

Effectiveness of Giving Herbal Oil on Pressure Ulcers Management in Intensive Care Unit (ICU) Patients: Systematic Review



Cross Mark

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ABSTRACT

Background: Intensive Care Unit is a unit to treat critical patients who need intensive care and monitoring. This can pose many risks, one of which is getting pressure ulcers/decubitus ulcers. Pressure ulcers are wounds caused by continuous compression of soft tissue. Prevention of pressure ulcers can be done by treating the patient's skin using herbal oil. Purpose: To identify the effectiveness of giving herbal oil on the treatment of pressure ulcers in ICU patients.

Methods: The literature search was carried out using the PICO framework. This systematic review is limited to articles published in 2011-2021. The databases used are Google Scholar, PubMed, Sage Journal, Science Direct, and ProQuest with the keywords (oil OR herbal oil) AND (decubitus OR pressure ulcers OR bedsores) AND (critical patient). The selection of articles follows the PRISMA flow. Assessment of article quality was carried out by supervisors and authors using the risk of bias from The Cochrane's Collaboration.

Results: Based on the seven articles reviewed, five recommended oils were obtained, including olive oil, Virgin Coconut Oil (VCO), fish oil, almond oil and henna oil. The oil is applied by three methods, including by smearing without massage, smearing with massage and dressing. The instruments used are the Braden Scale, Suriadi Sanada Scale, Pressure Ulcer Scale for Healing (PUSH), International NPUAP/EPUAP Pressure Ulcer Classification System, micro life NC100 infrared thermometer and Mini Nutritional Assessment (MNA).

Conclusion: Herbal oil can be applied by various methods as a complementary therapy to prevent and treat pressure ulcers in patients in the ICU.

Keywords: Herbal oils, Pressure ulcers, ICU patients

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INTRODUCTION

The Intensive Care Unit (ICU) is a special area in a hospital with special staff and equipment intended for the observation, care and therapy of patients suffering from life-threatening or potentially life-threatening illnesses, injuries or complications (Kemenkes 2010). Critically ill patients may experience increased pain, sleep disturbances, malnutrition and decreased consciousness and immobilization, increasing the risk of developing pressure ulcers or pressure sores (Kozier et al. 2011). Patients in the ICU have a higher risk of pressure sores than other units, which is 12-42% (Cox & Roche 2015). The prevalence of pressure sores in the ICU in several

countries and continents is 49% in Western Europe, 22% in North America, 50% in Australia and 29% in Jordan (Tayyib, Coyer & Lewis 2013). In Indonesia, the incidence of pressure sores reaches 33.3%. This figure is quite high in Southeast Asia, which only ranges from 2.1 to 31.3% (Tayyib, Coyer & Lewis 2013).

Pressure sores or pressure sores are localized sores on the skin and underlying soft tissue caused by prolonged pressure and friction (Becker et al. 2017). The body parts that often have pressure sores are the sacrum, heels, elbows, lateral malleolus, great trochanter, and ischial tuberositis (Pokorná et al. 2019). Prevention of pressure sores is very important to reduce pain, affect the

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patient's quality of life emotionally, physically, socially, and even reduce the risk of death in patients, as well as prevent increasing length of stay and spikes in treatment costs (Whitty et al. 2017).

The method of preventing and treating pressure sores is called bundle care. This method consists of risk assessment, skin assessment, use of a supportive bed surface, good nutrition and repositioning (Primalia and Hudiawati 2020). Another effort that can be done to prevent pressure sores is skin care.

Skin care in question is by keeping the skin clean and skin moisture. Skin care aims to prevent pressure sores through efforts to treat, maintain, and improve skin tolerance to pressure (NPUAP 2009). One of the skin treatments that can be done is using herbal oils.

Herbal oil is a traditional herbal remedy used to nourish, rejuvenate and treat various skin conditions. The benefits of herbal oils are obtained through a combination of nutrients, antioxidants and biostimulants obtained from plants using oil extraction techniques that do not damage the content (Mikaili et al. 2012).

There have been many reports or studies showing the effect of giving herbal oil on the treatment of pressure sores in ICU patients, but no systematic review has been found regarding this. Therefore, the authors are interested in conducting a Systematic Review: Effectiveness of Giving Herbal Oil on Pressure Wound Management in Intensive Care Unit (ICU) patients.

