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Intervention for pressure injuries prevention in bed rest patients

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ABSTRACT

Pressure injuries, also known as pressure injuries or hospital-acquired pressure injuries, was damage to the integrity of the skin or soft tissue in a local area that tends to compress the bony prominences with the surface area due to a combination of prolonged pressure such as friction, shear and moisture. The main groups at risk for pressure injuries were patients with spinal cord injuries, hospitalized patients, especially those undergoing orthopedic surgery and patients admitted to the intensive care unit (ICU). The purpose was to determine the types of tools/materials, substance, techniques and nursing interventions for the prevention of pressure injuries in bed rest patients. The research used a literature review using 3 databases, namely Science direct, Pudmed, Google Scholer with studies design included Quasi Experimental and Romdomized Controlled Trials. The study obtained 7 articles describing pressure ulcer prevention interventions. Tool and substance to prevent pressure ulcer such as providing appropriate mattresses for bed rest patients, giving oral supplements, providing lubricating agents and moisturizers in the wound area. While the technique that can be applied likely providing massage therapy with lubricating agents or not, and turning the patients into right side and left side regularly. Several nursing interventions can be implemented to prevent pressure injury in bed rest pastient with low cost and easy technique such as massage, oinment, bedsore mattress and regular mobilisation.

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INTRODUCTION

The Pressure wounds, also known as pressure injuries or hospital aquired pressure injuries, are localized damage to the integrity of the skin or soft tissue, occurring due to pressure between a bony prominence and a surface area due to a combination of prolonged pressure such as friction, shear and moisture (NPUAP, 2018). Patients who are on bed rest for a long period of time are at risk of developing pressure injuries (Mengist et al., 2022). Pressure injuries are common in the gluteal region, occiput, scapula, elbow, sactum, heel, ear and shoulder (NPUAP, 2018). The main groups at risk of developing pressure injuries are patients with spinal cord injuries, hospitalized patients,

especially those undergoing orthopedic surgery and patients hospitalized in the Intensive Care Unit (ICU) (NPUAP, 2018).

There was a significant relationship between pressure injuries and length of hospitalization, cause of hospitalization, diabetes mellitus, muscle paralysis, malnutrition, and smoking. The chance of pressure injuries in patients with muscle paralysis was 5.1 times higher than in other patients. The risk of pressure injuries in patients with a length of hospitalization of more than 10 days and diabetes was 4.0 and 3.5 times higher than other patients, respectively (Chung et al., 2022). Body mass index is also a risk factor for pressure injuries. A person who has a low body mass index (< 18,5) is more likely to experience a pressure bulge on the bone compared to a person who has a normal or high body mass index (Chung et al., 2022).

Research data from Iran showed that the overall prevalence of pressure injuries in Iran's intensive care unit (ICU) was 19.55% (Akhkand dkk, 2020). Indonesia has the highest incidence of pressure injuries around 1-10,8% in older dwelling setting (Sari et al., 2019).

The results of Edsberg's research show that the provision of nursing interventions such as good skin care, constant tilt position transfer either using tools such as special beds for people with bed rest or manually, providing education to patients and support systems is proven to reduce pressure injury scores in patients with bed rest (Edsberg et al., 2022).

Mokorimban and Chayati's research explains that progressive mobilization from level 1 to level 4 with head of bed activities of 300 to 450. The results of the study explain that progressive mobilization can reduce the incidence of pneumonia and the risk of pressure injuries in the Intensive Care Unit (ICU) room (Mokorimban dan Chayati, 2020). Mardhiah's research aims to apply the method of preventing pressure injuries with skin care using Nigella Sativa Oil, proving that Nigella Sativa Oil in bed rest patients can reduce the degree of wounds and accelerate patient care days (Mardhiah, 2021) by using efflurage techniques for 4-5 minutes (NPUAP, 2018). Although there have been many studies on various pressure injury prevention interventions, those that combine various interventions with details on technique, timing and materials or tools required still need to be updated, so as to provide evidence for patient care. To answer this question, research approach that appropriate was a review study to analysis comprehensively from many sources.

