

## Research Article

# The effect of topical olive oil on prevention of bed sore in intensive care units patients

Zahra Abbas Ali Madadi<sup>1\*</sup>, Reza Zeighami<sup>2</sup>, Jalil Azimian<sup>2</sup>, Amir Javadi<sup>3</sup>

<sup>1</sup>Master of Intensive Care Nursing, Nursing & Midwifery Faculty, Qazvin University of medical sciences, Qazvin, Iran

<sup>2</sup>Assistant Professor of Nursing & Midwifery Faculty, Qazvin University of Medical Sciences, Qazvin, Iran

<sup>3</sup>Instructor of Biostatistics, Qazvin University of Medical Sciences, Qazvin, Iran

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### \*Correspondence:

Mr. Zahra Abbas Ali Madadi,

E-mail: madadi\_z20@yahoo.com

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## ABSTRACT

**Background:** Bedsores are injuries to skin and underlying tissues caused by prolonged pressure. Although, some methods like frequently changing position and using particular tools are used for preventing and caring of pressure ulcers, their prevention would still be as a vital urgency. Olive oil is an herbal product with potential preventive effects to prevent bedsores because of its numerous medical properties. The major aim of this study was to determine whether topical olive oil can prevent the risk of developing bedsores in I.C.U. patients.

**Methods:** This clinical trial was accomplished in 2014 with 60 patients who were selected by simple random sampling method into intervention and control groups. During three weeks, the control group had received routine skin care, while the intervention group had received topical Olive oil in addition to the routine care. Statistical analysis, including Chi-square, T-test and Fisher's tests, were performed with SPSS version 20 software.

**Results:** The intervention group had contained 19 male and 11 female, with an average age of  $60.46 \pm 18.06$  and the control group had contained 20 male, 10 female, with an average age of  $50.96 \pm 21.38$ . Five patients (16%) who received routine care plus topical olive oil had developed bed sore after an average of  $18.73 \pm 5.36$  days and twelve patients (40%) who received routine care only had developed bed sore after an average of  $15.46 \pm 7.40$  days. The risks of developing bedsores between two groups were statistically significant ( $P=0.03$ ).

**Conclusions:** Our study has revealed potential effects of topical olive oil to prevent bedsores in I.C.U. patients.

**Keywords:** Bed sore, Olive oil, Prevention

## INTRODUCTION

It is for many years that bed sore is not only an unsolved problem for nurses, but also for those who provide health care in global arena.<sup>1</sup> Bed sore (Decubitus or pressure ulcer) is a localized injury of the skin and underlying tissues usually over a bony prominence as a result of long-term pressure, or pressure in combination with shear or friction.<sup>2,3</sup> This damage can be so painful for

patients and will reduce their ability to take part in physical and social activities which finally will disturb patient's sanity.<sup>4</sup>

Bed sore is like a heavy load on the shoulders of health system. In U.S., Pressure ulcers affect 3 million adults across health care settings; they have a major impact on health status, quality of life, and health care costs. The average of medical-treatment expenses for a patient who

is affected by bed sore grade 4 in a hospital has been estimated \$129248 in one hospitalization period and it is \$124327 for one who is affected in the society.<sup>5,6</sup> The annual incidence in long-term care patients is between 11 and 12%.<sup>7</sup> In Iran, the incidence and the percentage of bed sore have been estimated up to 44% according to type of current disease in intensive care units.<sup>8</sup>

In the existing economic environment which the concentration is on pay-back of health care and limiting the expenses; governmental and local reports plus making free cost policies have made a new stimulation for creating and executing successful strategies to prevention of bed sore as a serious problem, in fact it is for a long time that bed sore prevention has been considered as a priority in acute and long-term health care centers.<sup>9,10</sup> Although different medical treatment methods like Antibiotic, stimulus of blood-circulation are used for bed sore medication, its prevention would still be as a vital urgency.<sup>1</sup>

