Public Health Nursing Vol. 26 No. 6, pp. 523–531
0737-1209/ © 2009 Wiley Periodicals, Inc.
doi: 10.1111/j.1525-1446.2009.00812.x

Effects of Exercise Program on Physical Fitness, Depression, and Self-Efficacy of Low-Income Elderly Women in South Korea

Kyung Rim Shin, Younhee Kang, Hyo Jung Park, and Margaret Heitkemper

ABSTRACT ***Objective:*** This study aimed to examine the effects of exercise programs on physical fitness, depression, and self-efficacy in low-income elderly women (age $\geq$ 75). ***Design and Sample:*** A pretest-posttest experimental research design with a control group was used. The sample consisted of 26 women in the exercise group and 22 women in the wait-list control group in Seoul, Korea. ***Measures:*** The measures of physical fitness included body mass index, cardiopulmonary endurance (blood pressure and heart rate), muscle strength (hand grip strength), flexibility (degree of bending of the upper body), and balance (duration of time for which the subject could stand on one foot). Depression and self-efficacy were measured by the Center for Epidemiological Studies Depression scale and a modified form of Lee's scale, respectively. All measures were obtained twice: at baseline and at the completion of the exercise program. ***Intervention:*** The exercise program consisted of 4 weeks of education along with 8 weeks of physical exercise. ***Results:*** After the intervention, significant improvements were found in depression, self-efficacy, and all measures of physical fitness, except heart rate and flexibility, in the experimental group. ***Conclusion:*** The exercise program may be recommended as a method to maintain and promote the health of low-income elderly women.

Key words: depression, elderly women, exercise, physical fitness, self-efficacy.

Population aging has become a common concern the world over. In Korea, the population of elderly people is increasing at a faster rate than in many other countries (Korea Ministry of Health and Welfare, 2007). Adults over the age of 65 currently account for 8.7% of the population in Korea (Korea National Statistical Office [KNSO], 2001). With a higher average life span, women constitute nearly two thirds of the population aged over 65 in Korea (KNSO, 2001). At the same time, poverty among elderly people is a growing concern and has been considered as a major long-term social issue. Nearly 45% of the population aged over 65 lives in poverty, with an income of <300,000 won per month (US$214).

A higher percentage of elderly women (11.3%) as compared with elderly men (6.3%) subsist on the National Basic Livelihood Security (KNSO, 2001). As a result, the number of poor elderly women at risk for chronic illnesses is increasing. According to a report issued by the Korean Ministry of Health and Welfare in 2007, 79.4% individuals aged over 65 were suffering from at least one disease. Of these, the majority were women (Korea Ministry of Health and Welfare, 2007).

Kyung Rim Shin, R.N., Ed.D., F.A.A.N., is Professor, College of Health Sciences, Ewha Womans University, Seoul, Korea. Younhee Kang, R.N., M.S.N.-A.N.P., Ph.D., is Associate Professor, College of Health Sciences, Ewha Womans University, Seoul, Korea. Hyo Jung Park, R.N., Ph.D., is Assistant Professor, College of Health Sciences, Ewha Womans University, Seoul, Korea. Margaret Heitkemper, R.N., Ph.D., F.A.A.N., is Professor and Chair, Biobehavioral Nursing and Health Systems, University of Washington School of Nursing, Seattle, Washington.
Correspondence to:
Kyung Rim Shin, College of Health Sciences, Ewha Womans University, 11-1 Daehyun-dong, Seodaemun-gu, Seoul 120-750, Korea. E-mail: krshin@ewha.ac.kr

The combination of aging, reduced economic resources, and chronic illnesses may reduce the capabilities of elderly women to engage in health promotion activities.

