Original articles

Physical activity levels and preferences of Sri Lankan middle-aged and older hypertensive patients - Descriptive cross-sectional study

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Abstract

Objectives

This descriptive cross-sectional study was conducted in a Family Medicine Clinic in Colombo North region Sri Lanka to determine the physical activity preferences and the amount of weekly physical activities done per week of a sample of middle aged and older hypertensive patients.

Methods

A structured interviewer-administered questionnaire was used to collect data. The questionnaire consisted of questions related to demographic data, intensity, amount and frequency of physical exercises done for a week and preferences for type of physical exercises. Categorical data were described using percentages and numerical data were described using means and standard deviations.

Results

Total number of participants were 102. Age range – 42-86yrs. Mean age (SD) was 59.9 (11.8) years. Middle aged participants accounted for 66%. Among middle aged 27 participants (40.3%) and among elderly 14 participants (40%) did not reach the target level of daily moderate intensity physical activity levels of (≥ 150 min/week).

For middle aged walking on the pavement (50.7%) and gardening (13.4%) were the most preferred physical activity types and for elderly walking on the pavement (60%) and a playground (23%) were the most preferred physical activities. Cycling was not preferred by any of the elderly and using a stationary exercise bike was not preferred by any of the middle aged.

Conclusions

A significant percentage of participants were not achieving the adequate level of moderate intensity physical activities. Physical exercise preferences differ among middle aged and older adults. Hence physical exercise promotion programmes must be age appropriate.

Keywords: *cycling, exercise bike, gardening, intensity, walking*

Introduction

Hypertension is a prevalent medical condition strongly associated with an increased risk of cardiovascular disease (CVD)-related mortality [1]. It is diagnosed in individuals with a systolic blood pressure (BP) of 140 mmHg or higher, a diastolic BP of 90 mmHg or higher, or those undergoing antihypertensive treatment [2]. Globally, hypertension ranks third among diseases contributing to reduced disability-adjusted life-years, affecting nearly one billion people [3]. In China, more than 20% of adults have hypertension, while over 40% exhibit prehypertension [4]. A systematic review of 16 studies examining hypertension risk factors among Ghanaian adolescents and adults found prevalence rates ranging from 13.0% to 28.4% for hypertension and 22.0% to 51.4% for prehypertension [5]. In Sri Lanka, hypertension affects 18.8% of men and 19.3% of women aged 30 to 65 years [6]. However, this estimate excludes individuals over the age of 65. A separate descriptive cross-sectional study conducted in Sri Lanka's Central Province

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reported a 31.7% prevalence of undiagnosed hypertension [7].

Hypertension is a complex disease influenced by both non-modifiable and modifiable risk factors. Non-modifiable factors include age, sex, ethnicity, and genetic predisposition, while modifiable factors involve obesity, excessive sodium consumption, and insufficient physical activity [8]. Additionally, a lack of regular physical exercise is a recognized risk factor for the onset of hypertension and its associated cardiovascular complications [9].

Lifestyle modifications are essential for the prevention, treatment, and control of hypertension, with exercise being a key component [1]. The BP-lowering effects of exercise are most evident in hypertensive individuals, with BP decreasing by approximately 5-7 mm Hg after a single exercise session [1]. The proposed mechanisms for these BP-lowering effects include neurohumoral, vascular, and structural adaptations [1]. Physical deconditioning, which increases vasoconstrictor tone and structural remodeling in arteries, can contribute to hypertension development [10].

It is recommended to engage in moderate-intensity physical exercise (40-<60% VO2 max) for 30 minutes daily, preferably on most or all days of the week, to manage hypertension [1]. Studies indicate that active individuals have a lower risk of developing hypertension compared to sedentary ones [11]. Current literature suggests that regular aerobic training reduces ambulatory BP in hypertensive patients, while resistance training shows no hypotensive effects [11]. However, Boutcher and Boutcher (2017) found that aerobic and anaerobic exercise performed at more than 70% of maximal oxygen uptake is more effective in reducing BP in hypertensive individuals compared to moderate-intensity exercise [12].

Physical activity has many other benefits on physical and psychological health in addition to its beneficial effects on hypertension. A study that was conducted involving 2345 healthy adults to investigate the relationships between physical activity and life satisfaction and happiness in young, middle-aged, and older adults while controlling for demographic characteristics, found that participants with high and moderate activity levels had significantly higher life satisfaction and happiness than those with a low activity level across the total population and physical activity was significantly related to life satisfaction and happiness in young, middle-aged, and older adults [13].