The protection of skin integration is the main way of bed sore's prevention. Now, some methods like frequently changing the patient's position and using particular tools such as support surfaces, glide sheets and patient transfer equipment are useful for preventing pressure ulcer.<sup>11,12</sup> Meanwhile, the utilization of Wax, Honey and leaf of some plants are remained as researches of health-watchers in order to reach the accurate response.<sup>1</sup> However, some herbal oils such as Arnebia root oil and Sunflower oil were suggested to use for bed sore prevention and treatment as well as some Lotions for lubricating the skin.<sup>13-15</sup>

Olive oil is one of herbal products which have been used in traditional medicine for a long time and it is produced in global arena.<sup>16</sup>

This oil has numerous medical properties including antinociceptive and anti-inflammatory effects, prevention of neurodegeneration; protection against age-related cognitive decline and Alzheimer's disease, improving the major risk factors for cardiovascular disease such as the lipoprotein profile, blood pressure, glucose metabolism and antithrombotic profile. Microconstituents from Olive oil are bioavailable in humans and have shown antioxidant properties and capacity to improve endothelial function. In countries where the populations fulfilled a typical Mediterranean diet, such as Spain, Greece and Italy, where Olive oil is the principal source of fat, cancer incidence rates are lower than in northern European countries. The protective effect of Olive oil can be most important in the first decades of life, which suggests that the dietetic benefit of Olive oil intake should be initiated before puberty, and maintained through life.<sup>17-20</sup>

This oil is composed of 98% triglycerides, including predominantly monounsaturated oleic acid which has been proven to be essential for skin maintenance and this

may accelerate the recovery and healing process of wound. The roll of oleic acid is a key feature within the reconstruction of cell membranes, providing higher smoothness to the dermis by restoring skin humidity levels, thus moisturizing the skin and providing it with elasticity. Besides such oil component as phenolic compounds and chlorophyll have a high antioxidant and anti-aging effects, apart from accelerating the dermis healing process. Moreover, vitamin E is included in the oil composition which is the excellent source of protection against the free radicals causing cell oxidation.<sup>21,22</sup>

The topical usage of olive oil is effective on reduction of acute radiation proctitis and pain, bleeding and itching caused by hemorrhoid and anal fissure.<sup>23,24</sup>

The daily usage of topical olive oil has been reported as an effective way in promoting the skin of preterm infants and it has reduced the risk of dermatitis among them.<sup>25</sup>

Skin massaging by herbal oils is considered to be as one of important traditions in some countries and more than three million Bangladeshi neonates are treated and cared by topical mustard, olive and coconut oils annually. This matter would be done because of many different reasons such as prevention of infections, promoting the skin condition, thermoregulation and wholly for their health.<sup>26,27</sup>

Thus, the purpose of our study was to determine the effect of topical olive oil on prevention of bed sore in intensive care units hospitalized patients.

