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Original Article

The Effect of Effleurage Knee Massage Therapy on Quality of Life in Elderly Women with Osteoarthritis

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Abstract

Background: Aging is a feminine phenomenon, and the quality of life is less in elderly women than in elderly men due to chronic diseases being two times more prevalent. This study was conducted to investigate the effect of knee massage on the quality of life of elderly women with osteoarthritis.

Methods: The present study is a crossover clinical trial of 58 elderly women with mild to moderate osteoarthritis in two intervention and examination classes and two pre-wash and post-wash phases. In the first phase of the study, we gave a massage on each knee every day for 15 minutes a week using the effleurage method with standard treatment (diclofenac 100 mg), and the control group received only standard treatment. In the second phase, the intervention was shifted into groups according to the study type after 3 weeks of washout. We analyzed the data using SPSS 20 software. Descriptive statistics were used to describe quantitative and qualitative variables, and independent and paired t-tests were used to judge the effect of the intervention. The independent *t* test was also used to evaluate the effects of time and treatment.

Results: In the first phase of the study, the independent *t* test results showed no significant difference between the quality of life scores in the two groups before the intervention ($P<0.452$); however, after the intervention, the quality of life was significantly higher in group A (the group receiving massage) than in group B (the group receiving standard treatment) ($P<0.001$). In the second phase of the study, the independent t-test results showed no significant difference between the two groups before the intervention ($P<0.32$); however, after the intervention, the quality of life was significantly higher in group B (the group receiving massage in the second phase of the study) than in group A (the group receiving standard treatment in the second phase of the study) ($P<0.001$).

Conclusion: Results showed that conducting one-week massage therapies would enhance the quality of life of women. This finding was validated based on the sectional design and group replacement results, considering the value of quality of life in the elderly. As a result, using massage therapy is recommended as a low-risk, low-cost, and non-pharmacological method in old age.

Keywords: Massage, Quality of life, Osteoarthritis

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Introduction

Healthy aging is the right of all human beings. Today's science pays attention to not only prolonging the life span, but also noting that the extended years of human life should be spent in ultimate peace and physical and mental health (1,2).

Iran has one of the fastest growth rates of the elderly population globally, and the share of the population over 65 years in Iran has increased from 4.2% in 1989 to 6.4% in 2019 (3). The quality of life is lower in elderly women than in elderly men in terms of chronic diseases being two times more prevalent (4).

Osteoarthritis is the most prevalent joint disorder in the world (5). Almost everyone in his/her old age finds radiographic changes (reduced joint space in terms of cartilage loss and osteophyte formation), but not all individuals have symptoms (6). Osteoarthritis is a multifactorial, mostly slowly progressing, and primarily non-inflammatory degenerative disorder of the synovial joints, which is often age-related or trauma-induced. However, osteoarthritis is the most common musculoskeletal condition worldwide, which causes significant health,

economic, and social problems (7). The most common complaints of patients with osteoarthritis are primarily non-specific and include general fatigue, pain, weakness, inability to perform activities, decreased energy, decreased sleep quality, joint dryness, muscle weakness, decreased range of motion, decreased efficiency of the nervous-muscular system, and decreased quality of life. It is often correlated with disease activity but is more strongly linked to pain (8).

The course of the disease and long-term disability reduces personal independence and difficulty in daily activities, social isolation, limited recreational, sports, occupational activities, and reduced self-care; this feeling of inadequacy leads to further loss of quality of life in the elderly. (9).

Regarding the adverse effects of osteoarthritis on the elderly's physical and mental conditions and quality of life, and in terms of the increasing economic burden of this disease on society and the family, using preventive interventions and non-pharmacological treatments to delay or reduce the risk of disease progression is essential (10). However, there is no definite cure for this disease, and treatment strategies only reduce the rate of disease progression, control pain, reduce joint rigidity, and maintain functional capacity so that reducing these symptoms affects not only public health but also the ability to perform daily activities and improve the quality of life (11).

