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ORIGINAL ARTICLE

# Effect of flaxseed poultice compress application on pain and hand functions of patients with hand osteoarthritis

Burcu Babadağ Savaş[1] · Güler Balcı Alparslan[1] · Cengiz Korkmaz[2]

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## Abstract

**Introduction/objectives** This randomized controlled intervention study investigated the effect of flaxseed poultice compress application on pain and hand functions in patients with primary interphalangeal hand osteoarthritis (OA).

**Method** The study sample consisted of 82 patients who met the inclusion criteria in the Rheumatology Outpatient Clinic at a University Hospital between January 15, 2017, and May 15, 2018. Patients included in the sample groups were selected randomly. Three sample groups were formed: intervention group I (flaxseed poultice compress) ($n = 33$), intervention group II (hot compress) ($n = 29$), and control group ($n = 20$). The interventions were applied once a day for 7 days in a row. These patients also continued their routine pharmacological treatment. descriptive characteristics identification form, visual analog scale (VAS), Australian–Canadian (AUSCAN) Osteoarthritis (OA) Hand Index, and side effect evaluation form were used as data collection tools.

**Results** The means of VAS scores of patients in the intervention group I were 6.03 ± 0.25 on day 0, 2.2 ± 0.30 on day 8, and 3.39 ± 0.32 on day 15. The means of AUSCAN total scores of patients in the intervention group I were 40.84 ± 1.76 on day 0, 14.03 ± 1.66 on day 8, and 15.78 ± 1.66 on day 15. The present study showed that pain significantly decreased and the hand function efficiency increased in patients treated with flaxseed poultice compress compared with the hot compress and control groups.

**Conclusions** In addition to pharmacological treatment, flaxseed poultice compress intervention is recommended to be used as a nursing intervention for reducing pain and increasing hand functions for patients with hand OA in cooperation with the physicians and other health professionals.

**Keywords** Flaxseed poultice · Hand function · Hand osteoarthritis · Nursing · Pain

## Introduction

Osteoarthritis (OA) is the most common form of arthritis among rheumatic diseases. Hand OA is a disease characterized by subclinical inflammation in the hand joints, pain, swelling, and impaired hand function. Especially OA-induced impairment of the functions of the hand, which is the most mobile organ of the upper extremity, and symptoms such as pain, stiffness, and swelling discomfort the patients significantly [1, 2].

The idea of supporting the current pharmacological treatment methods with nonpharmacological treatment came into existence after it was realized that pharmacological therapy alone was insufficient in controlling and treating the symptoms of the disease. Various studies showed that supporting the pharmacological treatment with the nonpharmacological applications increased the success rate [2, 3]. This led to the need for complementary interventions, particularly for controlling symptoms. Plants such as capsaicin, ginger, rosemary, *Nigella sativa*, and flaxseed are used among the herbal remedies, which are included in the complementary interventions [4–6]. The flaxseed plant contains a significant amount of alpha-linolenic acid and omega-3 fatty acids. These fatty acids inhibit arachidonic acid and prevent the inflammatory response of neutrophils. Thus, flaxseed causes a reduction in

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✉ Burcu Babadağ Savaş
burcubabadag1@gmail.com

[1] Department of Nursing, Faculty of Health Science, Eskisehir Osmangazi University, Meşelik Campus, 26480 Eskisehir, Turkey

[2] Department of Internal Medicine and Rheumatology, School of Medicine, Eskisehir Osmangazi University, Eskisehir, Turkey

the synthesis of prostaglandin and leukotriene. The use of flaxseed plants for patients with arthritis is thought to be important in reducing OA symptoms because of these effects of flaxseed [6–8]. Researchers reported successful results with the oral use of flaxseed or use of this plant as oil in rheumatic diseases because of its anti-inflammatory and analgesic effects [7, 8]. Flaxseed poultice was also used for treating some other diseases due to its anti-inflammatory effect [6]. Therefore, the topical use of the mashed plant extract could be effective for OA.

On the contrary, investigating the effect of flaxseed poultice application in patients with hand OA may be useful because of the low number of studies on hand and the hand being the most commonly used organ in daily life activities. No studies have investigated the use of flaxseed poultice in hand OA.

