



## **The Effects of Topical Olive Oil on the Pain Intensity among Patients with Knee Osteoarthritis**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author AG conceived the idea and guided in conducting this research study. Author GI collected the data, wrote the manuscript and analysed the data. All authors read and approved the final manuscript.*

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### **ABSTRACT**

Given the importance of relieving pain and disability experienced by the patients, the present study aimed to study the Effects of topical olive oil on the pain intensity among patients with knee osteoarthritis. The patients were randomly assigned into the experimental (28 patients) and control groups (27 patients). Firstly, in topical olive oil (TOO) group, a high-quality olive oil, branded as Família was used and in the control group, Diclofenac gel was applied. In experimental groups, 5 drops of herbal oils were applied to the knee thrice a day at morning, noon and evening and the knees were covered with a nylon sheet for more absorption. The patients were followed up for 4 weeks and their capability and pain intensities were evaluated prior the study, during the first week, the second week and the fourth week with Visual Analogue Scale. Data were analyzed using descriptive and analytical tests by SPSS V. 16 software. According to the findings, also the Mean

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(SD) pre-intervention Pain score in experimental group A was 8.10(0.91), which decreased to 1.78(0.78) after the intervention and in the control group from 8.55(0.69) to 3.85(0.98). Due to the greater effect of olive oil compared to Diclofenac gel on reducing pain of patients with KOA, it is recommended that patients use olive oil. Further studies are also recommended.

*Keywords: Topical olive oil; Diclofenac gel; pain; knee osteoarthritis.*

## 1. INTRODUCTION

People with chronic conditions encounter some challenge [1-3]. Pain is recognized as a problem experienced by the chronic patients [4-5]. As unpleasant issue, it raises to negative experiences for patients about the condition [6]. Pain-related complications include malfunction, low quality of life, decreased general health, as well as increased stress, anxiety and depression [7-9]. Knee osteoarthritis (KOA) is an osteoarthritis-related disorder [10] characterized mainly by pain that patients undergo and interrupts their function [11-13].

Prior studies have found different prevalence estimates for KOA, as in Yoshimura et al. [10] with 3940 subjects recruited among the Japanese population, KOA was found with the prevalence of 48.2% and 51.6% in the age groups 70-79 and  $\geq 80$  years old, respectively [10]. In Zamani, et al. [14] with 1000 subjects affected by knee pain among the Iranian population, KOA was found among 350 subjects [14]. According to the obtained evidences about the high prevalence of KOA found in the mentioned references [10,14], it is essential to consider some intervention for reducing the disorder rate.

Some interventions that have ever been used include medication therapies, lifestyle changes, intra-articular medicine injections, physical therapy, such as orthopedic footwear and in worst cases, operative management [15-17]. Complementary medicine (CM) is referred as an alternative effective intervention for this condition [18]. Olive (*Oleaeuropaea*) oil has been used for the therapeutic qualities shown in many diseases since ancient times [19]. The olive oil components may act as a pain reliever similar to non-steroidal anti-inflammatory drugs or NSAIDs [20,21].

Given the importance of relieving pain and disability experienced by the patients, the present study aimed to study the effects of topical olive oil in the pain intensity among patients with KOA.

## 2. MATERIALS AND METHODS

### 2.1 Research Design and Participants

This study was designed as a clinical trial with two groups, including one group by topical olive oil and a control group treated with Diclofenac gel.

### 2.2 Sample Size

As similar to the prior studies, the sample size was determined as 30 patients in each group, but actually 35 subjects were recruited for each group at the initial phase.

Of these patients, 3 patients in the experimental group (2 because of unwillingness to continue to cooperate and one due to death) and 2 patients in the experimental group because of unwillingness to cooperate in the study, were excluded. Finally, data analysis was performed with 27 patients in the experimental group and 28 patients in the control group.

### 2.3 Inclusion Criteria

1) the patient should suffer from KOA according to the medical records and documentation, 2) the patient should sign the informed written consent to participate in the study, 3) the patient should not present with other chronic diseases that may probably influence on the pain, 4) the patient should not consume sedative drugs to relieve pain symptoms, 5) the condition of KOA should be established at least for 6 months, 6) the pain score should be recorded as 5 according to VAS questionnaire.

### 2.4 Exclusion Criteria

1) the patient would like to exit from the study, 2) the patient did not comply the intervention instructions according to the prior following ups, 3) the patient is affected by a new disease with probable influences on the pain, 4) the patient has the secondary osteoarthritis, including rheumatologic disorders (gout, rheumatism and

all kinds of infections, metabolic and traumatic arthritis), 5) there are the allergic symptoms or reactions to the performed interventions, 6) there is a skin lesion in the area around the knee, 7) the patient underwent an operation, or passed away during the intervention program.

