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Original Article

Factors Shaping Exercise Patterns and Health Status among the Elderly in Aging Nations: A South Korean Perspective

#Eun Surk Yi [1], #Mehdi Rezaei [2], *Hyun Byun [1], *Sangwan Jeon [3]

1. *Department of Exercise Rehabilitation, Gachon University, Incheon, Republic of Korea*
2. *Asia Contents Institute, Konkuk University, Seoul, Republic of Korea*
3. *Department of Physical Education, Mokpo National University, Mokpo, Republic of Korea*

***Corresponding Author:** Email: lovepotionn9@gachon.ac.kr, jeon3972@mnu.ac.kr
#The first two authors contributed equally to this work.

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Abstract

Background: The global phenomenon of population aging requires an understanding of the factors influencing the health of the elderly becomes imperative. We aimed to focus on South Korea, a nation set to become an aging society by 2025. The study examined the influence of regular exercise and exercise types on the health of the elderly with particular attention to South Korea's unique sociodemographic context.

Methods: We targeted individuals aged 50 yr and above. The study was conducted through online surveys from August to September 2023. Utilizing Logistic Regression analysis and Chi-Square tests, the research explored correlations, trends, and influencing factors affecting elderly exercise behaviors, encompassing demographic variables, health status, and exercise types.

Results: The analysis of demographic characteristics revealed that marital status, education level, and financial status displayed diverse representations within the sample. Comparisons between health status and exercise groups suggested potential health benefits for the Regular Exercise group. Logistic Regression analysis identified significant influences of gender and financial status on regular exercise engagement. Additionally, a strong relationship between health status and exercise preferences, notably strength training, emerged.

Conclusion: Regular exercise and exercise types benefit elderly individuals. Men and those with better financial status are more likely to exercise regularly. Strength training emerges as a significant contributor to better health across various health status categories. Policymakers and healthcare professionals should consider these insights to develop targeted interventions for promoting healthy aging, acknowledging the cultural and socioeconomic factors of South Korea's aging population.

Keywords: Aging; Elderly health; Exercise; Demographic factors; South Korea; Public health

Introduction

As the world is experiencing the trend of aging in the global population, understanding the factors that influence elderly health is crucial. As the aging population grows, issues such as health, well-being, and the societal implications of senior citizens' lifestyles become increasingly pertinent (1). Physical activity and regular exercise could be considered significant factors in overcoming the

aging population's health issues. Promoting healthy aging is a crucial concern for rapidly aging nations like Korea, as the aging process is linked to declining bodily functions (2).

In 2025, South Korea is set to become an aging society, constituting 20% of the population (3,4). The number of seniors is expected to increase by 13 million, accounting for 25.5% of the population by 2030. Additionally, It is predicted that the elderly population will reach 17.4 million, or 46.4% of the total population in 2070 (3).

Overcoming health issues in an aging society, physical activities can be considered as preventive actions as well as pursuits of well-being for the elderly (2). Additionally, variations in physical function due to exercise are significant determinants of health in the elderly (5). Consequently, improving physical function through regular exercise is a frequent target to prevent life disability and improve the life satisfaction of the elderly. Numerous research indicate that individuals who engage in regular exercise during their older years are more likely to experience successful aging compared to those who participate irregularly (6,7). Furthermore, exercise is a valuable tool for enhancing physical function, preventing hormone deficiency, and sustaining the optimal quality of life in elderly women (8,9). Likewise, numerous studies have supported the positive impact of exercise on the elderly. For instance, Regular participation in physical activity is an effective way to promote subjective well-being among older adults in Korea (1). Additionally, combined exercise programs contributed to improvements in overall health, in elderly Korean women (10).

A clear understanding of the associations between exercise and socioeconomic factors is essential to unraveling patterns, preferences, and barriers that shape elderly interaction with physical activities.

We aimed to investigate and understand the factors influencing exercise behaviors among the elderly in South Korea, with a focus on promoting healthy aging. In particular, the study investigates the role of socioeconomic factors in shaping regular exercise engagement. Additionally, the research aimed to examine the relationship between exercise preferences and the health status of the elderly.

Methods

Sampling

This study targeted individuals aged ≥50 years and utilized online distribution and collection methods through the research institutes "Panel Marketing Interactive (PMI)" and "EMBRAIN" for 11 days, from August 27 to September 11, 2023.