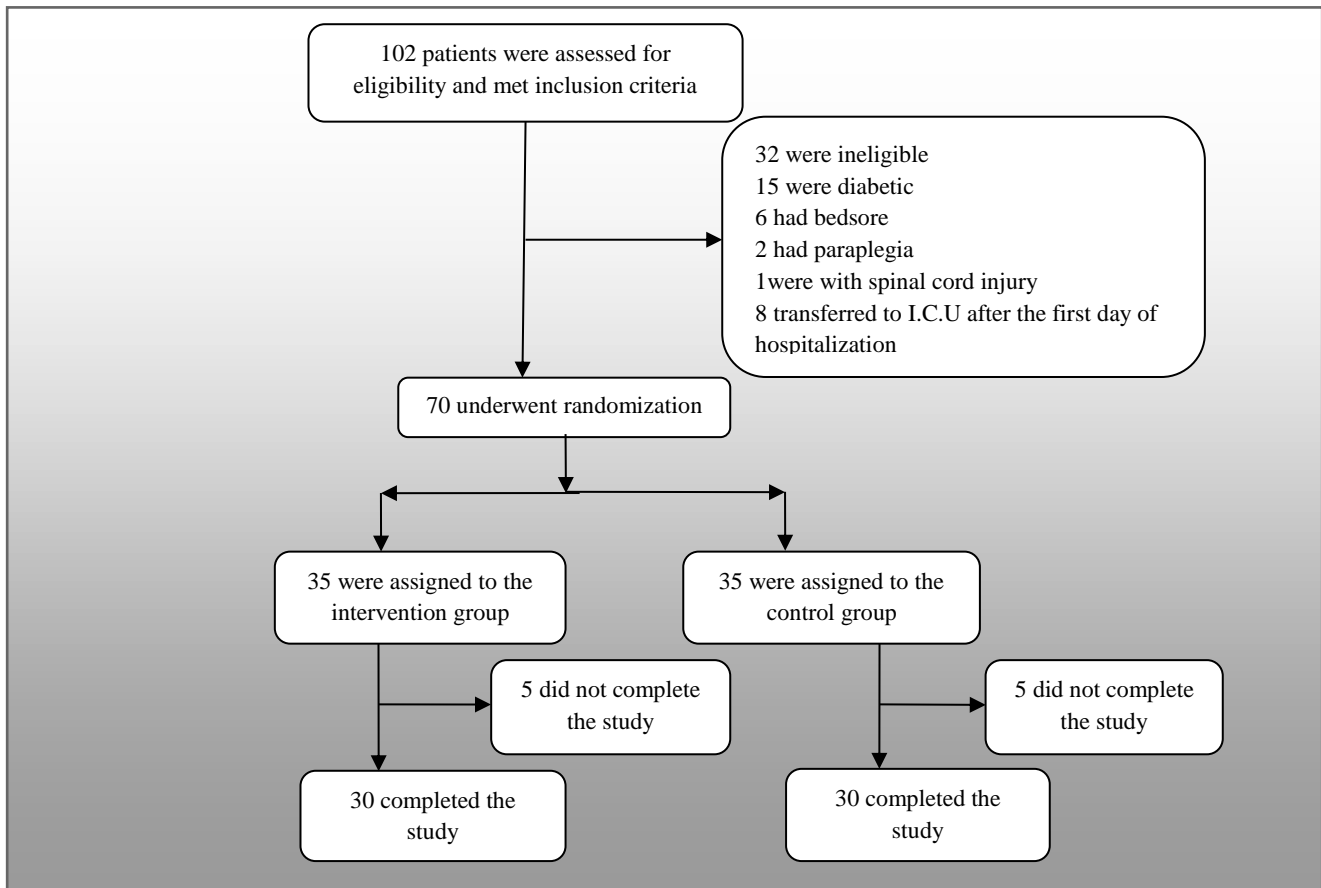
## METHODS

### Study design

Having confirmed by ethics committee in the researches department of Qazvin University of Medical Sciences and being registered in Iranian Registry of Clinical Trials center entitled NO. IRCT 2013111014634N2 in 2014, this clinical trial was done in the five intensive care units of public medical treatment-educational hospitals of Qazvin city on non-traumatic patients.

### Study patients

Sample size was determined based on data gathered from related researches; the incidence rate of bed sore was considered 40%,  $1-\alpha = 0.95$ ,  $1-\beta = 0.80$ . Seventy non traumatic patients were eligible for this study, 35 of whom received the routine care plus topical Olive oil and the remainder just received the routine care. No patients withdrawn from the study and the reasons for the incomplete study were the death and discharge. Finally, 60 patients (30 in each group) completed the study (Figure 1).



**Figure 1: Patients flow across the study.**

The inclusion criteria were: lack of skin disorders and bedsores, no history of diabetes, lack of apparent peripheral vascular disease, no history of sensitivity to olive and its by-products, no history of previous bedsores, no history of paraplegia or quadriplegia, having a Foley catheter and being transferred to I.C.U. in the first day of hospitalization. The exclusion criteria: The incidence of any sensitivity or skin problems (rash, hives, redness, swelling, ulcers), having continuous fever, lack of consent of patient's or his/her guardians for the continuation of taking part in the study, transfer to another medical center outside of Qazvin city and his/her death.

#### **Study protocol**

Having informed totally about the research conditions to the qualified patients or their guardians and completing the ethical inform consent was written by them, the samples of control group had received routine skin care including changing their position every 2 hours and vibrating wavy mattress. In the intervention group, beside the routine care (changing position every 2 hours as well as a vibrating wavy mattress), they had received 15 cc premium and standard formula olive oil. This oil was applied gently once a day on the following areas of

patient's bodies without any massaging: Earlobes (0.5 cc each), shoulders (1.5 cc each), spine (1.5 cc), waist (1.5 cc), buttocks (1.5 cc each), iliac (1 cc), sacrum (1cc), elbows (0.5 cc each), heels (0.5 cc each) and ankles (0.5 cc each).