Previous investigations have reported that lack of exercise, smoking, alcohol intake, poor dietary habits, and reduced health examinations are the major factors that influence the health of elderly people (Centers for Disease Control and prevention [CDC], 2004; Cho, 1998; J. J. Park & Hong, 2000). In Korea, lack of exercise has been shown to be the most influential factor affecting the health of the elderly (Cho, 1998). Lack of exercise is most common among women who are older, less educated, and live on a reduced income (CDC, 2004; J. J. Park & Hong, 2000). Barriers to performing exercises include insufficient knowledge, prejudices, misunderstandings, chronic health conditions, and inadequate social recognition accorded to elderly people (Conn, Burks, Pomeroy, Ulbrinch, & Cochran, 2003).

In elderly people, physical exercise has positively affected physical fitness; prevented or alleviated symptoms of chronic diseases (e.g., arthritis, hypertension, lumbago, sciatica, osteoporosis, diabetes); and improved mental health (e.g., depression) (Christmas & Andersen, 2000). The positive effects of physical exercise on the psychoemotional well-being and quality of life have been reported in several Korean studies (Jung, 2002; J. M. Park & Han, 2003). Specifically, depression and insomnia among elderly people has been shown to be decreased by the increase of social interactions through group exercise interventions (Jung, 2002; J. M. Park & Han, 2003). However, previous studies have not considered the socioeconomic status of subjects in terms of their accessibility to health promotion programs. Low-income elderly women have not yet been included as a specific participant group in health promotion programs although their vulnerability to health problems is higher than that of any other group.

Self-efficacy or self-confidence in being able to successfully perform a specific activity or behavior is one of the factors that influence the ability of an individual to begin and sustain the performance of physical exercise (Oka, DeMarco, & Haskell, 2005). To sustain participation in exercise programs, strategies to enhance self-efficacy should be included in intervention. The self-efficacy theory is founded on self-efficacy expectations and outcome expectations (Bandura, 1997). Self-efficacy plays an important role in helping maintain a level of physical exercise or activity (Resnick, Luisi, & Vogel, 2008; Resnick, Vogel, & Luisi, 2006). The self-efficacy theory espouses the intent to help elderly people increase their self-efficacy and thereby increase overall physical fitness and decrease depression (Bandura, 1997; Resnick et al., 2008).

This study aimed at examining the effects of exercise programs on physical fitness, depression, and self-efficacy in low-income elderly women in South Korea. Specifically, the following hypotheses were tested in the study: (1) participants in the exercise group will show a significantly greater improvement in their physical fitness than those in the control group after 8 weeks of intervention and (2) participants in the exercise group will show a significantly greater improvement in depression and self-efficacy than those in the control group after 8 weeks of intervention.

Methods

Design and sample

This study utilized a pretest-posttest design with a nonequivalent comparison group to investigate the effects of exercise programs on physical fitness, depression, and self-efficacy in low-income elderly women living in urban communities in South Korea.

This study was conducted on elderly women aged over 65 who were classified as low income according to the Elderly Welfare Act. The study was explained to and consent was obtained from the directors of public health centers from which the subjects were recruited. Approval from an institutional review board was also obtained. Participants needed to be able to communicate by telephone or have face-to-face interviews without any difficulties (e.g., blindness or hearing problem).

Potential participants were identified from lists of low-income elderly people taken from the public health centers of two urban communities and approached by either phone or direct visits. Both verbal and written information on the aims of and participation in this study were provided, and informed consent was obtained from each participant. Pretesting was conducted after obtaining consent from the participants, and posttesting was performed either on completion of the 8-week exercise program

for the exercise group or after a period of 8 weeks for the control group.

For the control group, the researchers explained that participants may be eligible to learn about the exercise program on completion of the study. A wait-list control group was given the option of enrolling in either of the interventions after the wait-list period. The wait-list control group received exercise program after the experimental group completed the program 8 weeks later without follow-up. A power analysis was performed to detect the likelihood that the study would yield a significant effect. In total, 16 participants were required to detect an effect size of .7, with an α set at .05 and a β set at .20.

Intervention

The exercise program used for this study was designed on the basis of integrated literature reviews (J. H. Kim, Lee, Hong, Ahn, & Kim, 2004; Lim & Cho, 2003; Moon, Oak, & Park, 2004; I. Y. Park, 2004) and modified by specialists in geriatric nursing and sports and leisure studies. This exercise program consisted of two parts: education and physical exercise.

