

Evaluation of the Local Impact of Pistacia Atlantica Oil on the Prevention of Bedsore: A Randomized Clinical Trial

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Abstract

Introduction: Hospitalization causes several difficulties in patients. Bedsore, as a significant concern in terms of health treatment, are among these concerns and health professionals are trying to prevent this problem so that patients do not suffer from the mental and physical consequences resulted from this problem. This research was conducted to investigate the local impact of Pistacia Atlantica oil, as an Inexpensive and low-risk substance, on the prevention of bedsore.

Methods: this randomized clinical trial study was performed on 70 patients in 2019-2020. The Norton bedsore predictor scale was used to assess the likelihood of bedsore and patients were chosen out of those who were under the same conditions in terms of treatment. The patients were randomly divided into two groups. Routine treatment included changing patients' positions every two hours. Moreover, Pistacia Atlantica oil was used once a day in the sacrum area for a 10-day period in the intervention group. Data were analyzed using Odds Ratio and t-test. $P < 0.05$ was considered as a significant level.

Results: Odds Ratio test showed that the incidence of bedsore was 3.6 times higher in the control group compared to the intervention group, but there was no statistically significant difference between these two groups ($P > 0.05$).

Conclusion: The findings of this research revealed that the effect of this oil on the prevention of bedsore requires further studies.

Keywords: Pistacia Atlantica oil, Prevention, Bedsore

Introduction:

Bedsore is considered as one of the most frequent medical complaints (Mogarehi and Sanaiey 2003). This problem, also known as pressure and decubitus ulcer, is one of the key challenges in medical science. Bedsore are skin cohesion disorders caused by soft tissue compression between the bony appendages and an external surface. This wound disrupts the supply of blood to the skin, contributing to the destruction of a part of the body's cells (Baghaei et al. 2013). Significant amounts of budget on an annual basis are spent at medical centers to prevent and treat bedsore, especially in patients with long-term stay in hospital (Sari AA, Zavare ZB, Arab M, Rashidian A 2010). Consequently, this leads to a waste of time, hospital facilities, and human resources (Mahmoudi et al. 1396). Despite scientific advances in health and treatment, leading to physical and mental problems for patients and their families, bedsore is still a major concern in hospitals (Galvão et al. 2017). This disorder is more common in bony prominences such as the sacrum, ischial, heel, trochanter, occipital area, and shoulders, and is rarely seen in nose, ears, and lips. In Iran, the incidence of bedsore, in general, is 5 percent, and in special wards, it is between 10.1 and 21 percent (Afkar et al. 2014). After cancer and cardiovascular diseases, bedsore are the third most common cause of death, with around 60,000 deaths annually occurring worldwide (Jamand

et al. 2012). Bedsores are more likely to occur in patients with long-term hospitalization and it is often emphasized that preventing their formation and spread are the best cures (ABDIDOORBASHI et al. 2016). For this reason, bed sore prevention is one of nursing care's goals and is considered as an important indicator of the quality of nursing care. However, there is still no focus on bed sore prevention. It is estimated that nursing procedures to avoid bedsores in high-risk patients require approximately 29-79 minutes (Panagiotopoulou and Kerr 2002; Aydin and Karadağ 2010). Notably, the Norton Bed Sore Prediction Scale, the Waterloo Bed Sore Prediction Scale, and the Braden-Bergstrom Bed Sore Prediction Scale are the most popular standard tools used to determine and classify patients who are at risk for bedsores (Baghaei et al. 2013). Maintaining the integrity of the skin is one of the ways to avoid bedsores. At present, some methods such as frequent changing position of the patient every 2 hours and the use of special devices such as beds, mattresses, and pillows are considered to maintain the integrity and to reduce pressure on the skin (Paymard et al. 2016). In some studies, to prevent or cure several diseases, complementary medicine approaches have been used (Paymard et al. 2016; Nikbakht et al. 2016). According to authentic historical sources, the Iranians were experts in the medicinal use of plants. In this regard, *Pistacia Atlantica* (Wild pistachio) from the Anacardiaceae family, is a type of pistachio that has many uses in most Middle Eastern countries such as Iran, Iraq, and Turkey, as well as many African countries, which is used in the treatment of eczema, kidney stones, infections of the throat, and asthma. It is also used as an antipyretic and anti-inflammatory treatment of fungal and bacterial infections. Additionally, it is used as a natural dressing to treat burns in the Kurdistan province in Iran (Haghdoost et al. 2013). *Pistacia Atlantica* extract was considered in a study by Asadi et al. (2017) as an effective medicine on improving nipple fissure and chest pain in lactating women (Asadi et al. 2017). According to the researches, the antimicrobial effects of *Pistacia Atlantica* are due to phenolic compounds such as gallic acid, paracoumaric acid, and other antibacterial substances, which are effective on a variety of gram-positive and gram-negative bacteria and fungi (Benhammou, Bekkara, and Panovska 2008). Therefore, this study was conducted to investigate the local impact of *Pistacia Atlantica* oil, as a low-cost tool, on bed sore's prevention based on the above-mentioned reasons and the significance of bed sore's prevention.

