RESEARCH ARTICLE

The effect of self-management training on pain intensity in patients with knee osteoarthritis referring to orthopedic clinic of Imam Hossein Hospital in Malayer

Afsar Omidi[1], Mostafa Jamshidi Zanganeh[2], Masoud Khodaveisi[1], Younes Mohammadi[3]

[1]Department of Community Health Nursing, Chronic Diseases (Home Care) Research Center, Hamadan University of Medical Sciences, Hamadan, Iran, [2]Department of Community Health Nursing, Hamadan University of Medical Sciences, Hamadan, Iran, [3]Department of Epidemiology and Biostatistics, School of Health, Hamadan University of Medical Sciences, Hamadan, Iran

Correspondence to: Masoud Khodaveisi, E-mail: khodaveisi@umsha.ac.ir

ABSTRACT

Background: Knee esthetic anesthesia is one of the most common diseases of old age. Pain, which limits the activity of patients, is the most common symptom of the disease. Self-management is one of the best approaches for reducing the symptoms of osteoarthritis. **Aims and Objectives:** The present study aimed to determine the effect of self-management training on pain intensity in patients with knee osteoarthritis. **Materials and Methods:** The present quasi-experimental study was conducted on 100 patients with knee osteoarthritis who referred to Imam Hossein Malayer Hospital; subjects were selected by convenience sampling method and randomly divided into two groups of test and control. Required data were collected using a questionnaire including demographic information and pain intensity questionnaire, which was measured by visual analog scale. Questionnaires were completed before and 2 months after the intervention by both groups. Then, pain intensity was evaluated and compared in two groups. Data were analyzed using SPSS version 22, Chi-square, independent t-test, and paired *t*-test. **Results:** The results showed that the mean score of pain severity was not significantly different between the two groups before and after the intervention ($P < 0.05$). There was a statistically significant decrease between the mean scores of pain intensity before (3.97 ± 0.91) and after intervention (2.77 ± 1.03) ($P < 0.05$). Furthermore, there was a statistically significant difference between the mean pain scores in the intervention and control groups after intervention ($P < 0.05$). However, in the control group, there was no statistically significant difference between the mean scores of pain severity before the intervention (3.96 ± 1.12) and after intervention (3.64 ± 0.8) ($P < 0.05$). **Conclusion:** The results of this study showed that considering proper diet and using non-medical pain relief methods such as exercise and stretching exercises and water treatment during self-management can reduce the severity of pain in knee osteoarthritis patients. Therefore, the implementation of self-management program by patients can be effective in reducing the incapacity and improves their range of motion.

KEY WORDS: Knee Osteoarthritis; Self-management Training; Pain Intensity

INTRODUCTION

Chronic diseases are the main challenge of health systems in the 21st century.[1] One of the most common types of chronic diseases is osteoarthritis, which affects millions around the world.[2] Osteoarthritis, or arthritis, is a joint disease that is gradual, chronic, and progressive. In this disease, the articular

cartilage is damaged and changes occur in the bone near the joint. The most common articular disorder is osteoarthritis of the knee, which is more common in the elderly due to low motor activity.[3] The prevalence of osteoarthritis increases with age. In Iran, 25% of people over the age of 65 are afflicted with knee osteoarthritis.[4] Today, nearly 700 million people worldwide are aged 60 and over, which will reach more than a billion by the end of 2020. According to a census of the Iranian Statistics Center, the 60-year-old population in Iran will reach over 10% by 2021.[5] Aging is the most important risk factor for osteoarthritis. Other risk factors for this disease are obesity, type of occupation, metabolic diseases, and trauma. Osteoarthritis causes motor disorder such as walking, climbing, and weight-bearing, especially in the elderly.[6] Factors such as maladaptive patterns and the prevalence of obesity in the society, especially among women, have led to an increase in osteoarthritis, as well as bad habits such as landing and using Iranian hand bases.[7] A study in the United Kingdom showed that in very obese people, the risk of osteoarthritis and knee rubbing is 6 times that of lean individuals.[2] So far, no definitive treatment of osteoarthritis has been proposed. Treatment options are medical, non-pharmacological, or surgical.[8] Self-management is one of the recent approaches to the treatment and care of osteoarthritis. In a self-management approach, individuals are encouraged to carry out activities that promote health, and treat and control the symptoms of the disease.[9] The goal of treatment and control of osteoarthritis is to reduce the pain of the patient and reduce joint stiffness to improve motor function.[10] Several studies have been carried out on the effects of non-pharmacological methods such as exercise therapy and physiotherapy on osteoarthritis patients who have reported the effectiveness of these studies.[7,11,12] Therapeutic exercises reduce the severity of pain effectively. Physicians have recommended non-pharmacological practices, particularly exercises such as tensile training, strength, and exercise in the water.[8] Hydrotherapy, through strengthening the muscles around the joint and reducing the pressure on it, is effective in reducing the intensity of pain and improving the quality of life of these patients. The results of the Hassani *et al.* study showed that although therapeutic motion in water does not affect the electrical activity of quadrilateral muscles, it can be used as an effective way to reduce pain intensity in patients with knee osteoarthritis.[11] Therapeutic motion can increase the range of knee movements and strengthen the muscles around the knee. These moves follow several major goals. At the first stage, attempts are made to increase the range of knee movements by stretching exercises. The next step is to try to increase the strength of the muscles by doing the movements. By increasing the strength of these muscles, especially the quadriceps muscle, knee pain is greatly reduced.[12] In the absence of mobility, the severity of joint pain and stiffness may be exacerbated somewhat; even, it might get difficult for the patient to perform daily activities. These patients will have to pay huge costs to treat their illness including pharmaceuticals and surgeries.[13] According to