The education session curricula covered topics such as (1) physical, psychological, and social changes in aging; (2) physio-psychological characteristics of elderly people; (3) benefits, effects, and forms of exercise; and (4) precautions to be taken while exercising. Education sessions were 15-min lectures and discussions were held once a week for the first 4 weeks of the 8-week program.

The physical exercise sessions were performed twice a week for 8 weeks, with the duration of the sessions being gradually increased from 30 to 50 min. This session comprised of warm-up, group-based main exercise, and cool-down activities. The physical exercise program was developed to include rhythmic movements for stretching, enhancing joint mobility, strengthening muscles, and increasing cardiopulmonary endurance.

Background music for the physical exercise segments ranged from children's songs and folk songs to popular music numbers that were selected on the basis of two factors: the musical preferences of the participants of the program and the types of music played in music therapy sessions for treating depression among elderly people, which were also culturally relevant music (W. Y. Lee, 2003).

The 5-min warm-up session consisted of stretching and movements for improving flexibility and preventing subsequent injuries during the main exercise session. Each set of 10 different movements was performed depending on the intensity and difficulty of the movements. The movements differed according to their characteristics, rhythm, and tempo of the music. Slightly more difficult movements were included from time to time in order to help the participants feel a sense of achievement, make the exercise more interesting, and help retain participants in the program. A 5-min cool-down session was also included.

Since participants had been taught to measure their resting heart rates and self-perceived exercise intensity, they were encouraged to evaluate their condition and control the intensity of the exercise during the session. To gradually improve participants' physical fitness, the intensity of the exercise was tailored for each participant. The intensity varied from "light," as perceived by the participants (up to 40–50% of the maximum heart rate of each person), to "slightly strenuous" or "strenuous" (up to 60–65% of the maximum heart rate of each person). As a strategy to retain subjects in the exercise group, recreational activities and games were organized every other week of the exercise program. Each participant was trained once.

All the education and exercise sessions were conducted by one public health nurse, two nursing master's degree students, and one baccalaureate degree nursing student in the auditorium of the Social Welfare Center, Seoul, Korea.

Measures

Physical fitness was assessed in terms of the body mass index (BMI), cardiopulmonary endurance, muscle strength, flexibility, and balance. BMI (kg/m^2) was calculated on the basis of height (cm) and weight (kg). Cardiopulmonary endurance was measured according to the blood pressure and resting heart rate. Muscle strength was measured using grip strength, and flexibility was measured by the degree of bending of the upper body relative to the floor. Balance was the duration for which a participant could stand on one foot with closed eyes.

Depression was measured using the Center for Epidemiological Studies Depression (CES-D) scale (Radroff, 1977). The scale consists of 20 items, with each response being rated on a scale of 0–3 on the basis of the frequency of occurrence ranging from 0 = *rarely or none of the time* to 3 = *most or all of the time*. Higher scores indicate the presence of one or

more indicators of depressive symptomatology. High internal consistency reliability and acceptable test-retest reliability were reported, and the content and construct validity were supported (Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977). In addition, the Korean version of CES-D has demonstrated a high internal consistency (O. S. Kim, Kim, Kim, & Baik, 2001; Yang, Suk, & Kim, 2005). The Cronbach's α was .92 in this study.

Self-efficacy was measured using a modified version of the scale developed by M. R. Lee (2001), with a total of 12 questions. Each response is scored from 0 to 3, where 0 = *not confident* and 3 = *very confident*. Higher scores indicate greater self-efficacy. Prior use of this measure with elderly people provided evidence of construct validity, with efficacy expectations and exercise behavior being significantly related to exercise (M. R. Lee, 2001). The Cronbach's α was .86 in this study.

Analytic strategy

Continuous variables of the general characteristics, physical fitness, depression, and self-efficacy for both exercise and control groups were summarized using mean and standard deviations, and categorical variables were summarized using frequency and percentage. To compare the general characteristics between the two groups, the χ^2 test and the *t* test were conducted.