Elderly people change their lifestyle patterns in terms of their pain-reduction strategies, and sometimes, with wrong choices, their physical activity and social interactions decrease, which can lead to emotional, psychological, and sexual disorders, as well as high dependence on others, which impression their self-confidence, independence, and quality of life, and leads to depression and isolation (12), while massage as a safe and effective technique can reduce pain. It improves performance, increases relaxation, reduces anxiety and depression, increases sleep quality and life, and thus improves the quality of life (4).

The common treatments for knee osteoarthritis mainly include health education, pharmacological and non-pharmacological treatments, and surgery (5). One of the ways to avoid drug side effects is complementary medicine (13). Massage is accepted as a supplemental therapy by 83% of doctors in Western countries, and 71% of physicians refer patients to massage therapists for massage treatments. Massage therapy is an old type of therapy gaining traction as part of the complementary and alternative medicine movement (14,15). Massage is not a single modality, but there is a combination of techniques for massage, such as effleurage, petrissage, friction, and the application of vibrations (14). Effleurage massage is a Swedish massage in which the skin is softly dragged across the surface with gentle pressure on both sides. The effleurage has a calming effect, mainly on lymphatic and vascular regurgitation. They are a series of hand movements performed regularly and evenly on body's tissues to affect the nerves, muscles, skin, joints, and circulatory systems (16). Massage could be part of the preventive care of physiotherapy as a complement to early care programs, ensuring gross motor function (17). Mechanical pressure might help increase blood flow by increasing the arteriolar pressure and muscle temperature from rubbing (18).

Various studies have been conducted on massage therapy. According to the results of Khoramizadeh and colleagues' study, Dalk and Ghamz massage improves the quality of life and range of motion in the shoulder and neck regions in patients with chronic non-specific neck pain (19). However, the results of Honarvar and colleagues' study showed that massage therapy for 6 weeks had no significant effect on the physical dimension of quality of life in women with multiple sclerosis (MS) (20). According to the high prevalence of pain experienced by the elderly and its complications and the country's codified policy on complementary medicine methods, research in this area is necessary to improve the quality of life. Also, most studies in this area are one-step, and it is impossible to determine whether the outcome of this intervention depends on other intervention factors or not. Thus, given the lack of sufficient studies regarding the effect of massage therapy on the quality of life of elderly women with osteoarthritis, this study was conducted to investigate the effect of massage on the quality of life in elderly women with osteoarthritis.

Methods

The present study was a crossover clinical trial study (identifier: IRCT20200811048370N1). The present two-group, single-blinded crossover clinical trial (the questionnaire completer, who filled the questionnaires, was blinded to the study) used a purposive sampling method and examined 60-year-old women and older referring to the Rheumatology and Orthopedic Clinic in Bojnurd, Iran, in fall and winter, 2019, with a diagnosis of mild to moderate definite osteoarthritis by physicians using the knee x-ray and based on the Kellgren and Lawrence system. The research purpose, method, and information confidentiality were first explained to the patients, and written consent was obtained from the research units. The inclusion criteria of the current study included osteoporosis, rheumatoid arthritis, neuromuscular disease, no lower limb disease (no injection and knee surgery), no anticoagulant therapy or coagulation problem, no massage therapy during the last three months, and no addiction., and the exclusion criterion included non-participation in 2 consecutive massage sessions or more.

Using the sample size formula ($Z\alpha = 1.96$, $Z\beta = 1.28$, $\mu 1 \pm \alpha 1$ 4.29 ± 0.99, $\mu 2 \pm \alpha 1$ 5.30 ± 1.15), the sample size was

30 per group (a total of 60 individuals according to a 20% loss). Due to their unwillingness to cooperate, a person from the intervention group and a person from the control group were excluded (Figure 1). The data analysis was finally performed on 58 individuals.

Measures

Data collection tools included a global and localized questionnaire (the Knee Injury and Osteoarthritis Outcome Score, KOOS) and a demographic information questionnaire. The KOOS contains 42 patient-centered questions to examine five concepts, namely, pain (9 questions), other symptoms (swelling, dryness, stiffness, etc.) of the disease (7 questions), daily activities (walking up and down the stairs, standing, bathing, etc) (17 questions), sports and recreational activities (jumping, running, and spinning) (5 questions), and quality of life in terms of knee problems (4 questions). There was no total score the questionnaire. The scores of subscales were calculated separately. The total score of each subscale was divided by the maximum possible score of the subscale. It should be noted that a score of 100 is always regarded as no problem, and zero is the worst status in traditional orthopedics (21). The questionnaire was localized by Saraei-Pour et al in Iran in 2007, and its reliability was confirmed with a Cronbach's alpha of 76% (21).