Methods

The current research was a randomized clinical trial performed in the internal wards of Shahid Mohammadi Hospital in Bandar Abbas. Many studies have suggested that bedsores are more likely to occur in the elderly (Baghaei et al. 2013). Therefore, the selection of internal wards was performed due to a large number of elderly patients in them. Based on the previous related studies on 70 participants, the sample size was determined (Nikbakht et al. 2016; Paymard et al. 2016). The patients were then grouped into two groups of intervention and control, each one containing 35 participants based on a random allocation table. No bedsores, no allergy to *Pistacia Atlantica* oil, no wavy pad, no urinary catheter, no skin issues at the intervention site, age over 18 years old, and Norton's scale score below 16 were considered as the inclusion criteria. Exclusion criteria included *Pistacia Atlantica* oil allergy, patient or guardian dissatisfaction with continued cooperation, patient discharge or transfer to another medical facility, patient mortality, the incidence of some unexpected conditions prohibiting further involvement, and Norton's scale score grew above 16. Most of the participants in this sample were elderly, so the Norton scale was used, which is more suitable to estimate the incidence of elderly bedsores (Baghaei et al. 2013).

Therefore, in this study, the Norton scale was used to predict the incidence of bedsores and the uniformity of the samples. This scale has high sensitivity and specificity and involve five separate parts as physical position, mental state (level of consciousness), activity, mobility, and incontinence (urine and feces). Each one of these parts is graded from a score of 1 (worst case) to a score of 4 (best case). The maximum score in this scale is 20 and the minimum is 5, and regarding these scores, the patients were divided into the following four groups: very high risk (score less than 9), high risk (score 10 to 12), moderate risk (score 13 to 16), and low risk (score above 16) (Macleane 2003; Baghaei et al. 2013; Pancorbo-Hidalgo et al. 2006). Data collection tool was a three-part checklist, including personal information, Norton Scale score information, and bed sore incident information. Informed consent was obtained from the newly admitted patients and the patients were then assigned to one of the intervention or control groups based on the random allocation table codes. Subsequently, regarding ethical guidelines, the intervention was performed. The common treatment to prevent bedsores in the control group was changing the position of the patient every 2 hours. In the intervention group, besides routine care (position changing), Pistacia Atlantica fruit oil was used. In this way, the skin sensitivity test was performed in the forearm area and 30 minutes later, 5 ml of the aforementioned oil was used gently and topically in the sacrum area for 3 minutes once a day. The duration of intervention was 10 days for each patient and during performing the intervention, the patients were advised not to use any other treatment or drug to prevent bedsores. It is noteworthy that the Norton scale score and information on the presence or absence of bedsores during the analysis were assessed regularly and daily in both groups and finally reported in the checklist. The most common site of bedsores is sacrum (Baghaei et al. 2013; SOOZANI et al. 2012). Therefore, the effect of the oil was only investigated in the sacrum region to increase the accuracy of study, while all other areas of the body were checked for bedsores. The obtained data were collected from the middle of 2019 to early 2020 and then analyzed by SPSS ver.24. The Quantitative variables were described with number (n) and percentage (%) and qualitative variables were described using mean and standard deviation (SD) and statistical tests, including t-test and Odds Ratio(OR) with 95% confidence interval (95%CI).