RESEARCH METHOD

Tracing Technique

The data search technique uses a gradual and structured approach and selection process. Literature sources that will be used are from the Google Schooler database, Sincedirect and PubMed. The article search used specific keywords such as "intervention", "preventive", "pressure injuries", and "bed rest" with their synonyms.

Inclusion and Exclusion Criteria

Articles that will be used must meet the criteria of experimental research design involving bed rest patients, research locations in hospitals and communities, articles in Indonesian and English, full text, articles published in 2015-2022. Articles will be excluded when the article is in the form of a review and maternal patient respondents.

Methods for selecting and organizing articles

All relevant articals that fit the inclusion criteria were collected into one folder and then entered into the bibliography software, Mendeley. The next step is to ensure that there are no duplicates obtained from other databases, then the researcher screens the title and abstract of the article to ensure that the article can be used as literature or not. In the next stage, the researchers read and analyzed the entire text of the articles that had been selected according to the inclusion criteria.

Article Quality Assessment Method

The guidelines used to assess the quality of articles are using the JBI Critical Appraisal Checklist For Romdomized Controlled Trials which contains 13 questions and the JBI Critical Appraisal Checklist For Quasi Experimental Studies which has 9 questions (Joanna Briggs Institute, 2017). Both instruments aim to assess the methodological quality of a study and determine the extent to which it addresses possible biases in design, conduct and analysis. All selected articles were included in the systematic review by meeting the inclusion criteria and were subjected to assessment by two reviewers. The assessment results of this instrument aim to inform the synthesis and interpretation of the results (Joanna Briggs Institute).

RESULTS AND DISCUSSIONS

The results of the article search obtained 317 articles from Google Schoolar, 29 articles from PubMed and as many as 50 articles through Science Direct, a total of 375 articles. Then duplication and article detection were carried out by removing 21 articles. The next step is screening the title and abstract of the article according to the inclusion and exclusion criteria, getting the results of 9 articles followed by viewing the article in full text and obtaining 7 suitable articles. The next article will be seen again and will be assessed for article quality using the JBI Critical Appraisal Checklist For Romdomized Controlled Trials and the JBI Critical Appraisal Checklist For Quasi Experimental Studies obtained the final result of 7 articles. The process of systematically selecting articles is summarized in Figure 1.

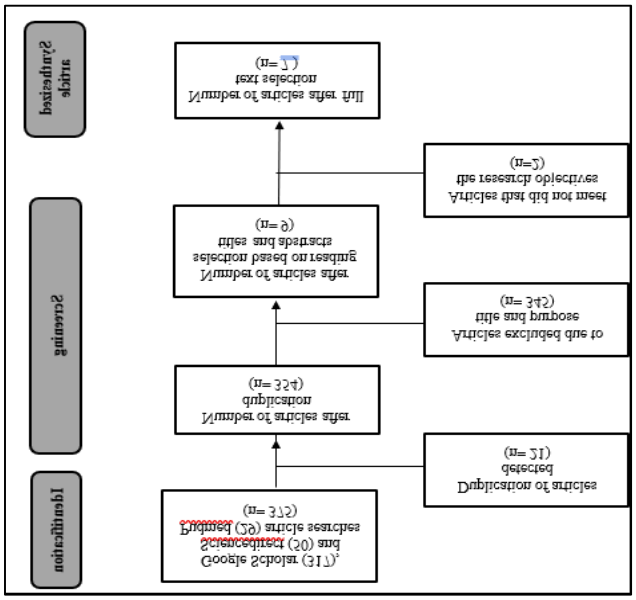

Figure 1. PRISMA Diagram

Obtaining articles that have passed the selection process obtained 7 articles to be reviewed which are summarized in Table 1.

