The Effect of Self-Management Educational Program on Pain Intensity in Elderly Patients with Knee Osteoarthritis: A Randomized Clinical Trial

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Abstract

BACKGROUND: Osteoarthritis is one of the chronic diseases that greatly affect the health and life quality of individuals.

AIM: This study aimed to determine the effect of self-management educational program on the pain intensity of the elderly patients with knee osteoarthritis.

METHODS: In a randomised clinical trial, a total of 82 elderly patients with knee osteoarthritis were randomly divided into intervention and control groups. The intervention group received six sessions of self-management group education, while the control group received only the routine care during this period. In both groups, patients' pain intensity, with a visual analogue scale (VAS), were assessed before, immediately after and eight weeks after the start of the study.

RESULTS: The mean pain intensity scores of the intervention and control groups were not significantly different before the intervention (P = 0.9), but after the intervention, the mean pain intensity score in the intervention group (3.61 ± 2.36) was significantly lower than that of the control group (4.93 ± 2.00), (P < 0.0001).

CONCLUSION: Implementation of a self-management program for the patients with knee osteoarthritis is useful in reducing their pain intensity and can be used as one of the effective methods for their empowerment.

Introduction

Osteoarthritis is one of the most common joint diseases among older adults. The prevalence of osteoarthritis in the United States is expected to exceed 66% by 2020 [1]. The most common symptom of osteoarthritis is joint pain, which is exacerbated by doing activities. Morning stiffness of the joints limits their daily activities due to their joint pain and tightness [2]. The problems caused by articular diseases are not only limited to a clear reduction in the patients' mobility and daily activities, but can lead to problems such as pain, fatigue, changes in mental self-imagery, and so on [3]. In developed countries, paying attention to osteoarthritis as a cause of pain and disability in the elderly is ever-increasing [4]. Osteoarthritis affects communities through its high prevalence, its effect on the quality of life, and high costs of health care [5]. As osteoarthritis is a chronic and untreatable disorder, caregivers have preferably focused on identifying changeable risk factors that can

reduce the effect of the disease [6]. Chronic pain has a negative effect on individuals' physical health. It has been observed that individuals with chronic pain are more likely to have activity restrictions over time [7]. It was shown that the untreated pain in elderly people could have a general effect on their quality of life and lead to depression, anxiety, social isolation, cognitive impairment, immobility, and sleep disorders [8] [9]. Despite its prevalence and considerable negative impact on patients' daily life, unfortunately, there is no definitive treatment for the osteoarthritis. The therapeutic goals should include reducing pain, improving the range of motion and facilitating the daily activities [10] [11]. Since osteoarthritis is one of the chronic diseases associated with people's habits, behaviors and lifestyles, it is likely that determining appropriate lifestyle might reduce the prevalence of the disease and its complications for the patients and communities [12]. Since drug therapy for osteoarthritis, especially in the elderly, has high costs and, on the other hand, drugs also have side effects, it seems that one of the safest and least costly ways to treat the pain caused by osteoarthritis is pain self-management [13]. Elderly people, especially those with chronic diseases, are incapable of managing their diseases. However, appropriate knowledge and awareness can improve their quality of life [14]. Achieving secure and correct pain management practices in the elderly can improve their performance, enhance their quality of life, increase their comfort and reduce the costs of caring them [8].

Considering the high prevalence of knee osteoarthritis in older adults and its significant pain which can lead to disability and decreased the quality of life in older adults, this study aimed to evaluate the effect of self-management educational program on pain intensity in elderly patients with knee osteoarthritis.

Patients and Methods

This randomised clinical trial conducted on the older adults with knee osteoarthritis who were referred to the elderly care clinic of Imam Reza specialised and subspecialized polyclinic in Shiraz from March 2016 to July 2016. Eighty-two eligible elderly people were selected according to the inclusion criteria. The inclusion criteria for entering the study included the willingness to participate, being 60 years old and over, suffering from knee osteoarthritis according to an expert's final diagnosis (grade one to three), having the ability to do the instructions, having the ability to communicate and not having mental illnesses, lack of life-threatening diseases, and the ability to regularly attend the meetings. The exclusion criteria included two sessions of absenteeism during the educational program, development of disabling

illnesses during the interventions that would cause non-identical therapeutic interventions, exacerbations of the symptoms and reluctance of the subjects to continue the treatment. Patients who meet the inclusion criteria were randomly allocated into two equal size group (n = 41) using permuted block randomisation method. In the beginning, and after obtaining informed consent for both the intervention and control groups by the research assistant, a researcher-made questionnaire including age, sex, body mass index (BMI), occupation, degree of suffering, education level, marital status and income level was used to collect the patients' demographic and clinical characteristics. Also, pain intensity of the patients was evaluated using Visual Analogue Scale (VAS). The validity and reliability of the VAS have been previously confirmed by researchers several times (its internal reliability has ranged from 0.85 to 0.95) [15].