Results:

Out of 70 participants included in this study, five from the control group and four from the intervention group were excluded from the study due to discharge or increase of Norton's score above 16, and finally, 30 and 31 people remained in the control and intervention groups, respectively. (Figure 1)

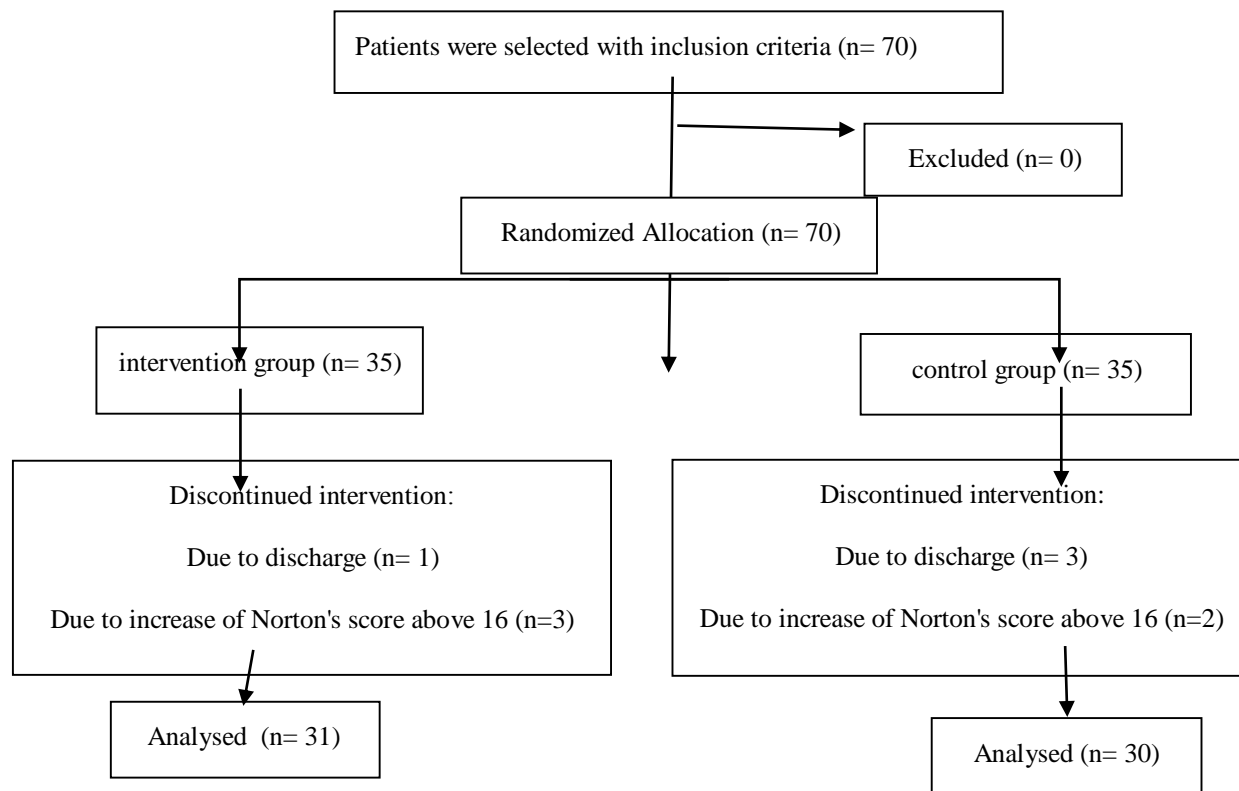


Figure 1: Flow diagram of study

The samples of the control group included 18 men (60%) and 12 women (40%) and the samples of the intervention group included 19 men (61%) and 12 women (39%). Regarding the age variable, the mean age of the control group's participants was 62.2 ± 12.6 years old and the mean age of the intervention group's participants was 63 ± 15.8 years old. Notably, the demographic variables in the two groups were same, and there was no statistically significant difference in both groups ($P > 0.05$). Additionally, the mean score of Norton scale in the intervention group was 13.58 ± 1.50 , and in the control group, it was 13.73 ± 1.23 . The results of Mann-Whitney test showed that there were no differences in both groups ($P > 0.05$).

Table 1: Distribution of bedsores in different areas of body

Group Area	Intervention		Control		Total (%)
	n (%)	grade	n (%)	grade	
Sacrum	2 (50)	1	6 (75)	1	8 (66/66)
Trochanter	1 (25)	1	2 (25)	1	3 (25)
Occipital	1 (25)	2	-	-	1 (8/33)
Total	4 (100)		8 (100)		12 (100)

According to the Table 1, 12 cases with bedsores were observed during the study. In the control group, 6 cases with the first-degree bedsores in the sacrum area and 2 cases with the first-degree bedsores in the trochanter area were found. In the intervention group, 2 cases with the first-degree bedsores in the sacrum area, 1 case with the first-degree bedsores in the trochanter area, and 1 case

with the second-degree bedsores in the occipital region, were observed. It should be noted that one patient in the control group developed bed sore in two areas as the sacrum and trochanter; meaning that 12 cases of bedsores occurred among 11 patients.