recent statistics, about $ 10 billion is spent on arthritis a year in the United States.[14] Arthritis is a major factor in reducing the productive power of the community, and it imposes high health care costs on societies. Arthritis causes 97% of knee replacement surgery.[10] Health and medical personnel, including nurses, can take effective measures by self-management education to reduce the patient's problems, in particular, reducing the cost of treatment and using non-pharmacological methods to reduce pain intensity.[13] Self-management is one of the most important approaches to reduce the cost of treatment and care for patients, especially those with chronic illnesses, and health policy-makers emphasize the development and promotion of self-management skills. Considering the role and effect of self-management in the treatment and care of knee osteoarthritis, this study examines the effect of self-management training on the pain intensity of patients with knee osteoarthritis.

MATERIALS AND METHODS

This study was a quasi-experimental study with pre- and post-measurement and control group that was performed by available sampling method; it was performed on 80 patients with knee osteoarthritis referring to the orthopedic clinic of Imam Hossein Hospital, Malayer in the second half of 2017. Being between 50 and 70 years of old, being literate, disease confirmation by orthopedic surgeon or radiologist, lack of other chronic diseases, not taking medicine, not having had surgical operation on the knee, not having a history of injection into the knee joint during the 30 days before the intervention, and no history of attending training classes or workshops on osteoarthritis were the main inclusion criteria. Deaths, relocation, and exacerbation of the disease that led to admission were exclusion criteria. According to Mirzaee *et al.* study, which was conducted to determine the effect of self-care education on the performance of elderly with knee osteoarthritis,[15] was estimated to be 49 in each group, with an error of $\alpha = 10\%$ and the power of 80%. Taking 10% drop in each group 54 people entered the study. The required data were collected through a two-part questionnaire. The first part was the demographic and clinical data collection form which was prepared by the researcher and verified by 10 faculty members of Hamadan Nursing and Midwifery Faculty specialized in the subject and included questions on age, sex, marital status, weight, economic status, occupation, education, number of children, place of residence, duration of illness, and family history of osteoarthritis; the second was the visual analog scale questionnaire. This visual scale included a 100 mm horizontal line, with the word "no pain" on one end and "extreme pain" on the other. The patient will mark the amount of pain that she feels at times on the 100 mm ruler of this smooth line. The method of measuring pain is calculated using a graded ruler from the beginning of the ruler to the patient's mark. This scale has been used extensively in pain-related research, and its validity and