The purpose of this study was to evaluate the effect of flaxseed poultice compress application on pain and hand functions in individuals with primary interphalangeal hand OA.

## Materials and methods

This was a randomized controlled experimental study. A total of 82 patients diagnosed with primary interphalangeal hand OA according to the American College of Rheumatology (ACR) (1981) classification criteria were included in this study between January 15, 2017, and May 15, 2018, at the Rheumatology Outpatient Clinic. In the final power analysis with $n = 82$, the power was found to be 1.00 (100%). Groups were randomized using the SAS University Edition package program (SAS, USA) with the criterion sampling method (Fig. 1). The randomization ratio was 1:3, and the randomization method was simple. Randomly selected sample groups were intervention group I (flaxseed poultice compress) ($n = 33$), intervention group II (hot compress) ($n = 29$), and control group ($n = 20$). Most of the patients in the control group, who had been randomized already, chose not to participate in our study once they were informed that no additional medical intervention would be made to relieve their pains except for therapy given before.

### Inclusion criteria

The inclusion criteria are the following: patients that are aged more than 18 years; diagnosed with primary interphalangeal hand OA according to ACR (1981) diagnostic criteria at least 1 month before the study, with pain for at least 1 month or longer, with no other inflammatory diseases such as rheumatoid arthritis, gout, or fibromyalgia, with the pain intensity between 4 and 8 according to the visual analog scale (VAS), with an Australian–Canadian (AUSCAN) OA Hand Index score of at least 12 or above, not with an intact skin integrity on hand, lack of circulatory disorder, and coagulopathy; and not diagnosed with complex diseases such as malignancy, with no serious hand trauma or hand surgery in the last 6 months, with no disease-modifying antirheumatic drugs (DMARDS) or intra-articular steroid injection therapy in the last 3 months; and not pregnant, with no psychiatric diagnosis, with no impairment of consciousness due to the drug used or existing diseases, with no communication problem, participating voluntarily in the study.

### Exclusion criteria

The exclusion criteria are the following: the switching in the treatment method during the application, change in the treatment dose during application, use of nonpharmacologic interventions during the application, serious change in nutrition [5, 6, 9–11].

#### Ethical consideration

The protocol was approved by the Ethical Committee of Clinical Research. Written informed consent was obtained from all patients.

#### Data collection

Three sample groups were formed: intervention group I, intervention group II, and control group, from the patients diagnosed with hand OA who met the inclusion criteria according to ACR (1981). For the first interview (0th day), one of the researchers used the face-to-face interview method and applied descriptive characteristics identification form, VAS, and AUSCAN OA Hand Index to the patients in a quiet and empty room of the outpatient clinic, after the examination of a rheumatologist. An appointment schedule of seven consecutive days (1 week) was prepared for the patients. The interventions were applied once a day for 7 days in a row. The groups were given appointments at different times to prevent contact of randomized groups with each other. The patients in the groups had no information about the application to the patients in the other groups. Thus, no transmission occurred between the patients during the application and bias was prevented during the patient assessment. The patients were evaluated three times using VAS, AUSCAN OA Hand Index, and side effect evaluation forms on the 0th day before the application, on the day after the application (8th day), and 1 week after the application (15th day). The patients were randomly sent to the other researcher on the 8th and 15th day after the application for the evaluation of the outcomes, and the researcher performed the patient assessment by blinding.