The subjects in the control group were emphasised to refer to the clinic three weeks and eleven weeks later for their pain intensity to be re-evaluated. The 41 subjects in the intervention group participated in the educational program for three weeks, two 60-minute sessions a week, and half an hour was allocated for answering the questions raised by the elderly subjects. For better learning, the older adults were divided into three small groups (two groups of 14 and a group of 13) according to their readiness. At the end of three weeks of education, the VAS was completed again for both the control and intervention groups. Upon completion of the educational sessions, the elderly subjects in the intervention group were given eight weeks to implement the education they had received with the help of the researcher at home. To ensure the implementation of the education provided during this period (weekly), the elderly in the intervention group was called and, if necessary, the provided education was reminded. After the eighth week, the VAS was completed again for both the intervention and control groups. It should be noted that one of the subjects in the control group was excluded from the study due to lack of cooperation. To observe ethical considerations and benefit the elderly subjects in the control group, a two-hour intensive educational session similar to what was provided for the intervention group was held for them.

Data were analysed using Statistical Package for the Social Sciences (SPSS) version 23.0 software (SPSS Inc., Chicago, IL). We used the Shapiro-Wilk test to determine whether data were normally distributed. To compare the pain intensity before and immediately after the education and eight weeks after the intervention, the repeated measures analysis of variance (ANOVA) was used. Besides, to do the post hoc tests related to the significant interaction between time factors and study groups, paired and independent t-tests were used. Significance levels were set at $P < 0.05$.

Results

The mean age of the elderly in the intervention group was 65.34 ± 6.19, and it was 64.58 ± 4.67 years in the control group. There was no statistically significant differences between two groups regarding gender, age, BMI, marital status, education level, occupation, the degree of disease and income level according (P > 0.05). At the baseline, no significant difference was observed between the intervention and control groups regarding mean pain intensity, respectively (4.83 ± 2.22 versus 4.78 ± 1.79; df = 79, P = 0.90). The mean and standard deviation of the pain variable for both control and intervention groups are shown in Table 1. The pain intensity score in the intervention group decreased by 2.36% compared to the control group.

Table 1: Table of descriptive statistical indices related to pain intensity in both control and intervention groups before, immediately after and eight weeks after the intervention

Time Period	Control		Intervention	
	Mean	SD	Mean	SD
Before intervention	4.78	1.79	4.83	2.22
Immediately after intervention	4.78	1.79	4.73	2.28
Eight weeks after intervention	4.93	2	3.61	2.36

In order to investigate the effect of self-management education on the pain intensity of the elderly with knee osteoarthritis, a two-group variance analysis with repeated measures of 2 x 3 was performed using the time variable at three levels (before intervention, immediately after intervention, and 8 weeks after intervention) and the intervention variables at two levels (self-management education and routine care) as independent variables, and pain as the dependent variable. The results of variance analysis indicated that the interaction between time and group was significant (P < 0.001); i.e. there was a significant difference between the control and intervention groups in terms of the effectiveness of self-management education programs on severity of the pain associated with osteoarthritis in the elderly people at different times (Table 2).

Table 2: Repeated measured variance analysis results to compare the pain intensity scores in the control and intervention groups at three measurement times

Source of Change	Sum of Squares (SS)	df	Mean Squares	F	P-value	Eta
Group	11.48	1	11.48	0.90	0.34	0.011
Time	0.64	2	2.78	21.47	<0.001	0.35
Time & Group	0.52	2	2.78	35.15	<0.001	0.47

The results of variance analysis showed that the interaction between time and group was significant (P < 0.001); i.e. there was a significant difference between the control and intervention groups in terms of the effectiveness of self-management education programs on severity of the pain associated with osteoarthritis in the elderly people at different times (df = 1.33, F = 34.5, P < 0.001). There was an interaction

in the evaluation of pain intensity between time and group. The interaction indicated that the pattern of changes in the pain intensity scores in the two groups depended on the time of its evaluation, and the changes in the pain intensity scores over time in the intervention and control group had a different pattern.

According to the patterns of changes, the mean score of pain intensity before the intervention in the control group was almost the same as that of the intervention group, but at the second time this difference increased, and at the third time it reached the maximum. In other words, the mean pain intensity scores in the intervention group decreased immediately after the intervention and especially eight weeks after the intervention in comparison with the control group.

This means that the self-management educational program had an impact on pain of the older adults with osteoarthritis. Due to the significant interaction of the time and group, the simple effects of the group and time were separately examined. Furthermore, the effect of the group factor was examined separately in each of the three time periods. Table 3 shows the post hoc comparisons of the mean pain intensity scores in the groups separately regarding time. It can be seen that in the control group, there was no significant difference between the pain intensity scores in different time periods.