Ethics approval and consent to participate

This research was performed following all relevant guidelines and regulations within the Declaration of Helsinki. Informed consent and ethical approval were granted by the Institutional Review Board of Gachon University.

Experimental design

To determine the health status of the elderly, they were divided into five groups, namely, very healthy, healthy, average, unhealthy, and very unhealthy. In addition, to define the benefits of exercise in elderly individuals, the samples were divided into regular exercise and non-exercise groups. Furthermore, to identify elderly exercise preferences, they were divided into three groups, aerobic exercise (walking, running, hiking, climbing, etc.), strength training (weightlifting, dumbbells, and gym exercises, etc.), and mixed exercise(aerobic exercise and strength training). It is noticeable that the division of the elderly was based on their answers to the questionnaire.

Analysis

Data analysis was performed by using SPSS version 23 (IBM Corp, Armonk, NY, USA). First, a descriptive analysis was conducted to provide a comprehensive overview of the demographic characteristics and compare between two exercise groups. Next, a Logistic Regression analysis was conducted to explore factors influencing regular exercise and later to determine the association

between exercise preferences and health status. Additionally, a Chi-Square analysis was conducted to find the relationship between health status and exercise preferences.

Results

General Characteristics

Table 1 provides general characteristics of the surveyed population. An equal gender distribution is observed, with 50% male and 50% female respondents. The age distribution revealed a mean of 58.57, ranging from 50 to 79 years. Regarding marital status, a substantial majority (81.7%) reported being married and cohabiting with a spouse, while a smaller percentage identified as bereaved (3.0%), unmarried (7.9%), or divorced/separated (7.4%). In terms of education, the majority of participants (60.4%) had a university degree, emphasizing the relatively high level of academic achievement in the sample. Furthermore, the financial status of the respondents varied, with the majority (56.4%) falling into the "Normal" category. The distribution among financial categories indicates a diverse socioeconomic representation in the studied population.

Table 1: Descriptive statistics for demographic variables

Demographic Variable	*Frequency*	*Percent or Mean*
Gender		
Male	520	50.0
Female	520	50.0
Age(yr)	1040	58.57
Marital Status		
1) Married (spouse cohabitation)	850	81.7
2) Bereavement	31	3.0
3) Unmarried	82	7.9
4) Divorce. Separately	77	7.4
Education Level		
1) Elementary School	5	0.5
2) Middle School	13	1.3
3) High School	254	24.4
4) University	628	60.4
5) Graduate School	139	13.4
6) Not Applicable	1	0.1
Financial Status		
1) Very Wealthy	7	0.7
2) Wealthy	159	15.3
3) Normal	587	56.4
4) Poor	236	22.7
5) Very Poor	51	4.9
Total	1040	100.0

Health status of two exercise groups

Table 2 compares the health status between two groups: those engaging in regular exercise (Regular Exercise group) and those not engaging in regular exercise (Non-Exercise group). The Regular Exercise group (N = 634) exhibits a

mean health status of 2.85, with a standard deviation of 0.748 and a standard error mean of 0.030. In contrast, the Non-Exercise group (N = 406) shows a higher mean health status of 3.11, accompanied by a standard deviation of 0.724 and a standard error mean of 0.036. These descriptive statistics. Based on the presented data the Regular Exercise group, with a lower mean health status, suggests a potentially better health status compared to the Non-Exercise group, which has a slightly higher mean health status. In other words, the lower mean health status in the regular exercise group indicates a tendency towards better health in that particular group.

Table 2: Comparison of health status between regular exercise and non-regular exercise groups

Group	*N*	*Mean*	*Std. Deviation*	*Std. Error Mean*
Regular Exercise	634	2.85	0.748	0.030
Non- Exercise	406	3.11	0.724	0.036

Influencing Factors of regular exercise

The logistic regression analyses were performed for demogrophic variables and exercis groups to identify the factors influencing regular exercise (Table 3). A significant effect was detected for Gender (B = 0.471, Wald = 13.520, *P* = 0.000), with a positive Exp(B) of 1.602, indicating that being male is associated with a higher likelihood of regular exercise. Similarly, the Financial Status variable also stands out (B = 0.365, Wald = 18.251, *P*= 0.000), with a positive Exp(B) of 1.440, indicating that individuals with better financial status are more likely to exercise regularly. In contrast, the education level suggesting that higher education levels are associated with a lower likelihood of engaging in regular exercise. Other variables, such as Age, and Marital Status do not show statistically significant associations. The constant terms provide baseline values for comparison.