Table 1. Data Collection Matrix

No.	Author name and year	Research design	Location	Respondent criteria	Types of interventions, materials and techniques	Length of intervention	Limitations	Results
1.	(Linggi.et al 2021).	Quantitative, Quasi-	Makasar,	30 respondents were	Intervention:	For 3 days (morning,	This study did not include the	Virgin coconut oil can

		experiment	Indonesia, Hospital, inpatient room	patients who experienced 24-hour bed rest, patients who experienced immobilization and patients who experienced decubitus risk according to the Norton scale.	Moisturizing and bed rest Ingredients: virgin coconut oil Technique: applied on the back and gluteal skin of patients with pressure sores and right-sided left-sided position.	afternoon, evening)	degree of pressure sores	reduce the risk of decubitus in bed rest patients.
2.	(Hekmatpou et.al. 2019)	Quantitative, randomized	Iran. Hospitalization room	80 patients with availability criteria to participate in the study age above 18 years and less than 65 years, patients who are at risk of moderate to severe pressure sores, possible length of stay of 10 days or more.	Intervention: Apply moisturizer and change position Materials: Aloe vera gel Technique: Gentle rubbing especially the sacrum, trochanter, heel, occipital region of the shoulder and given a change of position every 2 hours.	2x per day application at 09.00 and 21.00 for 10 days	The number of samples in this study is limited	The results of this study prove that aloe vera gel is one of the effective interventions to treat pressure sores in bed rest patients.
3.	(Bank et al 2016.)	Quantitative, randomized controlled trial	Australia, Hospital, inpatient room	50 patients who had stage II pressure sores with a length of hospitalization of more than 14 days	Intervention: Provide supplemental nutrition Materials: Supplements Technique: Oral	For 22 days and evaluated on days 5, 10, 15, and 22.	This study lacked data on patient groups, actual nutritional interventions, and wound healing formulas. Researchers need to focus on interventions that will be effective.	The results of this study did not show significant results on pressure sore healing with nutrition. Judging from the PUSH score, there was no change

								in the pressure sore area.
4.	(Wardani & Nugroho 2022.)	Quantitative, Quasi-experiment	Indonesia. Health Center	All post-stroke patients at madura health center who lack mobilization, randomly selected sample 28 samples	Intervention: Providing massage therapy and position change Materials: virgin coconut oil Technique: Back and gluteal neuroperfusion and right-left oblique position change	Given neuroperfusion massage therapy 2x a day and change the patient's position every 2-3 hours and evaluated through the Norton scale sheet.	This researcher did not include the degree of pressure sores	There is an effect of neuroperfusion massage therapy and bed rest transfer in stroke patients at risk of pressure sores.
5.	(Darmarej a, 2020.)	Quantitative, Quasi-experiment	Indonesia. Hospital. ICU	The characteristics of the respondents of this study were patients who were 45 years old, immobilized and had stable hemodynamics and patients must not be malnourished.	Intervention: massage therapy Ingredients: virgin coconut oil Technique: Effleurage performed on the mastoid bone, cervical spine, back, glutei, sacrum, hands and feet.	This study was conducted for 5 days and the intervention was carried out on the second to fourth day. Interventions were carried out 20 minutes of effleurage massage twice a day after bathing, then periodic observations were made.	This researcher did not include the degree of pressure sores	This study shows that effleurage massage using virgin coconut oil has a significant effect in reducing the risk of developing pressure sores in immobilized patients in the ICU.
6.	(Faridah. et al 2019)	Quantitative, Quasi-experiment	Indonesia. Hospital. Inpatient Room	34 respondents	Intervention: Bed rest Materials: - Technique: Right tilt left tilt	This intervention was conducted for 7 days	characteristics including age, gender education and occupation are not included in the data.	Providing an inclined position is more effective in reducing the degree of pressure sores

7.	(Beeckman. et. al 2016.)	Uji coba terkontrol secara acak kuantitatif	Belgium. Nursing home	This study looked at 26 nursing homes with a sample of 308 such as high risk of pressure sores, aged >65 years.	Intervention: Providing special bedding Materials: Static air mattress Technique: -	The intervention was given for 14 days and skin assessments and technical evaluations were conducted.	This study did not examine pressure sore risk classification and errors in classifying skin injuries.	The results of this study show that static air mattresses are more effective than alternating air pressure mattresses in preventing pressure sores in nursing homes.