Also, there was no significant difference in the intervention group between the first period (before the intervention) and the second one (immediately after the intervention), but the mean pain intensity scores in this group were significantly different between the second and third time periods (immediately after and eight weeks after the intervention) Intervention) and the first and third ones (before and eight weeks after the intervention) (P < 0.001).

Table 3: Post hoc comparisons of the mean intensity pain in the groups, separately regarding time

Group	Time (i)	Time (j)	Mean difference (i-j)	Standard error	P-value
	1	2	9	0.055	1
Control	1	3	-0.150	0.115	0.59
	2	3	-0.150	0.120	0.64
	1	2	0.098	0.054	0.23
Intervention	1	3	1.22	0.114	<0.001*
	2	3	1.12	0.119	<0.001*
*The coefficients that have become significant by Bonferroni's correction.					

In Table 4, the post hoc comparisons of the mean pain intensity at three time periods are observed separately for the study groups. In the first and second time periods (before and immediately after the intervention) there was no statistically significant difference between the intervention and control groups regarding the mean pain intensity scores. However, at the third period (eight weeks after the intervention), the mean scores were significantly lower in the intervention group (P = 0.009).

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Table 4: Post hoc comparisons of mean scores of pain in three time periods, separately, based on the study groups

Time	Group (i)	Group (j)	Mean difference (i-j)	Standard error	P-value
Before intervention	Control	Intervention	-0.054	0.449	0.90
Immediately after intervention	Control	Intervention	0.043	0.456	0.92
8 weeks after intervention	Control	Intervention	1.315	0.488	0.009*

*The coefficients that have become significant by Bonferroni's correction.

Discussion

The results of this study showed that the self-management education program was effective on pain relief in the older adults with knee osteoarthritis. The mean scores of the intensity of the pain caused by osteoarthritis before the intervention were almost the same in the control and intervention groups, but immediately after the intervention (at the end of the third week) the difference increased, and for the third period which was eight weeks after the intervention (at the end of the eleventh week) it reached maximum. The results of this study are consistent with other related studies [16] [17] [18] [19], but they are not consistent with another study conducted on the effect of self-care on arthritis [20]. In a study carried out on 120 patients with osteoarthritis a relatively great decrease of pain was observed in the intervention group, from 11.88 to 1.76 [16]. In our study, too, effective exercises were taught to relieve pain and strengthen the muscles keeping joints. In another study, it was reported that during the twelve weeks of implementing the exercise program, the pain rate decreased from 7.5 at the beginning of the study to 3.5 in the 12th week. That study was carried out on one group as before and after [17], and was consistent with the present study.

Therefore, the self-management arthritis program had played an effective role in improving the pain and motion range of the older adults with knee osteoarthritis [18]. In our study, the self-management education program was also effective in reducing the pain score in the intervention group. In another study, 146 patients with knee osteoarthritis were examined. The intervention group showed pain improvement, physical function, vitality and social functioning in comparison with control group. Therefore, the participants in the self-management program had a significant improvement in their quality of life and their performance eight weeks and six months after the intervention, compared to the control group [19]. It has been reported that the self-management arthritis program reduced anxiety and had a positive effect on self-efficacy of the participants for pain management, but it had no significant effect on their pain and physical functions [20]. The results of their study are not consistent with those of the present study, and the reason can be the differences in the tools used in the studies.

Since osteoarthritis is one of the chronic diseases associated with people's habits, behaviours and lifestyles, it may be possible to reduce the prevalence of this disease and its complications for the patients and the community by determining appropriate lifestyles [10] [15] [19]. As self-management is a protective factor for physical functioning in the patients with osteoarthritis, improving the self-efficacy of the patients with chronic pain can reduce their pain and improve their quality of life [19] [20]. Patient education is an essential part of nursing care, with the aim that the patients will live as independently as possible, take their medications properly, and use their aid supplies correctly [21]. Educating the patients is focused on the type of disorder, the changes caused by the disorder, the prescribed regimen, the side effects of drugs, strategies for maintaining independence and functions of the individuals. On the other hand, in many of these cases, it is possible to reduce many of their limitations and problems by educating the older adults with osteoarthritis regarding activity, rest, taking medications and their complications, and other issues related to lifestyle. Hence, the use of self-management education is the best way to convince the patients of behavioral changes and non-pharmacological treatment to promote their health, prevent the disease and successfully control it.

In conclusion, according to the present study, the self-management education, conducted through six educational sessions, reduced the pain of the elderly patients with osteoarthritis. Therefore, using self-management education is the best way to convince the patients of behavioural changes and non-pharmacological treatments to promote their health, prevent the disease, and successfully control their disease.

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