Correlations between Physical Activity And Health Status Among Community-Dwelling Older Adults Aged ≥65 Years

Zhang Xiaojun[1], Zhang Guiying[2], Chang Ping[3]
[1] Research Office, Hebei North University, Zhangjiakou, China
[2] Community Health Service Center of South Station, Economic Development Zone, Zhangjiakou, Hebei, China
[3] Department of Physical Education, Hebei North University, Zhangjiakou, China

Abstract: This study aims to investigate the influence of regular physical activity on the body mass index (BMI), blood pressure, and prevalence of chronic diseases among elderly individuals aged 65 and older residing in the community. Employing a cross-sectional survey design, the study included 230 community-dwelling older adults (120 males and 110 females). Data on physical activity habits (frequency, duration, and type) were gathered through questionnaires, while BMI, blood pressure, and chronic disease data (hypertension/diabetes/cardiovascular conditions) were obtained from physical examinations. The classification of physical activity frequency was as follows: daily physical activity group (≥30 minutes/day), occasional physical activity group (1-3 times/week), and non-physical activity group (<1 time/week). Utilizing SPSS 25.0 for t-tests, chi-squared tests, and correlation analyses, the findings revealed that the daily physical activity group had significantly lower BMI (24.8±2.1 vs 27.1±3.2), systolic blood pressure (130.5±10.3 vs 142.8±12.6 mmHg), and diastolic blood pressure (78.4±7.2 vs 85.2±9.4 mmHg) compared to the non-physical activity group (all P<0.01). Additionally, the prevalence of chronic diseases was markedly reduced in the daily physical activity group: hypertension (38.5% vs 62.3%), diabetes (15.5% vs 33.3%), and cerebrovascular disease (6.2% vs 12.3%) (all P<0.05). Walking was identified as the primary form of physical activity among elderly community members, demonstrating greater health benefits than other forms of physical activity (P>0.05). This study concludes that engaging in daily walking for at least 30 minutes can significantly improve the weight, blood pressure, and chronic disease management among older adults, underscoring the necessity for enhanced physical activity interventions within the community.

Keywords: Elderly; Physical Activity; Chronic Diseases; Body Mass Index; Community Health Management

1. Introduction

With the acceleration of global aging, the health issues faced by the elderly are receiving increasingly extensive attention. By the close of 2024, it is projected that 15.6% of the population in China will be aged 65 and above, with over 70% of this group afflicted by chronic diseases. The decline in physical function among older adults often coincides with the presence of multiple chronic conditions, which intensifies the health burdens and economic pressures on individuals and society alike. Consequently, there is a pressing need for cost-effective health management strategies. Research has demonstrated that regular physical activity can lower all-cause mortality rates by 12–40% [1], making it a crucial intervention for improving the physical and mental health of the elderly. Despite this, there is a notable lack of comprehensive studies in China that examine the relationship between various forms of physical activity and the simultaneous management of multiple health conditions. In response to this gap, the present study employs a cross-sectional survey methodology to investigate the correlations between the physical activity habits of community-dwelling older adults and their body mass index (BMI), blood pressure, and prevalence of chronic diseases. The objective is to provide evidence-based foundations for crafting targeted community physical activity

intervention programs that address the specific health needs of this demographic.

2. Participants and Methods

2.1 Participants

Inclusion Criteria: Participants must be aged 65 years or older, have resided in the community for at least five years, possess clear consciousness, and be able to independently complete questionnaires and undergo routine physical examinations.

Sample Characteristics: A total of 230 individuals were included (120 males and 110 females), with an average age of 71.5 ± 5.2 years.

2.2 Methods

2.2.1 Data Collection

Data was collected through a combination of structured questionnaires and physical examinations. The specific content included: ① Demographic Information: Gender, age; ② Anthropometric Measurements: Height, waist circumference, BMI; ③ Lifestyle Factors: Smoking status (yes/no), alcohol consumption (yes/no), dietary habits (assessed using a standard dietary frequency questionnaire); ④ Physical Activity Parameters: Physical activity duration (minutes per day), frequency (sessions per week), and types of activities (aerobic, resistance, flexibility, etc.); ⑤ Clinical Physiological Indicators: Resting blood pressure (systolic/diastolic) and respiratory rate (breaths per minute); ⑥ Chronic Disease Diagnoses: Information regarding cerebrovascular diseases, cardiac conditions, pulmonary diseases, hypertension, and diabetes (diagnostic criteria based on relevant clinical guidelines).

Key indicators from the physical examination included BMI, waist circumference, and blood pressure. Diagnoses of chronic diseases were based on authoritative standards such as the Chinese Guidelines for the Prevention and Treatment of Hypertension and the Chinese Guidelines for the Prevention and Treatment of Type 2 Diabetes.