METHOD

This systematic review uses the PICO method, with the description P (population) = Intensive Care Unit patients, I (intervention) = intervention using herbal oil, C (comparison) = presence of a control group or a group with other interventions, O (outcome) = knowing prevention and treatment of pressure sores. The databases used include Google Scholar, PubMed, Sage Journal, Science Direct, and ProQuest. The search keywords for the article were "(oil OR herbal oil) AND (decubitus OR pressure ulcers OR bedsores) AND (critical patient)".

The inclusion criteria included articles published from 2011-2021, articles published in English or Indonesian, articles available and can be downloaded in full text, articles

containing interventions using herbal oil, research subjects were patients treated in the ICU and the outcome of the study was prevention. and pressure ulcer treatment. Meanwhile, the exclusion criteria were articles in the form of a systematic review or meta-analysis, inaccessible articles and articles discussing herbal oil interventions but not in accordance with the topic being compiled.

Search results for articles based on keywords in the database found Google scolar (17,200), PubMed (6), Sage Journal (113), ScienceDirect (377) and ProQuest (1,843). The article selection process can be seen based on the PRISMA flowchart in Figure 1.

Assessment of article quality was carried out using The Cochrane Collaboration's Tool (Higgins et al. 2011) to see if there was a risk of bias. Of the seven articles, four articles have a low risk of bias (Borzou et al. 2020; Karimi et al. 2020; Madadi et al. 2015; Miraj et al. 2020) and three articles have a high risk of bias (Poursadra et al. 2019; Sari, Suriadi & Herman 2018; Setiani 2014).

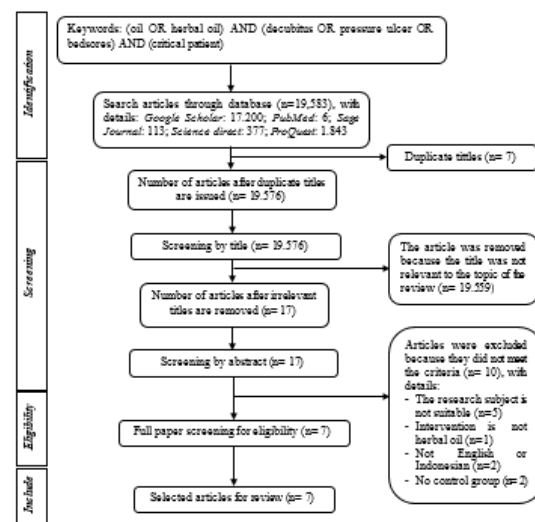


Figure 1. PRISMA Flowchart

DISCUSSION

The seven articles in this systematic review discuss the effectiveness of giving herbal oil to the treatment of pressure sores in ICU patients. Olive oil as the most widely used herbal oil in the article proved to be effective in treating pressure sores. Olive oil also contains fatty acids that can provide moisture to the skin and skin smoothness. Olive oil is effective for accelerating wound healing because it contains essential fatty acids that can stimulate the proliferation of epidermal cells (Miraj et al. 2020). The phenolic compounds in olive oil have antimicrobial, anti-

inflammatory and antioxidant properties so that olive oil can increase tissue coverage and accelerate wound healing (Ghanbari et al. 2012). The effectiveness of olive oil in preventing pressure sores is confirmed by the study of Laily, Saragih & Sirait (2019) which states that after administration of olive oil, patients with very high pressure ulcer risk in the initial intervention group as much as 60% (n = 9) decreased to 13.3 % (n=2). This is in line with the systematic review conducted by Safdari et al. (2021) that olive oil is the type of oil that is most often used and in many studies it has been proven to be effective in preventing pressure sores.

The second oil is Virgin Coconut Oil (VCO). VCO is an original Indonesian processed product made from fresh old coconut meat which is processed at low temperatures or without going through heating, so that the high content of medium chain fatty acids, vitamin E and enzymes that are important in the oil can be maintained (Tanasale 2012). The content of fatty acids, especially lauric acid and oleic acid, softens the skin (Lucida, Salman & Hervian 2008). Virgin Coconut Oil provides nutrition through the process of absorption of small Medium Chain Fatty Acids (MCFA) molecules by the skin and as a lubricant to reduce the effects of pressure, friction and shear which are the main causes of pressure sores (Sari, Suriadi & Herman 2018). Research by Darmareja, Kosasih & Priambodo (2020) proved that VCO given with effleurage massage proved to be effective in reducing the risk of pressure sores in immobilized patients (P=0.0001).