Table 3: Logistic Regression Results for Factors Influencing Regular Exercise

Variable	*B*	*S.E.*	*Wald*	*df*	*Sig.*	*Exp (B)*
Gender	0.471	0.128	13.520	1	0.000	1.602
Constance	-1.159	0.206	31.707	1	0.000	0.314
Age	-0.010	0.010	.945	1	0.331	0.990
Constance	0.118	0.583	.041	1	0.840	1.125
Marital statue	0.032	0.069	.215	1	0.643	1.032
Constance	-0.491	0.116	17.811	1	0.000	0.612
Education level	-0.294	0.095	9.517	1	0.002	0.745
Constance	0.684	0.371	3.407	1	0.065	1.982
Financial status	0.365	0.085	18.251	1	0.000	1.440
Constance	-1.605	0.280	32.753	1	0.000	0.201

Relationship between Health Status and Exercise types

For testing the relationship between health status and exercise types, we performed two calculations. First, Chi-Square tests were conducted to examine the overall relationship between respondents' health status and their exercise types. After that, multinomial logistic regression tests were performed to find the association between exact types of exercise on respondents' health. As shown in Table 4, these findings highlight a strong association between health status and exercise types among respondents. In detail, the Pearson Chi-Square test showed a value of 48.250 with 8 degrees of freedom (df), resulting in a p-value of 0.000. The Likelihood Ratio test

also produced a significant p-value of 0.000 with 8 df. Additionally, the Linear-by-Linear Association test, focusing on the ordinal relationship between variables, showed a statistically significant association (P= 0.000) with 1 df.

Table 4: Chi-Square tests for relationship between health Status and exercise facilities

Chi-Square Test	*Value*	*df*	*Asymptotic Significance (2-sided)*
Pearson Chi-Square	48.250[a]	8	0.000
Likelihood Ratio	45.962	8	0.000
Linear-by-Linear Association	35.111	1	0.000
N of Valid Cases	1040		

a. 4 cells (26.7%) have an expected count less than 5.
b. The minimum expected count is .40

As in the reported results in Table 5, For individuals reporting a Very Healthy status, Strength Training was significantly associated with increased odds of being in this health category (Exp(B) = 9374681.118, P< 0.001). Similarly, among those classified as Healthy, engaging in Strength Training significantly increased the odds of having a better health status (Exp(B) = 3088130.251, P< 0.001). In the Normal health status category, Strength Training also showed a significant positive association with better health (Exp(B) = 9258944.314, P< 0.001). These results suggest that Strength Training exercises are significantly related to a better health situation across different health status categories. It is important to note that the other exercise type, Aerobic Exercise, showed significant associations with decreased odds of better health in some categories, emphasizing the nuanced relationship between exercise types and health outcomes.

Table 5: Multinomial Logistic Regression Results for Exercise Facilities and Health Status

Health Status	*Exercise Type*	*B*	*S.E.*	*Wald*	*df*	*Sig.*	*Exp(B)*	*95% CI for Exp(B)*
Very Healthy	Aerobic Exercise	-2.385	1.202	3.935	1	0.047	0.092	0.009 to 0.972
	Strength training	16.054	1.197	179.861	1	0.000	9374681.118	897534.476 to 97917849.899
	Mixed exercise	0	-	-	-	-	-	-
Healthy	Aerobic Exercise	-2.245	1.035	4.711	1	0.030	0.106	0.014 to 0.804
	Strength training	14.943	0.581	661.658	1	0.000	3088130.251	989025.732 to 9642366.359
	Mixed Exercise	0	-	-	-	-	-	-
Normal	Aerobic Exercise	-1.232	1.033	1.422	1	0.233	0.292	0.039 to 2.210
	Strength training	16.041	0.495	1049.404	1	0.000	9258944.314	3508034.416 to 24437630.774
	Mixed Exercise	0	-	-	-	-	-	-
Unhealthy	Aerobic Exercise	-1.070	1.048	1.041	1	0.308	0.343	0.044 to 2.678
	Strength training	16.167	0	-	1	-	10499642.852	10499642.852
	Mixed Exercise	0	-	-	-	-	-	-

Discussion

Exercise plays a major role in elderly health, in the present study, we detected the effect of regular exercise, type of exercise, and some demographic factors on the elderly health in South Korea. Given the anticipated challenges associated with an aging population, understanding the relationship between exercise, demographic factors, and health status becomes crucial. This discussion delves into the findings, highlighting key patterns and potential implications for promoting healthy aging in South Korea.