Comparisons of physical fitness, depression, and self-efficacy before and after the exercise program were made with the paired *t* test in each group. After calculating the differences in the changes in values, a comparison between the two groups was conducted using analysis of covariance, with adjustments for initial values of each variable. SPSS 12.0 (SPSS Inc., Chicago, IL) was used for all statistical analyses. The null hypothesis was rejected at $p < .05$ as the level of significance. For Hypothesis 1, physical fitness outcomes were considered. Hypothesis 2 focused on depression and self-efficacy.

Results

Participants were recruited between February 1, 2005, and March 10, 2005, and received intervention between March 12, 2005, and May 8, 2005. Initially, 60 women agreed to participate in the study: 30 in the exercise group and 30 in the control group. Twenty-six women in the exercise group and 22 women in the control group completed the study. The attrition rates in the exercise and control groups were 13.3% and 26.7%, respectively; attritions occurred because of medical problems (e.g., flu), family meetings, traveling, and other reasons (Fig. 1). No significant differences were found in baseline measures between those who completed the study and dropouts.

Baseline participant characteristics

Table 1 shows the baseline demographic characteristics, physical fitness, depression, and self-efficacy of both the exercise and control groups. The groups were similar in all measurements, except in the case of the diastolic blood pressure, wherein the former group showed a significantly higher value than the latter group ($p = .005$).

Intervention effects on physical fitness

In the exercise group, measurements of parameters of physical fitness revealed statistically significant improvements in BMI, two variables (systolic and diastolic blood pressure) of cardiopulmonary endurance, muscle strength, and balance after intervention. In the control group, there were no significant changes in the measures of physical fitness, except for the diastolic pressure, which declined (Table 2).

