

ORIGINAL ARTICLE

Effects of aromatherapy massage on pain, functional state, and quality of life in an elderly individual with knee osteoarthritis

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Abstract

Aim: To investigate the effects of aromatherapy massage on pain, functional state and life quality of elderly individuals with knee osteoarthritis.

Methods: This controlled and experimental study was conducted in two nursing homes. In this study, 90 elderly individuals with knee osteoarthritis were randomized as aromatherapy, massage and control groups. Data were collected in weeks 0, 4, and 8 using Patient Information Form, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) Knee Osteoarthritis Evaluation Scale, OsteoArthritis Knee and Hip Quality of Life Scale (OAKHQoL). Aromatherapy and massage groups received a total of 15–20 min total classic leg massage twice weekly for 3 weeks. In the aromatherapy group, two essential oils (ginger and rosemary) were added to the black seed oil.

Results: In the aromatherapy group, WOMAC (pain and functional state) scores were lower and quality of life scores were higher than the massage and control groups in week 4, and these differences were statistically significant ($p < .001$). These significant differences were present in the massage group when compared with the control ($p < .001$). These significant differences in the aromatherapy group were also sustained decreasingly in week 8 ($p < .001$), while the means were not different from baseline in the massage group ($p > .05$).

Conclusions: Aromatherapy massage performed in elderly patients with knee osteoarthritis reduced pain and improved functional status and quality of life. The week 8 findings showed that aromatherapy has more favorable and longer sustained effects than the massage.

KEYWORDS

aromatherapy, knee osteoarthritis, massage, nursing, pain, quality of life

1 | INTRODUCTION

Osteoarthritis is defined as a progressive and irreversible degenerative joint disease which affects joint cartilage and causes joint pain and functional loss (Glass, 2006; Steimberger & Kersch-Schindl, 2013). Osteoarthritis is the

most commonly observed joint disease in the world and is also the most common cause of loss of function and disability in adults (Atkins & Eichler, 2013; Conaghan, Dickson, & Grant, 2008). Osteoarthritis, which is encountered in 75% of the elderly population has unfavorable effects on the functional state and quality of life of patients due to pain and

limitation of movement (Alkan, Fidan, Tosun, & Ardiçoğlu, 2014; Conaghan et al., 2008). The treatment of osteoarthritis aims to increase patients' quality of life by approaches directed to decrease symptoms such as pain and disability (Atkins & Eichler, 2013).

Pain is the most common symptom in elderly patients with osteoarthritis. The gradually increasing severity of pain as the disease progresses is determinative of the negative relationship between quality of life and osteoarthritis (Laslett et al., 2012). Non-pharmacological approaches play an important role in symptom management and disability prevention in osteoarthritis treatment, which includes methods, such as physical treatment (e.g. heat, light), exercise, training, hot-cold application, health spas, massage and tissue manipulation (Davis & MacKay, 2013; Glass, 2006). Previous studies conducted on osteoarthritis have shown the positive effects of non-pharmacological methods (e.g. balneotherapy, acupuncture, yoga) on pain and quality of life (Evcik, Kavuncu, Yeter, & Yigit, 2007; Fouladbakhsh, 2012; Mavrommatis, Argyra, Vadalouka, & Vasilakos, 2012). Nursing practices in a patient with osteoarthritis should be focused on performing regular follow up, training, and determining the most effective symptom management methods (Kee, Harris, Booth, Rouser, & McCoy, 1998). Aromatherapy and massage are among the non-pharmacological methods which nurses may directly and independently use to control pain (Apay, Arslan, Akpinar, & Celebioglu, 2012; Lai et al., 2011).