reliability have been repeatedly confirmed.[16] To collect the data, after approving the plan and obtaining written permission from the university authorities and the ethics committee, the researcher was introduced by presenting the letter to the head of Imam Hossein Hospital, Malayer. The samples were available at orthopedics clinic and randomly divided into two groups using permutation block. 54 people were selected as the control group on even and 54 other were selected as the test group on odd days. The researcher attended the research environment, while introducing himself to the units and obtaining their written consent; then, he explicated the purpose of the study and the manner of completing the questionnaires. Then, the questionnaires were completed by the two groups of test and control. Test group subjects received self-management training in the form of lecture and PowerPoint in three sessions of 45–60 min, each session at a maximum of 10 people in Imam Hossein Hospital lecture room. At the first session, pain relief methods (resting on the knee, using warm water compressors, keeping knees up reducing heavy activity and modifying lifestyle such as sitting on the chair, using a cane, using a bed instead of mattress on the floor, and using a chair-shaped armchair) were explained to the subjects; in the second session, proper diets (using fresh fruits and vegetables, consuming foods containing Vitamin C, Vitamin D, and calcium, consuming foods that contain omega-3 and soy) were taught to the subjects; then, in the third session, appropriate physical exercise was practiced in the presence of the researcher to strengthen the knee muscles. At the end of the course, a booklet containing the materials described was provided to patients. 2 months after the intervention, the pain intensity questionnaire was completed again by both groups. For the ethical considerations, the educational pamphlet was also provided to the control group at the end of the research. Data were analyzed using SPSS. To describe the characteristics of the groups, the absolute and relative abundance, mean and standard deviation were used. To investigate the effects of pre- and post-intervention in each group, t-test or non-parametric Wilcoxon equivalents were used. To determine the effects of intervention, the independent t-test or non-parametric Mann–Whitney equivalent test was used at a statistical significance level of 0.05.

RESULTS

The results of the study showed that the mean age of the patients was 57.12 ± 9.16 in the test and 58.76 ± 8.31 in the control group. In regard with gender, the majority of the subjects, 78% in the test and 80% in the control group, were female. 70% of subjects in the test and 72% in the control group were married. The majority of subjects in both groups, 66% in the test and 72% in the control group, had an education below the diploma. Furthermore, the majority of subjects in the test group (76%) and in the control group (74%) had an occupation requiring standing position. 48% of test and 52% of subjects in the control group had the

keen pain for more than 4 years by the time of the study. The majority of subjects in the test (48%) and control group (58%) had pain in both knees. Most of the subjects in the test group (80%) and control group (68%) used analgesic drugs before intervention. The use of analgesic was 74% before intervention, decreasing down to 44% after the intervention. Furthermore, other items, such as calcium intake, D3, omega-3, and soy foods, increased from 20% to 50% in the test group after intervention. According to Chi-square and independent t-test, the subjects were homogeneous in two groups of test and control in terms of age, sex, education level, marital status, occupation, body mass index and income, number of children, history of osteoporosis, and occupational activity. There was no statistically significant difference between the two groups ($P > 0.05$) [Table 1]. Wilcoxon non-parametric test and Kolmogorov–Smirnov statistical significance test were used to compare the mean of pain intensity in the test group before and after the intervention, the result of which, after examining the normality of the variables, implied the negation of the assumption of normalization ($P > 0.05$); the mean score of pain intensity in the test group decreased from 3.97 ± 0.91 to 2.77 ± 1.03, which is statistically significant [Table 2] ($P < 0.05$). Furthermore, for comparing the mean pain intensity in the control group before and after the intervention, after examining the normality of the variables studied using the Kolmogorov–Smirnov statistical significance test and assuming a normal assumption ($P < 0.05$), there was no statistically significant difference between the mean score of pain intensity before intervention (3.96 ± 1.29) and after intervention (3.64 ± 0.81) ($P < 0.05$). To compare the mean pain intensity in the control and test groups, after using the Kolmogorov–Smirnov statistical significance test and refusing to assume normality ($P > 0.05$), the non-parametric Mann–Whitney test was used, according to which there was no statistically significant difference between the mean scores of pain intensity in the two groups before intervention ($P > 0.05$). However, there was a statistically significant difference between the mean pain scores in the two groups after the intervention [Table 3] ($P < 0.05$).

DISCUSSION

Disability causes several constraints in patients with osteoarthritis. These patients do whatever they can to minimize pain and disability. In this study, the effect of self-management training on the severity of pain in patients with knee osteoarthritis was examined. The results of this study showed that the mean pain scores decreased in the test group after the self-management training, while the mean pain scores did not change in the control group and there was a significant difference between the mean pain scores in the two groups after the intervention. The findings of this study were consistent with Jahan. study that examined the effect of self-management program on knee pain in elderly patients with osteoarthritis.[17] Kao *et al.* examined the effects of