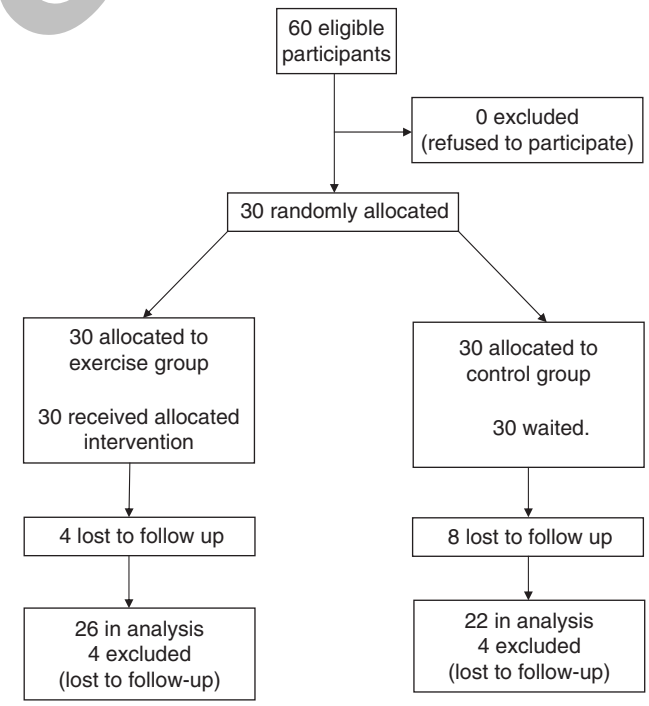

Figure 1. Flow diagram of a trial

TABLE 1. *Baseline Characteristics of the Exercise and Control Group*

	Exercise group (n = 26)		Control group (n = 22)		
Variable	*N*	%	*N*	%	*p*-value
Age	76.6 ± 6.8[a]		75.1 ± 8.2		.522
Education					
Illiteracy	14	53.8	12	54.5	.993
Elementary school	8	30.8	7	31.8	
Middle school or higher	4	15.3	3	11.6	
Marital state					
Married	5	19.2	2	9.1	.223
Widowed	21	80.8	20	81.3	
Religion					
Protestant	10	38.5	6	27.3	.746
Catholic	7	26.9	6	27.3	
Buddhism	4	15.4	3	13.6	
None	5	19.2	7	31.8	
Number of children (person)	3.04 ± 2.18		2.91 ± 1.72		.823
Monthly income (10,000 won)	41.8 ± 24.9		33.1 ± 29.5		.270
Pocket money per month (10,000 won)	3.0 ± 4.7		5.1 ± 6.3		.383
Chronic disease					
Yes (≥1)	26	100.0	21	95.5	.458
No	0	0.0	1	4.5	
Regular exercise					
Yes	9	34.6	6	27.3	.756
No	17	65.4	16	72.7	
Physical fitness					
Body composition					
Height (cm)	146.6 ± 6.0		149.6 ± 6.4		.102
Weight (kg)	53.0 ± 8.4		56.6 ± 8.5		.147
BMI (kg/m^2)	24.6 ± 3.4		25.2 ± 2.8		.527
Cardiopulmonary endurance					
Systolic BP (mmHg)	140.0 ± 16.5		139.8 ± 19.4		.972
Diastolic BP (mmHg)	88.2 ± 13.5		78.0 ± 9.8		.005
Heart beat (beats/min)	75.3 ± 10.8		72.5 ± 9.0		.331
Muscle strength					
Right-hand grip (kg)	12.8 ± 5.3		14.6 ± 5.2		.241
Left-hand grip (kg)	11.9 ± 4.8		14.4 ± 4.8		.080
Flexibility (cm)	7.88 ± 7.71		6.21 ± 7.84		.573
Balance (s)	3.26 ± 3.30		2.97 ± 2.31		.732
Depression (score)	23.6 ± 12.5		26.9 ± 10.7		.333
Self-efficacy (score)	16.8 ± 5.4		17.9 ± 6.1		.508

Note. [a]*M* ± *SD*.

Thus, the exercise program had significant improving effects on physical fitness, except for two variables: heart beat and flexibility (Table 2).

Intervention effect on depression and self-efficacy

There was a statistically significant decline in the depression score of the exercise group ($p < .001$) after the exercise program, while no significant changes were found in the control group (Table 2). Therefore, this exercise program had a significant effect in alleviating depression symptomatology.

There was a statistically significant increase in the self-efficacy scores of the exercise group ($p < .001$), with no significant changes in the control group (Table 2). Thus, the exercise program used in this study had a positive effect on improving self-efficacy.

TABLE 2. *Baseline and 8-Week Scores for Outcome Measures*

Variables	*M* ± *SD*		Adjusted difference[a]	*p*-value[b]
	Pretest	Posttest		
BMI (kg/m^2)				
Ex.	24.3 ± 3.4	23.9 ± 3.5	− 0.69	.003
Con.	25.2 ± 2.8	25.2 ± 2.7	− 0.03	
Cardiopulmonary endurance				
Systolic BP (mmHg)				
Ex.	140.0 ± 16.5	132.4 ± 12.8	− 7.53	.120
Con.	139.8 ± 19.4	138.7 ± 19.0	− 1.44	
Diastolic BP (mmHg)				
Ex.	88.2 ± 13.5	78.5 ± 6.8	6.33	.008
Con.	78.0 ± 9.8	84.3 ± 13.8	2.40	
Heart beat (beats/min)				
Ex.	75.3 ± 10.8	76.4 ± 7.8	1.93	.972
Con.	72.5 ± 9.0	75.5 ± 6.7	1.99	
Muscle strength				
Right-hand grip (kg)				
Ex.	12.8 ± 4.2	14.4 ± 5.4	1.29	.169
Con.	14.6 ± 5.2	14.1 ± 4.5	− 0.19	
Left-hand grip (kg)				
Ex.	11.9 ± 4.8	14.1 ± 4.6	2.05	.044
Con.	14.4 ± 4.8	14.2 ± 6.0	0.03	
Flexibility (cm)				
Ex.	7.48 ± 7.71	8.79 ± 6.22	1.58	.041
Con.	6.21 ± 7.84	5.34 ± 5.96	− 1.19	
Balance (s)				
Ex.	3.26 ± 3.30	4.59 ± 3.43	1.37	.001
Con.	2.97 ± 2.31	2.38 ± 1.82	− 0.63	
Depression CES-D (score)				
Ex.	23.6 ± 12.5	15.6 ± 10.6	− 8.57	< .001
Con.	26.9 ± 10.7	28.1 ± 11.2	1.87	
Self-Efficacy (score)				
Ex.	16.8 ± 5.4	22.0 ± 4.9	4.89	< .001
Con.	17.9 ± 6.1	17.1 ± 4.1	− 0.42	