The reliability of the questionnaire was reconfirmed with Cronbach's alpha of 83%. The demographic information questionnaire consisted of explicit items. The validity of the questionnaires mentioned above was evaluated in terms of content.

The questionnaire completer completed the KOOS questionnaire for mild to moderate osteoarthritis. All questionnaires were completed during the study by a questionnaire completer unaware of the research. To unify all participants and eliminate the effects of previous interventions and pharmacological and non-pharmacological treatments, all participants received standard treatment only for a week, and using other alternative therapies, which might affect the intervention, was eliminated. The participants were then divided into two groups: Intervention and control. After completing the questionnaires, the intervention group underwent individual massage and standard treatment (diclofenac 100 mg daily) in the examination room. Massage on each knee was performed using the effleurage method by the researcher for 15 minutes every day for a week at a specific time. Effleurage is a type of Swedish massage performed as a sliding manipulation of superficial tissues with a slight pressure of two palms on the surface of the skin (22). Finally, the massage CD was delivered to the individuals, and their questions were answered. The control group

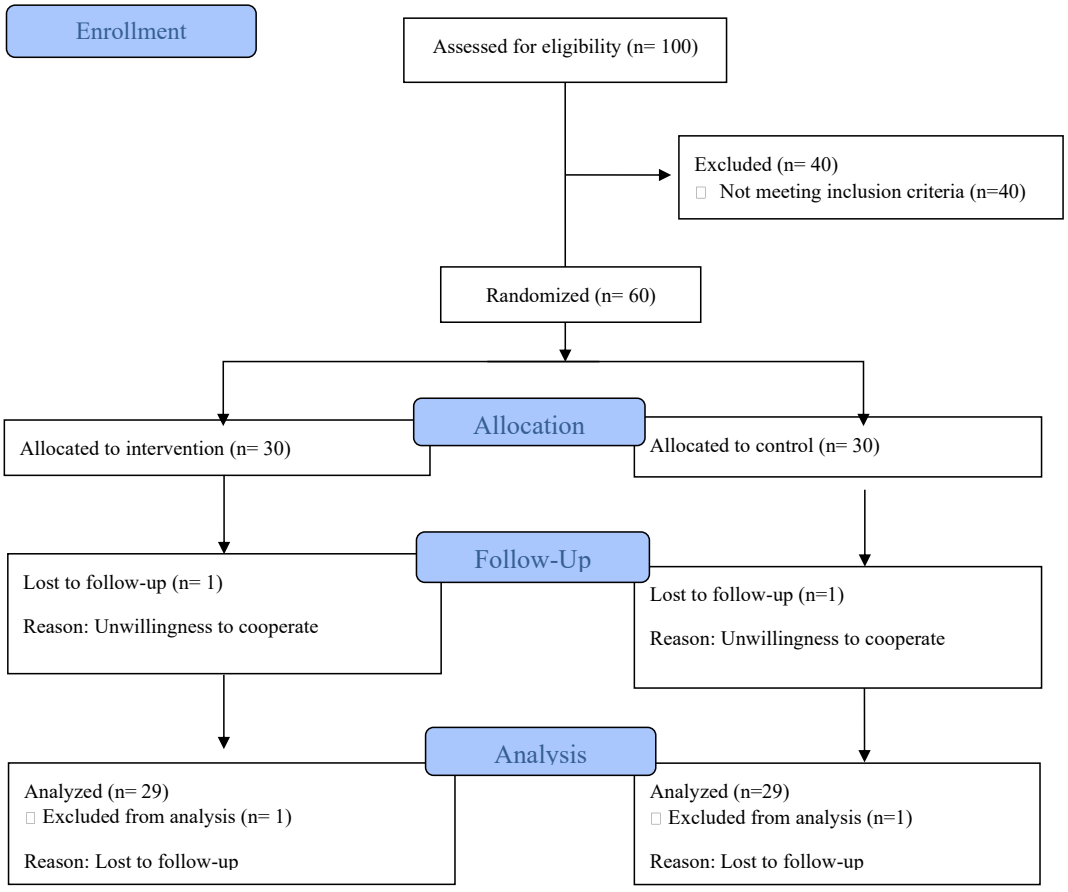

Figure 1. Consort flow diagram

received only standard treatment (diclofenac 100 mg daily). After one week of intervention in both groups, the questionnaire completer re-completed the KOOS questionnaire. Depending on the type of study (crossover clinical trial) and elimination of the possible effect of the intervention (given that the washout duration was three times higher than the half-life of the intervention and the half-life of the massage is one week) (23), all participants rested for three weeks at this stage, and no intervention was performed except for the standard treatment. The questionnaire completer re-completed the surveys. The intervention and control groups were then swapped out, with the control group taking on the role of intervention and the intervention group taking on the role of control. Massage and control were performed on the target groups according to the previous protocol, and the questionnaires' re-evaluation and filling were performed immediately after the last intervention session.

We analyzed the data using SPSS 20 software. We used the Kolmogorov-Smirnov test to evaluate the normality of the distribution of quantitative variables. Descriptive statistics were used to describe quantitative and qualitative variables, and independent and paired t-tests were used to judge the effect of the intervention. The independent t-test was also used to evaluate the effects of period and treatment.

Results

