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Effects of the BeHaS Exercise Program on Self-Esteem, Balance, and Flexibility in Community-Dwelling Adults Experiencing Pain

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Abstract

The purpose of this study was to evaluate the effects of the Be Happy and Strong (BeHaS) exercise program on the physical and psychological function of community-dwelling adults experiencing pain. This was a single-group experimental study with pre- and post-tests given to 57 community-dwelling adults. The BeHaS exercise program was conducted in three different districts in D city. It was conducted once per week for 8 weeks. The outcome measures were self-esteem, balance, and flexibility (left and right shoulder). Data were analyzed using descriptive statistics and paired t-test. Following the intervention, there were significant improvements in balance, flexibility of the left shoulder, and self-esteem. No statistically significant change was observed in the flexibility of the right shoulder. The BeHaS exercise program may be an effective nursing intervention as it has a positive impact on both the physical and psychological health of community-dwelling adults experiencing pain.

Keywords: Balance, Exercise, Flexibility, Self-Esteem

1. Introduction

There has been increasing interest in health problems due to the aging population in Korea. One of the most common health problems among the elderly population is chronic pain. About 67% of community-dwelling elderly suffer from pain and patients have usually reported one or more pain areas[1]. Chronic pain is a health issue frequently complained about among an aged population. A previous study conducted on 1,118 elderly people aged 65 and over found that more than half of community-residing elderly adults suffered from severe pain caused by chronic musculoskeletal diseases[2].

In fact, according to the statistical analysis of the actual living conditions of the elderly and a welfare needs survey, many community-dwelling elderly adults had various musculoskeletal disorders[3]. In terms of chronic disease in the elderly, arthritis has the second highest prevalence, affecting 34.3%, followed by lower back pain (21.0%) and osteoporosis (12.7%).

Elderly adults with pain experience a decline in physical activities, leading to health problems, such as functional deterioration, sleep problems, depression, and low quality of life[4,5]. Moreover, the pain can last for the rest of the patient's life.

Chronic pain caused by musculoskeletal disorders becomes a major burden, not only for individuals, also for but health systems and communities, contributing significantly to indirect costs[6]. To solve this problem, physical exercise therapy is considered an alternative and effective approach[7].

In many patients experiencing pain, drug treatments for pain alleviation are often limited due to side effects. Since pain is a considerable health issue, cost-effective

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and community-based approaches would be desirable. Although patients experiencing pain are often afraid of exercising, research has explained how chronic disability develops in patients experiencing pain[8–10]. For these people, gentle physical exercise, mind-body exercise, and some type of relaxation therapy should be recommended for their pain management.

Chronic disability caused by pain may increase the number of days in which the activities of daily living, particularly for the elderly, necessitate reliance on others. It is important to improve one's functional independence through regularly conducted physical activities, as self-esteem and self-efficacy are easily undermined, endangering one's quality of life[11,12].

Having a greater pain tolerance, exercise program, or relaxation therapy produces a global improvement in quality of life[13–16]. Further, it exercise programs have a proven ability to significantly reduce falls in older adults, as exercise improves physical function, strength, and balance[17].

Additionally, patients experiencing pain who also have impaired balance are at a greater risk of falls[18]. As patients with pain may rely heavily on their sight to maintain their balance, it is possible that these patients would be at an increased risk for falls if their visual input were inappropriate or reduced, such as at nighttime. The Be Happy and Strong (BeHaS) exercise program is a balance-based exercise program that integrates movement of all joints in the body. Maintaining proper balance and flexibility can help prevent or treat pain experienced due to musculoskeletal disorders[19]. The BeHaS exercise program also consists of therapeutic time in which participants are encouraged to express their feelings, consequently enhancing their self-esteem[20].

For the community-dwelling adults, it is essential to choose exercise interventions that are easy to access[21]. Exercise that requires equipment may lose its benefits when the research intervention finishes. In addition, increasing the effects of listening to music can be expected when this is combined with exercise. In previous research involving music integrated into an exercise intervention, the quality of life of the participants was improved significantly with decreased anxiety and depression[22].

The BeHaS exercise program was developed by Kim[21] for elderly people with osteoarthritis. Many previous studies have reported the effectiveness of the BeHaS exercise program on physical and psychological health[23-25]. However, no previous research has looked at patients who are in ongoing pain. Arthritis, for example, often causes pain and most patients use drugs or injection to control their pain.

There has generally been a lack of evidence for the link between the BeHaS exercise program and physical and mental health among patients experiencing ongoing pain. This current study was designed to ascertain the actual outcomes for elderly adults experiencing ongoing pain after an 8-week BeHaS exercise program.