Aromatherapy is one of the complementary treatment methods and is frequently used in nursing care in some countries (Glass, 2006; Lai et al., 2011). Aromatherapy is a safe and supportive treatment method, in which essential oils and essential oil-containing herbs (aromatic herbs) are used for the treatment (Apay et al., 2012; Battaglia, 2003). Increasing knowledge and experience is very important in aromatherapy and nurses have contributed to this field by investigating the potential effects of aromatherapy and essential fats in several areas, such as gestation, maternal and fetal health, dysmenorrhea, pain, intensive care, cancer, gastrointestinal, nervous, respiratory diseases and mental health (Cho, Min, Hug, & Lee, 2013; Kim, Nam, & Paik, 2005; Maddocks-Jennings & Wilkinson, 2004). There are studies that have shown that aromatherapy decreases pain, fatigue, anxiety and sleep disorders (Cho et al., 2013; Kabiri, HasanPour-Dehkordi, & Deris, 2018; Kim et al., 2005; Lee, Choia, Posadzki, & Ernst, 2012). Studies conducted on elderly individuals have shown that aromatherapy could be applied effectively and safely. Different studies revealed that aromatherapy had beneficial effects on pain, psychological stress, anxiety, depression, cognitive functions and sleep in the elderly (Johannessen, 2013; Tang & Tse, 2014). In one study a total of eight sessions of aromatic hand massage (with lavender) was performed over 4 weeks on elderly individuals who had lived for long periods of time

in nursing homes and had chronic pain. The findings showed that chronic pain decreased in the aromatic massage group and could be used effectively and safely in the elderly with pain (Cino, 2014).

Aromatherapy may also be used to relieve symptoms, such as pain and limitation of movement in osteoarthritis (e.g. Efe Arslan, Kutlutürkan, & Korkmaz, 2018; Kim & Kim, 2009; Kim et al., 2005; Nasiri & Mahmodi, 2018; Nasiri, Mahmodi, & Nobakht, 2016; Therklason, 2014; Yip & Tam, 2008). In this studies, lavender, eucalyptus, chamomile, or ginger oils were used as essential oils in aromatherapy. There is no study that a mixture of black seed, ginger and rosemary oils were used in aromatherapy. In addition, previous studies were based on pre- and post-test assessments. There are only two study follow-ups to evaluate the long-term effectiveness of aromatherapy massage (Nasiri & Mahmodi, 2018; Nasiri et al., 2016). After an independent electronic search, we have found a few studies performed to evaluate the efficacy of aromatherapy massage among elderly subjects with knee osteoarthritis (Choi, 2006; Won & Chae, 2011; Yip & Tam, 2008), which show there is an urgent need to conduct studies in the nursing literature on the effects of aromatherapy massage for pain, functional status and quality of life in elderly patients with osteoarthritis. Hence, conducting research in this area is significant. Nurses may be able to apply aromatherapy to decrease pain, facilitate daily activities and increase the quality of life of their patients with osteoarthritis. Therefore, we conducted the present study to determine the effects of aromatherapy (black seed, ginger and rosemary oils) and massage on pain, functional state, and quality of life of elderly individuals with knee osteoarthritis.

Our hypotheses are as follows.

1. Participants who received aromatherapy massage would have less pain than the patients in the massage and control groups.
2. Participants who received aromatherapy massage would have better functional state than the patients in the massage and control groups.
3. Participants who received aromatherapy massage would have a higher quality of life than the patients in the massage and control groups.

2 | METHODS

2.1 | Design and sample

The present study was designed as a randomized, pre-test and post-test controlled experimental study. Participants were selected after interviews with 169 elderly residents of

two nursing homes between April and November 2014 in Bursa, Turkey.

In this study, the inclusion criteria were being diagnosed with osteoarthritis according to the 1987 American College of Rheumatology criteria at least 6 months ago, being at or over 65 years of age and having pain severity intensity at or above four points according to a visual analog scale (VAS). The exclusion criteria were communication and cognitive problems, acute inflammation at the application site, knee joint surgery or drug (steroid, chloramine, hyaluronic acid) treatment in the last 6 months, a known allergy against aromatic fatty acids, and having cancer, bleeding diathesis or circulation problems.

The sample size was determined according to the power analysis performed by taking means of scales used in previous studies which were conducted on individuals with knee osteoarthritis. The confidence interval was calculated as 29.05 if α was 0.05, and $1-\beta$ was 0.80. According to this result, a total of 90 elderly individuals with knee osteoarthritis were included in this study so that each group consisted of 30 participants. Participants were allocated into three groups (aromatherapy, massage, and control) using a random table of numbers.

