primary, which means that the cause is unknown, while a small percentage are secondary and caused by pre-existing conditions such as hyperthyroidism, renal disease and stenosis.<sup>3</sup>

Risk factors for hypertension include smoking, inactivity, stress, family history, obesity and other underlying conditions.<sup>4,5</sup> Hypertension can lead to several health issues, including chest pain, dizziness, tinnitus, arrhythmias, epistaxis, lethargy, headache and vision problems.<sup>6,7</sup> Hypertension is associated with a range of risk factors including unhealthy dietary habits, smoking, high salt intake, family history, excessive alcohol consumption, male gender, obesity, low vegetable intake, chronic non-communicable diseases, diabetes, chronic kidney disease, physical inactivity and low education.

In 2018 a meta-analysis of 1670 studies in 71 countries found that hypertension prevalence ranges from 4 to 78%.<sup>8-10</sup> Hypertension is more prevalent in older age groups, with 30-45% of Europeans being affected. France had 37.3% men and 23.2% women with hypertension. Pakistan had 26.34% hypertension with higher rates in urban areas and men.<sup>11,12</sup> Data from 2017 CDC NCHS showed 29.0% of 18-year-olds had hypertension. The study also suggested that 29% of the population will have hypertension by 2025.<sup>12-14</sup> Hypertension is a condition that requires medication when lifestyle and diet

changes are not effective in lowering blood pressure. These cardiovascular disease (CVD) patients are typically treated with thiazide diuretics, ACE inhibitors, ARBs and calcium channel blockers. The ESC/ESH guidelines recommend a calcium antagonist or diuretic for elderly hypertensives without CVD. Combination therapy may be more effective for treating hypertension when blood pressure is 20/10 mmHg above normal. ACE inhibitors or ARBs with a diuretic are considered safe and effective treatments.<sup>15-17</sup> Sedentary behavior is a contributing factor to hypertension.

It is defined as prolonged sitting, reclining or lying down and is associated with low levels of physical activity. Lack of awareness, time constraints, poor health perception, safety concerns, lack of motivation and other factors can lead to a sedentary lifestyle. Essential or primary hypertension causes 17 million CVD deaths worldwide and managing its negative effects can be difficult.<sup>18-20</sup> This study aimed to examine the association between hypertension and sedentary behavior in older adults in urban areas, intending to understand how hypertension affects daily activity and also the prevalence of sedentary behavior and physical status of older adults.

## METHODS

A cross-sectional survey was conducted from April to September 2022 to assess the association between hypertension and a sedentary lifestyle among older adults in the urban population. The study population consisted of adults aged 50 years and above who reside in urban areas have a history of hypertension and provided their consent to participate in the study. Participants who had some psychological complications or did not have a history of hypertension were excluded

from the study.

Data was collected from Polyclinic Hospital, Rawal General Hospital, Hearts International Hospital, Allama Iqbal International Hospital and Riphah International Hospital of Islamabad and Rawalpindi, Pakistan. The sample size of 172 participants was calculated<sup>27</sup> using the Raosoft sample size calculator and a non-probability convenient sampling was used for the selection of participants. The Modified WHO STEP instrument for non-communicable diseases risk factor surveillance questionnaire was used for the survey.<sup>21</sup> The survey consisted of questions on demographic information, hypertension status, sedentary behavior and other lifestyle factors.

The survey was conducted over three months after the ethical approval was obtained from Shaheed Zulfiqar Ali Bhutto Medical University. All statistical analysis was

performed using SPSS version 25. Initially, descriptive statistics were performed and categorical variables such as age and gender were presented as frequencies and percentages. As the data was not normal, a non-parametric chi-square test was used to calculate the association between hypertension and sedentary lifestyle. The study aimed to understand the impact of hypertension on daily activity and sedentary behavior among older adults in urban areas to improve the treatment and management of hypertension.