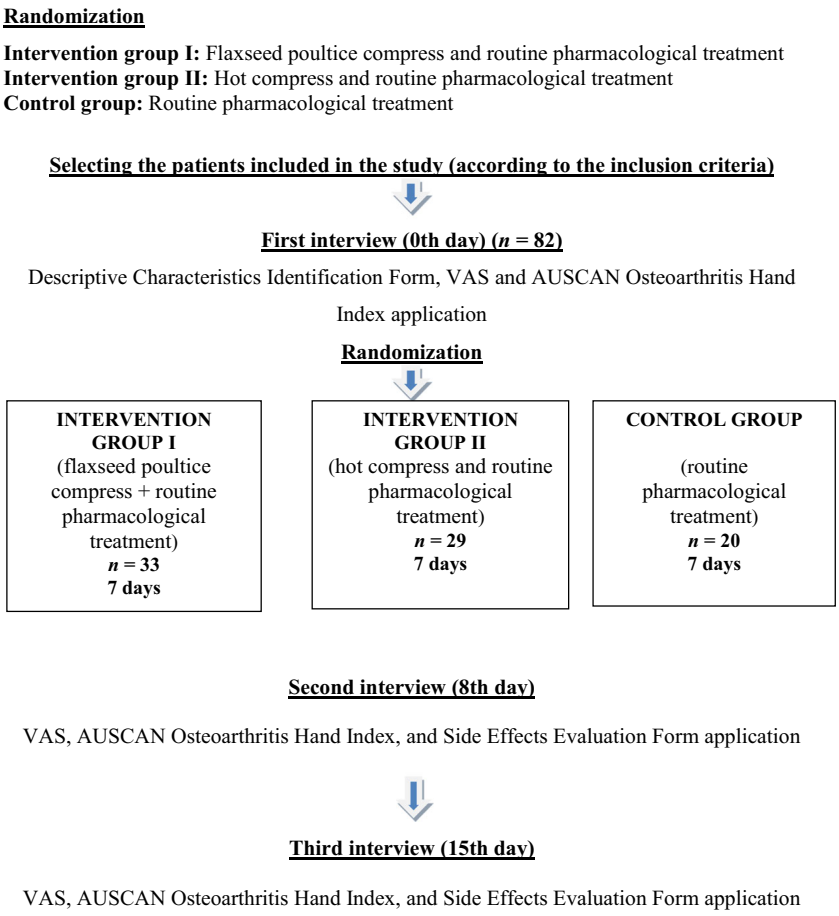


**Fig. 1** Work plan of the applications used in the study

### Descriptive characteristics identification form

The form was prepared according to the recent studies. It consisted of 22 items, with the first 6 items related to sociodemographic characteristics and the remaining related to disease, treatment, and coping strategies. Besides, another form (consisting of two items) was used to evaluate the side effects during or after the application [6, 10, 11]. The patients' pain severity was determined using VAS [12].

### AUSCAN OA Hand Index

AUSCAN OA Hand Index developed by Bellamy et al. [13] is used to evaluate the functional status of the hands and recommended by the Outcome Measures in Rheumatology Clinical Trials Group for clinical studies. In addition, the validity and reliability of the AUSCAN OA Hand Index were approved by Allen et al. [14]. It is also translated into other languages including Turkish [13–15]. The scale consists of 15 items and is a 4-point Likert (0 = none to 4 = very severe) type. The scale has three subdimensions that assess pain, stiffness, and hand function. The scale score has no breakpoint. The functional efficiency decreases with the increase in the total score of the scale. In addition, the difficulty experienced related to pain, stiffness level, and hand function increased with the increased in the scores of the subdimensions of the scale [14, 15].

### Flaxseed

**General information** The flaxseed was prepared according to the Turkish Food Codex and obtained from a company having a national food safety management certificate (Company TS EN ISO 9001: 2008 Quality and TS EN ISO 22000). Approximately 22.5 g of α-linoleic acid (ALA) is present in 100 g of flaxseed [16]. Flaxseed contains 3–10% mucilage (arabinoxylans, galactans, and rhamnogalacturonans), cyanogenic glycosides (0.05–0.1%), and 10–45% fatty acids (40–70% ALA, 10–25% linoleic acid, and 13–30% oleic acid). Flaxseed is odorless [6].

### Preparation, dosage, and administration

- For preparation, the seeds of unground whole flaxseed were used. The flaxseed was crushed in a glass mortar, mixed obtained contained 60% water and 40% flaxseed [6, 11, 17–19].
- After boiling, the flaxseed poultice was wrapped in a gauze patch to form a compress.

- Two thermophores at 40–45 °C were prepared, and the temperature was checked with a water thermometer regularly.
- The flaxseed compress was kept between the two thermophores (40–45 °C) for 20–30 min, and the temperature was kept stable during the intervention.
- Before the intervention, the skin surface in the hand area was examined to ensure that the skin integrity was intact.
- The warm flaxseed poultice prepared on a gauze patch was wrapped onto the hands of the patient.
- Both hands were wrapped with the flaxseed compress. Then, they were covered with a nylon bag and thermophores filled with warm water were placed on top of the compress. The hands were covered with a towel. Hence, a stable temperature was maintained. The application time was 20–30 min.