There was no significant difference between the two groups regarding age, weight, and the number of deliveries. The mean and standard deviation of age in group A (the group receiving massage in the first phase of the study) and group B (the group receiving standard treatment in the first phase of the study) was 62.14 ± 2.77 and 62.40 + -22.3, respectively. The mean and standard deviation of weight in group A and group B was 65.77 ± 39.6, and 66.03 ± 28.6, respectively. In addition, the mean and standard deviation of number of deliveries in group A and group B was 6.88 ± 4.8 and 5.5 ± 1.75, respectively. There was no significant difference between the groups, being homogeneous (Table 1).

In the first phase of the study, the results of the paired t-test showed no significant difference before and after the intervention in group A (the group receiving massage) ($P < 0.783$) and group B (the group receiving standard treatment) ($P < 0.231$). However, the independent t-test results showed no significant difference between the two groups before the intervention ($P < 0.452$), while there was a significant difference after the intervention ($P < 0.001$), so that the quality of life was significantly higher in group A (the group receiving massage) than in group B (the group receiving standard treatment) (Table 2).

Table 1. Mean and standard deviation of research units according to age, weight, and number of deliveries in the two groups

Variable	Group A (Mean ± SD)	Group B (Mean ± SD)	Mean	Independent t-test result
Age	62.14 ± 2.77	62.40 ± 22.3	62.21 ± 27.53	$P = 0.993$
Weight	65.77 ± 39.6	66.03 ± 28.6	65.77 ± 39.6	$P = 0.489$
Number of deliveries	6.88 ± 4.8	5.5 ± 1.75	4.8 ± 1.01	$P = 0.458$

SD: Standard deviation

In the second phase of the study, we assessed the quality of life after 3 weeks of washout and replacement of groups (so that group A only received standard treatment and group B received massage). The results of the paired t-test showed a significant difference before and after the intervention in group B (the group receiving massage) ($P < 0.0001$); however, there was no significant difference before and after the intervention in group A (the group receiving standard treatment) ($P < 0.631$). The independent t-test results showed no significant difference between the two groups before the intervention ($P < 0.32$), while there was a significant difference between the two groups after the intervention ($P < 0.0001$) so that the quality of life was significantly higher in group B (the group receiving massage in the second phase of the study) than in group A (the group receiving standard treatment in the second phase of the study) (Table 2).

Regarding the effect of treatment, the independent t-test results showed that the effect of treatment on quality of life was significant in the two groups ($P < 0.0001$). Regarding the effect of time, the independent t-test results showed that the effect of time on the quality of life was significant in the two groups, indicating the difference in the turn of each treatment group ($P = 0.036$; Table 3).

