# Effect of Exercise Prescription Service Customized for the Elderly in Community

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## Abstract

This study has applied 'the exercise prescription customized for the elderly' program for each type of physical exercise in consideration of the needs of the elderly residents living in community and then analyzed the effect. The subject was the low-income women aged 60 and older who live in areas and 20 persons were selected respectively from each group of yoga, dance and sports massage. We implemented exercise prescription for 60 minutes twice a week over 36 weeks against 3 groups in 3 social service stronghold institutions and analyzed the effect by monitoring the results from the exercise. The result shows that muscle, flexibility and agility was improved after exercise in each group of yoga, dance and sports massage and there was some difference between groups. Among various sports programs, the effect of exercise was the most significant in yoga group. So it was found that exercise prescription program to which physical properties of female elderly in local community can improve their health, makes the independent daily life possible and provided positive effect to the life quality of the elderly.

*Keywords*: community, the elderly, desire, exercise prescription service, functional fitness

## **1. Introduction**

Korea currently has shown the highest interest in life of the elderly personally, socially and nationally due to the fastest aging population rates in the world [1]. Such aging is significantly increasing the burden on government welfare spending and also it could pose a serious threat to the country's finances [2]. In particular, the increase in the elderly population is connected to the increase of the sustenance allowance and medical expenses for the elderly while physical impairment and increased prevalence of various age-related diseases can be predicted to persist [3]. This social change shows the support to maintain a healthy old age can be an effective countermeasure to prevent the national disease and decrease the national medical cost [4]. Especially with age, the life and resource of the elderly women is poorer than men but their lifespan gets longer and so the interest and improvement for them is required [5].

The muscular strength of the elders weaken after the age of 30 and approximately 0.75~1% of the muscle decrease [6]. The decrease of muscular strength followed by the decrease of muscles is mostly applied when the frequency of participation of physical activity is low, not when an individual ages [7]. Also, the decrease of muscular strength of the elders affect the maintenance of posture, the improvement of stability prevents the possibility of falling down, and also is important for decrease of financial expenses due to falling down, and for the improvement of quality of falling life [8].

Many investigators planned and applied various training programs to manage a healthy life as well as a delay of aging. However, periphrastic form of exercise improves the health better than exercise of one type for elders that have all of their physical abilities decreasing at once. Looking at the previous investigations regarding the functional physical fitness and the exercise programs for elders, Shin Ji Young [9] reported that through local exercise programs that can be applied consistently at individual homes, elder women's muscular strength of lower extremity, flexibility of upper body, flexibility of lower body, and cardiovascular endurance development increased. Park Jung Jae [10] reported that elders that participated in the exercise program in the course of 24 weeks have improved muscular strength through a prescription of low-intensity workouts.

Thus, participation in regular exercise programs among a variety of measures to improve the quality of the elderly, is strongly recommended as it brings fitness level in everyday life and ultimately improves the life quality of them. Already the states of advanced welfare have provided the environment where they can join sports for successful aging as a national policy and made efforts to improve life quality by establishing it as a life style to enjoy the opportunity of participating in voluntary physical activity [11].

Therefore, as a study focused on physical activity and health has increased in recent years, the attempt to improve the health of the elderly using through systematic and regular movement using physical activity program is growing. In particular, 'the exercise prescription service customized for the elderly' program run by national support and selfexpense provides various exercise programs purposed for health promotion and rehabilitation aimed at the elderly and help them to lead a healthy life through consistent healthcare.

While many institutions carries out a variety of 'the exercise prescription service customized for the elderly' but several factors such as health, exercise intensity, exercise time, total quantity of exercise, psychological factors, environment should be considered against the elderly who are weak physically and mentally in order to achieve cost efficiency and consistent practice of exercise. Also it is above all necessary to develop exercise program which has no limitation in facility, space and finance. Since it could influence the effectiveness of 'the exercise prescription service customized for the elderly' ultimately, variety of studies on exercise prescription method like that seems to be necessary.

In this study, we applied various physical activity-oriented preventive therapeutic exercise prescription programs in 'the exercise prescription service customized for the elderly' in order to identify its effect on health and fitness as considering the needs according to the health status of the elderly community.