Notes. Ex. = exercise group; con. = control group.
[a]Adjusted for initial value of each variable. [b]*p*-values by ANCOVA.

Discussion

The results of the study support the hypotheses that a program that includes education and exercise has a positive effect on measures of physical fitness, depression, and self-efficacy for low-income elderly women in South Korea.

As a measurement of physical fitness, the BMI improved significantly in the 8-week exercise program. This finding was congruent with the finding of Grant, Todd, Aitchison, Kelly, and Stoddart (2004), where a 12-week exercise program had significantly decreased the BMI of obese elderly women.

In this study, muscle strength increased significantly with the exercise program. Congruent findings were reported in other studies (Fatouros et al., 2002; S. J. Lee, 2000), which conducted aerobic and muscle-strengthening exercises for elderly people. Lastly, there was a significant improvement in balance after the completion of the exercise program. This result is in line with those of previous studies on elderly women (Choi, 2001; Ourania, Yvoni, Christos, & Ionannis, 2003). A comparison of the length of the exercise program in this study with those of previous studies revealed that subjects' balance significantly increased in proportion to the length of the exercise program.

Among the measures of physical fitness, heart rate and flexibility were not influenced by the exercise program in this study. In previous studies, in contrast,

the heart rate decreased significantly in 12-week exercise programs (Grant et al., 2004; W. Y. Lee, 2003) and flexibility increased in exercise programs lasting more than 8 weeks (Choi, 2001; W. Y. Lee, 2003; Ourania et al., 2003).

In addition, subjects' mean ages in other studies were lower than those in this study. Thus, a plausible explanation for findings regarding the heart rate and flexibility in this study is that the period and frequency of the exercise program were insufficient to see changes in the said measures and that the participants' age was a key influencing factor.

Depressive symptoms in the exercise group among low-income elderly women had significantly improved after the exercise program. This result was congruent with those of previous studies (K. E. Lee & Choi, 1999; Timonen, Rantanen, Timonen, & Sulkava, 2002), where the same and other depression measurement tools were utilized. However, in previous studies (Jeon, 1996; J. M. Park & Han, 2003; Yoon & Choi, 2002) that utilized Yesavage's (1998) Geriatric Depression Scale, depression in exercise groups did not change with exercise intervention although the lengths of the exercise programs were longer than that of this study. This discordance may be attributed to the difference in the measurement tools used and the fact that depression is influenced by age (J. J. Park & Hong, 2000).

The exercise program in this study included not only exercises but also background music. In addition, recreational activities and games were introduced in this study, which may have also affected depression. Thus, the change in depression scores can be ascribed to any of the following reasons: the exercise program and background music; the recreational activities and games incorporated into the program; or socialization with other elderly as a result of the overall program. We can thereby infer that the exercise program combined with background music, recreational activities, and games might be effective in reducing depression among low-income elderly women.

Self-efficacy increased significantly after the completion of the exercise program. Similar results were reported in a previous study where the elderly living in public institutions perceived increased self-efficacy after the exercise program (H. J. Kim, 1994). On the other hand, a study (M. R. Lee, 1996) investigating the effects of muscle-strengthening exercises on the self-efficacy of women with degenerative knee osteoarthritis reported that self-efficacy decreased after 6 weeks of intervention. Subsequently, at the 12-week point, it was higher than the baseline and 6-week point values. Thus, it can be said that the effect of exercise on self-efficacy may vary depending on subjects' characteristics such as age- and health-related factors.

