THE EFFECTS OF PHYSICAL ACTIVITY PROGRAMS ON LIFE SATISFACTION OF THE ELDERLY

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Abstract— **The purpose of this study was to influence of perceived health status and falling efficacy on life satisfaction in elderly performing physical activity program. The 12-week physical activity program was applied to public health clinic in H City from January to March 2019, and the evaluation was conducted before and after the program was applied. The data collected from 34 subjects were analyzed by SPSS 23.0. The ratio of women was 94.1%, and the average age was 76.09(±7.37). The number of chronic diseases was the highest with 2 (41.2%) and the average was 2.29 (±1.24). Life satisfaction, perceived health status, and falling efficacy were 3.0 points in the pre-average and 3.3 points in the post-average, which were statistically significant. The factors that affect the life satisfaction before and after applying the physical activity program were perceived health status (p<0.001). The physical activity program for the elderly is an essential project for the welfare policy for the elderly, and continuous performance and expansion are required.**

Keywords— **Falling Efficacy, Life Satisfaction, Perceived Health Status, Physical Activity**

1. INTRODUCTION

The Welfare of the Elderly Act and the WHO define an elderly person as someone aged 65 years and older. The International Association of Gerontology (IAG) says an elderly individual is "the person in the process of complex forms where physiological, psychological, economic and behavioral changes appear in the process of human aging interact" [1]. As of 2018, 14.3% of Korean society is made up of the elderly, and by 2025 17 cities and provinces will become super-aged societies within 30 years[2]. The healthy age in Korea is 73 years, and the life expectancy is 82.3 years. The difference between the two is 9.3 years[3]. In 2015, the National Statistical Office estimated that the number of elderly households to increase 2.9 times from about 3.66 million in 2015 to about 10.65 million in 2045. The number of elderly single households among all elderly households will increase 3.1 times, and the number of elderly couple households will increase 2.6 times[4]. Modern medicine and a low birth rate have increased the average life expectancy, leading to a rapid increase in the elderly population and increasing interest in health issues related to the elderly[5].

Many elderly people have various problems related to quality of life due to chronic diseases. Aging of the human body starts at age 40, including changes in the skeletal system, a quantitative reduction of muscles due to muscle control disorder, declines in overall exercise ability and function related to muscle strength, agility, flexibility, endurance, *etc.*, a decrease in the quality of life, and difficulties performing independent

daily life activities[6-8]. In a 2015 community health survey, the incidence of falls in the elderly was approximately 20%, or one in five elderly people experience falls[9]. Approximately 3.7% of men and women aged 65 and over have experienced a fall; this figure is much higher in women (68.8%) than in men (31.2%)[9]. The lower leg muscle strength of elderly women decreases more rapidly than that of men[10], and the rate of joint disease and imbalances increases, such as in the knee and hip joints[11]. Elderly people living alone have a higher risk of falling due to the lack of general care[9].

Aging can drastically reduce life quality due to physical and functional deterioration. The purpose of this study is to conduct a physical activity program in an elderly population to assess positive aging, the facilitation of daily activities, and life satisfaction. This research provides basic data for initiating an effective physical activity program for the elderly by analyzing life satisfaction, perceived health status, falling efficacy, and factors affecting life satisfaction before and after the program.

2. METHOD

2.1. RESEARCH SUBJECT

This single-group pretest-post test quasi-experimental study was conducted for 12 weeks with the cooperation of the M public health clinic in H city, Gyeonggi-do. The physical activity program was conducted for elderly people aged 65 and over in rural areas.

The subjects of this study were elderly people (aged 65 years and older), who have never participated in a physical activity program, in a rural area in H city, Gyeonggi-do. After fully explaining the purpose and content of the study, 34 people provided consent and were selected as the final subjects. The program was conducted once a week for 12 weeks from January to March of 2019. A muscular strength test and questionnaire were conducted at weeks 1 and 12. Each physical activity session was between 60 and 70 minutes.

2.2. RESEARCH TOOLS

2.2.1. GENERAL CHARACTERISTICS: The questionnaire included questions on gender, age, spouse, cohabitation type, number of children, education level, religion, economic level, falling experience, and number of chronic diseases. The age ranges were 60, 70, 80, and the cohabitation type was single or married, the children category was two or more, and the education level was divided into six years or nine years or more. The number of chronic diseases was divided into one or less or two or more, and economic level was divided into high, middle, and low.