Fish oil as the third oil found in the article also has many ingredients, such as various types of vitamins and omega-3s, with anti-inflammatory and healing characteristics and their positive effects and benefits have been proven by many other articles. Research by Karimi et al. (2020) reviewed in this systematic review stated that it was rare to find other studies that used fish oil to prevent pressure sores, but the results showed that the use of fish oil dressings was able to prevent the development of wounds. The use of fish oil orally or topically is more used to heal wounds than to prevent wounds. Research by Kasaei & Rashidy-Pour (2000) stated that the topical use of fish oil was proven to be effective in treating burns and inflammatory processes (p<0.05). Research by (Elahi, Mojdeh & Poordad 2012) also confirmed the effectiveness of fish oil in accelerating the healing process of pressure sores (P<0.001).

Almond oil is an oil derived from almond seed

extract that has been used in traditional medicine and has almost the same chemical content as olive oil (Lin, Zhong & Santiago 2018). The content in almond oil, especially oleic acid, linoleic acid and vitamin E has an effect that can protect the skin from wounds, superficial lacerations, eczema and psoriasis (Lin, Zhong & Santiago 2018). Its mechanism of action is to increase skin resistance, repair the top layer of the epidermis, produce a repairing and moisturizing effect on the skin, increase capillary blood circulation, stimulate collagen production and protect the skin from free radicals (Ahmad 2010). A study by (Varaei et al. 2019) comparing olive oil and almond oil showed that olive oil and almond oil were effective in preventing pressure sores. The study also said that almond oil contains vitamin E (26 mg of vitamin per 100 g of oil), vitamin B complex, amino acids and minerals that can be used as an oil for massage.

Lawsonia inermis or Henna is a medicinal plant originating from North Africa and Southwest Asia. Henna contains phenolic glycosides (such as coumarins, xanthenes, quinoids and β -glucoside sitosterol, tannins and alkaloids) (Hekmatpou et al. 2018). The content of glycosides in henna can inhibit macrophage activity thereby inhibiting the production of chemical mediators and reducing inflammation. In addition, the presence of alkaloids also provides a good physiological effect in wound healing (Towfik, Munahi & Hamza 2015). Based on research conducted by Hekmatpou et al. (2018) showed that in the intervention group only 1 patient showed redness on the third to sixth day, on the sixth and seventh day the redness disappeared, but in the control group there were 6 patients who showed redness. Research by Rafiei et al. (2019) also got similar results where henna extract can reduce the wound area and reduce the average pressure sore score using PUSH.

The method of giving the oil found in the articles is different. The first method of administration is smeared without massage (Borzou et al. 2020; Madadi et al. 2015; Miraj et al. 2020; Poursadra et al. 2019). Topical application of oil is useful for preventing transcutaneous water loss so that moisture will be maintained, maintaining the integrity of the stratum corneum (the outermost layer of the epidermis which functions to protect the skin layer underneath) and preventing excessive cell proliferation (Sari, Suriadi & Herman 2018; Syapitri, Siregar & Ginting). 2017). The second method is giving oil by massage (Sari, Suriadi & Herman 2018; Setiani

2014). Massage can increase muscle relaxation, increase blood circulation and can increase the absorption of biological oil content through the skin pores (Sihombing, Yuniarlina & Supardi 2016). The third method using dressings has a moisture balance principle where this principle will keep the skin moist (Perangin-angin 2013). The choice of using the dressing method has another advantage, namely that it requires less topical therapy than the two methods above (Karimi et al. 2020).

The instruments used to measure the risk of pressure sores in patients are the Braden Scale and the Suriadi Sanada Scale. Based on the results of the Australian Wound Management Association (AWMA) meta-analysis, it is stated that the Braden scale has the strongest reliability compared to other scales that measure the risk of pressure sores (The Australian Wound Management Association 2012). Mufarika's research (2012) which measured the risk of pressure sores in critically ill patients using the Braden Scale and the Suriadi Sanada Scale showed that the Braden Scale had better predictive validity than Suriadi Sanada's with a sensitivity value of 80% and a specificity of 93.3%.

The second instrument is the Pressure Ulcer Scale for Healing (PUSH). PUSH has three parameters, namely surface area (length × width), amount of exudate and type of wound tissue (Thomas et al. 1997). PUSH reliability has been reported in several studies as 97-100% (Gardner, Hillis & Frantz 2011; Stotts et al. 2001).