2.2 | Procedures

Each elderly individual in the aromatherapy and massage groups received a total of six massage sessions; that is, twice a week for 3 weeks. In the aromatherapy group was performed the massage using aromatic oils, whereas in the massage group sunflower oil was used. The participants in the control group received no aromatherapy or massage. All groups were provided with routine, conventional treatment and care. Evaluation forms were completed for each participant at previously defined timelines (weeks 0, 4, and 8; Figure S1).

Aromatherapy: The main oil used was black seed oil which is known to have analgesic and anti-inflammatory effects. Ten drops each of ginger (2.5%) and rosemary (2.5%) as essential oils (total 5%), which have analgesic and circulation increasing effects, were added to 20 mL of black seed oil (Keville & Green, 2008; Lai et al., 2011; Muruganathan, Sudheer Kumar, Sathya Chethan, & Mohan, 2013). All of the oils were bought from a firm that has ICEA (Institute Ethical and Environmental Certification) "Master Certificate". Oils to be used during aromatherapy were prepared weekly in airtight and blackout bottles. The aromatherapy oils were applied for testing purposes to the inner surfaces of the forearms of participants in the aromatherapy group. None of the participants developed an allergic reaction after a 24 hr follow up period.

2.2.1 | Massage application

The massage application was performed in a private room that is allocated in the two nursing homes. All of the massages of the elderly patients (aromatherapy and massage) were performed in the same massage room. The elderly patients took a semi-Fowler's position. For each patient, bed protectors were only for single usage. The confidentiality of the patients was ensured. Close attention was paid to the hand temperature of the practitioner and the room. It is notable that during the massage, there was a good communication with the patients, thus, there was an embracing milieu in which patients expressed themselves.

Massage was performed, including effleurage and petrissage techniques that were applied to the total leg (mainly on the knee joint) in the direction of lymph drainage for 15–20 min (Jain, 2002). Lower extremity massage, which was applied in the beginning of this research, was started with general effleurage. The patting started when the patients were standing and continued toward the thigh. Superficial effleurage was applied downward until when the upper part of the thigh was reached. This application was repeated three times. Then, massage was performed to the lower leg, knee and thigh. To all parts, first effleurage was applied deeply and superficially three times. Then, petrissage was applied and this application was repeated three times. After the petrissage, localized effleurage massage and localized massage were applied. All these interventions were made for the anterior, outside, posterior and inside. After the localized massages ended, deep and superficial effleurage was performed three times again to all of the extremities. The massage application was performed on both legs.

2.3 | Data collection

2.3.1 | Patient information form

This form contained a total of 20 questions. Seven of them were about the participants' socio-demographic characteristics, five of the questions were about daily activities, and eight of the questions were about their disease and its treatment. The 10 cm VAS (0: none, 10: very much) was used for pain evaluation.

2.3.2 | WOMAC knee osteoarthritis evaluation scale

Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) Knee Osteoarthritis Evaluation Scale was developed by Bellamy et al. (Bellamy, 2002; Bellamy, Buchanan, Goldsmith, Campbell, & Stitt, 1998). The Turkish validation and reliability study was performed by Tüzün, Eker, Aytar, Daşkapan, and Bayramoğlu (2005). This scale,

which evaluated osteoarthritis-related disability in the hip and/or knee osteoarthritis, is also very sensitive to the changes in health states (Bellamy et al., 1998). The scale contains a total of 24 items and three dimensions. The scores obtained from the scale differ, with pain (5 items) having 0–20 points, stiffness (2 items) 0–8 points, and difficulties in daily activities (17 items) 0–68 points. As scores increase in all dimensions, the intensity and severity of the complaint also increase (Bellamy, 2002). In the Turkish validation and reliability study, the Cronbach alpha value was determined to be 0.70 (Tüzün et al., 2005).