2.2.2. LIFE SATISFACTION: Life satisfaction is a concept that includes subjective well-being [12]. This study was composed of five items translated by Cho & Cha[13] on the Diener *et al.*[14] life satisfaction scale and Korean life satisfaction scale (K-SWLS). This five-point scale ranges from 'not at all' to 'very yes'. A higher score indicates a higher life satisfaction. The mean of the total items was used as the life satisfaction variables. The Cronbach's score was .856 in the pre-test and .911 in the post-test.

2.2.3. PERCEIVED HEALTH STATUS: Perceived health status is an indicator of the overall health status of individuals and is a subjective health condition[15]. The perceived health status used in this study is Speake *et al.*,[16], a tool supplemented with three items. This five-point scale ranges from 'very bad' to 'very good'. The higher the score, the higher the perceived health status. The mean of the total items was used as the perceived health status variables. The Cronbach's score was .851 in the pre-test and .878 in the post-test.

2.2.4. FALLING EFFICACY: Falling efficacy refers to the degree of self-confidence that one will not fall while performing specific activities[17]. In this study, FESI (Falls Effectiveness Scale-International), developed by Yardley *et al.*,[18], was modified with nine items from the Korean type falling efficacy scale (FES-K) modified by Heo *et al.*,[19]. It is a five -point scale ranging from 'very unconfident' to 'very confident'. The higher the score, the higher the falling efficacy. The mean of the total items was used as the falling efficacy variable. The Cronbach's score was .948 in the pre-test and .934 in the post-test.

2.2.5. PHYSICAL ACTIVITY PROGRAM: The physical activity program used in this study included gymnastics for balance and strength. It was organized with the help of instructors and health and athletic experts with many years of community health clinic experience. The preparatory exercises were for five minutes each, and the exercise session was 60 minutes.

2.3. DATA COLLECTION AND ANALYSIS

Data collection was conducted from January to March of 2019. Information on the method of physical activity, the survey, time required, and participation or withdrawal were explained. The data were collected by structured questionnaires that were written and read by researcher and her assistants.

All collected data were computerized by SPSS 23.0. Data analysis was conducted by calculating the average and standard deviation of variables by group through descriptive statistics. Independent t-test and ANOVA analysis were conducted for the pre- and post-variables to verify homogeneity, and paired t-tests were conducted for the homogeneous variables. Multiple linear regressions were performed to determine the factors affecting life satisfaction. The significance level of all statistical processing was set at 0.05.

3. RESULTS

3.1. SUBJECT'S GENERAL CHARACTERISTICS

The majority of participants were women (94.1%), and 44.1% were between 70-79 years old. The average age was 76.09 (±7.37). Also, 64.7% were without spouses (including bereavement or divorce), and 52.9% were living alone. The average number of children was 3.68 (±1.55). The average education level was 6.91(±2.39). For religion, 38 .2% were Buddhists, the economic level was 61.8%, and 70.6% have experienced a fall. Approximately 41.2% had chronic diseases, with an average of 2.29 (±1.24) conditions, up to 5 conditions.

Table I. General Characteristics of Subjects

	Classification	N	%	M(±SD)	Range
Gender	Male	2	5.9		
	Female	32	94.1		
Age	65-69	6	17.6		
	70-79	15	44.1	76.09(±7.37)	60-88
	80-89	13	38.2		
Spouse	Yes	12	35.3		
	No	22	64.7		
Cohabitation type	Alone	18	52.9		
	Couples	7	20.6		

	Two generations or more	9	26.5		
Children(n)	≥2	7	20.6	3.68(±1.55)	1-8
	≤3	27	79.4		
Education level	≥6year	29	85.3	6.91(±2.39)	6-16
	≤9year	5	14.7		
Religion	Christianity	10	29.4		
	Buddhism	13	38.2		
	Catholicism	3	8.8		
	None	8	23.5		
Economic level	High	2	5.9		
	Middle	21	61.8		
	Low	11	32.4		
Falling experience	Yes	10	29.4		
	No	24	70.6		
Chronic diseases(n)	≥1	8	23.5		
	2	14	41.2	2.29(±1.24)	0-5
	≤3	12	35.3		

3.2. DESCRIPTIVE STATISTICS OF VARIABLES RELATED TO LIFE SATISFACTION

Descriptive statistics on the variables related to life satisfaction are in Table II. For the data test, the study analyzed the skewness and kurtosis of individual items and the average scores for life satisfaction, perceived health status, and falling efficacy.