Discussion

Comparison of the mean score of quality of life indicated that massage techniques could improve the quality of life, also confirmed by the effect of treatment; however, the effect of period (whether the arrangement in each group has affected the treatment or not) does not show much difference between the two groups in this variable. Hence, the placement order in each group had no effect on the treatment outcome, and no significant statistical difference was observed. However, the quality of life score was slightly better in group B (the group receiving massage and standard treatment in the second stage of the study) than in group A (the group receiving standard treatment in the second stage of the study).

According to Miladinia and colleagues' study, massage techniques such as superficial tapping every other day for four weeks can affect physical performance, limiting physical and public health problems and even limiting underlying and mental health problems (24). Despite using the Short-Form 36 (SF 36) Healthy Survey Questionnaire in Miladinia and colleagues' study to evaluate the quality of life, with indicators different from those of the KOOS questionnaire, the lower mean age of participants in Miladinia and colleagues' study than the

Table 2. Test results before and after one week of intervention and after three weeks of washout

Variable	Group	The First Stage of the Study			The Second Stage of the Study (after the end of 3 weeks washout)		
		Befor Intervention	After Intervention	*P* value of Paired t-test	Befor intervention	After intervention	*P* value of Paired t-test
		Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
Quality of life	A	64.2 ± 57.71	71.17 ± 71.05	< 0.783	65.6 ± 43.53	65.1 ± 7	< 0.631
	B	67 ± 6.5	76.7 ± 23.42	< 0.231	67 ± 6.5	76.7 ± 36.32	< 0.0001
Mean difference before and after		-3.50 ± 6.65	-4.9 ± 52.63		-2.22 ± 2.37	0.13 ± -11.36	
P value of independent t-test		< 0.452	< 0.001		0.32	< 0.0001	

Table 3. The t-test results of the effects of treatment and period after three weeks of washout

Group	Mean ± SD	Result of the effect of treatment	Result of the effect of period
Group A	2.16 ± 68.38	*P* < 0.001 T = -3.810	*P* < 0.036 T = 2.207
Group B	15.4 ± 29.2		

SD: Standard deviation

mean age of elderly women in the present study (18 to 50 years versus 62 years in the current study), and even the different type of disease (leukemia versus osteoporosis) and massage duration between the mentioned study and the present study, the results of the two studies are similar and consistent. In a study on the effect of massage on serum cortisol levels, quality of life, and mental health of women with breast cancer, Shahrjerdi and Darvish Shafighi showed the effectiveness of massage in improving individuals' quality of life and mental health (9). Although the results of our study are consistent with those of Shahrjerdi and Darvish Shafighi's study, the difference in the mean score of pain in their study is more favorable than ours. In Shahrjerdi and Darvish Shafighi's study, massage was performed for 30 minutes twice a week for five weeks, which can be considered the reason for more favorable results in their study compared to our study on the long-term use of massage. If massage is performed continuously for patients who should be continuously treated, the therapeutic effect will be significantly higher (9).

In a study by Kazemi et al, common treatments, including ultrasound, infrared, and electrical nerve stimulation through the skin, were used in the physiotherapy and the physiotherapy-reflexology groups; in addition to physiotherapy treatment, foot reflexology was used for 30 minutes. In both groups, the treatment program was performed for 24 sessions (4 sessions per week for 6 weeks). In the pre-test and post-test of both groups, the KOOS questionnaire was used to assess patients' symptoms. The findings showed that the symptoms of the patients with knee osteoarthritis (joint pain and rigidity while daily activity, exercise, and recreation) were better in the physiotherapy-reflexology group than in the physiotherapy group. However, there was no significant difference between the effect of the two therapies on the quality of life for patients with knee osteoarthritis, and the two methods could positively affect the quality of life ($P = 0.111$) (25). Perhaps one of the reasons for massage ability to improve individuals' quality of life is that during the massage process (one week, every day), patients were removed from their homes and placed in a new environment for an extended period of time to receive massage techniques. They were also associated with peer women and received massage techniques that could temporarily alleviate patients' symptoms and improve their physical and mental health. The disease progression decreased regarding anxiety following massage (although the level of anxiety was not assessed in this study). The reason is that individuals receiving massage release more norepinephrine and epinephrine from the synaptic terminal, lowering cortisol levels that can confirm their low level of stress and thus improve their quality of life. The results of Honarvar and colleagues' study demonstrated that massage therapy had no significant effect on the physical dimension of quality of life in women with MS, which was not consistent with the present study; however, it significantly affected the mental health dimension of quality of life in women with MS (20). One of the reasons for the lack of significant effect of massage on the quality of life of individuals with MS is the short duration of the study, as well as the small sample size (n = 17) in this study. Thus, the differences in the type of research community and the quality of life assessment tools can be the causes of discrepant results of previous studies and our research. It seems that since these patients are away from home for a long time and enter a happy environment by going to physiotherapy or massage therapy centers, if the massage process duration can be extended, it can lead these patients for a while to separate themselves from feeling sick and increase their physical health (20).