**Data analysis** Statistical analysis was performed using the IBM SPSS Statistics V 21.0 (SPSS Inc., IL, USA) package program. The normality test was performed with the Shapiro–Wilk's test. Descriptive statistical methods (mean, standard deviation/standard error, number, and percentages) were used for evaluation. Fisher's exact chi-square test and Pearson's exact tests were used for evaluating the distribution of descriptive features of the groups. Two-way analysis of variance (single factor repetition) was used to evaluate the differences in the groups with respect to variables between the measurement time points. A least significant difference was used to evaluate the multiple comparisons. Statistical significance was set at $P < 0.05$.

## Results

### Sociodemographic-, disease-, and treatment-related factors

The mean age of the patients was 63.84 ± 8.02 years; 92.7% of them were female, and 79.3% were married. The mean duration of disease related to OA was 81.95 ± 72.17 months. All patients (100.0%) stated that they had OA-related complaints in both hands.

The proportion of colchicine use was determined to be 12.1% in the intervention group I, 6.9% in the intervention group II, and 5.0% in the control group using colchicine. In addition, most of the patients (100.0%) used paracetamol and had histories of using it in case of need (Table 1).

The use of nonpharmacological methods to cope with OA and pain was found to be 42.4% in the intervention group I, 58.6% in the intervention group II, and 40.0% in the control group. All groups were found to be similar in terms of sociodemographic-, disease-, and treatment-related characteristics such as age, gender, duration of disease, treatment, and coping strategies ($P > 0.05$) (Table 1).

### VAS score comparisons

The multiple comparisons performed between the groups and the days revealed that the means of VAS scores were significantly different ($P < 0.001$). The VAS scores indicated a reduction in the pain of the flaxseed poultice compress group ($P < 0.001$) on days 8 and 15, whereas no significant difference was found in the pain of the hot compress and control groups ($P > 0.05$) (Table 2).

### AUSCAN score comparisons

The multiple comparisons performed between the groups and the days revealed significant differences in AUSCAN total scores and mean values of pain, stiffness, and function ($P < 0.001$). The AUSCAN scores indicated a reduction in the pain and stiffness of the flaxseed poultice compress group ($P < 0.001$) on days 8 and 15, whereas no significant difference was observed in the pain and stiffness of the hot compress and control groups ($P > 0.05$) (Table 3).

### Evaluation of the side effect

Side effect assessment was done on the 8th day. No side effects were observed in all patients (100.0%) in the intervention group I, and side effects of the increase in pain and mild redness were observed in 17.2% of the patients in the intervention group II ($P < 0.05$). On the 15th day, side effects were observed in 3% of the patients (mild itching) in the intervention group I and no side effects were observed in all patients (100.0%) in the intervention group II ($P > 0.05$).

## Discussion

### VAS score comparisons

Pain is one of the major symptoms of OA, and most patients are admitted to the health institutions due to their inability to relax in pain complaints [1, 20]. The present study showed that pain significantly decreased in patients treated with flaxseed poultice compress compared with the hot compress and control groups (Table 2). Similarly, Mosavat et al. [21] evaluated the efficacy of flaxseed oil in patients with knee OA in a randomized placebo-controlled double-blind study; 20 mg flaxseed oil was applied to the patients in the treatment group every 8 h and liquid paraffin was topically applied to the patients in the placebo group. In the VAS evaluation performed at the end of 7 days, it was observed that the severity of the pain decreased significantly in the flaxseed oil group

