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Repositioning and virgin coconut oil effleurage massage to reduce pressure ulcer risk among bedridden patients

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Abstract

Background: Bedridden patients in the intensive care unit (ICU) are at increased risk of pressure ulcers because prolonged immobility and sustained pressure impair tissue perfusion and compromise skin integrity. Repositioning and effleurage massage are non-pharmacological nursing interventions that may help reduce this risk.
Purpose: To evaluate changes in pressure ulcer risk following a combined repositioning and effleurage massage intervention among bedridden ICU patients.
Method: This quasi-experimental study used a one-group pretest-posttest design and included 40 bedridden ICU patients recruited through total sampling. Pressure ulcer risk was assessed using the Norton Scale before and after a three-day intervention comprising repositioning every two hours and effleurage massage with virgin coconut oil. Pre-intervention and post-intervention risk scores were compared using the Wilcoxon signed-rank test.
Results A marked shift toward lower pressure ulcer risk categories was observed after the intervention. The proportion of participants classified as being at high risk decreased from 70.0% (n = 28) before the intervention to 5.0% (n = 2) afterward, whereas the proportion classified as having no risk increased from 5.0% (n = 2) to 92.5% (n = 37). The Wilcoxon signed-rank test showed a statistically significant reduction in pressure ulcer risk following the intervention ($p < 0.001$).
Conclusion: The combined repositioning and effleurage massage intervention was followed by a significant reduction in assessed pressure ulcer risk among bedridden ICU patients.

Keywords: Effleurage Massage; Pressure Ulcer Risk; Repositioning

INTRODUCTION

Pressure ulcers are localised injuries to the skin and underlying tissue caused by sustained pressure or pressure combined with shear. They remain a substantial patient-safety concern in intensive care because critically ill patients often experience immobility, haemodynamic instability, impaired tissue perfusion, sedation, mechanical ventilation, and prolonged hospitalisation. Systematic reviews have reported a considerable burden of pressure injuries among adult intensive care unit (ICU) patients and hospitalised populations worldwide (Chaboyer, Thalib, Harbeck, Coyer, Blot, Bull, Nogueira, & Lin, 2018; Li, Lin, Thalib, & Chaboyer, 2020).

Pressure ulcer development is multifactorial. Advanced age, restricted mobility, impaired perfusion, vasopressor therapy, and longer ICU stay have repeatedly been identified as important risk factors in critically ill populations (Alderden et al., 2017; Alderden, Brooks, Kennerly, Yap, Dworak, & Cox, 2025). Structured risk assessment can facilitate early identification and prevention, although assessment scales should complement clinical judgement and ongoing skin evaluation (Zhang, Zhuang, Shen, Chen, Wen, Jiang, & Lao, 2021).

Repositioning is a core preventive strategy because it redistributes pressure and limits prolonged loading over bony prominences. International

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guidance recommends individualising repositioning according to mobility, clinical condition, skin tolerance, support surface, and overall risk rather than applying a single schedule to every patient (European Pressure Ulcer Advisory Panel et al., 2019). Although repositioning is widely recommended, systematic reviews indicate that the optimal frequency and regimen remain uncertain (Avsar, Moore, Patton, O'Connor, Budri, & Nugent, 2020; Gillespie, Walker, Latimer, Thalib, Whitty, McInnes, Lockwood, & Chaboyer, 2021; Asiri, 2023). Pressure ulcer prevention in critical care is therefore best approached as a multicomponent nursing intervention that also includes skin inspection, appropriate support surfaces, moisture management, nutritional care, and device-related pressure prevention (Alshahrani, Sim, & Middleton, 2021; Coyer et al., 2020; Lovegrove, Fulbrook, Miles, & Steele, 2022).

Effleurage massage is a gentle stroking technique that can be used to apply a topical emollient without deep pressure. Virgin coconut oil (VCO) is commonly used to maintain skin moisture and reduce friction during skin care. Studies in immobilised and high-risk patients have reported improvements in pressure ulcer risk scores after effleurage massage with VCO or regular repositioning, although the evidence is still developing and includes several small or quasi-experimental studies (Andayani, Wahyuni, Ausrianti, Reni, Edo, & Amir, 2023; Zahra & Dwiningsih, 2023; Badrujamaludin, Melanie, & Nurdiantini, 2021; Darmareja et al., 2020; Darmareja, Kosasih, & Priambodo, 2020). Trials of other plant-based topical preparations have also suggested potential preventive benefits in high-risk populations (Fallahi, Soroush, Sadeghi, Mansouri, Mobaderi, & Mahdavikian, 2022; Lupiañez-Pérez, Morilla-Herrera, Kaknani-Uttumchandani, Lupiañez-Perez, Cuevas-Fernandez-Gallego, Martin-Santos, Caro-Bautista, & Morales-Asencio, 2017).