## 2. Theoretical Background

The problems of elders that an aging society is encountering are able to be divided into the decrease of financial stability due to a loss of a source of income, the weakening of health and arising of diseases due to the decrease of physical strength, the decrease of self-esteem due to a loss of a role, and the increase of the sense of feeling lonely. The decrease of physical strength reduces the quality of life due to various illnesses, and is the main reason of depressing one's ultimate goal of life, happiness, due to lack of exercises and natural aging[12].

The illnesses of elders are not too different from other illnesses of other age groups, but various health problems arise along with the process of aging. According to Kim Sun Kyung [12], the physical abilities generally decrease and the elders usually do activities sitting, characterized to not move very much. This phenomenon ultimately leads a decline of social activity and a change in the nervous system around the brain [13]. The decadence of ability of feeling senses due to these changes become a major reason for a decadence of perception ability and a change in ability to solve the problem. The human body especially decreases in effectiveness as one ages, and the ability of the body and the activity due to natural desires decrease as well. The physical activities for the elders are limited to simple chores and daily routines unlike usual adults or teenagers. The chances

of doing physical activities in daily life are slowly decreasing, leading to a decadence of physical strength of the elders.

Therefore, the elders start seeking for a way to delay the health problems and prevent illnesses, and a portion of them choose physical activity. Proper amount of physical activity maintains and improves the abilities of the human body, whereas a lack of physical activity easily leads to a weakening, making the maintenance of physical abilities difficult. According to the data of Behavioral risk factor surveillance system: BRFSS, 40% of women above the age of 65 do not do leisure activities, and the consumption of energy related to exercise is low compared to the younger generations[14].

Likewise, the lack of physical activity decreases, deactivates, shrinks the function of the vitality of cells, whereas the proper amount of physical activity activates the cells and improves the effectiveness [15]. Also, the maximum oxygen consumption that is the guideline of cardiopulmonary function decreases from the average of 50 ml/kg/min for the age of 20 to 20 ml/kg/min for the age of 80. However, the proper exercises help elders in the 70's to have the level of the maximum oxygen consumption of a 30 year old [15].

Therefore, exercises can help in maintaining and improving the physical abilities. Stamina refers to a broad field of physical strength that a human body can exhibit, and health is a basic requirement for a happy life, and can ultimately be enhanced when a healthy stamina is established. However, if the stamina is weakened, the health is lost, leading to a loss of motivation and arising of unstable mindset. Also, an individual is not able to fully exhibit his or her best, leading to a sense of alienation from the society.

Therefore, if stamina is weakened, the physical, social, and mental health are not able to be maintained, making the improvement of stamina for a happier life necessary. In other words, because the stamina of elders can be improved through active physical activity and regular exercises, regular exercises can prevent illnesses and bring about various physical health.

The program for improved health that the American College of Sports Medicine: ACSM recommended is advocating the resistance movement, flexibility workouts, and aerobic exercises to maintain a smooth daily life and maintain the physical strength and the amount of muscle. If these workouts were to be done regularly, the brain, nerves, heart, and breath are stimulated to improve the physiological functions, metabolism is gentle, help with the sense of independence, and improve the instability and the possibility of falling of the elders[16].

On the other hand, the change in body composition caused by aging, primarily happens because of the lack of physical activity and the decrease of basic metabolic rate, and as the aging progresses, the moisture within the cells, the number of activated brain cells, and the lung capacity decrease. And as the aging progresses, the amount of calcium in the bones decrease, increasing the frequency of osteoporosis, especially for the women after the menopause [17]. Also, the speed of nerve conduction decreases by  $10\sim15\%$ , decreasing the ability of memory and making it easier to get tired, decreasing the speed of activity [18]. The decrease of physical activities of these elders is the main reason of decrease in muscle, the loss of cross sectional areas are averaged to be 40% in between the ages of 20-80, and can be started at the age of 25 if early, and 10% of the total muscle loss begins at the age of 50[18].

The serious problems of the elders are problems regarding health, and the weakening of muscular strength due to a decrease in activities eventually limit the abilities of exercises of the elders, causing the muscles and the frame to quickly degrade, and this again leads to a weakening of muscular strength, making a cycle of negative effects that degenerate the quality of life [19-20].