Physical inactivity is a common risk factor for several non-communicable diseases which includes hypertension [14]. Physical inactivity accounts for 9% of all deaths worldwide and is among the top 10 risk factors for global disease burden and nearly half of people aged over 60 years are inactive [15]. In developed and many developing countries physical inactivity is one of the most important public health problems of the 21st century [16]. The World Health Organization estimates that globally the prevalence of physical inactivity among adults is 17%, ranging from 11% to 24% across the world [9]. For adults in the age range 18-64 years it is recommended that they should involve in 150-300minutes of moderate intensity physical activity/week or 75-150 minutes of vigorous intensity physical activity/week. For adults over 65 years of age they should be at least involved in 30 minutes of physical activity on most, but preferably all days [16].

Given the numerous benefits of physical exercise, it is important to understand the physical activity preferences of adults. A systematic review of 21 independent primary studies found that the majority of white older adults in the United States prefer walking and engaging in physical activity for about 30 minutes per day [17]. In a survey conducted in the United States, which examined the exercise preferences of 187 college students aged 18-25 years, seventy percent of participants preferred a combination of moderate-intensity cardio and strength training [17]. The second most preferred exercise was moderate-intensity cardio without strength training, while the least preferred types were strength training and intense strength training [18].

The study also revealed gender differences in exercise preferences, with women favoring a

combination of moderate-intensity cardio and strength training at a higher rate than men (13.4% vs. 10.7%), while men preferred intense strength training at a higher rate than women (17.3% vs. 0.9%) [18]. However, this study did not examine the exercise preferences of middle-aged and elderly individuals, possibly because it only included college students.

Research comparing the physical exercise preferences of middle-aged and older adults is limited. No studies have been conducted in Sri Lanka regarding the exercise preferences of these age groups, whether they have hypertension or not. Therefore, gathering information on physical exercise preferences will be valuable for doctors and therapists when advising their patients on regular physical activity participation

Methods

This descriptive cross-sectional study was conducted at a Family Medicine Clinic in the Colombo North region of the Western Province in Sri Lanka, aiming to determine the levels and preferences of physical activities among individuals with hypertension.

From the clinic register, chronic hypertensive patients (defined as those with a blood pressure reading of >140/90 mm Hg on three separate measurements taken at one-month intervals, as outlined by Thrift et al., 2020 [19] who were aged 40 years or older and could communicate in Sinhala or English were selected.

Individuals diagnosed with severe ischemic heart disease, heart failure, cerebrovascular accidents, or dementia were excluded from the study.

Sample size calculation

From the clinic register, chronic hypertensive patients aged 40 years and older were selected. Those who met the exclusion criteria were excluded. The target hypertensive population for the clinic was 140, and according to the Morgens table [20], the sample size was 103.

Data collection and data analysis

Data were collected using a structured interviewer-administered questionnaire. The questionnaire included questions about demographic data, risk factors for hypertension, treatment used, compliance with the treatment, duration and intensity of physical exercise per day, frequency of weekly physical exercise, and preferences for types of physical exercise.

Height, weight, and blood pressure readings were taken from clinic records. Patients were categorized into four blood pressure groups according to World Health Organization guidelines: Normal (90/60 – 119/79 Systolic/Diastolic), Pre-Hypertension (120/80 – 139/89 Systolic/Diastolic), Stage 1 Hypertension (140/90 – 159/99 Systolic/Diastolic), Stage 2 Hypertension (>160/100 Systolic/Diastolic), and Stage 3 Hypertension (>180/110 Systolic/Diastolic) [21].

Traditionally, compliance refers to the extent to which a patient follows the clinician's advice and adheres to the prescribed regimen. Compliance with treatment is characterized by the alignment of the individual's behavior with medical or health advice regarding medication use, lifestyle changes, and attendance at medical appointments [3]. In this study, compliance was categorized into two groups: those who regularly complied with the clinician’s advice regarding medication and clinic visits, and those who did not [3].

The physical activity level of the subjects was assessed using the International Physical Activity Questionnaire (IPAQ), culturally validated for Sri Lanka [22]. The frequency and duration of vigorous, moderate, and light intensity activities were recorded, along with the total duration of vigorous and moderate activities per week related to gardening, household chores, recreational activities, and sports.

Physical exercise preferences were categorized as recreational physical activities, indoor sports, and outdoor sports. Walking, running, swimming, cycling, and gardening were considered recreational activities. Badminton,

table tennis, and squash were classified as indoor sports, while cricket, rugby, tennis, and golf were classified as outdoor sports.

Data were analyzed using SPSS version 21. Categorical data were described using percentages, while continuous data were described using means and standard deviations

Ethics

All work was conducted in accordance with the Declaration of Helsinki (1964). Ethical approval and permission to conduct the study were obtained from the ethical review committee of a recognised University in United Kingdom (REACH reference number: EP 14/15 4) and the Sri Lankan Family Medicine Clinic.