**2.5 Questionnaires**

**2.5.1 Demographic form**

The demographic form included questions about the patient’s age, gender and education.

**2.5.2 Visual Analogue Scale (VAS)**

This tool reports pain intensity between 0-10 and its validity and reliability have been confirmed in previous studies [22,23].

**2.6 Method of Research**

The patients were randomly assigned into the experimental and control groups. Firstly, some paper envelopes were prepared according to the sample size and set randomly. During sampling, they were given to the subjects, and as a result, the patients were recruited in the experimental and control groups. The oil treatment was performed by a person (clinics’ secretary) for patient groups in a blinded way according a given list. The patients received a complete explanation about the performed interventions and they were requested to address immediately their questions or problems associated with the

interventions with the researcher in order to give medical advice from the responsible physician.

Firstly, in tropical olive oil (TOO) group, a high-quality olive oil, branded as Famila was used, and in the control group, Diclofenac gel was applied. In experimental groups, 5 drops of herbal oils were applied to the knee thrice a day at morning, noon and evening and the knees were covered with a nylon sheet for more absorption. The patients were followed up for 4 weeks and their capability and pain intensities were evaluated prior the study, during the first week, the second week, and the fourth week.

**2.7 Statistical Analysis**

Data were analyzed using descriptive and analytical tests by SPSS V. 16 software.

**3. RESULTS**

The mean age of patients in test group A was 78.07(8.59), test group B was 79.14(7.99) and in control group was 76.66(10.39). According to the findings of Table 1 the Mean (SD) pre-intervention Pain score in experimental group A was 8.10(0.91), which decreased to 1.78(0.78) after the intervention and in the control group from 8.55(0.69) to 3.85(0.98).

Mauchly’s test was significant (p=0.04). Therefore, multivariate tests were done. Pillai’s trace was significant (F=437.381, df=2, p=0.001). Table 2 shows the results of repeated measure test.

**Table 1. Comparison of Pain between study groups before and after the intervention**

Times before and after intervention	Experimental		Control	
	M(SD)	Comparison p compared to the before the intervention	M(SD)	Comparison p compared to the before the intervention
Before intervention	8.10(0.91)	-	8.55(0.69)	-
After 2 weeks	5.1(0.72)	P=0.000 T=12.75	4.66(1.90)	P=0.000 T=9.97
After 4 weeks	1.78(0.78)	P=0.000 T=15.40	3.85(0.98)	P=0.08 T=1.82

**Table 2. Tests of Between-Subjects Effects**

Source	Sum of Squares	Mean Square	df	Partial Eta Squared	Sig.	F
Intercept	4704.006	4704.006	1	984	.000	3299.173
Error	76.994	1.426	54			

#### 4. DISCUSSION

Pain is one of the issues affecting the quality of life of patients and attention to it is of great importance [24-25]. The present study was performed aimed to the effects of topical olive oil on the pain intensity experienced by the patients.

Among the reviewed studies about the effects of TOO on the pain intensity and disability experienced by KOA patients, there is a study carried out by Priscilla et al suggested that olive oil can reduce the pain in the patients experienced Osteoarthritis<sup>34</sup>. Bohlooli et al. [26] compared TOO and Piroxicam gel for reducing pain among KOA patients, and found that the pain was relieved in both study groups after the performed intervention [26]. also, in the study Nakhostin-Roohi showed TOO can reduce female athletes *Anterior Knee Pain* [27]. In a study by Hekmatpou et al. [28] which examined the effect of Olive Oil on knee pain in women with Rheumatoid Arthritis, it was shown that olive oil reduced pain in these patients [28]. Priyanga et al. [29] study, which aimed to compare the effect of olive oil and heat treatment on pain in patients with knee pain, showed that the group using olive oil had less pain than the heat treatment group [29]. According to the results of this study, the effect of olive oil on reducing pain in patients.

Other studies that have investigated olive oil in patients' health states include Amani et al. [19] Who have showed that TOO can reduce pain in patients with episiotomy ulcers [19]. In the study of Al Maly et al. [30] For 2 weeks, 5 times a week, olive oil was used and its effect was compared with topical ketoprofen gel. According to the findings, pain was reduced in both groups, but was higher in the group using olive oil [30] in line with the results of this study.

#### 5. CONCLUSIONS

Due to the greater effect of olive oil compared to diclonac gel on reducing pain of patients with KOA, it is recommended that patients use olive oil. Further studies are also recommended.

#### CONSENT AND ETHICAL APPROVAL

The study was approved by the Medical Ethics Committee of Kermanshah University (ethical approval code: IR.KUMS.REC.1398.704. A written informed consent for participation in the study, no cost considered in patient recruitment in the study, the patients were free to choose

their quit from the study any time, the patients were randomly assigned to the study groups, the obtained information was kept confidential.

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#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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