There is limited scope for the generalization of the findings of this study because of the small sample size, the convenient sampling method used, and the short duration of intervention without follow-up. Further research aimed at the health promotion of low-income elderly women needs to expand the existing body of knowledge on the development and effectiveness evaluation of specific types of health promotion programs, including exercise, healthy behaviors, and health education.

In conclusion, this study examined the effects of an 8-week exercise program on physical fitness, depression, and self-efficacy in low-income elderly (≥75 years) women living in urban communities in South Korea. The exercise program used in this study was compared with existing ones in terms of the program format and components (e.g., type of background music, recreation activities, and games). Accordingly, various significant findings were derived, such as an increase in all measurements of physical fitness, with the exception of heart beat and flexibility, a decrease in depression, and an increase in self-efficacy.

In addition, the current study focuses on elderly women from the lower socioeconomic strata who have difficulty in accessing to health promotion programs. In fact, it is the first study to shed light on low-income elderly women who are vulnerable to many chronic illnesses. Accordingly, this exercise program may be recommended as a method to maintain and promote the health of elderly individuals as well as low-income elderly women.

References

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.

Centers for Disease Control and prevention [CDC]. (2004). Strength training among adults aged ≥65 years United States, 2001. *Morbidity and Mortality Weekly Report*, *53*(2), 25–28.

Cho, W. J. (1998). Development of a health promotion program for elders using PRECEDE model. *Korean Journal of Nursing Query*, *7*(2), 169–186.

Choi, S. K. (2001). *The study on the effects of silver-obic exercise program on physical functions and powerlessness*. Unpublished master's thesis, Ewha Womans University, Seoul, South Korea.

Christmas, C., & Andersen, R. A. (2000). Exercise and older patients: Guidelines for the clinician. *Journal of the American Geriatrics Society*, *48*(3), 318–324.

Conn, V. S., Burks, K. J., Pomeroy, S. H., Ulbrinch, S. L., & Cochran, J. E. (2003). Older women and exercise: Explanatory concepts. *Women's Health Issues*, *13*(4), 158–166.

Fatouros, I. G., Taxildaris, K., Tokmakidis, S. P., Kalapotharakos, V., Aggelousis, N., Athanasopoulos, S., et al. (2002). The effects of strength training, cardiovascular training and their combination on flexibility of inactive older adults. *International Journal of Sports Medicine*, *23*(2), 112–119.

Grant, S., Todd, K., Aitchison, T. C., Kelly, P., & Stoddart, D. (2004). The effects of a 12-week group exercise programme on physiological and psychological variables and function in overweight women. *Public Health*, *118*(1), 31–42.

Jeon, M. Y. (1996). *Effect of Korean traditional dance movement training on psycho-physiological variables in Korean elderly women*. Unpublished master's thesis, Seoul National University, Seoul, South Korea.

Jung, Y. (2002). The effects of rhythmical exercise program on physiological index, life satisfaction, calcium, phosphorous, osteocalci, deoxypyridinoline in older women. *Journal of Korean Fundamental Nursing Science*, *4*(2), 93–112.

Kim, H. J. (1994). *An effect of muscle strength training program on muscle strength, muscle endurance, instrumental activities of daily living and quality of life in the institutionalized elderly*. Unpublished doctoral dissertation, Seoul National University, Seoul, South Korea.

Kim, J. H., Lee, E. H., Hong, M. Y., Ahn, M. H., & Kim, Y. J. (2004). Effects of rhythmic exercise on body composition and health-related fitness in elderly women. *Korean Sports Research*, *15*(2), 1207–1215.

Kim, O. S., Kim, A. J., Kim, S. W., & Baik, S. H. (2001). The effects of anxiety, depression, and self-esteem on smoking and nicotine dependency among unmarried woman smokers. *Journal of Korean Academic Society of Adult Nursing*, *13*(4), 509–516.

Korea Ministry of Health and Welfare. (2007). *Aging society in Korea*. Retrieved November 20, 2007, from http://www.mohw.go.kr

Korea National Statistical Office [KNSO]. (2001). *2000 national survey in population and household*. Seoul: Korea National Statistical Office.