2.3.3 | Osteoarthritis knee and hip quality of life (OAKHQoL)

The OAKHQoL scale developed by Rat et al. is made up of 43 items, and it contains five sub-dimensions as follows: physical activity, mental health, pain, social support and social functionality. The scale is calculated using 40 items, and questions in the pain section are included in the calculation of the sub-dimension of physical activity. Each item is evaluated between 0–10 in the scale, which consists of Likert-type responses. As the total score increases, the quality of life also increases (Rat et al., 2005; Rat et al., 2006). The validity and reliability study for Turkey was performed by Duruöz et al., and the Cronbach alpha value was determined to be 0.80, 0.51, 0.87, 0.77, and 0.31 for each sub-dimension respectively (Duruöz, Duruöz, Uçar, & Topçu, 2013). In this study, the Cronbach alpha value was determined to be 0.82, 0.76, 0.80, 0.64, 0.20 for each sub-dimension respectively and 0.78 for total items.

2.4 | Ethical considerations

To conduct this study, written permission was obtained from the institution with the ethical consent form ethics committee

(dated: 04.03.2014 and numbered 2014/22). Before this study started, permission was received for the use of scales in this study and at the nursing homes where this study was conducted. Written informed consent was obtained from the elderly individuals. All the individuals were informed about the aim of this study, and they were assured of confidentiality and anonymity. The elderly individuals were also assured of their right to withdraw from this study and that all the information obtained would be used only for research aims.

2.5 | Data analysis

Data analysis was performed using the SPSS 22.0 program (IBM, Armonk, NY, USA). The cases distribution was evaluated by Kolmogorov-Smirnov test, and according to the results of this test, there was normal distribution. For that reason, we have used parametric tests for statistical evaluations to compare means. Chi-square, multiple variance analysis (ANOVA), and the significance of differences between two pairs (paired *t*-test) were used for the analysis, The Tukey Honestly Significant Difference test analysis was performed for advanced analysis. *p* values of less than .05 were defined as statistically significant.

3 | RESULTS

3.1 | Characteristics of the patients

The distributions of the characteristics of the elderly individuals enrolled in this study are shown in Table 1. There was no difference in age, means of age, gender, education level, body mass index (BMI) and disease duration between the groups ($p < .05$).

The distribution of previous treatments among elderly individuals with osteoarthritis was determined as 78.9% pharmacological treatment, and 40% of these individuals

TABLE 1 Distribution of characteristics of the elderly according to groups

	Aromatherapy	Massage	Control	<i>p</i> value
Age (mean, years)	78.30 ± 7.82	76.00 ± 6.69	75.63 ± 6.89	.280
Gender (n / %)				
Female	18 60.0	18 60.0	17 56.7	.955
Male	12 40.0	12 40.0	13 43.3	
Education level (n / %)				
Literate	8 26.7	11 36.7	14 46.7	.272
Primary school	13 43.3	13 35.1	11 36.7	
Secondary school	6 20.0	3 10.0	3 10.0	
High school	-	3 10.0	2 6.7	
BMI (mean, kg/m ²)	27.00 ± 4.52	29.44 ± 10.02	28.32 ± 4.31	.388
Disease duration (mean, years)	11.67 ± 11.55	8.10 ± 8.70	11.10 ± 8.36	.311

BMI, body mass index.

had used nonsteroidal anti-inflammatory (NSAI) gel, and 60% of them had used NSAI drugs. While 23.3% of the elderly reported they had previously had injections in their joints, 36.7% reported they had had physical treatment. Of the participants, 21.1% reported they had asked for an alternative treatment for osteoarthritis.

3.2 | Results of the groups' pain and functional states

The distributions of mean scores of WOMAC pain, stiffness and functional state by groups are shown according to groups in Table 2. While the mean scores for WOMAC pain, stiffness and functional state were significantly decreased at the end of week 4 in the aromatherapy group, at week 8, these scores were significantly lower than the baseline scores ($p < .001$).

While the mean scores for WOMAC pain and stiffness were significantly decreased at the end of week 4 in the massage group ($p < .001$), they were re-elevated in week 8 and these scores were not different from baseline scores ($p > .05$).