The International NPUAP/EPUAP Pressure Ulcer Classification System is an instrument used to determine the degree of pressure ulcers (National Pressure Ulcer Advisory Panel European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance 2014). This instrument divides pressure sores into grades 1 to 4, unstageable, and suspected deep-tissue injuries. The micro life instrument NC100 infrared thermometer is used to measure body temperature and the temperature of the pressure sore area. Increased body temperature is one of the intrinsic factors of pressure sores (Bergstrom & Braden 1987). The results showed that there was a significant relationship between increased body temperature and the risk of pressure sores (Bergstrom, Demuth & Braden 1987). The Mini Nutritional Assessment (MNA) instrument was used to determine the patient's risk of malnutrition. The reliability of MNA has been confirmed in the study of Payvar et al. (2016)

with a correlation coefficient of 0.95.

CONCLUSION

The herbal oils recommended in this systematic review include olive oil, Virgin Coconut Oil (VCO), fish oil, almond oil and henna oil. The oil can be applied by several methods, including by smearing without massage, smearing with massage and dressing. The instruments used to measure the risk of pressure sores are the Braden Scale and the Suriadi Sanada Scale. The degree or severity of the wound was measured using the Pressure Ulcer Scale for Healing (PUSH), International NPUAP/EPUAP Pressure Ulcer Classification System, micro life NC100 infrared thermometer and Mini Nutritional Assessment (MNA). The findings from the seven articles showed that the effectiveness of each topically applied herbal oil proved to have a significant effect on the prevention and treatment of pressure sores in ICU patients.

RECOMMENDATION

The results of this systematic review are expected to be used as a reference for nurses, especially ICU nurses, so that they can implement interventions using herbal oil in preventing pressure sores in patients with prolonged bed rest as a combination of interventions that have existed before. Based on the price review, it was found that the most affordable herbal oils were olive oil and virgin coconut oil. Future studies can analyze more deeply the mechanism of action of herbal oil in studies with larger samples, using a control group as a comparison, using a higher research design so that the risk of research bias is smaller and the results are more reliable.

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Table 1. Results of extraction data

No.	Authors and Tittle	Study design	Subject	Interventions	Outcome Measurement	Results	Level of evidence
1.	Effect of Olive Oil in Preventing the Development of Pressure Ulcer Grade One in Intensive Care Unit Authors: Sepideh Miraj, Seyedmehdi Pourafzali, Zohre Vakili Ahmadabadi, Zahra Rafiei (2020) Location: Iran	A randomized single-blind trial study	- The sample is 72 patients who are admitted to the ICU, divided into two groups; intervention and control.	- Intervention group: standard treatment was performed, 15 ml of olive oil was gently applied to the wound area once a day for 30 minutes without massage, then the area was washed with warm water and the skin was dried. - Control group: changing position every 2 hours is also done by nurses. - Intervention is done once a day for one week.	- Assessment of pressure wound healing status: Pressure Ulcer Scale for Healing (PUSH). - Measurement of body temperature and the temperature of the pressure sore area: micro life NC100 infrared thermometer.	- The measurement of body temperature and pressure sores showed no significant difference between the two groups ($P>0.05$). - The measurement using PUSH showed that there was a significant difference in the intervention group, which was lower than the control group ($P<0.001$).	Randomized Controlled Trial [1.c]
2.	The Effect of Using Olive Oil and Fish Oil Prophylactic Dressings on Heel Pressure Injury Development in Critically Ill Patients Authors: Zohreh Karimi, Ali Mousavizadeh, Hossein Rafiei, Naeem Abdi,	Clinical Trial	- The sample is 40 ICU patients who have moderate to high risk assessed based on the Barden Scale. - Samples were divided into two groups (olive oil and fish oil). - At the start of the study, 12 patients were selected,	- Both groups received routine care in the form of skin checks every shift and changing the patient's position based on the patient's needs by the nurse. - In the olive oil group, in addition to routine care, patients were given additional treatment in the form	- Braden scale: to identify the risk of pressure sores. - Instrument for identifying and measuring the degree of pressure sores: American Pressure Injury Grading Tool.	- There was no significant difference in the mean Braden Scale scores in the two groups ($P=0.083$). - The two intervention groups (olive oil and fish oil) did not show any signs of pressure sores on the heels. - Both olive oil and fish oil dressings have the same effect in	Randomized Controlled Trial [1.c]