The average value of life satisfaction was 3.02 (±0.72) in pre-test and 3.20(±0.80) in post-test, and the average value of perceived health status was 2.79(±0.78) in pre-test and 3.05(±0.84) in post-test. The average value of falling efficacy was 3.17 (±0.98) in pre-test and 3.54 (±0.86) in post -test. The measured value of the variables used in this study is assumed to be less than 3 absolute values of the skewness and a normal distribution of less than 10 absolute values of kurtosis (Kline, 2005). There was no problem with the path analysis of this data.

Table II. Descriptive Statistics of Major Variables

Variables		Minimum value	Maximum value	Mean	SD	Skewness	Kurtosis
Life satisfaction	pre-test	1.60	4.60	3.02	0.72	-0.03	-0.48
	post-test	2.00	4.60	3.20	0.80	-0.13	-1.10
Perceived health status	pre-test	1.00	4.67	2.79	0.78	0.39	0.40
	post-test	2.00	4.67	3.05	0.84	0.59	-0.79
Falling efficacy	pre-test	1.44	5.00	3.17	0.98	-0.17	-1.07
	post-test	2.00	5.00	3.54	0.86	2.29	-0.95

3.3 VERIFICATION OF SAMPLES OF MAJOR VARIABLES BEFORE AND AFTER THE PHYSICAL ACTIVITY PROGRAM

The average of the main variables was significantly higher after the physical activity program. The significant level of life satisfaction and perceived health status was $p < 0.05$, and the level of falling efficacy was $p < 0.001$. Therefore, there were significant changes in falling efficacy, life satisfaction, and perceived health status following the program.

Table III. Mean Difference of Major Variables before and after Physical Activity Program

Variables		Mean(±MD)	t	p
Life satisfaction	pre-test	2.79(±.78)	-2.898	.007 ✳
	post-test	3.05(±.84)		
Perceived health status	pre-test	3.02(±.72)	-2.182	.036 ✳
	post-test	3.20(±.80)		
Falling efficacy	pre-test	3.17(±.98)	-3.969	.000 ✳✳✳
	post-test	3.54(±.86)		

✳ $p < 0.05$, ✳✳ $p < 0.01$, ✳✳✳ $p < 0.001$

3.4. FACTORS AFFECTING LIFE SATISFACTION OF BEFORE AND AFTER APPLYING PHYSICAL ACTIVITY PROGRAMS

The explanation power of factors affecting life satisfaction of before and after the physical activity program was 65.4% in pre-test and 66.7% in post-test. Table IV displays the verification of the program's general characteristics affecting life satisfaction. The perceived health status was statistically significant before and after the physical activity program ($p < 0.001$).

Table IV. Factors Affecting Life Satisfaction Before and After Physical Activity Program Application

	Variables	B	SE	β	t	p	Tolerance	VIF
Pre-test	(constant)	1.017	.304		3.348	.002		
	Perceived health status	.773	.116	.843	6.666	.000	.699	1.432
	Fall efficacy	-.049	.092	-.067	-.527	.602	.699	1.432
	R2=.654 Adj R2=.631 F=29.246 p=0.000							
Post-test	(constant)	.799	.366		2.181	.037		
	Perceived health status	.762	.127	.801	5.976	.000	.598	1.672
	Fall efficacy	.022	.124	.024	.178	-.231	.598	1.672
	R2=.667 Adj R2=.654 F=31.011 p=0.000							

4. CONCLUSIONS

The results of this study are the ratio of women was 94.1%, and the average age was 76.09(±7.37). The number of chronic diseases was the highest with 2 (41.2%) and the average was 2.29 (±1.24). Life satisfaction, perceived health status, and fall efficacy were 3.0 points in the pre-average and 3.3 points in the post-average, which were statistically significant. The factors that affect the life satisfaction before and after applying the physical activity program were perceived health status ($p<0.001$).

Elderly individuals who engaged in physical activity had significant changes in life satisfaction, perceived health status, and falling efficacy. How physical activity is measured in the elderly should be studied since the physical activity program has a significant effect on elderly people's life satisfaction, local governments should promote a variety of physical activity programs through health institutions. These programs provide long-term and sustainable conditions.

This study applied a physical activity program to elderly people in one rural area, and the results cannot be generalized to all elderly individuals. Nevertheless, this study confirmed that physical activity has a significant effect on the life satisfaction and perceived health status of the elderly.

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