## RESULTS

The sample consists of 172 participants and the job status of these participants were divided into the following categories: homemakers i.e., housewives, retired, government and non-government employees, self-employed and unemployed (unable to work). Table I showed that for all employment categories, a high percentage

**Table I: Biographic Parameters**

Employment status	Frequency	Percentage	Diagnosed with Hypertension (last 12 months)	METS-minutes/week	Sedentary Behaviour (hours)
<b>Government employee</b>	14	8.1%	Yes	<600	12-17
<b>Non-government employee</b>	12	7%	Yes	<600	12-17
<b>Self-employed</b>	25	14.5%	Yes	<600	12-17
<b>Homemaker</b>	68	39.5%	Yes	<600	12-17
<b>Retired</b>	31	18%	Yes	<600	12-17
<b>Unemployed (able to work)</b>	11	6.4%	Yes	<600	12-17
<b>Unemployed (unable to work)</b>	11	6.4%	Yes	<600	12-17
<b>N/A</b>	15	8.7%	No		0-6

over 90% of individuals have been diagnosed with hypertension in the last 12 months. Additionally, for all categories a majority of the individuals have a METS-minutes/week value of less than 600, indicating a low level of physical activity. Furthermore, a majority of the individuals have a sedentary behavior of 12-17 hours per day. For the individuals that fall under the "N/A" category, 100% of them are not diagnosed with hypertension in the last 12 months and have METS-minutes/week, METS refers to the energy expenditure that occurs during the sort of activity they conduct, such as either vigorous, moderate, low-intensity or no activity at all. The corresponding METs for the three physical activity intensities are the following: No activity equals one MET, light activity equals three METS, and medium activity equals 3.0-

6.0 METS and, exercises of high intensity and >6 METS.

The tables show the correlation between hypertension status, sedentary behavior, METS minutes/week, and physical status. **Error! Reference source not found.** shows that the majority (61.8%) of older adults who have been diagnosed with hypertension in the last 12 months have a sedentary behavior of 12-17 hours per day. In contrast, the majority (60%) of older adults who have not been diagnosed with hypertension in the last 12 months have a sedentary behavior of 0-6 hours per day. Table III showed that the majority (88.5%) of older adults who have been diagnosed with hypertension in the last 12 months have a METS-minutes/week of less than 600.

**Table II: Sedentary Lifestyle and Hypertension**

Hypertension Status	Sedentary Behaviour				p-value
	(0-6 hours)	(7-11 hours)	(12-17 hours)	(18-24 hours)	
Diagnosed in the last 12 months	1 (0.6%)	48 (30.6%)	97 (61.8%)	11 (7%)	0.000
Not diagnosed in last 12 months	9 (60%)	5 (33.3%)	1 (6.7%)	0	0.000

**Table III: METs and Hypertension Status**

Hypertension Status	METS-minutes/week (≥1300)	METS-minutes/week (600-3000)	METS-minutes/week (<600)	Total	p-value
Diagnosed in the last 12 months	3 (1.9%)	15 (9.6%)	139 (88.5%)	157	0.000
Not diagnosed in last 12 months	5 (33.3%)	6 (40.0%)	4 (26.7%)	15	0.000

**Table IV: Physical Status and Hypertension**

Hypertension Status	Physical Status (Physically active)	Physical Status (Physically inactive)	Total	p-value
Diagnosed in the last 12 months	18 (11.5%)	139 (88.5%)	157	0.000
Not diagnosed in last 12 months	11 (73.3%)	4 (26.7%)	15	0.000

In contrast, the majority (40%) of elderly who have not been diagnosed with hypertension during the last year have a METS-minutes/week between 600 and 3000.

Table shows that the majority (88.5%) of older adults who have been diagnosed with hypertension in the last 12 months are physically inactive. In contrast, the majority (73.3%) of older adults who have not been diagnosed with hypertension in the last 12 months are physically active.