	<p>Mohammad Behnamoghdam, Maryam Khastavaneh, Sharif Shahini (2020)</p> <p>Location: Yasuj, Iran</p>		<p>randomly divided into 2 groups using the fishbowl technique. Then, each new patient admitted after the first sampling was assigned to one of the groups using a table of random numbers after signing the informed consent.</p>	<p>of a simple gauze dressing soaked in 4 cc of olive oil on both heels every day. Dressings are evaluated and changed every shift.</p> <ul style="list-style-type: none"> - The fish oil group received similar treatment with a difference in the oil used, namely fish oil. - The total duration of the intervention is 7 days and dressings are changed 3 times a day. 		<p>preventing pressure sores on respondents.</p>	
3.	<p>Topical Almond Oil for Prevention of Pressure Injuries: A Single-Blinded Comparison Study</p> <p>Authors: Seyed Reza Borzou, Sheller Amiri, Azim Azizi, Leili Tapak, Farshid Rahimi Bashar, Shirin Moradkhani (2020)</p> <p>Location: Hamadan, Iran</p>	<p>A Single-Blinded Comparison Study</p>	<ul style="list-style-type: none"> - A sample of 108 patients was taken by convenience sampling. - The sample was divided into 3 groups of 36 patients each, namely: group A, group B, group C randomly (permuted block randomization method). 	<ul style="list-style-type: none"> - Group A: Almond oil was applied by hand in a circular motion without pressure for 5 seconds on 5 pressure-prone areas including 1.5 cc to the back of each shoulder and sacrum and 1 cc to each heel by the principal investigator (SA) at every 1 o'clock 8:00 am for 7 days. - Group B: liquid paraffin as placebo. The method and area of application of paraffin use the same procedure as the almond oil group. 	<ul style="list-style-type: none"> - Braden scale: to see the risk of pressure injury. - Measurements to check the severity of pressure sores: The National Pressure Ulcer Advisory Panel (NPUAP)/European Pressure Ulcer Advisory Panel (EPUAP) and the Pan Pacific Pressure Injury Alliance (PPPIA). - Mini Nutritional Assessment (MNA) questionnaire is used to assess the risk of malnutrition of 	<ul style="list-style-type: none"> - There was no significant difference in the Braden Scale and MNA scores in the 3 groups ($P > 0.05$). - The incidence of grade I pressure sores in the almond oil group was 5.60% ($n=2$), in the placebo group 13.94% ($n=5$), while in the control group it was 25.14% ($n=9$). - There was no significant difference in the three groups, but the incidence of grade I pressure sores in the almond oil 	<p>Randomized Controlled Trial [1.c]</p>

				- Group C only received routine maintenance: changing positions every three hours and using a decubitus mattress.	respondents.	group was lower than the other groups.	
4.	<p>Comparing the Effect of Henna Oil and Olive Oil on Pressure Ulcer Grade One in Intensive Care Units Patients</p> <p>Authors: Elahe Poursadra, Motahare Anvari-Tafti, Asieh Dehghani, Maryam Eghbali-Babadi, Zahra Rafiei (2019)</p> <p>Location: Isfahan, Iran</p>	Quasi experimental	<p>- The sample in this study amounted to 108 people aged >18 years with first-degree pressure sores on the scapula, sacrum, heel or other areas.</p> <p>- Samples were divided into 3 groups (olive oil, henna oil and control groups) with 36 patients each using random allocation software.</p>	<p>- The three groups received the standard intervention for pressure sores treatment, namely changing the patient's sleeping position every 2 hours by the nurse. Beds, mattresses and sheets used are in accordance with pressure ulcer prevention standards.</p> <p>- In the henna oil group, an allergy test was carried out first by mixing 1 g of henna and 10 ml of distilled water then applied to the inner forearm for 10 minutes, if there is no allergic reaction, henna can be applied to pressure sores for 30 minutes, then rinsed with warm water and dried. Henna is applied once a day.</p> <p>- A total of 15 ml of</p>	<p>- Braden scale: to assess the patient's risk of pressure sores.</p> <p>- Wound healing progression: Pressure Ulcer Scale for Healing (PUSH).</p> <p>- Measurement of body temperature and wound temperature: micro life NC100 infrared thermometer.</p>	<p>- There was no significant difference in temperature measurements of patients on day 1, 4 and 7 ($P>0.05$) in all groups.</p> <p>- Based on the PUSH assessment in the 3 groups, there was no significant difference in the mean pressure ulcer score on the first day of intervention ($P=0.553$).</p> <p>- Day 4: the mean pressure ulcer scores in the olive oil (7.50) and henna oil (6.28) groups were lower than the control group (9.50).</p> <p>- Day 7: the mean pressure ulcer scores in the olive oil (5.44) and henna oil (3.39) groups were lower than the control group (9.83).</p> <p>- - From the data above,</p>	Quasi Experimental Designs [2.c]