2. Purpose of Study

This study was designed to evaluate the effectiveness of the BeHaS exercise program on the physical (balance and flexibility) and psychological (self-esteem) functions of community-dwelling adults experiencing pain.

3. Method

A single-group quasi-experimental study design was used. Pre- and post-tests were used with a group of community-dwelling adults. An 8-week Silver BeHaS exercise program was conducted in three different districts in D city. Participants signed informed consent forms.

Using the G*Power 3.0 program, the sample size of this study was determined. A significance level of 0.05, power of 0.08, and effect size of 0.50 were applied. The required sample for this study was 27. Taking into consideration possible dropouts, 76 participants were recruited using convenience sampling. Of the 76 adults who applied to participate in the BeHaS program, patients who reported experiencing pain above Pain Level 1 were included in this study. A total of 57 adults experiencing pain completed both the pre- and post-tests.

3.1 BeHaS Exercise Program

The BeHaS exercise program was conducted by a nurse who was qualified instructor for the BeHaS exercise program, once per week for 8 weeks (a total of 8 sessions). The program's sessions lasted approximately 60 to 120 minutes per day. The program consisted of four different processes; namely, theme activities, health education, group support, and exercise. These sessions involved either singing or listening to music. A brief outline of the BeHaS exercise program is as follows (Table 1).

Table 1. Contents of the BeHaS exercise program

Duration and Session	Contents	Time
8 Weeks 8 Sessions	Theme activity	20 minutes
	Health Education	10 minutes
	Group support	10 minutes
	Exercise Warming -up exercise Main exercise Cooling down exercise	30-60 minutes

3.2 Instrument

3.2.1 Pain

The numeric rating scale (NRS) of pain severity used to assess the pain level of participants. A Likert scale ranging from 0 (none) to 10 (severe) was used, with a higher score indicating higher pain levels.

3.2.2 Balance

The one leg standing test was conducted with an eyes closed condition. The length of time (sec) of participants standing on one leg was measured to assess balance. The longer the time measured, the better the balance of the participants.

3.2.3 Flexibility

The back scratch test was used to measure the shoulder flexibility of the study participants. During the back scratch test, participants were asked to reach behind their head with one hand and behind their back with the other hand toward the middle finger of both hands. The score is expressed as the distance (cm) between both middle fingers and a shorter distance indicates better shoulder flexibility.

3.2.4 Self-Esteem

The Rosenberg Self-esteem Scale[26] was used to measure the level of self-esteem. This tool consists of 10 items: 5 are positive questions and 5 are negative questions. Using a 5-point Likert scale, participants responded to 10 statements ranging from 1 (strongly disagree) to 6 (strongly agree). A higher score indicates the higher self-esteem of participants.

3.3 Statistical Analysis

Analyses were performed using the Statistical Package for Social Sciences (SPSS 21.0, SPSS Inc., Chicago, IL, USA). Demographic variables were analyzed using descriptive analysis. Paired t-tests were performed for the pre- and post-comparisons for the continuous variables. The differences were considered significant at $P < .05$.

4. Results

The demographic characteristics of the participants are described in Table 2. The mean age of the participants was 67.91. The mean score of the participants' pain level was 4.16. The majority of participants were female (86.0%). One-fifth of participants were uneducated and one-third

Table 2. General characteristics of the study participants (N = 57)

Characteristics	Category	N (%) or M(±SD)
Age (yrs)		67.91(±9.30)
Pain (0-10)		4.16 (±1.92)
Gender	Male	8 (14.0%)
	Female	49(86.0%)
Education	Uneducated	13 (22.8%)
	Primary school	6(10.5%)
	Middle school	9(15.8%)
	High school	10(17.5%)
	College/University	17(29.8%)
Religion	Protestant	1(1.8%)
	Catholic	56(98.2%)
Regular exercise	Yes	12(21.1%)
	No	45(78.9%)

had received higher education above college. Only one out of five participants reported undertaking regular exercise (Table 2).

Mean scores for balance, flexibility, and self-esteem are presented in Table 3. Apart from one variable—the flexibility of the right arm - scores changed significantly after the BeHaS exercise program intervention. There was a statistically significant change in participants' balance in which the mean score increased from 4.24 to 5.23 ($t = -2.423$, $p = .019$). The flexibility of the participants' left arm enhanced significantly, as the mean score decreased from 16.67 to 13.75 after intervention ($t = 2.458$, $p = .017$). The self-esteem of participants was enhanced significantly from 25.50 to 27.49 ($t = -4.445$, $p < .001$).