Jung Suk Hee and Jung Kyung Hee [21] have reported that aerobic exercises help with women's flexibility, stability, and muscular endurance. Kim Sul Hyang and others [22] have enforced the programs consisted of 10 weeks of stretching, aerobic exercises, exercise of muscle, exercise of stability, and warm-down, and were able to check the

improvement of strength of lower extremity, balance, and cardiovascular endurance. Ku Mi Ok and Eun Young[23] divided the muscular exercises into low-intensity and medium-intensity and applied a personalized exercise for each elder, and checked that the strength of lower extremity were more improved in the low-intensity after 16 weeks.

Also, Kwon Jin Sook [24] reported that after the participation of the exercise programs by the leisure facility of the elderly, the flexibility of the lower body, the muscular strength of lower body, and the MFT balance were increased. Park Chang Un [25] reported that applying a 48 week course of various exercises to the elders above the age of 65 have a positive effect on functional fitness and daily fitness. Park Sang Muk [26] reported that a 12 week course of various exercises for the obese women elders improve the fitness of independent living. Kang Chang Kyun[27] reported that an elder's flexibility, balance, endurance, and muscular strength were improved after a 12 week course of walking and aerobic exercises.

Likewise, the program of prescribing complex exercises have a positive effect on an elder's physical and functional abilities, making us anticipate the positive result of this investigation.

# 3. Method of Study

## 3.1. Subjects of the Investigation

The subjects of this study were the elderly who are aged more than 60 years and have the potential social risks in household whose income is less than 120% of average monthly household income and are subject to protection system for elderly (including basic old-age pension) or belongs to household entitled to the basic support from local government. Among the elderly who understand the spirit of the program and apply for exercise prescription based on physical activity, 20 persons respectively for yoga group, dance group and sports massage group were selected and then their interest, life pattern and health status was examined through medical examination in advance. Exercise prescription program was implemented for 60 minutes twice a week for 36 weeks, total of 72 sessions in 3 community service institutions in 3 groups. The characteristics of the subjects are shown in table 1, the procedure of investigation is shown in table 2.

	Age (years)	Height (cm)	Weight (kg)	
Yoga-ist (20)	71.62 ± 5.51	149.16±6.44	54.90±8.51	
Dancers (20) 72.06±4.55		152.47±3.19	57.96±7.59	
Sport massages (20)	74.36±4.06	152.2±5.09	62.52±7.96	

 Table1. Characteristics of the Subjects

Average ± Standard deviation

February to March Establishing the plan of yearly prescribed exercises and recruiting subjects				
April : First prescription of exercises (prior measurement of functional fitness)				
	Yoga-ists	Dancers	Sport Massages	
Grouping	60 min X 2-time exercise April to December, Twice a week, Total of 72 times			
Pretest	SFT (Senior Fitness Test)			
during exercise	Twice a week (36 weeks)Yoga Exercise Program Dance Exercise ProgramSports Massage Exercise Program			
post-test	SFT (Senior Fitness Test)			
Analysis	two-way repeated ANOVA			
writing paper				

# Table2. Procedure of Investigation

## 3.2. List of Measurement and Method of Measurement

The method of measuring a subject's functional fitness was done by adjusting the senior fitness test manual [28]. The measuring topics were muscular strength of the lower body, muscular endurance, overall flexibility, and agility, and were done with chair stand test, arm curl test, modified sit- and- reach test, back scratch test, 2.44m up and- go test. The details are as follow.

## **3.2.1.** Chair Stand Test

We enforced the chair stand test (sitting and standing back on a chair) to evaluate the muscular strength and muscular endurance of the lower extremity. In this evaluation, the subjects are told to sit on their chair with their arms on their chest in the shape of X. The subjects completely stand up and completely sit back down, following the start signal. The investigators measured the standing up and sitting down as 1 time and was measured in times/30 sec. The investigators used a chair and a stopwatch (CASIO HS-3OW, Japan) as the tools.

## 3.2.2. Arm Curl Test

The investigators enforced the arm curl test (lifting and putting down a 2kg wrist weight) to measure the muscular strength and endurance of upper body. The subjects were told to wrap the wrist weight around one of their wrists and have their fist facing the ceiling. Lifting the arms and putting down the arms count as 1 time and the number of the

quickly and precisely repeated times were recorded in times/30 sec. The tools of measurement were 2kg wrist weights (Sports Angel, Korea), stopwatch (CASIO HS-30W, Japan), and a chair.