A recent study provided results to understanding the effects of regular exercise on the elderly health by examining health status among two groups (Regular Exercise, Non-Exercise group). The Regular Exercise group showed potential health benefits associated with regular physical activity. Many studies on the relationship between physical activity and the health of the elderly reported that exercise significantly improves physical function (11,12). The aging process is linked to a decrease in physical function (13,14), physical fitness and elderly health were strongly correlated (15), so regular exercise is one of the crucial factors for physical fitness in the elderly. Moreover, engaging in regular exercise is linked to consistently reduced levels of inflammatory disease in older adults (16). Consequently, low-grade inflammation has been associated with various aspects of healthy aging, such as chronic diseases (17,18), depression (19), cognitive decline (20), and disability (21). These observations are consistent with those of a previous study that reported the association between regular exercise and healthy aging (4,7,15,22).

Regarding the influencing factors on regular exercise, our results indicate that gender emerged as a significant predictor, with males showing a higher interest in engaging in regular exercise. This result is consistent with the research of Won et al (1), where gender had a significant influence on the participation of the elderly in physical activity. They also mentioned that this result is related to male gatekeeping and the gender culture in sports and physical activity in Korea (1). Financial status represents another influential factor that can significantly impact one's commitment to regular exercise. The results of our research indicated that individuals with better financial situations were more likely to exercise regularly. Individuals with lower socioeconomic status are less likely to maintain high levels of physical activity compared to those from more affluent backgrounds (23). Hence, financial status plays a pivotal role in shaping the physical activity engagement and health outcomes of older individuals. On the other hand, education level demonstrated a negative association, suggesting that higher education levels were linked to a lower likelihood of regular exercise. This finding might be attributed to factors such as job responsibilities and commitments, implying that those with higher education levels, might be occupied with work, consequently having less time for physical activity. Consequently, further investigation is necessary to clarify the complex relationship between education level and regular exercise and contribute to a deeper understanding of factors influencing healthy aging. These findings provide a significant role of demographic characteristics to promote regular exercise among the elderly. Therefore, policymakers should develop strategies to support the elderly and reduce participation barriers to promote exercise habits.

Another meaningful finding of this study was the relationship between health status and exercise preferences. Exploring how different types of physical activities affect the health of the elderly, especially among elderly Koreans, is highly significant (1). Throughout our research, we found a significant association between respondents' health status and exercise types. Strength training, including weightlifting, dumbbells, and gym exercises, emerged as a significant contributor to better health across various health status categories. Frontera and Bigard, in their research, showed that incorporating strength training for the elderly is crucial. This not only partially counteracts

the age-related decline in muscle mass but also fosters notable improvements in strength and hypertrophy. These gains are vital for sustaining physical independence in everyday activities (24). Strength training contributed to improving muscle strength and mobility, in addition to enhancing physical and social abilities, including older adults' capability to perform both simple and more complex daily activities (25-26). Muscular weakness is commonly associated with aging, and even minor enhancements in strength and mobility can be deemed significant (27). Moreover, this result is tied to the demographic factor of respondents, particularly their financial status. As noted in our research, strength training includes gym exercises, suggesting that participants with better financial situations tended to utilize the gym more regularly. Consequently, policymakers in Korea should take into account the nature of physical activity recommendations and ensure accessibility to these exercise programs.

The findings imply that initiatives aimed at encouraging regular exercise among the elderly in South Korea should take into account demographic factors and exercise preferences. Future research should explore cultural influences, societal perceptions, and additional demographic factors more extensively to develop targeted strategies for promoting healthy aging in South Korea.

Conclusion

This study clarifies the significant role of exercise in promoting elderly health in South Korea, emphasizing the impact of regular exercise, exercise types, and various demographic factors. The demographic characteristics should be carefully considered by policymakers aiming to develop strategies that support the elderly and alleviate barriers to exercise participation. Additionally, recognizing the significant relationship between health status and exercise preferences, especially the positive impact of strength training, emphasizes the importance of tailoring exercise recommendations for diverse health status categories. This approach ensures a comprehensive understanding and effective promotion of regular exercise among the elderly population. Policymakers and healthcare professionals can develop targeted interventions to promote healthy aging in this rapidly aging society.

Journalism Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or fal-sification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors

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Conflict of interest

The authors declare that there is no conflict of interest.

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