Table 3. Mean differences for balance, flexibility, and self-esteem after intervention (N = 57)

Variables	Pre-test M (±SD)	Post-test M (±SD)	Difference in mean change M (±SD)	t	P
Balance sec	4.24 (±4.45)	5.23 (±4.29)	0.99 (±3.31)	2.423	.019
Flexibility (Rt.), cm	11.54 (±10.25)	10.69 (±9.39)	-.85 (±4.41)	-1.454	.151
Flexibility (Lt.), cm	16.67 (±11.81)	13.75 (±9.61)	-2.92 (±8.96)	-2.458	.017
Self-esteem	25.51 (±3.40)	27.49 (±2.98)	1.87 (±3.36)	4.445	.000

5. Discussion

With no clear evidence regarding the effectiveness of exercise intervention for people experiencing pain, they are reluctant to exercise when they are suffering from ongoing pain, and since most elderly adults have chronic pain, it would not be diminished easily. However, the study findings revealed the effectiveness of the BeHaS exercise program intervention on balance, shoulder flexibility, and self-esteem in community-dwelling adults experiencing pain. Therefore, the BeHaS exercise program could be used for community-dwelling adults. The study findings also suggest not only physical, but also psychological, benefits of the BeHaS exercise program for patients experiencing pain.

Following the BeHaS exercise program, the participants' balance was significantly enhanced. This finding is consistent with previous studies in which the BeHaS exercise program was applied to various groups, from middle-aged groups to institutionalized elderly[23–25]. A previous study conducted with community-dwelling elderly individuals found a significant association between foot and ankle strength and performance in balance[27]. The BeHaS exercise program was designed to strengthen the lower leg muscles through various movements of the lower part of the body, which explains the improvement in balance.

In this study, right shoulder flexibility was enhanced significantly. Interestingly, flexibility of the left shoulder showed a non-significant improvement, while the back scratch score decreased slightly by 0.85 cm. This was consistent with one previous study in which the 8-week BeHaS exercise program was applied to women in a senior citizens' school[28]. Here, there was no significant improvement in shoulder flexibility. Since the participants were recruited from the senior citizens' school, they had already been exposed to many physical activity programs, and had much better flexibility compared to other community-dwelling elderly adults. Eight weeks of intervention would not be enough to significantly improve shoulder flexibility. Nevertheless, most previous study with the BeHaS exercise intervention showed that participants' flexibility improved in both shoulders[23–25].

One possible explanation is an unequal level of flexibility between both shoulders. Considering that participants had better flexibility on the right shoulder at the baseline test, the improvement was relatively insignificant. Most Koreans are right arm dominant, and better flexibility in the right arm would be expected in study participants. In addition, participants in this study may be less engaged in the flexibility exercise due to ongoing pain. Therefore, further research with a pre- and post-test

control group design is required to evaluate the effectiveness of the intervention.

Increasing flexibility through physical activities means that individuals' pain can be manageable[19]. In addition, the BeHaS exercise program does not require a particular instrument or place for people experiencing pain to exercise regularly.

The present study also found a significant positive relationship between the exercise program and the self-esteem of participants. Participants' self-esteem enhanced significantly after the exercise intervention, suggesting a positive impact of the exercise program on the mental health of participants. In previous studies, physical activities were proven effective in enhancing self-esteem, especially in an elderly group[29–31]. The positive effects of exercise can be boosted when it is undertaken in a group[32]. This is because individuals satisfy their need for positive self-esteem by establishing a relationship with other members as well as by affiliating with socially valued activities. Moreover, the BeHaS exercise program includes some activities in which individuals share their feelings and experiences. In this regard, many participants of the BeHaS exercise intervention express feelings of joy during and at the end of the program. However, in this study, which examined self-esteem only, the psychological effects of the BeHaS exercise intervention are ambiguous.

The BeHaS exercise program does not require special equipment or physical space. In addition, anyone after two days of undertaking an instructor workshop can become qualified to run a program within the community. The BeHaS exercise program, therefore, is suitable for a community-dwelling population, and could easily be expanded nationwide.

6. Conclusions

The findings of this study show the effectiveness of an 8-week BeHaS exercise program in community-dwelling adults experiencing pain. The BeHaS exercise program enhanced balance, flexibility, and self-esteem, suggesting a positive impact of the BeHaS exercise program on the physical and psychological health of study participants. The results show the possibility for the application of an exercise intervention for people experiencing ongoing pain. The present study provided the baseline data needed for further research to ascertain the effectiveness of the BeHaS program on other physiological and psychosocial outcomes. This study used a single-group pre- and post-test design, which results in a lack of causal relationships. Further research using a pre- and post-test control group design that considers other possible physical and psychological effects is needed.

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