**Table 1** Sociodemographic-, disease-, and treatment-related factors

| Characteristics | Groups | | | | | | |
|---|---|---|---|---|---|---|---|
| | Flaxseed poultice compress group (1) | | Hot compress group (2) | | Control group (3) | | |
| | Mean ± SD ($n = 33$) | | Mean ± SD ($n = 29$) | | Mean ± SD ($n = 20$) | | $P$ |
| Age | 61 ± 96 ± 6.76 | | 64.82 ± 8.32 | | 65.50 ± 9.21 | | .216 * |
| Duration of disease (month) | 86.54 ± 77.63 | | 95.79 ± 78.72 | | 54.30 ± 42.26 | | .126 * |
| | $n$ | %[a] | $n$ | %[a] | $n$ | %[a] | |
| Gender | | | | | | | |
| Female | 31 | 93.9 | 28 | 96.6 | 17 | 85.0 | .375* |
| Male | 2 | 6.1 | 1 | 3.4 | 3 | 15.0 | |
| Marital status | | | | | | | |
| Married | 26 | 78.8 | 22 | 75.9 | 17 | 85.0 | .737* |
| Single | 7 | 21.2 | 7 | 24.1 | 3 | 15.0 | |
| Medical treatment for OA paracetamol (in case of need) | | | | | | | |
| Yes | 33 | 100.0 | 27 | 93.1 | 20 | 100.0 | .180** |
| No | 0 | .0 | 2 | 6.9 | 0 | .0 | |
| Colchicine | | | | | | | |
| Yes | 4 | 12.1 | 2 | 6.9 | 1 | 5.0 | .688* |
| No | 29 | 87.9 | 27 | 93.1 | 19 | 95.0 | |
| Nonpharmacological methods to cope with OA and pain | | | | | | | |
| Yes | 14 | 42.4 | 17 | 58.6 | 8 | 40.0 | .328 * |
| No | 19 | 57.6 | 12 | 41.4 | 12 | 60.0 | |

*Pearson's exact tests

**Fisher's exact chi-square test

compared with the placebo group. Singh et al. [8] investigated the anti-arthritis and disease-modifying effects of flaxseed oil. The experimental model was set in five groups as follows: control (group I), indomethacin treatment (group II), three flaxseed oil treatment groups (group III dose 1 mL/ kg, group IV dose 2 mL/kg, and group V dose 3 mL/kg). The study showed that the edema in the joint region decreased significantly in all groups except the control group. It reported that the edema level of the group receiving 3 mL/kg flaxseed oil decreased significantly compared with the indomethacin treatment group, especially on the 21st day ($P < 0.001$). In addition, flaxseed oil was found to be more effective in reducing tumor necrosis factor receptor 1 (TNF-R1) and interleukin-6 (IL-6) levels in the groups receiving flaxseed oil treatment than in the group receiving indomethacin. Kaitwas and Majundar investigated the therapeutic effect of flaxseed oil in rats with acute and chronic arthritis. The edema was found to be significantly lower in the joint area in the group receiving 3 mL/kg flaxseed compared with the group receiving 100 mg/kg aspirin treatment [7]. Thus, the reduction of TNF-R1 and IL-6 levels by flaxseed produced an anti-inflammatory effect, which was thought to be effective in reducing edema and indirectly in reducing pain. The flaxseed plant ALA inhibits the production of arachidonic acid in the inflammatory process in rheumatic diseases such as arthritis due to the presence of omega-3 fatty acids. This inhibits the inflammatory response of neutrophils and the synthesis of other inflammatory mediators such as histamine, serotonin, leukotriene, quinine, and prostaglandin. Thus, the edema in the joint area reduced in patients with OA [8, 10, 22, 23]. The present study also showed that flaxseed poultice compress had a similar effect and could be used safely in patients with hand OA in addition to pharmacological treatment. Differences are seen in the administration mode, administration area, frequency, and duration between studies evaluating the effect of flaxseed [6, 8, 11, 21, 24]. The results of the present study showed that the pain-decreasing effect of flaxseed poultice compress continued on the 15th day.

In the present study, the comparison of the hot compress and control groups on the 8th and 15th days showed that pain did not decrease significantly compared with the flaxseed poultice compress group (Table 2). Especially, the studies comparing the hot herbal compresses and hot compresses showed that hot herbal compresses were more effective in reducing pain and increasing functions compared with just hot compress application [25, 26]. In addition, Sarsan et al.

