Effects of 12 weeks complex exercise program on functional fitness and cognitive behavioral function of elderly women

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INTRODUCTION

According to the statistics of the elderly, the proportion of the population aged 65 and over in Korea is expected to increase from 14.3% to 42.5% in 2065 (Statistics Office, 2017). Among the degenerative diseases according to the increase of the elderly, especially the cognitive function decreases, which negatively affects the overall quality of life of the elderly. In addition, the increase in age increases the prevalence of senile disease, the independence and quality of life of the elderly, and the risk of falls. Specialized exercise to prevent falls is important for the elderly, but complex exercise is effective for always maintaining overall body composition and functional movement.

MATERIAL & METHODS

This study examines the effect of 12-week complex exercise program participation on functional fitness and cognitive behavioral function for elderly women over 65 who are using the senior of A city in Gyeongsangbuk-do, and proposes an effective exercise program for the elderly in the region.

This study was measured using the senior fitness test and aging index developed by Rikli and Jones (2001). Upper body strength was measured for grip strength and dumbbell lifting, lower body strength was seated on a chair, standing up, cardiorespiratory fitness was walking for 6 minutes, flexibility was sitting and bending forward to the upper body, and 3m target return was measured by measuring dynamic balance. . Eight-way gait was measured to confirm coordination. The complex exercise program for 12 weeks was performed by strength training and senior aerobics using elastic bands and balance pads. The training time was gradually increased to 10 minutes for preparatory exercise, 45 to 55 minutes for main exercise, and 10 minutes for rearrangement exercise. Statistical analysis was carried out with repeated measures and variance analysis to obtain the mean and standard deviation of each variable and to verify the interaction effect by group and time period of each group participating in this study. For data processing, the significance level was set to α = .05 using SPSS-PC (version 22.0).

Table1. Charicteristic of Participants

Variable	Total(N=52)	EG(N=27)	CG(N=25)	t	p
Age(y)	81.67±5.51	80.85±6.06	82.64±4.74	-1.146	.258
Education(y)	2.60±3.04	3.19±3.22	1.63±2.52	1.753	.088
Height(cm)	148.64±6.02	150.38±4.96	146.66±6.60	2.164	.037
Weight(kg)	54.66±10.84	56.73±10.64	52.07±10.79	1.449	.155
BMI(kg/㎡)	18.12±2.99	18.48±3.12	17.51±2.75	.995	.328
BF (%)	36.15±7.31	36.00±6.68	36.34±8.21	-.152	.880
SBP	138.05±14.21	137.87±14.28	138.24±14.48	-.085	.933
DBP	73.02±8.25	70.87±7.75	75.38±8.30	-1.857	.070
HR	75.16±12.43	73.59±15.09	76.81±8.94	-.855	.398

RESULTS

This study conducted a 12-week complex exercise program for 25 control groups and 27 exercise groups for 52 elderly people voluntarily participating among women aged 65 years or older who are using the local A city local convenience facilities. As a result, among the physical fitness variables, the control group decreased in the left grip force (p = .005) and the exercise group increased, resulting in an interaction effect between the periods * groups, and the control group decreased with cardiopulmonary endurance (p = .003). And the exercise group increased. In addition, significant interaction was found in upper extremity muscle strength (p = .003) and coordination stress (p = .003).

Table 2. Changes in functional fitness with participation in complex exercise programs

Variable	Group	Pre	Post	p
Lt. Grip (kg)	CG(N=25)	13.79±4.50	11.47±4.25	a .197
	EG(N=27)	18.32±4.75	19.22±3.95	b .001
				c .005
Rt. Grip (kg)	CG(N=25)	15.35±4.94	14.58±4.80	a .943
	EG(N=27)	19.58±4.83	20.46±5.05	b .001
				c .280
Upper Strength (dumbbell/30sec)	CG(N=25)	17.45±5.16	18.61±3.40	a .001
	EG(N=27)	19.52±6.42	23.15±5.43	b .043
				c .003
Lower Strength (stand/30sec)	CG(N=25)	14.76±4.38	13.86±3.73	a .046
	EG(N=27)	17.48±6.66	15.00±5.77	b .296
				c .405
Cardiovascular Fitness (step/6min)	CG(N=25)	234.94±148.04	233.81±174.41	a .004
	EG(N=27)	247.18±122.10	325.36±160.98	b .287
				c .003
Flexibility (cm)	CG(N=25)	13.03±6.12	9.75±4.85	a .013
	EG(N=27)	13.61±6.95	12.58±6.48	b .397
				c .177
Balance (sec)	CG(N=25)	10.50±2.96	11.13±4.20	a .897
	EG(N=27)	9.14±2.39	8.62±2.77	b .053
				c .182
Coordination (sec)	CG(N=25)	23.56±8.47	27.32±8.67	a .200
	EG(N=27)	19.76±4.65	18.21±3.88	b .002
				c .003

Table 3. Changes in Cognitive Behavioral Function according to Participation in Complex Exercise Program

Variable	Group	Pre	Post	p
MMSE-DS	CG(N=25)	23.80±2.86	24.70±2.54	a .112
	EG(N=27)	24.85±3.00	25.73±2.30	b .241
				c .985
K-FES	CG(N=25)	67.10±22.63	63.10±29.20	a .760
	EG(N=27)	68.60±26.98	69.56±24.15	b .603
				c .482
K-ABC	CG(N=25)	985.38±556.65	957.14±465.31	a .519
	EG(N=27)	1040.00±382.3	1062.40±399.6	b .248
				c .545
SF-8	CG(N=25)	358.35±48.87	393.00±43.36	a .001
	EG(N=27)	360.01±53.14	396.01±37.56	b .885
				c .942

CONCLUSION

In the 12 weeks complex exercise program of this study, functional fitness variables improved significantly. It can be seen that this complex exercise program helps improve physical fitness in the elderly. However, there was no significant result in the fall efficacy, which is considered to be the result of statistically dividing the group regardless of whether or not there is a fall experience in the basic questionnaire test.