The results of the literature review illustrate that pressure injuries are mostly suffered by patients aged > 18 years, especially in post-stroke, post-surgery patients and elderly people with movement limitations. Interventions to prevent pressure injuries vary, ranging from single interventions such as right-left tilt mobilization, supplementation to increase endurance, massage, and the use of special wound prevention mats. Interventions can also be a combination of more than one or two interventions (Figure 2).

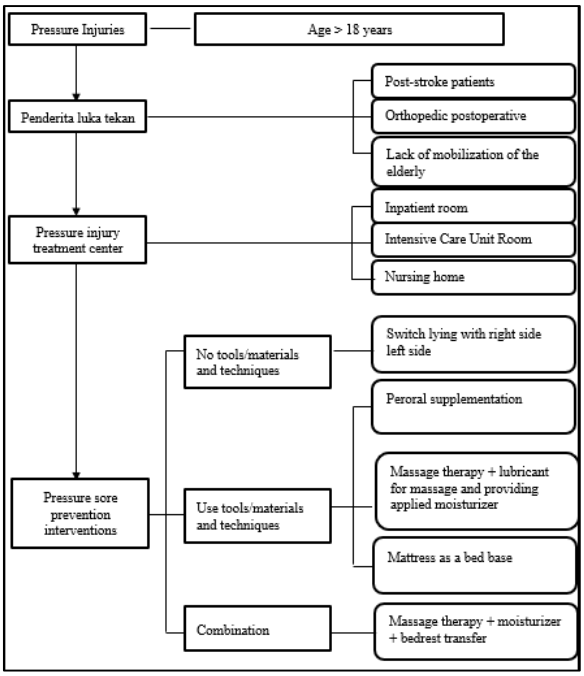

Figure 2. Framework

Pressure injuries will cause prolonged hospitalization and increase the cost of care. Interventions that can be done such as transferring beds. Basically, shifting beds as part of nursing interventions to prevent the risk of pressure injuries in immobilized patients (Wardani & Nugroho, 2022.). The transfer of lying position is done by tilting the patient's position from supine to oblique position or vice versa. The position is given to patients with a period of 2 hours to the right and 2 hours to the left (Wardani & Nugroho, 2022.). The tilted position in bed rest interventions is usually

accompanied by the use of pillows between the left knee and right knee, ankles and back to avoid pressure injuries in these areas (Faridah. et al 2019).

Bed rest is believed to be the easiest intervention to prevent the risk of pressure injuries in bed rest patients because bed rest does not take much time and tools or materials, easy for nurses and families to do so that families can do it independently (Faridah. et al 2019). In patients on bed rest, suppression affects cellular metabolism and will inhibit tissue circulation, leading to tissue ischemia and necrosis. When the patient is in a lying or sitting position, the body weight will rest on the bony protrusions. The longer the pressure occurs, the greater the risk of pressure injuries.

Bed rest can also be done accompanied by a special massage such as neuroperfusion massage. Neuroperfusion massage is a new massage technique to facilitate oxygen in the blood/lymph flow from the heart to the peripheral organs and vice versa with the aim of restoring sensory and motor functions. This massage technique must be done gently. The massage procedure begins at the main/central area (thorax and lumbar), followed by peripheral areas (cervical, brachial, femoral, pedis etc.) depending on the patient's complaint (Wardani & Nugroho, 2022.). Neuroperfusion massage can be done for 15 minutes to the patient which will provide a relaxing sensation and reduce pressure on the body (Wardani & Nugroho, 2022.).