Lee, K. E., & Choi, E. S. (1999). The effect of dance movement program on psychological health in middle-aged women. *Journal of Korean Women's Health Nursing Academic Society*, *5*(1), 43–53.

Lee, M. R. (1996). An effect of muscle strengthening exercise program on muscle strength, pain, depression, self-efficacy and quality of life of patients with knee osteoarthritis. *Journal of Nurses Academic Society*, *26*(3), 556–575.

Lee, M. R. (2001). Predicting exercise behavior in middle-aged women: Extended theory of planned behavior. *Journal of Korean Academic Society of Adult Nursing*, *13*(4), 610–619.

Lee, S. J. (2000). An application effect of rhythmic movement program for the health promotion in the elderly. *Journal of Nurses Academic Society*, *30*(3), 776–790.

Lee, W. Y. (2003). *The effects of rhythmic music therapy for health promotion in the elderly*. Unpublished doctoral dissertation, Chungang University, Seoul, South Korea.

Lim, S. K., & Cho, J. H. (2003). The effects of isokinetic training and stretching exercise for 12 weeks on physical fitness factors in elderly women. *Journal of Sports Science Research*, *13*(2), 191–202.

Moon, J. H., Oak, J. S., & Park, W. Y. (2004). The effect of 12 week exercise program on muscle fitness, flexibility, and balance in the fall down female. *Sports Science*, *13*(1), 77–86.

Oka, R. K., DeMarco, T., & Haskell, W. L. (2005). Effect of treadmill testing and exercise training on self-efficacy in patients with heart failure. *European Journal of Cardiovascular Nursing*, *4*(3), 215–219.

Ourania, M., Yvoni, H., Christos, K., & Ionannis, T. (2003). Effects of a physical activity program: Study of selected physical abilities among elderly women. *Journal of Gerontological Nursing*, *29*(7), 50–55.

Park, I. Y. (2004). Effects of 12 weeks aerobic exercise on health-related physical fitness and bone density in elderly. *Journal of Sport and Leisure Studies*, *22*, 459–469.

Park, J. J., & Hong, Y. J. (2000). The study on depression in elderly women according to physical exercise. *Journal of Korean Society of Aerobic Exercise*, *4*(1), 13–27.

Park, J. M., & Han, S. H. (2003). The effect of exercise program on health and depression in the elderly. *Journal of Nurses Academic Society*, *33*(2), 220–227.

Radroff, L. S. (1977). The CES-D Scale: A new self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401.

Resnick, B., Luisi, D., & Vogel, A. (2008). Testing the senior exercise self-efficacy project (SESEP) for use with urban dwelling minority older adults. *Public Health Nursing*, *25*(3), 221–234.

Resnick, B., Vogel, A., & Luisi, D. (2006). Motivating minority older adults to exercise. *Cultural Diversity Ethnic Minority*, *12*(1), 17–29.

Timonen, L., Rantanen, T., Timonen, T. E., & Sulkava, R. (2002). Effects of a group-based exercise program on the mood state of frail older women after discharge from hospital. *International Journal of Geriatric Psychiatry*, *17*(12), 1106–1111.

Weissman, M. M., Sholomskas, D., Pottenger, M., Prusoff, B. A., & Locke, B. I. (1977). Assessing depressive symptoms in five psychiatric populations: A validation study. *American Journal of Epidemiology*, *106*, 203–214.

Yang, K., Suk, S., & Kim, G. (2005). The effect of stretching exercise upon depression and motivation for rehabilitation of stroke patients. *Clinical Nursing Research*, *11*(1), 47–56.

Yesavage, J. A. (1988). Geriatric depression scale. *Psychopharmacology Bulletin*, *24*(4), 709–711.

Yoon, S. R., & Choi, H. J. (2002). The effects of recreation dance on depression and life satisfaction in elderly women in a low class community. *Journal of Korean Gerontological Society*, *16*(1), 135–147.