				olive oil was given to the olive oil group by applying it to the wound once a day without massage.		it can be concluded that henna oil has a lower average pressure ulcer score than olive oil.	
5.	<p>The Effect of Virgin Coconut Oil (VCO) on Pressured Areas to Prevent Pressure Sores in Bedrest Patients</p> <p>Authors: Eristya Dianna Sari, Suriadi, Herman (2018)</p> <p>Location: Pontianak, Indonesia</p>	Quasi eksperimental pre and post control group design	<ul style="list-style-type: none"> - The sample consisted of 22 bed rest patients in the ICU. - The sample was divided into intervention and control groups, each with 11 patients using the non-probability sampling method by accidental sampling. 	<ul style="list-style-type: none"> - Intervention group: Virgin Coconut Oil (VCO) with light massage from the back (3 ml), sacrum (1 ml), heels (0.5 ml), buttocks (1.5 ml), ischium (1 ml), elbows (1 ml), malleolus (1 ml) and trochanter (1 ml) for approximately 5 minutes. - The control group underwent pressure ulcer prevention interventions according to hospital SOPs. - Interventions are carried out according to the length of time the patient is treated in the room. The research was conducted from 24 July-14 August 2017. 	<ul style="list-style-type: none"> - Pressure ulcer risk assessment: Suriadi Sanada Scale. - Observation to see if the respondent had pressure sores using the 2014 National Pressure Ulcer Advisory Panel (NPUAP) observation sheet. 	<ul style="list-style-type: none"> - The results showed that pressure sores did not occur during the pre-test and post-test in the intervention group and the control group. - Bivariate statistical test could not be done because the results of the pre-test and post-test in both groups only found one category, namely no pressure sores. 	Quasi Experimental Designs [2.c]
6.	The Effect of Topical Olive Oil on Prevention of Bedsore in Intensive	Clinical Trial	<ul style="list-style-type: none"> - The sample is 60 ICU patients. - Samples were selected using 	- Control group: routine skin care in the form of changing positions every 2 hours and a	Researchers made observations using the European Pressure Ulcer Advisory Panel	- The incidence of pressure sores in the intervention group was lower than the	Randomized Controlled Trial [1.c]

	<p>Care Units Patients</p> <p>Authors: Zahra Abbas Ali Madadi, Reza Zeighami, Jalil Azimian, Amir Javadi (2015)</p> <p>Location: Qazvin, Iran</p>		<p>simple random sampling technique and divided into intervention and control groups.</p>	<p>decubitus mattress.</p> <ul style="list-style-type: none"> - Intervention group: 15 ml of standardized olive oil by applying gently without massaging once a day on the following areas: ears, shoulders, spine, waist, buttocks, iliac, sacrum, elbows, heels and ankles. - Interventions are carried out every day for three weeks. 	<p>(EPUAP) to assess the degree of pressure sores.</p>	<p>control group (P=0.03).</p>	
7.	<p>The Effectiveness of Massage with Virgin Coconut Oil on Pressure Wound Prevention in the Intensive Care Unit</p> <p>Authors: Diah Setiani (2014)</p> <p>Location: Samarinda, Indonesia</p>	<p>Quasi experimental with time series design</p>	<p>- The sample in this study was 34 ICU patients who were divided into treatment groups (n=17) and controls (n=17) randomly selected.</p>	<ul style="list-style-type: none"> - Treatment group: massage effleurage with Virgin Coconut Oil (VCO) in the scapula, sacrum and heel area for 12 days. - The control group only received standard prevention in the form of regular skin care according to hospital SOPs. - Intervention is carried out for 12 days. 	<ul style="list-style-type: none"> - Pressure ulcer risk assessment: Braden scale. - Assessment of pressure ulcer characteristics according to the International NPUAP/ EPUAP Pressure Ulcer Classification System (2014) classification. 	<ul style="list-style-type: none"> - Based on the measurement of the Braden Scale, there was no significant difference between the treatment group and the control group (P>0.05). - There is a significant difference in the measurement of the incidence of pressure sores between the treatment group and the group (P=0.001) 	<p>Quasi Experimental Designs [2.c]</p>