**Table 2** Means of VAS scores of the groups with respect to days

| VAS | Groups | | | |
|---|---|---|---|---|
| | Flaxseed poultice compress group (1) Mean ± SD ($n = 33$) | Hot compress group (2) Mean ± SD ($n = 29$) | Control group (3) Mean ± SD ($n = 20$) | Multiple comparisons $P$** |
| 0thday | 6.03 ± 0.25 | 6.75 ± 0.27 | 6.50 ± 0.32 | 1–2: $P = 0.053$ |
| | | | | 1–3: $P = 0.258$ |
| | | | | 2–3: $P = 0.543$ |
| 8th day | 2.21 ± 0.30 | 6.51 ± .32 | 7.05 ± 0.39 | 1–2: $P < 0.001$ |
| | | | | 1–3: $P < 0.001$ |
| | | | | 2–3: $P = 0.302$ |
| 15th day | 3.39 ± 0.32 | 6.75 ± 0.35 | 6.50 ± 0.42 | 1–2: $P < 0.001$ |
| | | | | 1–3: $P < 0.001$ |
| | | | | 2–3: $P = 0.639$ |
| Multiple comparisons | | | | |
| 0 and 8th days | $P < 0.001$ | $P = 0.363$ | $P = 0.087$ | *$P < 0.001$ |
| 0 and 15th days | $P < 0.001$ | $P = 1.000$ | $P = 1.000$ | |
| 8 and 15th days | $P < 0.001$ | $P = 0.309$ | $P = .056$ | |

*Two-way analysis of variance (single factor repetition)

**Least significant difference

[27] conducted a study on patients with knee OA and found that hot mud application was more effective than hot application alone in reducing pain values and increasing physical functions. The use of hot application alone provided controversial results about the effect of this practice on pain and hand functions [2, 28]. Therefore, the use of hot application with additional methods such as herbal treatments, mineral waters, and mud baths is thought to be more effective in reducing pain and increasing hand functions. The most important reason for the lack of beneficial effect of hot application on the pain and hand functions over the control group may depend on its duration of action and the time it is evaluated. The patient outcomes were evaluated nearly 24 h after the completion of the 7-day application (8th day). During the VAS and AUSCAN OA Hand Index evaluation, the state of pain, stiffness, and hand function in the last 48 h were asked. Based on the

**Table 3** Means of AUSCAN Osteoarthritis Hand Index total scores of the groups with respect to days

| AUSCAN total | Groups | | | |
|---|---|---|---|---|
| | Flaxseed poultice compress group (1) Mean ± SD ($n = 33$) | Hot compress group (2) Mean ± SD ($n = 29$) | Control group (3) Mean ± SD ($n = 20$) | Multiple comparisons $P$** |
| 0th day | 40.84 ± 1.76 | 44.13 ± 1.88 | 41.60 ± 2.27 | 1–2: $P = 0.207$ |
| | | | | 1–3: $P = 0.795$ |
| | | | | 2–3: $P = 0.393$ |
| 8th day | 14.03 ± 1.66 | 44.34 ± 1.77 | 41.95 ± 2.13 | 1–2: $P < 0.001$ |
| | | | | 1–3: $P < 0.001$ |
| | | | | 2–3: $P = 0.391$ |
| 15th day | 15.78 ± 1.66 | 45.24 ± 1.77 | 42.90 ± 2.13 | 1–2: $P < 0.001$ |
| | | | | 1–3: $P < 0.001$ |
| | | | | 2–3:$P = 0.401$ |
| Multiple comparisons | | | | |
| 0 and 8th days | $P < 0.001$ | $P = 0.882$ | $P = 0.835$ | *$P < 0.001$ |
| 0 and 15th days | $P < 0.001$ | $P = 0.484$ | $P = 0.494$ | |
| 8 and 15th days | $P = 0.073$ | $P = 0.388$ | $P = 0.447$ | |

*Two-way analysis of variance (single factor repetition)

**Least significant difference

researcher observation and patient expressions during the study, the beneficial effect of hot application was observed immediately after the application or within a few hours. But, the beneficial effect on the pain and hand function did not last more than a few hours. After 24 h, the beneficial effect may be further decreased. Also, in contrast to the decrease in pain in the hot treatment group, some patients reported a slight increase in pain as a side effect. According to these data, the effect of flaxseed poultice compress continued on the 8th day and 15th day.