## 3.2.3. Modified Sit-and-Reach Test

The investigators enforced the Modified Sit-and-Reach Test (bending over the upper body in the position of sitting down) to evaluate the flexibility in the lower body. The subjects were told to have their bottom on the floor and extend the leg that is getting measured and fold the other leg. The sole of the measuring leg is extended so that it will touch the measuring tool completely, and the upper body is slowly bent over and the middle fingers of both hands were told to slowly push away the measuring tool and when they are stopped for 2 seconds, the investigators measured it by 0.1 cm. This process was repeated twice and the higher number was recorded.

If the fingertip passed the end of the toes, it was recorded as (+), and if the fingertip did not pass the end of the toes, it was recorded as (-). The tools for the measurement were measuring tool (Digital Measuring Tool FT-3030, Korea), and a matt.

## **3.2.4. Back Scratch Test**

The investigators enforced the back scratch test (holding hands from behind the back) to evaluate the flexibility of the upper body. The subjects were told to stand straight and have one of their arms above a shoulder and drop it towards the back and have the palm and finger face downward, and have the finger touch the middle of the back if possible. The elbow should be facing upward. The other hand should be on the lower back with the palm facing outward and the fingers downward, to try to have both the middle fingers touch each other. If the middle fingers did not touch, it is recorded as (-), if the middle fingers almost touched, a 0, and if the middle fingers overlap, it was recorded as (+). The subjects were told to stay still for 3 seconds and the distance between the two middle fingers were measured up to 0.1 cm, and the highest number was picked after 2 times of the same process.

## 3.2.5. 2.44m Up-and-Go Test

The investigators enforced the 2.44m Up-and-Go test (walking 2.44m back and forth) to evaluate the agility. The subjects were told to sit on a chair and stand up out of the chair following the start signal and walk to the cone that is 2.44m ahead, walk back, and sit back at the chair. The time was measured in seconds up to 0.1 sec, and this process was repeated twice, and the better score was recorded. The measuring tools were a chair, a stopwatch (CASIO HS-30W, Japan), cone, and a tape measure.

## 3.3. Exercise Prescription Customized for the Elderly

Yoga, dance and sports massage were performed respectively for each group. Exercise intensity was higher than medium level depending on individual's exercise capability as directed by instructor and assistant athletic director and safe range was set based on level 11 to 13 in subjective exercise intensity awareness (RPE: rating of perceived exertion, Borg scale). Workout time, frequency and period in customized exercise prescription service practiced was 60 minutes, twice a week and for 36 weeks. The detailed information is shown in table 3.

	Content of the Exercise Program			
Yoga-ist	Consisted of the basic moves of hita yoga Sitting pigeon pose, opening up the chest posture, rabbit pose, plow pose, fish pose, cobra pose, bow pose, bending the two knees and touch the chest, having the two arms out and extend, triangle pose, capillary exercise, full rest pose.	Warm-ups (Stretching) 10 minutes		
Dancer	Consisted of low-intensity folk dance that does not require any skills Composed of basic standing movements of Patty Cake Polka (USA), Kinder Polka (Germany), Maim Maim (Israel), Yenka (Finland), Oslo Waltz (Scotland)	↓ The Actual workouts 40 minutes ↓ Warm-downs (breathing, massage, stretching) 10 minutes		
Sports Massage	Certificate owner with a certain amount of training, using a part of the body as a way to exercise The order of the sports massage prone position: bottoms, lower back, neck, lower extremity supine position: hip joint, knee joint, stomach, lower extremity			

Table 3. Content of Group Exercise Program

## 3.4. Data Processing

All data was analyzed using SPSS win. 19.0 and the age, height and weight of the subjects was presented as mean (M) and standard deviation (SD). The difference between before and after the exercise was analyzed and two-way repeated ANOVA analysis was implemented to investigate the mutual effect by introducing time and groups simultaneously. Statistical essential level was set to be 0.05.

# 4. Data Results

The results of measuring the detailed factors of functional fitness- chair stand test, arm curl test, modified sit-and-reach test, back scratch test, 2.44m up-and-go test are as follow.