Results

Out of the initial 103 patients, one patient dropped out of the study, resulting in a final sample size of 102. The participants' ages ranged from 42 to 86 years, with a mean age (SD) of 60 (11.7) years. Males comprised 55% of the sample, and middle-aged individuals (40-65 years) made up 65.7% of the study population. The mean BMI was 25.9 (±4.4). Additionally, 55% of the participants had an income level below $272, and 57% had not pursued education up to the tertiary level.

Over 40% of the participants had a blood pressure level above 140/90 mm Hg. In the middle-aged group, 29 (43.3%) individuals had a blood pressure level above 140/90 mm Hg, while among the elderly, 14 (40%) had a blood pressure level above 140/90 mm Hg (Table 1).

Regarding physical activities, 60% of participants were engaged in at least 150 minutes per week of moderate-intensity physical activities and only 13% of participants engaged in 75 minutes per week of vigorous-intensity exercise. Table 2 provide information on physical activity levels of participants (Table 2).

The most preferred physical activity was walking on the pavement (54%). There were notable differences in physical activity preferences between middle-aged and elderly individuals. For middle-aged participants, gardening was the second most preferred activity, whereas for elderly participants, it was walking on a playground. None of the elderly participants preferred activities like cycling and weight lifting, and none of the middle-aged participants favored activities such as using a stationary bike and walking indoors. Table 3 provides detailed information on the physical activity preferences of middle-aged and elderly individuals.

Discussion

In our study, 42% of participants did not have adequate control of blood pressure (<140/90 mm Hg), and only 55% of participants adhered to the prescribed advice. In a study conducted in Southern India, 82% of hypertensive patients were taking regular treatment, but only 37% of those on regular medication had controlled blood pressure levels [23]. In the present study, 58% had blood pressure levels below 140/90 mm Hg. The blood pressure control in our study appears to be better than that in the Southern India study. Differences in medication types, lifestyle, diet, physical exercise levels, and genetics between our study and the Southern India study may be contributing to the variations in blood pressure control.

To improve the survival rate and quality of life for hypertensive patients, long-term self-management, along with supervision and intervention from doctors, is essential [4]. According to Duan et al. (2020), patients need to take their medications as prescribed, adopt healthy lifestyle changes, and adhere to a continuous self-monitoring regime of blood pressure (BP) measurements [4].

Given the numerous benefits of physical exercise, more efforts should be made to educate, motivate, and empower patients with the necessary knowledge, skills, and values to facilitate their own regular physical exercise participation, thereby improving their quality of health (Magobe et al., 2017) [9]. Despite the well-documented benefits of a physically active lifestyle, in England, only 29% of women and 39% of men report engaging in sufficient physical activity to meet the minimum recommended guidelines of 150 minutes of moderate-intensity physical activity per week or

75 minutes of vigorous-intensity physical activity per week (Solomon et al., 2012) [16].

A study in the Boston Metropolitan area involving 61 adults aged 18-45 years indicated that 75% were engaged in some regular form of exercise, while 25% were not (Killgore et al., 2013) [24]. In a Sri Lankan study involving 200 undergraduate physiotherapy students, 49% of students were inactive, and only 16% were highly active. In the current study, 60% of participants met the 150 minutes/week of moderate-intensity activities, and only 13% of participants met the 75 minutes/week of vigorous-intensity activities. To obtain cardiovascular benefits, moderate-intensity activities should be performed for 150-300 minutes/week or more, for 3-7 days/week [25]. In the present study, 60% of subjects achieved the recommended level of physical activity. The higher rate of meeting physical activity recommendations in our study compared to those by Soloman et al. (2012) [16], Killgore et al. (2013) [24], and Ranasinghe et al. (2016) [14] may be due to the inclusion of only hypertensive patients, who may be more motivated to exercise than individuals without an illness.

Walking on the pavement (54%), walking on a playground (13%), and gardening (10%) were the most preferred types of physical activities in our study (Table 2). Walking and exercising at a fitness class were the most preferred methods according to a study by Bank et al. (2012) [26]. The findings of a study by Abrantes et al. (2011) indicated that the most preferred types of physical activities were walking (75%), strength training (37.1%), exercising in a gym (33%), sports (32%), and swimming (27.8%) [27]. Similar to these studies, walking was the most preferred type of physical activity in our study. Walking requires minimal cost and preparation, which may explain its popularity. In the present study, the lack of access to gymnasiums and sports facilities for the majority of participants could explain the lower involvement in challenging physical activities compared to studies by Bank et al. (2012) [26] and Abrantes et al. (2011) [27].