Another massage technique that can be performed on immobilized patients is effleurage massage. Effleurage massage is a rubbing massage movement and can be done for 4-5 minutes with a frequency of twice (morning and night) for 7 consecutive days can have the effect of improving blood circulation, so that oxygen supply can be fulfilled (Adevia et al., 2022) Effleurage massage can be performed on the mastoid bone area, cervical, back, glutei, sacrum, hands and feet (Darmareja, 2020)

Based on previous research (Darmareja, 2020), skin nutrition is very important in bed rest patients. Therefore, the intervention that can be given is to provide moisturizers to the skin, one of which can provide virgin coconut oil. Virgin coconut oil has a moisturizing component that can soften the skin that protects skin damage. In addition, virgin coconut oil contains antioxidants, antimicrobials and antifungals that can protect the skin from free radicals and tissue degeneration (Darmareja, 2020.). Virgin coconut oil is also easily absorbed by the skin, contains vitamin E which functions as a cell membrane stabilizer and can protect the skin from free radicals and has a good pH for the skin. Virgin coconut oil can be used as a moisturizing agent to perform massage therapy on bed rest patients (Darmareja, 2020). Virgin coconut oil is one of the natural processed ingredients that can be used as an alternative topical therapy as skin care (Sumah, 2020). Virgin coconut oil will react with skin bacteria into free fat as contained in sebum. Sebum consists of medium chain fatty acids that can protect the skin from pathogenic microorganisms (Sumah 2020). The use of virgin coconut oil can be used as a moisturizer in any massage therapy with the aim of reducing rough friction on the skin.

Another moisturizer that can be used as a moisturizing agent in patients with pressure injuries is aloe vera gel. Aloe vera is anti-inflammatory, antibacterial, antiviral, antiseptic, protects the skin and heals and prevents wounds (Hekmatpou et.al. 2019). The amino acids and zinc found in aloe vera can maintain skin integrity, moisture, skin erythema, and help prevent sores (Hekmatpou et.al. 2019). Based on previous research (Budiyanto, 2020), it is explained that the administration of aloe vera extract is effective and has an effect on chronic decubitus wounds in rats because of some of the active compounds in aloe vera that have special functions in wound healing such as aloin, amino acids, vitamin C. each of these compounds still has a role in each phase of wound healing.

Providing nutrition to patients at risk of pressure injuries can be done because the Braden scale consists of 6 variables that conceptually describe the degree of sensory perception, moisture, activity, friction and sliding. The Braden scale is very appropriate in the Intensive Care Unit (Chung et al. 2022) Based on the findings of previous research (Primalia & Hudiyawati. 2020), nutritional

monitoring can be used as an intervention in preventing the risk of pressure injuries, but in this review the provision of nutrition is carried out by combining it with other interventions.

CONCLUSION

There are several tools, materials, techniques and nursing interventions that can be applied to the prevention of pressure injuries in bed rest patients. Tools and materials that can be used include moisturizing agents such as virgin coconut oil and aloe vera gel, mattresses as bed supports, and supplements. Supplements are designed as nutrition related to nutritional status and body mass index. Techniques and interventions that can be used by nurses such as transferring bed rest every 2 hours, providing massage therapy such as effleurage massage and neuroperfusion massage techniques and lubricating agents such as virgin coconut oil, smearing wound areas with moisturizers such as aloe vera, providing special mattresses for bed rest patients, and providing peroral supplements 3x a day. The results of this review serve as a reference to provide appropriate interventions for bed rest patients who are at risk of developing pressure injuries during hospitalization. This study has limitation on minimum database that used, so another study that approriate and related to the topic can not involved. Further research design, meta analysis could be implemented in order to make recommendation which the best intervention to prevent pressure injury.

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