2.2.2 Definition of Physical Activity Groups

In accordance with the physical activity recommendations set forth by the World Health Organization and the objectives of this research, the following classification criteria were established: ① Physical Activity Group: individuals engaging in continuous physical activity for a duration of at least 30 minutes per day; ② Non-Physical Activity Group: individuals engaging in physical activity less than once a week.

2.3 Data Analysis

Statistical analysis was conducted using SPSS version 25.0: Normally distributed quantitative data were expressed as mean ± standard deviation ($\bar{x} \pm s$); non-normally distributed data were represented by median (interquartile range). To compare continuous variables between two groups, the independent samples t-test was employed; for comparisons among multiple groups, one-way analysis of variance (ANOVA) was utilized. If the assumption of homogeneity of variances holds and significant intergroup differences are present, further pairwise comparisons were performed using the Least Significant Difference (LSD) method. A P-value of less than 0.05 was considered statistically significant.

3. Results

3.1 Relationship between Different Physical Activity Habits and Health Status

The average BMI of the physical activity group was recorded at 24.8 kg/m², significantly lower than that of the non-physical activity group, which stood at 27.1 kg/m² ($P < 0.01$). Additionally, the average waist circumference for the physical activity group was 85.3 cm, notably less than the 92.5 cm observed in the non-physical activity group ($P < 0.01$). The prevalence of chronic diseases in the daily physical activity group was significantly lower than that in the non-physical activity group: the prevalence of hypertension among the physical activity group was 38.5%, which was considerably lower than the 62.3% in the non-physical activity group ($P < 0.01$); the diabetes prevalence in the physical activity group was 15.5%, also significantly lower than the 33.3% in the non-physical activity group ($P < 0.01$). Furthermore, the incidence rates of cerebrovascular diseases and heart diseases in the physical activity group were reported at 6.2% and 5.0%, respectively, both significantly lower than the 12.3% and 10.1% in the non-physical activity group ($P < 0.05$). The

average systolic blood pressure in the physical activity group was 130.5 mmHg, significantly lower than the 142.8 mmHg in the non-physical activity group ($P < 0.01$); the average diastolic blood pressure in the physical activity group was 78.4 mmHg, also significantly lower than the 85.2 mmHg of the non-physical activity group ($P < 0.01$), as illustrated in Table 1.

Table 1. Relationship between Different Physical ACTIVITY Habits and Health Status

Variable	Physical Activity Group ***n*=161**	Non-Physical Activity Group ***n*=69**	P-value
Age (years)	71.2 ± 4.5	72.1 ± 5.3	0.12
Gender (Male/Female)	85/76	35/34	0.78
BMI (kg/m²)	24.8 ± 3.2	27.1 ± 4.5	<0.01
Waist Circumference (cm)	85.3 ± 8.7	92.5 ± 10.2	<0.01
Smoking Rate (%)	25.5%	30.4%	0.45
Alcohol Consumption Rate (%)	20.5%	24.6%	0.52
Hypertension Prevalence (%)	38.5%	62.3%	<0.01
Diabetes Prevalence (%)	15.5%	33.3%	<0.01
Cerebrovascular Disease (%)	6.2%	12.3%	0.04
Heart Disease (%)	5.0%	10.1%	0.03
Lung Disease (%)	3.7%	6.0%	0.25
Systolic Blood Pressure (mmHg)	130.5 ± 12.3	142.8 ± 15.6	<0.01
Diastolic Blood Pressure (mmHg)	78.4 ± 8.7	85.2 ± 10.1	<0.01

3.2 Comparison of Health Indicators among Different Physical Activity Frequency Groups

The daily physical activity group exhibited significantly lower BMI (24.8 ± 2.1 vs 27.1 ± 3.2), systolic blood pressure (130.5 ± 10.3 vs 142.8 ± 12.6 mmHg), and diastolic blood pressure (78.4 ± 7.2 vs 85.2 ± 9.4 mmHg) compared to the non-physical activity group (all $P < 0.01$), as detailed in Table 2.

Table 2. Comparison of Health Indicators among Different Physical Activity Frequency Groups

Indicator	Daily Group n=161	Occasional Group n=49	Non-Physical Activity Group n=20	P-value
BMI (kg/m²)	24.8±2.1	25.3±2.4	27.1±3.2	<0.01
Waist Circumference (cm)	85.3±6.5	88.7±7.1	92.5±8.7	<0.01
Systolic Blood Pressure (mmHg)	130.5±10.3	136.2±11.5	142.8±12.6	<0.01
Hypertension Prevalence (%)	38.5	43.9	62.3	<0.01
Diabetes Prevalence (%)	15.5	19.5	33.3	<0.01

Note: Pairwise comparisons among groups (LSD method): Daily group vs non-physical activity group ($P < 0.01$); Daily group vs occasional group ($P < 0.05$).