## DISCUSSION

A study was conducted to investigate the correlation between sedentary behavior and hypertension in older urban inhabitants. The study found that out of 172 participants, those diagnosed with hypertension in the past 12 months spent more hours in sedentary behavior compared to those who were not diagnosed. Additionally, most of the participants performed less than 600 METS minutes per week of physical activity, with a small proportion performing between 600-3000 METS minutes per week. Furthermore, the study found that most participants spent 12-17 hours per day in sedentary behavior. Previous research has also found a correlation between hypertension and sedentary behavior, as well as demographic factors such as marital status, work status, and age. Studies have also shown that women tend to be more active and perform more METS minutes per week compared to men. Overall, the study highlights the importance of addressing

sedentary behavior in the management of hypertension in older urban inhabitants. Hayon Michelle Choi et al. found that recent hypertensive women had a slightly higher HTN rate than men.<sup>22</sup> Married folks had the highest hypertension rates in 2019, followed by widowed and divorced. This study confirms Azra Ramazan Khani et al. finding's that married persons had the highest hypertension rates.<sup>23</sup>

In research by Rosana Poggio et al., retired individuals had the greatest frequency of HTN among male and female participants however, the present study indicated that homemakers had the highest work status.<sup>24</sup> Chunmei Guo et al. discovered that each hour of sedentary behavior increased hypertension risk.<sup>25</sup> In the 2003–2004 NHANES, US people spent 7.7 hours per day sedentary, according to Paul H. Lee et al. AusDiab revealed that Australians sat 8.7 hours each day.<sup>26</sup> Inactive persons have higher blood pressure, according to Bruce Twinamasiko et al.<sup>27</sup>

Most of the 157 patients diagnosed with hypertension in the last year spent 12-17 hours sitting, reclining, or resting, not counting sleeping, according to this study. A handful spends 0-6 hours. Hypertension is linked to sedentary behavior, since more than half of the 15 who were not diagnosed with hypertension after 12 months spent 0-6 hours sitting, reclining, or resting, not counting sleep. Most of the 157 patients diagnosed with hypertension last year did <600 METS-

minutes/week and were sedentary, whereas others did 600-3000 and 1-3000 and were active. However, individuals who had not been diagnosed with hypertension within the last year were largely active and just a few were inactive, showing that those with hypertension were less active and more sedentary.

Rosana Poggio et al.<sup>24</sup> Overall, these results suggest a strong association between hypertension and a sedentary lifestyle among older adults in the urban population of twin cities. The results indicate that individuals who have been diagnosed with hypertension within the last 12 months are more likely to have higher levels of sedentary behavior, low-intensity activity, and physical inactivity compared to those who have not been diagnosed with hypertension in the last 12 months.

Additionally, it also indicates that the majority of people from different employment status have similar characteristics of hypertension and a sedentary lifestyle. These findings highlight the importance of addressing sedentary behavior as a potential risk factor for hypertension among older adults in urban populations. There were several strengths of the current study. The study found a significant association between hypertension and sedentary behavior, with those diagnosed with hypertension in the past 12 months spending more hours in sedentary behavior than those who were not.

The study investigated the relationship between hypertension, sedentary behavior, and physical activity level, providing a comprehensive understanding of how these factors are related. The study included 172 participants, which is a relatively large sample size, increasing the power of the study and the generalizability of the findings. However, there were potential limitations of the study

that being an observational study, which means that it is not possible to control for all possible confounding variables. This may limit the strength of the conclusions that can be drawn from the study. The study only included older urban inhabitants, so the findings may not be generalizable to other populations. As it is an observational study, it can only show the correlation between hypertension, sedentary behavior, and physical activity level, it cannot establish a causal link between these variables.

## CONCLUSION

The results of the study indicate a strong association between hypertension and a sedentary lifestyle among older adults in an urban population of twin cities. The study found that a majority of the participants (91.3%) had been diagnosed with hypertension within the last 12 months, and the majority of them reported a sedentary behavior (57%). Additionally, the study found that a majority of participants with hypertension were physically inactive (88.5%) and reported low levels of physical activity (88.5%). These findings suggest that addressing sedentary behavior and promoting physical activity may be an effective way to manage hypertension among older adults in the urban population.

## 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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**Authors' contributions:** All authors read and approved the final manuscript.

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