Dancing has the potential to be an appealing physical activity that can be tailored to fit a target population's age, physical limitations, and cultural background [28]. Findings suggest that dance, regardless of style, can significantly improve muscular strength and endurance, balance, and other aspects of functional fitness in older adults [28]. However, in our study, only 2% of middle-aged participants preferred dancing, and none of the elderly did. This low preference may be due to a lack of dancing skills and the fear of being seen by others.

Research comparing physical activity preferences between middle-aged and elderly individuals is limited. In our study, elderly participants preferred walking on softer surfaces, like playgrounds, more than middle-aged individuals (Table 3). This preference could be due to a fear of falling, as older people generally prefer low-risk activities [15]. Middle-aged participants preferred indoor games (table tennis and badminton), gardening, weight training, and cycling more than the elderly did (Table 3). The elderly may avoid such activities because they prefer less strenuous exercises. However, both groups equally preferred outdoor games (Table 3). Among the outdoor games, middle-aged participants favored more strenuous activities, like cricket and tennis, while elderly participants preferred less strenuous activities, like golf. Using a stationary bike at home and walking indoors were preferred only by the elderly (Table 3). The middle-aged may find these activities less challenging and monotonous. In Sri Lanka, no studies have compared the physical activity preferences of middle-aged and elderly individuals, making the findings of this study particularly valuable.

Limitations and future recommendations

One potential limitation of this study is the reliance on self-reported data for measuring the intensity and frequency of physical activity, which can introduce recall bias. Direct observation of physical activity was not feasible within the clinic-based study setting. Additionally, the study was limited to a single private sector family medicine clinic in the Western Province of Sri Lanka due to constraints in time and resources, which affects the generalizability of the findings to the wider population. For future research, it is

recommended to conduct similar studies in both private sector and government clinics across all nine provinces to obtain more comprehensive and generalizable results.

Conclusions

In the present study, a significant percentage of participants had poorly controlled blood pressure levels, and a notable percentage of middle-aged and elderly individuals did not meet the WHO-recommended levels of weekly physical activity. Physical activity preferences varied between the middle-aged and elderly groups.

Declarations

The research was funded by the personal funds of the corresponding author. We declare that there are no financial or non-financial interests directly or indirectly related to the work submitted for publication.

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Table 1. Levels of blood pressure of the study participants

Blood pressure level	Middle Aged (N =67) Number or Value	%	Elderly (N = 35) Number	%
Systolic BP range (mm Hg)	110-180		110-190	
Mean Systolic BP (mm Hg)	140.6 (± 15.1)		141.1 (± 19.5)	
Diastolic BP range (mm Hg)	70 -110		70 -100	
Mean Diastolic BP (mm Hg)	88.9 (± 9.6)		83.9 (± 8.0)	
BP level > 140/90 (mm Hg)	29	43%	14	40%

Table 2. Levels of physical activities of the study participants

Physical activity level	Middle Aged (N=67) Number or Value	%	Elderly (N = 35) Number or Value	%
Total Physical activity range (Minutes/week	0-1960		0-2520	
Mean total physical activity level (Minutes/week)	387.7 (± 438.9)		447.0 (± 643.5)	
Total Moderate intensity physical activity range (Minutes/week)	0-1960		0-2520	
Mean Moderate intensity physical activity level (Minutes/week)	331.03 (± 397.7.9)		416.1 (± 641.3)	
Total Vigorous intensity physical activity range (Minutes/week)	0-810		0-240	
Mean Vigorous intensity physical activity level (Minutes/week)	56.6 (+ 147.1)		6.9 (+ 40.6)	
Number of people reaching the WHO target level of total moderate Intensity physical activity levels (150 minutes/week)	40	59.7	21	60
Number of people reaching the WHO target level of total Vigorous Intensity physical activity levels (75 minutes/week	12	17.9	1	2.9

Table 3. Physical activity preferences among middle aged and elderly participants

Type of activity	Middle Aged (67)		Elderly (35)	
	Number	Percentage %	Number	Percentage %
Walking on the pavement	34	50.7	21	60
Walking on the play ground	5	7.5	8	23
Gardening	9	13.4	1	3
Walking indoors	0	0	1	3
Using a stationary exercise bike	0	0	1	3
Cycling	2	3.0	0	0
Playing Out door games – cricket, rugby, volley ball, golf	3	5.0	2	6
Playing Indoor games – badminton, table tennis	2	3.0	0	0
Trekking	0	0	1	3
Aerobics	3	5.0	1	3
Weight lifting	3	5.0	0	0
Gymnastics	2	3.0	0	0
Dancing	1	2.0	0	0