Table 2: Incidence rate of bedsores in the sacrum area

Group Incidence of bedsores	Control	Intervention	OR(%95 CI)	p-value
	n (%)	n (%)		
Yes	6 (20)	2 (6/5)	3/63 (0/67-19/63)	0/12
No	24 (80)	29 (93/5)		

OR= Odds Ratio

Regarding the incidence of bedsores in the study area (sacrum), the results of Odds Ratio test showed that the incidence of bedsores was 3.63 times higher in the control group compared to the intervention group, which showed a positive effect of Pistacia Atlantica oil on the prevention of bedsores in the sacrum area in the intervention group. However, no statistically significant difference was observed between the incidence of bedsores in sacrum area in the intervention and control groups ($P > 0.05$). (Table 2)

During performing this study, 11 patients had the developed first and second-degree bedsores in various parts of their body, of which 8 subjects (72%) had a mean Norton score of 12, meaning that they were in a high-risk group and 3 people (28%) had a mean Norton score of 13 to 15, meaning that they were in the moderate-risk group.

Discussion:

In this study, 6.5 percent of the patients in the intervention group and 20 percent of the patients in the control group had bedsores in the sacrum, and the frequency of bedsores in the control group was approximately 3.6 times higher than the intervention group. However, based on the Odds Ratio test, despite the positive effect of Pistacia Atlantica oil on bed sore's prevention in the intervention group, the study hypothesis that this product would be effective on bed sore's prevention has not been verified yet ($P > 0.05$). In a research by Nikbakht et al. (2016), this substance was reported as effective on diabetic foot ulcers healing (Nikbakht et al. 2016). In addition, Haghdoost et al. (2013) in their study found the extract of this plant (Pistacia Atlantica) to be beneficial for the treatment of the first- and second-degree burn wounds in laboratory mice (Haghdoost et al. 2013). Therefore, according to the results of the above-mentioned studies, the effect of this oil on the reduced occurrence of bedsores by one third in the intervention group compared to the control group, seems to be rational. In this study, while the intervention was only conducted in the sacrum area, all areas of the patients' body were checked for the incidence of bed sore. According to the findings, the highest incidence of bedsores was in the sacrum (66.6 percent), which is in line with the results of many studies. Maghari and Zarif Sanaiey (2003) reported the incidence of bedsores in the sacrum area as 81.7 percent, which is consistent with the results of this study (Mogarehi and Sanaiey 2003). As another point, in the present study, no relationship was observed among the variables of age, sex, and weight and the incidence of bedsores, which may be due to the samples of this study who mostly were elderly. The results of a study by Beheshti Zavare et al. (2010) revealed that the incidence of bedsores was higher in the elderly, which is consistent with the results of the current study. However, in terms of gender, Beheshti Zavare et al. (2010) reported that the chance of bed sore incidence in women is twice more than that of men, which is inconsistent with the results of the present study (Sari AA, Zavare

ZB, Arab M, Rashidian A 2010). The first case of bedsores was observed on the third day of the hospitalization and 9 cases of bedsores (75%) occurred on the third to sixth days of hospitalization; emphasizing that more attention should be paid to the care of patients in the first week of hospitalization. Afkar et al. (2014) reported that about 60 percent of bedsores occur in the first two weeks of patient's hospitalization, which is largely consistent with the current study (Afkar et al. 2014). About 18 percent of the samples in this study had the developed first and second-degree bedsores. Karimian et al. (2016) considered that the highest prevalence of bedsores is related to first-degree and second-degree wounds and its prevalence in Iran was 19%, which is similar to the results of this study (Karimian et al. 2016). Furthermore, Jaul et al. (2018) estimated the prevalence rate of bedsores between 8% and 14% (Jaul et al. 2018). On the other hand, Liao et al. (2018) have stated that the prevalence rate is between 1% and 66% (Liao, Gao, and Mo 2018). Therefore, according to these different statistics, it seems that the incidence rate of bedsores is very different in various countries depending on the quality of care and treatment facilities

Conclusion

This research was conducted to investigate the local effects of Pistacia Atlantica oil on bedsores' prevention. While the study results were not statistically significant, this oil had a positive impact on the prevention of bedsores and it was able to reduce the incidence rate of bedsores to an acceptable level in the intervention group compared to the control group. On the other hand, since the impact of this herbal oil on the prevention of bedsores has been investigated for the first time in this study, it seems that more complete research should be performed in this field to obtain more accurate results.

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