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Website: www.jehp.net
DOI: 10.4103/jehp.jehp_52_23

Investigating the effect of an Orem-based self-care educative supportive nursing system on the joint function of patients with knee osteoarthritis

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Abstract:

BACKGROUND: Osteoarthritis is the most common form of arthritis. It is a common progressive joint disease characterized by chronic pain and functional disability, which disturbs functional movements, body balance, and quality of life in patients with knee osteoarthritis. This study investigates the effect of an Orem-based self-care educative supportive nursing system on the joint function of patients with knee osteoarthritis.

MATERIALS AND METHODS: This semi-experimental paper studies 130 patients with knee osteoarthritis. The patients are selected using convenience sampling and randomly assigned to intervention and control groups equally. The K00S questionnaire was used to collect patients' demographic information and other information relating to their knees' function. We carried out interventions for six weeks, with a session of 45 to 60 minutes each week. Data were collected before the intervention and three months after the intervention. SPSS 21.0 and descriptive and inferential statistics were used to analyze the collected data at the significance level of 0.05.

RESULTS: The results show significant differences between the two groups in terms of joint symptoms ($P = 0.001$), pain ($P = 0.001$), daily activities ($P = 0.001$), sports and recreational activities ($P = 0.001$), and quality of life ($P = 0.02$). In other words, there was a significant difference in the average subscale scores of activities in all five dimensions between the intervention and control groups ($P < 0.05$).

CONCLUSION: Orem's self-care model has a positive and significant effect on the functional movement of patients with knee osteoarthritis and improves their joint function.

Keywords:

Joint function, knee osteoarthritis, Orem's self-care model, osteoarthritis, quality of life

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Received: 11-01-2023
Accepted: 25-07-2023
Published: 11-07-2024

Introduction

Osteoarthritis is a degenerative and progressive joint disease.^[1] Its active process destroys cartilage, thickens subchondral bone, and forms new bone.^[2] Population aging increases obesity, osteoporosis, and, as a result, osteoarthritis.^[3] Ten percent of the

population suffers from osteoarthritis, and 50% will suffer from it before 65.^[4] Currently, more than 300 million people worldwide suffer from osteoarthritis.^[3] Knee osteoarthritis is a common progressive joint disease characterized by chronic pain and functional disability.^[5] Unfortunately, 80% of the patients suffer from movement

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How to cite this article: Talebianpoor E, Mohammadi HR, Dehbanizadeh A, Afrasiabifar A, Najafi Doulatabad S. Investigating the effect of an Orem-based self-care educative supportive nursing system on the joint function of patients with knee osteoarthritis. *J Edu Health Promot* 2024;13:223.

limitations, and 25% fail to do most of their daily activities.^[6]

These patients can use different treatments, but self-care treatments presented in nursing models are preferable to empower the patients and relieve their chronic pain.^[7] Nursing models are valuable guidelines consisting of professional nursing care structures that help nurses examine, measure, and evaluate nursing care.^[8] These models can improve the quality of care and life and, as a result, people's health.^[9] These models emphasize self-care, which is people's ability to perform self-care activities.^[10] Orem's self-care model is an important self-care nursing model. It includes three caring systems based on the needs and deviations from the patient's health, that is, wholly compensatory, partially compensatory, and supportive-educative systems.^[11] This model allows people to participate in their recovery and maintain their health. In addition, recovery is possible through increasing awareness, which can only be achieved through education.^[12] Despite high costs, existing treatments do not stop patients' chronic pain, and there is no safe, long-term, and effective treatment for this disease.^[13] Regarding the adverse effects of this disease on the life quality of patients and the importance of self-care training to these patients, this study investigates the effect of an Orem-based self-care educative supportive nursing system on the joint function of patients with knee osteoarthritis.

Materials and Methods

Study design and setting

The population of this semi-experimental study included patients with knee osteoarthritis who have had referred to Shahid Mofateh Clinic in Yasuj, Iran, in 2022.

Study participants and sampling

The patients (knee osteoarthritis) were selected using the convenience sampling method, and eligible patients were randomly and equally assigned to the intervention and control groups. The total number of patients was 130, and each group contained 65 patients.

Some inclusion criteria are willing to participate in the study, being 40–65 years old, having crepitus and less than 30 minutes of stiffness, not using narcotics, and not participating in exercise programs in the last month. Other inclusion criteria include having Grades 2 or 3 knee osteoarthritis in one or both knees based on radiographic evidence and the diagnosis of an orthopedic specialist, having no severe chronic diseases such as lupus, and having no history of neurological diseases. The exclusion criteria were the patient's non-participation in more than one training session and the patient's suffering from other diseases. The patients

received administrated drugs by his/her physician. The participants were informed about the study's purpose and the confidentiality of the collected information. They consented to participate in the study and were informed they could leave it at every stage.