## AUSCAN score comparisons

Comparisons of the mean of AUSCAN total scores showed that the hand function efficiency increased in the group treated with flaxseed poultice compared with the hot compress and control groups (Table 3). Similar to the present study, Mosavat et al. [21] reported that flaxseed oil significantly reduced the symptoms in patients with knee OA compared with placebo and increased functional status, daily living activities, and knee-related quality of life. Setayesh et al. [29] performed a randomized controlled study on patients with carpal tunnel syndrome. They found that topical flaxseed gel application for 3 weeks was more effective in managing symptoms and improving hand functions compared with hand splint application. Hashempur et al. [24] applied topical flax seed oil or topical placebo to the patients with mild and moderate carpal tunnel syndrome for 4 weeks, each day in the morning and evening. In addition, both groups were given a night splint application for 4 weeks. Similar to the present study, the rate of improvement was found to be significantly higher in the flaxseed oil group than in the placebo group. Thus, the use of flaxseed oil, gel, or poultice in patients with OA was thought to be effective in decreasing the symptoms and increasing the physical adequacy due to the anti-inflammatory effect of the omega-3 fatty acids in the flax seed.

In the present study, the AUSCAN total score was not significantly different in the hot compress and control groups compared with the flaxseed poultice compress group on days 8 and 15 (Table 3). Similar to the present study, the flaxseed group was compared with the placebo, paraffin application, hot application, or control group in other studies investigating the effect of flaxseed. The improvement in the flaxseed group was found to be more effective in increasing physical functions and decreasing symptoms [21, 24, 29, 30]. Therefore, the hot compress was insufficient in patients with OA alone. Thus, interventions with herbal therapies were thought to be more effective in increasing physical adequacy. Meyenburg-Altwarg et al. [11] investigated the effect of flaxseed, applied in the form of hand and foot bath, on the symptoms of patients with hand–foot syndrome. They showed that paresthesia decreased in patients after flaxseed bath and a feeling of relaxation, decreased tension, and increased hand–foot function was observed. Therefore, the use of flaxseed plants in patients with OA was shown to reduce morning stiffness in the hands of the patient.

## Evaluation of the side effects

A randomized placebo-controlled double-blind study by Pruthi et al. [31] investigated the use of flaxseed for treating hot flashes during the menopausal period. The placebo group had mild itching and this side effect was significantly higher in the placebo group than in the treatment group. The researchers concluded that this difference in the side effects was not the result of any effect of flaxseed. Similarly, in the present study, mild itching was observed in some patients; this side effect was not connected with the flaxseed treatment due to the short duration of the study and the effect was seen 2 weeks after the treatment. Besides, the external use of flaxseed plants is particularly recommended for wound healing and skin irritation [6, 32]. Therefore, it is believed that flaxseed poultice compresses are not harmful when directly applied to the skin, and the external use of flaxseed plants may be advantageous.

Hot application can increase pain in some patients; hence, cold application is recommended in such cases to relieve pain [28]. In EULAR (2008) recommendations for evidence-based applications, it is seen that the thermal modulation applications have low levels of evidence and are usually recommended to relieve pre-exercise pain in the muscle and joint regions [2]. The present study showed a low rate of side effects in the patients in the hot compress group only 8 days after the application, and these side effects were associated with increased pain and mild redness. Therefore, thermal modulations should be combined with different interventions in patients with OA. If the thermal modulation is applied by the patient, the symptoms should be checked before and after the application. In the case of an increase in symptoms, changing the intervention method may have a positive effect on treatment/care.

## Limitations of the study

The present study had some limitation. First, this study was a single-blind investigation. The fact that the study was a single blind could not have a significant effect on the result of the study. Because the application and evaluation of VAS and AUSCAN OA Hand Index were made by different researchers separately, the researcher who evaluated the scales (8th and 15th day) did not know which application was performed to the patients. Second, we do not know the value of the penetration of flaxseed poultice into the surrounding tissue. Third, the follow-up period could be extended to a longer period to observe the duration of impact. Fourth, the small sample size is another limitation factor for this study.

## Conclusions

The present study showed that the use of flaxseed poultice compresses was beneficial for reducing the pain and increasing hand functions in patients with hand OA when used in combination with pharmacological treatment.

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### Compliance with ethical standards

**Disclosure** None.



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