When mean differences at baseline and week 4 scores were compared, there were significant differences in

WOMAC pain and functional state in the aromatherapy group when compared with the massage and control groups, while significant differences were present in the massage group when compared with the control group ($p < .001$). When the mean differences between at baseline and week 8 scores were compared, significant differences were present in WOMAC pain, stiffness, functional state of the aromatherapy group compared with the massage and control groups ($p < .001$). When the mean differences between the week 4 and week 8 scores were evaluated, the mean pain scores within the WOMAC pain sub-dimension had increased in aromatherapy and massage groups, and the change was different from the control group ($p < .001$).

3.3 | Results of the groups' quality of life

The distributions of the mean scores for quality of life are shown by group in Table 3. Our findings showed that in week 4 in the aromatherapy group the mean scores in the sub-dimensions of quality of life (except social functionality) significantly increased, and that they decreased again in week 8, and the same scores were determined to be significantly higher than the mean scores baseline ($p < .001$). Social support, which was a sub-dimension of quality of life,

TABLE 2 Distributions of mean scores of Western Ontario and McMaster Universities (WOMAC) pain, stiffness, and difficulties in daily activities according to the groups

WOMAC	Baseline Mean \pm SD	Week 4 Mean \pm SD	Week 8 Mean \pm SD	Baseline - week 4 within group <i>P</i> value	Baseline - week 8 within group <i>p</i> value	Week 4-8 within group <i>p</i> value
Pain (0–20, \uparrow worse)						
Aromatherapy	9.72 \pm 2.59	5.96 \pm 2.70	7.21 \pm 3.13	<.001	<.001	<.001
Massage	9.64 \pm 2.27	7.64 \pm 2.98	9.18 \pm 2.67	<.001	>.05	<.001
Control	10.62 \pm 2.30	10.80 \pm 2.34	10.83 \pm 2.28	<.05	>.05	>.05
Between-groups <i>p</i> value	.218	<.001	<.001	<.001	<.001	<.001
Stiffness						
Aromatherapy	2.46 \pm 1.40	1.25 \pm 1.08	1.65 \pm 1.25	<.001	<.001	<.05
Massage	2.58 \pm 1.58	1.68 \pm 1.41	2.34 \pm 1.40	<.001	>.05	<.001
Control	2.70 \pm 1.41	2.86 \pm 1.26	2.82 \pm 1.30	<.05	>.05	>.05
Between-groups <i>p</i> value	.819	<.001	.004	<.001	<.001	<.001
Functionality (0–68, \uparrow worse)						
Aromatherapy	36.22 \pm 9.74	29.53 \pm 9.50	31.98 \pm 9.78	<.001	<.001	<.001
Massage	35.53 \pm 10.31	33.58 \pm 14.26	35.73 \pm 11.00	>.05	>.05	>.05
Control	35.94 \pm 8.81	33.14 \pm 8.85	37.36 \pm 8.54	>.05	>.05	>.05
Between-groups <i>p</i> value	.962	.034	.101	<.001	<.001	.149

Note: Statistically significant values are shown in bold.