Data collection tool and technique

The KOOS questionnaire and a checklist designed by the researcher were used to collect data. Validity and reliability of the Persian version of the questionnaire were previously confirmed.^[14] This patient-centered questionnaire includes 42 questions. It examines five concepts about the patient: severity of knee pain (nine questions), the symptoms' severity of knee osteoarthritis (e.g., swelling, noise, stiffness, etc.) (seven questions), daily life activities (going up and down stairs, standing, bathing, etc.) (17 questions), sports and recreational activities (five questions), and the life quality-related knee osteoarthritis (four questions). There is no total score, and the score for each subscale is separately calculated. This instrument uses a Likert scale, and all items have five possible answer choices. Items are scored from 0 (no problems) to 4 (extreme problems). Each of the five scores is calculated by summing the items. Scores were transformed to a 0 to 100 scale, with zero representing extreme knee problems and 100 representing no knee problems.

The intervention started after explaining the research objectives to the participants and obtaining their informed consent and the ethical code from the research ethics committee of Yasuj University of Medical Sciences.

First, demographic information and universal, developmental, and health deviation self-care needs were set. Orem's health checklist was used to detect any self-care deficiency in nursing diagnoses. Accordingly, the educational support system was applied to the intervention group, including the patients' education, consultation, and follow-up. The control group not received specific intervention except routine follow-up.

The educational program was performed in 6 weeks. Each week a session of 45 to 60 minutes was held for each patient through lectures, questions, and answers, PowerPoint, showing photos, and providing educational booklets. The educational contents included knowledge of knee osteoarthritis, its causes, symptoms, treatment methods, diagnostic methods, and their side effects. Other contents included self-care measures about exercise, fatigue, constipation, mental and psychological disorders, dietary compliance, drug abuse, and drug side effects (see [Table 1]). Patient education was planned based on individual patient's need to care and education through nursing process, and it was performed by the first author and its time varies between 60 and 90.

Table 1: Patients' demographic data

Variable groups		Experiment mean (SD)	Control mean (SD)
Age: M±SD		52.3±6.1	58.3±7.1
Gender n (%)	Male	9 (13.8)	12 (18.5)
	Female	56 (86.2)	53 (81.5)
Residence place n (%)	Urban	39 (60)	42 (64.6)
	Rural	26 (40)	23 (35.4)
Education level n (%)	Unread and less than a diploma	61 (93.8)	51 (78.5)
	Diploma and above	4 (6.2)	14 (21.5)
Employment n (%)	Employed	6 (9.2)	6 (9.2)
	housekeeper	30 (46.2)	24 (36.9)
	Free and others	29 (44.6)	35 (53.9)

The above measures were practiced with the patients, and their questions were answered. In addition to education, the patients were provided with counseling measures such as family counseling, career counseling, psychological support, follow-up of diagnostic and therapeutic measures, and, if necessary, specialized referral. All the participants completed KOOS questionnaire before and three months after the intervention, and their scores were compared with pre-intervention. If the patients received any analgesic or physiotherapy, he/she would be excluded from the study. Chi-square and independent *t*-test were used in SPSS 21.0 to analyze the collected data.

Ethical consideration

After obtaining the necessary permits and the code of ethics (I IR.YUMS.REC.1400.083) from the ethics committee of Yasuj University of Medical Sciences, oral and written informed consent was obtained from the participants. They were also informed about the voluntary nature of their participation and that they could withdraw from the study at any time.

Results

The intervention began with 130 participants, and none was excluded later. If any changes in inclusion criteria were happened, the patients would exclude from the study. The demographic information of the intervention and control groups' patients shows no statistically significant difference between the two groups except for education [$P > 0.05$, see Table 2]. In addition, there was no significant difference between the two groups in terms of treatment duration, medicine-taking approach, profession, drug side effects, addiction, number of visits by the doctor, follow-up tests, and underlying diseases ($P > 0.05$).

The joint function results showed a significant difference in the average scores of the activities' subscales in all five dimensions (i.e., quality of life, physical pain,

daily activities, sports activities, and joint symptoms) between the intervention and control groups after the intervention ($P > 0.05$) [see Table 3].

Discussion

Knee osteoarthritis, like all chronic diseases, limits a person's abilities and performance in most aspects of life. The present study investigates the effect of an Orem-based self-care educative supportive nursing system on the joint function of patients with knee osteoarthritis.

The results show that intervention significantly improves the patients' joint function. In other words, the joint function was better in the intervention group than in the control group after the intervention.

Our findings are consistent with the results of Kim and Park^[15] in terms of improving symptoms and quality of life, Elsayed Hussein *et al.*^[16] in terms of improving functional movements, and Ariana *et al.*^[17] in terms of improving symptoms and performance of patients with knee osteoarthritis.