## 4.1. Chair Stand Test

The average of prior and afterwards of the Chair Stand Test for muscular strength and endurance in the low extremity is shown in table 4, and the time and the mutual effectiveness of the group is shown in table 5. There was no obvious difference as of the time but there was for the group, (p<.05). Time x The mutual effectiveness of the group did not have a significant difference.

	Yoga-ists	Dancers	Sports Massages
Prior	14.92±4.90	11.00±4.35	8.500±2.38
Afterwards	15.23±2.91	11.40±3.64	11.25±4.57

Table 4. Chair Stand Test-	1st and 2nd time Ave	rage (inning/30sec)

Average ± Standard deviation

# Table 5. Contrast of Chair Stand Test's Two Way ANOVA

	Sum of Squares	The degree of freedom	Mean Square	F
Time	24.342	1	24.342	3.274
Group	251.324	2	83.775	2.961*
Time x Group	15.476	2	5.159	0.694

\* p<.05

# 4.2. Arm Curl Test

The Right Arm Curl Test for the evaluation of the muscular strength and endurance of the upper body's average of prior and afterwards are shown in table 6 and the time and the mutual effectiveness of the group are shown in table 7. There was a good difference in the time and group (p<.01, p<.001) and there was also a difference in the time x group mutual effectiveness (p<.05).

Table 6. Right Arm Curl Test- 1st and 2nd time Average (inning/30 sec)

	Yoga-ists	Dancers	Sports Massage	
Prior	22.23±7.16	18.80±6.76	11.00±8.40	
Afterwards	35.61±12.70	20.80±9.31	13.75±1.25	

Average ± Standard deviation

# Table 7. Contrast of Right Arm Curl Test's Two Way ANOVA

	Sum of Squares	The degree of freedom	Mean Square	F
Time	575.185	1	575.185	18.349***
Group	1935.681	2	645.227	5.999**
Time x Group	330.569	2	110.190	3.515*

\* p<.05, \*\* p<.01, \*\*\* p<.001

The Left Arm Curl Test for the evaluation of muscular strength and endurance in the upper extremity's average prior and afterwards are shown in table 8, and the time and the mutual effectiveness of the group is shown in table 9. There was a difference in the time and group (p<.001), and a difference in time x group mutual effectiveness (p<.01).

Table 8. Left Arm Curl Test- 1st and 2nd time Average (inning/30 sec)

	Yoga-ists	Dancers	Sports Massage
Prior	24.53±7.10	18.60±4.56	12.25±10.50
Afterwards	37.92±12.98	21.60±9.18	11.00±7.39

Average ± Standard deviation

	Sum of Squares	The degree of freedom	Mean Square	F	
Time	485.167	1	485.167	16.116***	
Group	2734.386	2	911.462	7.672***	
Time x Group	421.194	2	140.398	4.664	
** 04 *** 004					

## Table 9. Contrast of Left Arm Curl Test's Two Way ANOVA

\* p<.01, \*\*\* p<.001

## 4.3. Modified Sit-and-Reach Test

The Right Modified sit and reach test for the muscular strength and endurance's average is shown in table 10 and the mutual effectiveness of the group is shown in table 11 and there was a difference (p<.01) in the time and the group but there was no difference in the time and the effectiveness of the group.

# Table 10. Right Modified sit-and-reach Test- 1st and 2nd time Average<br/>(inning/30 sec)

	Yoga-ists	Dancers	Sports Massage
Prior	7.46±8.56	4.20±8.67	-12.00±13.68
Afterwards	14.84±10.71	4.40±2.70	2.62±6.65

Average ± Standard deviation

## Table 11. Contrast of Right Modified sit-and-reach Test's Two Way ANOVA

	Sum of Squares	The degree of freedom	Mean Square	F
Time	971.685	1	971.685	11.811**
Group	1612.293	2	537.431	5.832**

Time x Group	328.222	2	109.407	1.330		
** p<.01						

The Left Modified sit and reach test for the muscular strength and endurance's average is shown in table 12 and the mutual effectiveness of the group is shown in table 13 and there was a difference (p<.01) in the time and the group but there was no difference in the time and the effectiveness of the group.