Tosun and colleagues' study entitled "The effects of self-knee massage with ginger oil in patients with osteoarthritis: an experimental study" showed that the mean visual analog scale (VAS) pain scores of the intervention group were significantly lower at the end of the first and fifth weeks ($P < 0.05$). The mean total scores and the mean scores of the function subscale of Western Ontario and McMaster Universities Osteoarthritis Index

were significantly lower in the massage group in the first- and fifth-week assessments ($P<0.05$).Self- knee massage with ginger oil may be used as a complementary method to standard medical treatment. Nurses can efficiently train patients and their caregivers on knee massage, and patients can implement the intervention at home without any restrictions on location (26). On the other hand, in Seyed Esfahani and colleagues' study entitled 'Investigating the effect of traditional Iranian massage (Kermanshahi style) on the clinical symptoms of knee osteoarthritis," 84 patients with knee osteoarthritis were randomly divided into two groups. The treatment group underwent Mahlouji Kermanshahi massage therapy with chamomile oil for six weeks. According to the acquired data, using Mahlouji Kermanshahi massage therapy as a Persian medicine can improve the symptoms of knee osteoarthritis (27).

Various studies were performed on the physiological effects of massage (28). The proposed mechanism for the effect of massage on improving patients' pain scores is that by performing gentle and light massage, mechanical receptors with low thresholds that adapt slowly or rapidly are activated in the peripheral system, leading to the activation of A-beta nerve fibers. In the presence of pain, this stimulation in the thick nerve fibers reduces the transmission of pain impulses in the lamina of the posterior branch of the spinal nerve (29,30).

The quality of life of a person in terms of his/her level of satisfaction with his/her life and ability to perform daily activities are defined (31). On the other hand, the progressive nature of osteoarthritis and the resulting pain and disability affect the patient's ability to perform daily activities (32). This condition reduces patient's activity and mobility, decreasing their quality of life (33). Hence, treatments that can reduce pain and disability in patients can increase their quality of life.

In designing our study, we tried to examine each group and also compare our own group with another group. All massage techniques were performed by a single person to avoid any difference in the method of massage and even in the method of communication, which was the strength of the present study.

Similar to any study, the present study had some weaknesses. Even though we sought to make the data analyst unaware of the study, unfortunately, we could not make the massage recipient and the massager unaware of the study's method, and it was probably a kind of bias. Considering the effectiveness of the massage and having a good sense of it in the first stage, we could not be sure of not doing the massage in the washout stage. Unfortunately, this question was not designed in the questionnaire.

Conclusion

As the elderly population continues to grow, osteoarthritis has become one of the most common diseases affecting this age group. This disease can cause many problems and difficulties causing to decrease in the quality of life of these people. In order to deal with this issue, it is recommended to use complementary medicine techniques, such as massage therapy, in f orthopedics to care for and treat diseases related to this science, including osteoarthritis. It is hoped that this research will serve as a foundation for future studies on various complementary medicine techniques that can improve the treatment of various diseases, enhance the level of health, and ultimately improve the quality of life of people in the community.

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Author's Contribution

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Competing Interests

No conflict of interest.

Ethical Approval

The present study was a crossover clinical trial code (IRCT20200811048370N1) extracted from a master's thesis and approved by the Ethics Committee of North Khorasan University of Medical Sciences (IR.NKUMS.REC.1397.043). Ethical considerations were explained to the participants.

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