#### **Data collection**

The following data were collected for all patients: age, gender, body mass index, the rate of mobility, the status of head of bed, those drugs causing skin side-effects and the period of hospital stays time as well as those information related to the incidence of bedsores: the period of time patients have not been affected, the location and grade of bedsores which has been emerged, by a check list.

In this check list, the mobility was included following items: 1) Completely immobile: Does not make even slight changes in body or extremity position without assistance. 2) Very limited: Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently. 3) Slightly limited: Makes frequent though slight changes in body or extremity position independently. 4) No limitations: Makes major and frequent changes in position without

assistance.<sup>2</sup> The grades of bedsore were considered by using the European Pressure Ulcer Advisory Panel (EPUAP) grading system for pressure ulcer classification including Grade I: Intact skin with non-blanchable redness, Grade II: Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled or sero-sanguinous filled blister, Grade III: Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed, may include undermining and tunnelling and Grade IV: Full thickness tissue loss with exposed bone, tendon or muscle.<sup>7</sup> The incidence of bedsore and its grades were investigated by observation.

All processes of intervention, observation and recording have been done by just one person in order to control the effect of those factors weakening the results. No cream/lotion or any other oil was used on the area of being examined in both groups. In addition, the survey and intervention was carried out from the first day the samples had been hospitalized in I.C.U.

**Statistical analysis**

Our data had normal distribution; it has been analyzed using software SPSS version 20 by Chi-square, Exact Fisher's and T-test. P value less than 0.05 were considered as a significant difference in this study.

**RESULTS**

The intervention group had contained 19 male (63.3%), 11 female (36.7%), with an average age of 60.46 ± 18.06 and the control group had contained 20 male (66.7%), 10 female (33.3%), with an average age of 50.96 ± 21.38 with a range of 19 to 85 years old. The average of Body mass index was 24.96 ± 4.02 in the intervention group and it was 24.81±3.69 in the control group.

The average time of patient's affecting by bedsore was after 18.73 ± 5.36 days in the intervention group and after 15.46 ± 7.40 days in the control group. The average time of hospital stays was 30.63 ± 5.93 days in the intervention group and 35.70 ± 7.25 days in the control group.

The patient's mobility and the status of the head of bed are shown in Table 1.

In those drug surveys which cause skin side-effects, in the intervention group 3 persons (10%) had injected Chlorpromazine ampoules, while 1 person (3.3%) in the control group had taken carbamazepine tablets and 1 person (3.3%) had injected chlorpromazine ampoules.

The demographic characteristics including age, gender, Body Mass Index, mobility, the status of head of bed and those drugs causing skin side-effects didn't have a statistically significant difference in both groups, thus

two groups were homogeny (P>0.05). No significant relationship was seen among none of demographic characteristics with the rate of affectedness by bedsore (P>0.05).

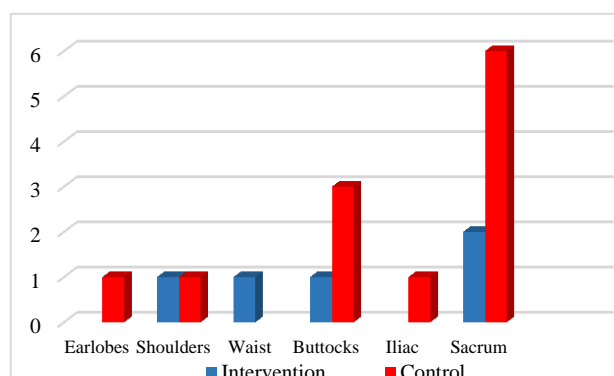
The incidence of bedsore in the intervention group was less than the control group and this difference was statistically significant (P=0.03) which is shown in the Table 2.