# Table12. Left Modified sit-and-reach Test- 1st and 2nd time Average (inning/30 sec)

	Yoga-ists	Dancers	Sports Massage
Prior	4.07±10.62	2.40±5.02	-14.25±12.33
Afterwards	16.26±8.80	4.40±4.72	2.50±8.80

Average ± Standard deviation

Table 13	Contrast of	Left Modified	sit-and-reach	Test's Tw	o Wav	ANOVA
	Contrast of	Lett Mounieu	Sit-ana-reach	ICSUS IW		

	Sum of Squares	The degree of freedom	Mean Square	F
Time	1416.531	1	1416.531	17.260***
Group	1567.578	2	522.526	5.379**
Time x Group	486.021	2	109.407	1.330

ʻ\* p<.01, \*\*\* p<.001

# 4.4. Back Scratch Test

The Right Back Scratch Test for the evaluation of the flexibility of the upper body's average of prior and afterwards are shown in table 14, and the time and the mutual effectiveness of the group are shown in table 15. There was no difference in time and group but there was in time x group mutual effectiveness (p<.01).

Table 14	. Right Back	Scratch Test-	1st and 2nd time	Average	(inning/30 sec	;)
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	Yoga-ists	Dancers	Sports Massage
Prior	-13.50±16.89	-11.20±37.09	-11.50±11.61
Afterwards	-30.42±14.54	-22.00±9.08	-25.25±4.03

Average ± Standard deviation

	Sum of Squares	The degree of freedom	Mean Square	F	
Time	121.170	1	121.170	0.725	
Group	3466.003	2	1155.334	2.471	
Time x Group	3003.992	2	1001.331	5.993**	
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Table15, Contrast of Right Back Scratch Test's Ty	wo Way ANOVA
Table 10. Contrast of Right Back Condition rest 5 h	

\*\* p<.01

The Left Back Scratch Test for the evaluation of the flexibility of the upper body's average of prior and afterwards are shown in table 16, and the time and the mutual effectiveness of the group are shown in table 17. There was no difference in time and group but there was no difference in time x group mutual effectiveness as well.

	Yoga-ists	Dancers	Sports Massage	
Prior	-15.88±17.77	-7.20±37.37	-14.50±15.80	
Afterwards	-23.80±22.61	-19.60±11.63	-22.50±7.41	

Average ± Standard deviation

	Sum of Squares	The degree of freedom	Mean Square	F
Time	32.559	1	32.559	0.112
Group	4032.115	2	1344.038	2.302
Time x Group	2465.363	2	821.788	2.816

Table 17. Contrast of Left Back Scratch Test's Two Way ANOVA

## 4.5. 2.44m up and Go test

The average of prior and afterwards the 2.44 m Up-and-Go test done to evaluate the agility are shown in table 18, and the time and the group mutual effectiveness are shown in table 19. There was a difference in time and group (p<.01) and there was no difference in time x group mutual effectiveness.

Table 18. 2.44m Up-and-Go	Test-1st and 2nd time	Average (inning/30 sec)
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	Yoga-ists	Dancers Sports Massage	
Prior	5.52±0.85	8.66±2.00	10.10±1.68
Afterwards	8.20±4.42	10.05±2.59	11.64±2.64

Average ± Standard deviation

	Sum of Squares	The degree of freedom	Mean Square	F
Time	35.817	1	35.863	8.788**
Group	143.479	2	47.826	6.786**
Time x Group	13.888	2	821.788	2.816

Table 19. Contrast of 2.44 Up-and-Go Test's Two Way ANOVA

\*\* p<.01

## **5.** Conclusion and Suggestion

In this study, to investigate the effectiveness of 'the exercise prescription service customized for the elderly' against the female elderly of low income, which is conducted by elderly welfare institutions which is the stronghold in community and local governments, its effect on functional fitness was analyzed by applying therapeutic complex exercise prescription program focused on 3 cat agories of yoga, dance and sports massage. The subjects of this study were women of age not younger than 60 who live in Yeongdo Gu of Busan City. Twenty persons respectively from yoga group, dance group and sports massage group did exercise for 60 minutes twice a week for 36 weeks, total of 72 sessions in the level of RPE 11-13 to identify the effect on fitness before and after exercise.