3.3 Comparison of Health Benefits among Different Types of Physical Activity

In the walking group (n=137), a negative correlation was observed between the reduction in BMI and physical activity duration ($r = -0.32$, $P < 0.01$). In the aerobics/dancing group (n=46), a statistically significant difference in systolic blood pressure was noted when compared to the walking group ($P = 0.03$); however, due to the smaller sample size, the overall inter-group differences did not reach a significant level ($P > 0.05$), as illustrated in Table 3.

Table 3. Comparison of Health Benefits among Different Types of Physical Activity

Indicator	**Walking n=137**	**Aerobics/Dancing n=46**	**Other Physical Activities n=34**	**P-value (compared to Walking Group)**
BMI (kg/m²)	24.5±2.0	25.3±2.3	25.8±2.5	0.052
Systolic Blood Pressure (mmHg)	129.8±10.2	134.2±11.3	136.5±12.1	0.030
Diastolic Blood Pressure (mmHg)	77.6±7.1	80.1±7.5	82.3±8.0	0.045
Hypertension Prevalence (%)	35.0	41.3	45.3	0.083
Diabetes Prevalence (%)	14.6	19.6	23.5	0.052

4. Analysis and Discussion

4.1 Role of Physical Activity in Improving Metabolic Indicators in the Elderly

According to research conducted by the WHO, regular physical activity effectively regulates body weight and reduces abdominal fat accumulation, thereby diminishing the risk of obesity-related diseases [2]. A study focused on the elderly found that engaging in at least 150 minutes of moderate-intensity physical activity

per week (such as walking) significantly lowers both BMI and waist circumference [3]. Our research indicates that the average BMI (24.8 kg/m²) and waist circumference (85.3 cm) of seniors in the regular physical activity group were markedly lower than those in the non-physical activity group (27.1 kg/m², 92.5 cm; $P < 0.01$), corroborating the WHO's conclusion regarding physical activity's role in reducing abdominal fat accumulation. Regular physical activity increases energy expenditure and improves lipid metabolism, thus mitigating visceral fat accumulation [4]. Walking, as a form of low-intensity aerobic physical activity, continuously activates fat oxidation enzymes while posing a low risk of joint injury, making it particularly suitable for the elderly demographic.

4.2 Role of Physical Activity in Blood Pressure Regulation in the Elderly

The American Heart Association (AHA) asserts that regular aerobic physical activity (such as walking and swimming) can lower blood pressure and reduce the prevalence of hypertension [5]. A study involving individuals over 65 years of age found that engaging in 30 minutes of moderate-intensity physical activity daily can significantly decrease both systolic and diastolic blood pressure. In our study, the average systolic blood pressure for the physical activity group was 130.5 mmHg, significantly lower than the 142.8 mmHg observed in the non-physical activity group ($P < 0.01$). The diastolic pressure recorded was 78.4 mmHg—also significantly lower than the 85.2 mmHg found in the non-physical activity group ($P < 0.01$). These findings align with existing literature and correspond with the blood pressure-lowering effects proposed by the AHA. The physiological basis for physical activity's influence on blood pressure may include the upregulation of nitric oxide synthase expression, enhancing vascular endothelial elasticity, and reducing peripheral resistance. Additionally, physical activity promotes improved circulatory efficiency; regular aerobic activity enhances myocardial contractility [6], facilitates blood circulation, and mitigates the risk of blood pressure fluctuations.

4.3 The Comprehensive Effect of Regular and Moderate Physical Activity in Reducing Chronic Disease Risks in the Elderly

Numerous studies have demonstrated that regular physical activity can significantly lower the incidence of chronic diseases. Research focused on older adults reveals that engaging in 150 minutes of moderate-intensity physical activity each week can diminish the risks of hypertension, diabetes [7], and cardiovascular diseases. In our study, the prevalence of hypertension in the physical activity group was 38.5%, considerably lower than the 62.3% noted in the non-physical activity group ($P < 0.01$). The prevalence of diabetes was 15.5%, significantly less than the 33.3% in the non-physical activity group ($P < 0.01$), a result closely associated with the enhancement of insulin sensitivity and increased expression of the GLUT4 transporter due to physical activity. Furthermore, the prevalence rates of cerebrovascular and cardiac diseases in the physical activity group were 6.2% and 5.0%, respectively, both significantly lower than the 12.3% and 10.1% observed in the non-physical activity group ($P < 0.05$). Additional research indicates a positive correlation between the frequency of physical activity and health outcomes. In this study, older adults with physical activity daily had an average BMI of 24.5 kg/m², significantly lower than that of those with physical activity occasionally (25.3 kg/m²) or not at all (27.1 kg/m²) ($P < 0.01$). The prevalence of hypertension and diabetes in this group was 35.0% and 12.5%, respectively, both significantly lower than those in the control group ($P < 0.01$). The health status of seniors who engaged in daily physical activity was notably superior to that of their occasionally active counterparts and those who did not engage in physical activity at all. This study also suggests a "dose-response effect" for physical activity: the minimum effective dose should be at least 30 minutes per day (totaling a minimum of 150 minutes per week), in accordance with the lower limit of the WHO recommendations for physical activity in older adults [8]. Walking, due to its high safety profile (minimal joint load) and good adherence (requiring no special equipment), emerges as the preferred intervention in community settings. However, it is imperative to note that older adults (over 80 years) or those with sarcopenia should incorporate resistance training (such as seated elastic band