**Table 1: The patient's mobility and head of bed in two groups.**

Group	Intervention		Control	
	No.	%	No.	%
<b>Mobility</b>				
Completely immobile	6	20%	9	30%
Very limited	10	33.3%	12	40%
Slightly limited	13	43.3%	9	30%
No limitations	1	3.3%	-	-
<b>Total</b>	<b>30</b>	<b>100%</b>	<b>30</b>	<b>100%</b>
<b>Head of bed</b>				
Completely flat	1	3.3%	-	-
15 degree	5	16.7%	1	3.3%
30 degree	12	40%	18	60%
45 degree	12	40%	10	33.3%
60 degree	-	-	1	3.3%
<b>Total</b>	<b>30</b>	<b>100%</b>	<b>30</b>	<b>100%</b>

**Table 2: The incidence of bedsore in two groups.**

Group	Intervention		Control	
	No.	%	No.	%
<b>Grade of bedsore</b>				
Grade 1	4	13.3%	3	10%
Grade 2	1	3.3%	9	30%
Lack of bedsore	25	83.3%	18	60%
<b>Total</b>	<b>30</b>	<b>100%</b>	<b>30</b>	<b>100%</b>



**Figure 2: The locations of bedsore based on different parts of body.**

Our findings showed that in the intervention group the locations of bedsore were including shoulders (3.3%), waist (3.3%), buttocks (3.3%) and sacrum (6.6%); also,

25 patients (83.3%) were without it. in the control group the locations of bed sore were including earlobes (3.3%), shoulders (3.3%), buttocks (10%), iliac (3.3%) and sacrum (20%); moreover, 18 patients (60%) were without it. The most common location of bed sore was on the sacrum area (Figure 2).

In this study, topical Olive oil did not cause any reaction or side effect.

## DISCUSSION

This study showed that using topical Olive oil decrease the incidence of bed sore in those patients whom have been hospitalized in I.C.U. Lupiañez-Perez & et al. (2015) stated a significant risk reduction of Pressure ulcer incidence by using topical extra-virgin olive oil for high risk immobilized patients in the home environment.<sup>28</sup> In the study of Dhikhil & et al. (2014), results showed using topical Coconut oil was significantly effective on decreasing the risk of bed sore.<sup>29</sup> The findings of two recent studies were in accordance with our research. In a research which Taavoni & et al. (2011) have done with the aim of determining the effect of Olive oil on incidence of striae gravidarum in the second trimester of pregnancy in Tehran city, there was no significant difference between the intervention group who have rubbed topical olive oil over the belly skin slowly without any massage twice a day and the control group while it was in contrast with our results.<sup>30</sup>

In the recent study, the average time when the patients have not been affected by bed sore in the intervention group was more than the control group which shows that using topical olive oil can be effective on lengthening the bed sore incidence time. Also, the average time of hospital stays in the control group was more than the intervention group and it was in accordance with the study of Dhikhil & et al.<sup>29</sup> It seems to be that lack of bed sore can be effective on reducing the hospital stays period.

The recent study findings showed that the most common location of bed sore was in sacrum which was in accordance with research of Leijon & et al. (2011) and Lupiañez-Perez & et al.<sup>28,31</sup> The study of Aljezawi and et al. (2014) showed that the most common place for pressure ulcers was on the buttocks which was not the same as our findings.<sup>32</sup> Our results showed that there was no significant relationship among none of demographic characteristics in two studied groups with the incidence of bed sore and it was in accordance with research of Dhikhil & et al.<sup>29</sup>

Nowadays pressure ulcers are considered as an important health issue causing a great economic impact by substantially increasing pharmaceutical expenditure. The total expenditure of pressure ulcer treatments amount to 5% of annual health care expenditure and causes a higher health care burden on professional staff.<sup>28</sup> Bed sore should be considered as a preventable pathology, and the

introduction of preventative measures is the mainstay of treatment.<sup>7</sup> The acceptance of our hypothesis provided evidence supporting the regular use of topical olive oil for prevention of bed sores in the intensive care units. These results can help I.C.U. nurses in the frame of an independent intervention to prevent and reduce the incidence of bed sore. Further studies with larger sample sizes are required to validate our findings. Future studies are also needed to elucidate the mechanisms of bed sores prevention by topical olive oil.

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