TABLE 3 Distributions of mean scores of life quality according to groups

Quality of life	Baseline Mean ± SD	Week 4 Mean ± SD	Week 8 Mean ± SD	Baseline - week 4 within group <i>p</i> value	Baseline - week 8 within group <i>p</i> value	Week 4-8 within group <i>p</i> value
Physical activity						
Aromatherapy	34.86 ± 13.53	40.40 ± 14.16	38.31 ± 14.33	<.001	<.001	<.001
Massage	35.48 ± 12.64	37.93 ± 13.36	35.08 ± 13.56	<.001	>.05	<.001
Control	36.37 ± 15.47	37.28 ± 11.06	37.04 ± 10.85	>.05	>.05	>.05
Between-groups <i>p</i> value	.915	.618	.628	.072	.152	.001
Pain						
Aromatherapy	54.25 ± 11.65	80.33 ± 12.97	69.83 ± 16.08	<.001	<.001	<.001
Massage	52.66 ± 13.61	67.50 ± 16.60	56.00 ± 17.01	<.001	<.05	<.001
Control	47.58 ± 14.37	46.25 ± 13.59	40.00 ± 39.63	<.05	>.05	>.05
Between-groups <i>p</i> value	.133	.000	.000	<.001	.001	.622
Mental health						
Aromatherapy	58.05 ± 10.95	62.46 ± 11.34	60.97 ± 11.15	<.001	<.001	<.05
Massage	56.30 ± 11.45	58.48 ± 12.66	56.41 ± 12.75	<.05	>.05	<.05
Control	55.05 ± 12.89	54.00 ± 13.40	54.15 ± 13.00	<.05	>.05	>.05
Between-groups <i>p</i> value	.615	.036	.098	<.001	.001	.023
Social support						
Aromatherapy	49.50 ± 10.22	51.16 ± 10.84	50.83 ± 10.71	<.05	>.05	>.05
Massage	50.75 ± 15.98	51.75 ± 16.57	51.58 ± 16.40	>.05	>.05	>.05
Control	53.25 ± 17.69	51.33 ± 18.57	53.00 ± 17.91	>.05	>.05	>.05
Between-groups <i>p</i> value	.616	.989	.857	.007	.067	.161
Social functionality						
Aromatherapy	53.66 ± 10.87	52.55 ± 10.19	53.77 ± 10.16	>.05	>.05	>.05
Massage	49.44 ± 10.90	49.44 ± 9.67	48.66 ± 9.81	>.05	>.05	>.05
Control	47.66 ± 10.76	49.66 ± 7.94	49.77 ± 7.85	>.05	>.05	>.05
Between-groups <i>p</i> value	.616	.617	.618	.076	.094	.081

Note: Statistically significant values are shown in bold.

significantly increased in week 4 ($p < .05$), but it decreased again in week 8 ($p > .05$).

In the massage group, mean scores for physical activity and mental health, which were sub-dimensions of quality of life, significantly increased in week 4 ($p < .05$) and they decreased significantly in week 8 ($p < .05$), and were not different from the mean baseline score ($p > .05$). The mean score for pain, which was a sub-dimension of quality of life, increased significantly in week 4 ($p < .05$). However, we should note that the mean score significantly decreased in week 8, and this was not a significant difference from the baseline score ($p > .05$).

When the mean differences between baseline and week 4 scores were compared, the findings showed that the mean scores for pain, mental health and social support, which were sub-dimensions of quality of life, were significantly different

in the aromatherapy group than in the massage and control groups ($p < .05$). When the mean differences between the baseline and week 8 scores were compared, no difference was observed in the mean differences in social support between the groups ($p > .05$).

4 | DISCUSSION

The outcome of the present study, which was performed to analyze the effects of aromatherapy massage on pain, functional state and quality of life in elderly individuals with knee osteoarthritis, revealed the beneficial effects of aromatherapy, primarily on pain, and then on stiffness, functional state and some sub-dimensions of the quality of life.

There are several studies performed about the effects of aromatherapy on pain and functional status in knee

osteoarthritis in the literature (Efe Arslan et al., 2018; Kim & Kim, 2009; Nasiri & Mahmodi, 2018; Nasiri et al., 2016; Therklason, 2014; Yip & Tam, 2008). Therklason (2014) performed a topical ginger application for a week among subjects with knee osteoarthritis and reported significant and favorable effects on pain, fatigue, global evaluation, functional state, and life satisfaction of individuals after the applications. In the study performed by Nasiri et al. (2016) and Nasiri and Mahmodi (2018), the findings showed that pain severity and activities of daily living disability reduced significantly in patients who had aromatherapy massage when compared with before the application, and other groups (placebo massage and control). Efe Arslan et al.'s (2018) study showed aromatherapy massage performed in patients with osteoarthritis reduced knee pain scores, reduced morning stiffness, and improved physical functioning status. Significant decreases in pain and improvements in functional state in the aromatherapy group of the present study were consistent with this literature information.