Our results are consistent with previous research. For example, Dahlberg *et al.* examined the effect of a digital self-management program on hip and knee osteoarthritis patients and showed that continuous treatment increases their physical performance.^[18] In addition, the results of the meta-analysis by Wu *et al.* showed differences in pain, knee function, stiffness, mental health, and quality of life between self-managed and control groups of knee osteoarthritis patients.^[19] Moreover, Keshtkaran *et al.* found that self-care training positively affects the quality of life in osteoarthritis patients, and self-care training helps better toleration of adaptation to the disease and improves the quality of life and health of individuals and society.^[20]

Mahmoodi suggested that designing and implementing an educational program based on Orem's self-care theory, taking into account the needs of patients with burn injuries, could effectively improve their quality of life.^[21] Similarly, Sinatti *et al.*^[22] suggested that educating patients with knee osteoarthritis effectively reduces their pain and improves their hip and knee performance. Finally, Ganji *et al.*,^[23] Wood *et al.*,^[24] and Mikhled *et al.*^[25] showed that the use of self-care models reduces pain in patients with knee problems.

Therefore, a comprehensive, good, and appropriate program based on the patient's learning needs can improve their quality of life and help them to reduce their dependency and achieve optimal health.^[21] Orem's self-care model helps people have

Table 2: Mean scores of joint symptoms and function for patients in the two groups

Groups		Experiment Mean±SD	Control Mean±SD	Independent T sample test		Effect size
Variable/Times				P	Statistic	
Symptoms	Pre	24.78±3.48	24±3.9	0.223	0.7	0.21
	Post	60.2±14.6	50.4±14.5	0.001		0.67
Pain severity	Pre	27.18±5.1	24.66±3.18	0.1	5	0.59
	Post	58.3±9.7	38.2±9.4	0.001		2.10
ADL function	Pre	23.9±4.7	23.28±7.9	0.164	3	0.09
	Post	67.8±17	60.4±16.2	0.001		0.44
Sport and recreation function	Pre	26.27±6.2	30.7±5.4	0.974	6	0.76
	Post	55.3±13.7	46.9±10.6	0.001		0.68
Knee-related QOL	Pre	39.3±10.1	41.2±10.56	0.273	6	0.18
	Post	64.5±14.53	51.8±19	0.02		0.75

Table 3: Comparison of quality of life score in intervention and control groups before and after the intervention

Groups		Experiment		Control		Independent t-test			Effect size
Variable/Times		M	SD	M	SD	P	Degree of freedom	statistic	
Mobility	Before intervention	40.3	7.9	40.4	7.6	0.29	2	0.5	0.01
	After intervention	61.2	16.3	51.7	14.4	0.001			0.62
Self-care	Before intervention	53.8	11.3	52.7	14.7	0.291	5	1.2	0.08
	After intervention	75.8	20.6	65.9	18.4	0.001			0.51
Daily activities	Before intervention	49.7	13.9	47.6	11.6	0.61	3	0.8	0.16
	After intervention	73.4	20.6	64.1	18.3	0.001			0.48
Pain/ discomfort	Before intervention	45.8	12.9	46.9	14.3	0.38	2	1	0.08
	After intervention	68.3	11.6	62.7	18.9	0.001			0.36
Anxiety/ depression	Before intervention	43.7	8.9	45.8	11.4	0.289	2	0.8	0.21
	After intervention	61.4	22	61.8	22.4	0.001			0.02
Total	Before intervention	48.4	13.1	45.8	12.9	0.26	3	0.8	0.20
	After intervention	70.2	19.4	61.6	17.9	0.001			0.46

a more active role in their treatment, achieve optimal health, maintain it, improve their self-care, reduce their fear and dependence, and increase their motivation, self-confidence, and independence.^[26-29] Since self-care requires regular health examination, the person feels he has an essential role in his life and tries to improve his physical and social functioning. Therefore, Orem's self-care model changes a person's behavior. The training provided in the present study was to increase the patient's independence so that they can use their drugs and assistive devices correctly, do their exercises with the least possibility of injury, and consequently improve their performance in the desired areas. Therefore, the positive effects of Orem-based self-care education justify its application besides other treatment measures.

Limitation and recommendation

In addition to its strengths (e.g., random assignment and having a control group), this study also has limitation (e.g., all participants were outpatients), which limits the generalization of its findings. The education was performed in person and followed up over the phone. However, since all the participants were outpatients, applying the proposed model to hospitalized patients is also suggested.

Conclusion

The results show that participants of the intervention and control groups witnessed improvements in joint symptoms, reduced pain, improved daily activities, improved sports activities, and improved quality of life. However, those participants who received Orem-based self-care witnessed more improvements on average. Therefore, this model is suggested to improve knee osteoarthritis patients' symptoms and joint function. The health team members are suggested to include this supportive-educative program as a valuable and effective intervention for knee osteoarthritis patients.

Acknowledgment

We would like to thank the authorities of Yasuj University of Medical Sciences for their comprehensive support for this study with the ethical code (IR.YUMS.REC.1400.083) and participants who took part in the study.

Financial support and sponsorship

The financial costs of this project have been nominated by Yasuj University of Medical Sciences.

Conflicts of interest

There are no conflicts of interest.

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