physical activitys) to maintain muscle function [9]. Based on our findings and existing evidence, regular and moderate physical activity has a significant impact on the health of individuals aged 65 and older. Communities should encourage seniors to engage in daily physical activity to sustain optimal health. It is recommended that community programs enhance chronic disease management services for older adults [10], implementing a stratified management approach for health oversight of individuals aged 65 and older. For seniors aged 65 to 75, it is advisable to promote at least 150 minutes of moderate-intensity aerobic exercise (such as brisk walking) per week, distributed over at least five days. For those aged 80 and above, it may be beneficial to incorporate seated resistance band training to prevent sarcopenia. Individualized physical activity plans should be developed based on the health status and physical capabilities of older adults. Furthermore, special attention must be directed towards enhancing the monitoring of physical activity-related risks for seniors. Communities should regularly organize health seminars and check-ups to remind older adults to maintain their heart rates within a safe range during physical activity, and to carefully manage the duration and intensity of their physical activities to prevent cardiovascular incidents.

5. Conclusion

Regular and moderate physical activity, particularly walking, can significantly enhance the BMI, blood pressure, and management of chronic diseases among community-dwelling individuals aged 65 and older. Walking, as a low-intensity and easily maintainable form of physical activity, is especially well-suited for older adults. It is recommended that communities explore the establishment of a comprehensive health management model that integrates “physical activity prescriptions, nutritional support, and safety monitoring”, aiming to achieve precise health aging objectives through stratified interventions.

This study was financially supported by the Hebei Provincial Sports Bureau project “Research on the Current Status and Pathways of the Integration of Sports and Medicine in Hebei Province under the Vision of a Healthy China” (Project No.: 2024QT11).

References

[1] China Center for Disease Control and Prevention, Chronic Disease Center. Guidelines for Physical Activity among the Elderly in China (2022 Edition). Beijing: People’s Health Publishing House, 2022.

[2] Bull F C, Al-ansari S S, Biddle S, et al.World Health Organization 2020 guidelines on physical activity and sedentary behaviour.British Journal of Sports Medicine：2020,54: 1451–1462.

[3] Chen T, Tanaka S, Sasaki R, et al. Associations of objectively measured physical activity and sedentary time with all-cause mortality in Japanese older adults: a 10-year prospective study. British Journal of Sports Medicine, 2025, 59(3): 178-185.

[4] Kany S, AL-ALUSI M A, Romeo J T, et al. "Weekend Warrior" Physical Activity and Adipose Tissue Deposition. JACC: Advances, 2025, 4(3): 101603.

[5] American Heart Association Council on Lifestyle and Cardiometabolic Health et al. Obesity and cardiovascular disease: a scientific statement from the American Heart Association. Circulation, 2021, 143(21).

[6] Zhang Minghua, Li Jingyi. Research Progress on the Mechanisms of Aerobic Physical Activity’s Effects on Cardiovascular Health. Journal of Sports Medicine, 2023, 42(3): 245-258.

[7] Gu Yunjian, Wu Shangxi, Lyu Jingyi, et al. Study on the Relationship between the Risk of Elderly Diabetes and Physical Activity. Chinese General Practice, 2022, 25(6): 750-755.

[8] Liu Pan, Ma Lina, Li Yun. Interpretation of the international expert consensus guideline on exercise management for older adults. Chinese Journal of Geriatrics, 2023, 42(6): 626-632.

[9] Guo Yifang. On Daily Health Care for the Elderly during the Double Ninth Festival. Health Care Medical Journal, 2022(10): 35.

[10] Zheng Xiao, Zhang Chichen, Tian Feng, et al. Study on the Health Management Service Pathway for Multimorbidity of Middle-aged and Older Adults in the Community. Chinese General Practice, 2024, 27(17): 1-10.