Also, pain and stiffness significantly decreased in the massage group when compared with the control groups in the present study. The most commonly preferred alternative treatment method for elderly people with osteoarthritis is massage, and the beneficial effects of massage are shown in the studies that were conducted on pain, stiffness and physical functionality (Dillard, 2011; Fouladbakhsh, 2012; Perlman et al., 2012). In the study performed by Atkins and Eichler (2013), the effects of self-massage in patients with knee osteoarthritis were investigated. After randomization of the participants into two groups, individuals in the massage group were trained to carry out self-massage on their knees for 20 min twice a week. Both groups were evaluated 4 weeks later. Their findings showed that pain and stiffness significantly decreased, whereas functional state and joint movement range increased in the massage group when compared with the control group. However, the use of aromatic massage was recommended, because some studies showed that aromatic massage was more beneficial than massage alone (Jain, 2002; Lai et al., 2011; Nasiri et al., 2016). In our study also, aromatherapy massage performed more effective and longer sustained effects than the massage.

When we performed the literature review, surprisingly, there was only one study that revealed the efficacy of aromatherapy massage on quality of life in elderly individuals with knee osteoarthritis. Yip and Tam (2008) randomized elderly individuals with knee osteoarthritis into three groups (aromatherapy = 19, massage = 17, and control = 17) and applied a total of six massage sessions. While improvements in mean scores for WOMAC pain, stiffness and difficulties in daily activities were found in patients after aromatherapy massage (using ginger and orange) compared to the other groups, no difference was present in the quality of life. Our

findings relating to significant differences in the WOMAC sub-dimensions are consistent with these results. However, significant differences were determined in sub-dimensions of quality of life in our study. It is believed that this is because of the use of a quality of life scale that was specific for osteoarthritis.

Our findings suggest that aromatherapy may be applied by nurses as a non-pharmacological treatment method for osteoarthritis. Nursing practices in the care of osteoarthritic individuals should be focused on pain control, treatment management, exercise, patient training programs directed to diet and joint protection, prevention of pain and avoidance of disability which may cause psychosocial changes. Therefore, it is the nurse's responsibility to present individualized solutions to patients by performing regular patient follow up and training, and determining effective methods for symptom management (Kee et al., 1998). Aromatherapy can be performed effectively, safely and independently by the nurses. Effective symptom management can be provided for osteoarthritic patients if nurses are informed about this subject and are trained in how to apply it. In particular, nurses who work with elderly patients, who have an increased incidence of osteoarthritis, should be more active in using these treatments.

4.1 | Limitations

The limitation of this study is that the application of massage and the patients' interviews were carried out by the same researcher. Therefore, communication between the researcher and the participants may have affected the results of this research. Because the diagnosis of osteoarthritis was obtained from the elderly patients' files, we could not address the grading. We think that the patients in different grades would have different symptoms and this could influence the effects of the non-pharmacological methods. Future research could be conducted through grading. To show the efficacy of the aromatherapy, it is thought that the study to be done by using black seed and black seed + essential oil.

5 | CONCLUSIONS

Our findings showed that aromatherapy had positive effects on the pain, functional state and quality of life in elderly individuals with knee osteoarthritis. When aromatherapy was compared with massage, the findings revealed that aromatherapy had more beneficial and longer-lasting effects. Effective symptom management can be provided to individuals with osteoarthritis if nurses are informed about these findings and are offered related training programs. Nurses who specifically care for the elderly, who have increased incidences of osteoarthritis, should receive information

about non-pharmacological methods, including aromatherapy, which can be used for osteoarthritis. Nurses should also find a place for this treatment in their daily practices. Moreover, nursing home management, elder care and healthcare units should be informed about the findings of the present study. Hence, awareness of the efficacy of aromatherapy for elderly patients with knee osteoarthritis could be increased. For the sustainability of the present study, the aromatherapy treatment could be planned and conducted on all age groups, and interventions could be made to increase its efficacy after the determination of the baseline severity of the disease.

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CONFLICT OF INTERESTS

The authors declare that they have no conflict of interest.

AUTHOR CONTRIBUTIONS

All of the authors have agreed on the final version and meet at least one of the following criteria recommended by the International Committee of Medical Journal Editors 2013: substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data, drafting this research article or revising it critically for important intellectual content.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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