Table 1: Demographic characteristics of the subjects in two groups of test and control				
Information	**Groups**	**Examination group *n* (%)**	**Control group *n* (%)**	***P***
Sex	Women	38 (76)	40 (80)	*P*=0.447
	Men	12 (24)	10 (20)	
Marital status	Single	3 (6)	4 (8)	*P*=0.925
	Married	36 (72)	35 (70)	
	Widow/widowed	11 (22)	11 (22)	
Education	Illiterate	1 (2)	2 (4)	*P*=0.748
	Under diploma	33 (66)	36 (72)	
	Diploma	8 (16)	7 (14)	
	Academic education	8 (16)	5 (10)	
Income	<250 USD	15 (30)	14 (28)	*P*=0.953
	250–500 USD	25 (50)	28 (56)	
	500–750 USD	5 (10)	5 (10)	
	More than 750 USD	5 (10)	3 (6)	
Occupation	Standing	38 (76)	37 (74)	*P*=0.870
	Sitting	12 (24)	13 (26)	
Residence	Village	40 (80)	42 (84)	*P*=0.513
	Township	9 (18)	7 (14)	

Table 2: Clinical profile of subjects under study				
Information	**Groups**	**Examination group *n* (%)**	**Control group *n* (%)**	***P***
Body condition at the time of intense pain before intervention	Sitting position	6 (12)	10 (20)	*P*=0.099
	Standing position	6 (12)	5 (10)	
	During activity	21 (42)	15 (30)	
	Right after standing up	6 (12)	1 (2)	
	Always	11 (22)	19 (38)	
Body condition at the time of intense pain after intervention	Sitting position	6 (12.2)	19 (38)	*P*=0.025
	Standing position	7 (14.3)	5 (10)	
	During activity	21 (42.9)	15 (30)	
	Right after standing up	7 (14.3)	1 (2)	
	Always	8 (16.3)	18 (36)	
Knee pain time	<1 year	6 (12)	5 (10)	*P*=0.926
	Between 1 and 2 years	11 (22)	9 (18)	
	Between 2 and 4 years	9 (18)	9 (18)	
	More than 4 years	24 (48)	27 (54)	
Knee pain site before intervention	Left knee	14 (28)	13 (26)	*P*=0.526
	Right knee	12 (24)	8 (16)	
	Both knees	24 (48)	29 (58)	
Knee pain site after intervention	Left knee	16 (32)	13 (26)	*P*=0.826
	Right knee	13 (26)	11 (22)	
	Both knees	21 (42)	26 (52)	

self-management intervention in adults with knee osteoarthritis in Taiwan, the results of which turned out to be consistent with the present study. Hence, implementation of self-management program reduced the severity of pain in patients with knee osteoarthritis.[18] The results of Anwer *et al.* study, entitled the effect of self-management exercise program in patients with knee osteoarthritis, were consistent with the current research

and showed that managing exercise programs are effective in knee arthritis rehabilitation.[19] Furthermore, the results of this study were consistent with the study of Mehrabian *et al.* that examined the effect of exercise in water on knee osteoarthritis in women. This study showed that the implementation of self-management program in patients with osteoarthritis reduced the intensity of pain and improved motor function in daily

Table 3: Comparison of pain intensity mean scores in two groups of test and control before and after the intervention

Groups	Before examination		After examination		P
	Pain intensity mean score	SD	Pain intensity mean score	SD	
Examination	3.97	0.91	2.77	1.03	Z=−4.995
					P=0.0001
Control groups	3.96	1.12	3.64	1.08	t=3.226
					P=0.062

SD: Standard deviation

activities and their quality of life.[20] Buszewicz *et al.* study was conducted to determine the effect of self-management program on patients with osteoarthritis. The results showed that self-management program reduced anxiety and increased self-efficacy, but the severity of their pain and their sexual function did not change, which was not consistent with the present study.[21] Considering the results of the studies and the present study, more research is needed on the duration of exercise, the number of repetitions and intensity of exercises, and the amount of social support and quality of life in patients with knee osteoarthritis.

CONCLUSION

In general, the results of this study showed that self-management programs that included pain reduction, proper diet, and physical exercises were effective on pain severity in patients with knee osteoarthritis. Therefore, health and medical personnel, including nurses, can take effective measures, especially using non-pharmacological methods, by self-management training to reduce patients' problems. Self-management training encourages the individuals to carry out activities that promote health and control symptoms of the disease. Healthy lifestyle education, nutrition, weight loss, and the application of appropriate physical and rehabilitation methods can reduce pain and referral to physicians and using medical equipment and prevent pharmacological treatment and heavy treatment costs.

ACKNOWLEDGMENT

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