The detailed topics of functional fitness are chair stand test, arm curl test, modified sitand-reach test, back scratch test, 2.44m up-and-go test, and the results are as follow.

First, in the Chair Stand Test used to evaluate the muscular strength and endurance of the lower extremity, there was no difference in the time and the group effective mutualism, but there was a difference in the group. Second, in the Right Arm Curl Test used to evaluate the muscular strength and endurance of the upper extremity, there was a difference in both time and the group and the time and the group mutual effectiveness. Third, in the Left Arm Curl Test used to evaluate the muscular strength and endurance of the upper extremity, there was a difference in time and group and also a difference in the time and the group mutual effectiveness. Forth, in the Right Modified Sit-and-Reach Test used to evaluate the flexibility in the lower extremity, there was no difference in time and the group mutual effectiveness, but there was a difference in the time and the group. Fifth, in the Left Modified Sit-and-Reach Test used to evaluate the flexibility in the lower extremity, there was no difference in the time and the group mutual effectiveness, but there was a difference in time and the group. Sixth, in the Right Back Scratch Test used to evaluate the flexibility in the upper extremity, there was no difference in time and group but there was a difference in time and group mutual effectiveness. Seventh, in the Left Back Scratch Test used to evaluate the flexibility in the upper extremity, there was no difference in both time and group and the time and group mutual effectiveness. Eighth, in the 2.44m Up-and-Go Test used to evaluate the agility, there was no difference in time and group but there was a difference in time and group mutual effectiveness.

The results shows that upper extremity muscle strength, lower extremity's flexibility and agility was improved in yoga, dance and sports massage group while there was some differences between those groups. For lower extremity's muscle strength and endurance, upper extremity's muscle strength and endurance, lower extremity's flexibility and agility, yoga group obtained the best result followed by dance and sports massage group. Also for upper extremity's flexibility, yoga group showed the best improvement followed by sports massage and dance group. These results seem to be consistent with the previous study's results [2, 13, 25, 26] in the point that exercise prescription program for the elderly has the positive effect on functional fitness of the elderly. Therefore we can say that exercise prescription program improves functional fitness of the elderly comprehensively and exerts positive effect on their independent daily life ultimately. So the complex regular exercise of various types in the future is expected to make positive effect on improvement of life quality as its lead active daily life of them.

In particular, as the female elderly with lower-income are more consistent and more difficult to participate in long term, more various programs is estimated to be necessary in community. Also the result shows that the effect of exercise was the highest in yoga group. Those results means that yoga exercise in low intensity don't give lower burden on body of the elderly than active aerobic exercise in strong intensity and especially yoga's effect is recognized in mental and psychological side and so we need to understand physical and psychological properties and develop detailed exercise prescription programs based on it.

This investigation is significant for obtaining basic data about the 'prescribed sports service for the elders' in a more useful way through comparing different exercises and their effects. Therefore, we have procured a manual for a more standardized prescribed sports service program to use when the local elders are in an internal situation.

Based on the conclusion that has been procured from this investigation, we would like to suggest the following to further investigate the prescribed sports program for a healthier life of the elders.

First, the subjects of this investigation were elderly women with a low income, but enforcing a prescribed sports program comparing the gender, age, and the time frame, to be able to compare the change of the control group and the experimental group is considered to be necessary. The programs should also be extended to a program where it is possible to constantly participate, without a stop, since the health of the elders strongly depends on the consistency of the exercise. Second, the investigators were not able to control the nutrients and food that are consumed by the subjects, and were also not able to control the mental, genetic, and environmental factors. Further investigations should break the consumption of nutrients, age, the condition of illnesses, and the environment of the participation into details before enforcing the program. The investigators should seek a plan that is focused on acts that can improve the health, for the health of the elders depend on the physical, mental, and social health, and physical activity, education of nutrients, and dietary control. Third, this investigation prescribed a sport for each elder, analyzed body fat of each elder, and consulted with each elder regularly, but could not break the limit of a group program. Further investigations should supplement the group counseling in order to systematically manage each of the sports. Generation of 100 years is arriving, a social environment should be created where improving one's health and fitness, decrease of pain, daily life with energy, increase of the change of the acknowledgement of the participation of the program, and maintaining an elder's daily life healthier, active, positive, and enthusiastic are all possible.

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