Evidence regarding a combined protocol of frequent repositioning and effleurage massage with VCO in bedridden ICU patients remains limited. This study therefore evaluated changes in pressure ulcer risk before and after the combined intervention in the ICU of Sari Asih Hospital, Serang.

RESEARCH METHOD

This quantitative study used a quasi-experimental one-group pretest-posttest design. It was conducted in the Intensive Care Unit of Sari Asih Hospital, Serang. The study population comprised bedridden ICU patients, and 40 eligible patients were enrolled through total sampling during the study period.

Participant characteristics were obtained from medical records and included age, sex, education, occupation, and medical diagnosis. Pressure ulcer risk was assessed using the Norton Scale, which evaluates physical condition, mental condition, activity, mobility, and continence. Lower scores indicate greater pressure ulcer risk. Participants were classified as having no risk, low risk, or high risk according to the study criteria.

The intervention was delivered for three consecutive days and combined repositioning every two hours with effleurage massage using VCO on pressure-prone skin areas. Pressure ulcer risk was assessed before the first intervention and after completion of the intervention period. Categorical variables were summarised using frequencies and percentages. Differences between pre-intervention and post-intervention pressure ulcer risk were analysed using the Wilcoxon signed-rank test, with statistical significance set at $p < 0.05$.

RESEARCH RESULTS

Table 1. Characteristics of Bedridden ICU Patients (N = 40)

Variable	Results
Age (n/%) (Mean±SD)(Range)(Year)	57.30 ± 15.18(17–75)
17–25	1/2.5
26–35	5/12.5
36–45	4/10.0
46–55	2/5.0

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56–65	11/27.5
>65	17/42.5
Gender (n/%)	
Female	22/55.0
Male	18/45.0
Education level (n/%)	
Elementary school	3/7.5
Junior high school	9/22.5
Senior high school	22/55.0
Higher education	6/15.0
Employment status (n/%)	
Unemployed	25/62.5
Private-sector employee	10/25.0
Civil servant	5/12.5
Medical diagnosis (n/%)	
Stroke	17/42.5
Pneumonia	15/37.5
Diabetic ketoacidosis	3/7.5
Congestive heart failure	3/7.5
Pulmonary tuberculosis	2/5.0

Table 1 shows that participants older than 65 years constituted the largest age group, comprising 17 participants (42.5%), followed by those aged 56–65 years, with 11 participants (27.5%). Most participants were female (22, 55.0%), had completed senior high school (22, 55.0%), and were unemployed (25, 62.5%). Stroke was the most common medical diagnosis (17, 42.5%), followed by pneumonia (15, 37.5%).

Table 2. Pressure Ulcer Risk Before and After the Combined Intervention

Pressure ulcer risk category	Pre-intervention, n/%	Post-intervention, n/%	*p*-value
No risk	2/5.0	37/92.5	
Low risk	10/25.0	1/2.5	<0.001
High risk	28/70.0	2/5.0	

Table 2 shows that 28 participants (70.0%) were at high risk of pressure ulcers before the intervention. After the intervention, 37 participants (92.5%) were classified as having no risk, while 2 participants (5.0%) remained at high risk. The Wilcoxon signed-rank test indicated a statistically significant difference in pressure ulcer risk between the pre-intervention and post-intervention assessments ($p < 0.001$).

DISCUSSION

This study found a marked change in pressure ulcer risk after the combined repositioning and effleurage massage intervention. Before the intervention, 70.0% of participants were classified as high risk; after the intervention, 92.5% were classified as having no risk. The significant Wilcoxon test result indicates that the distribution of Norton Scale risk

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categories differed between the two assessment points.

The participant profile reflected several factors associated with pressure ulcer vulnerability. The largest age group was older than 65 years, and stroke was the most common diagnosis. Older age, limited mobility, impaired perfusion, and prolonged critical illness have consistently been associated with pressure injury development in ICU populations (Alderden, Rondinelli, Pepper, Cummins, & Whitney,2017; Alderden et al., 2025). More than half of the participants were female; however, sex alone is not consistently identified as a major independent predictor of pressure ulcer development (Lichterfeld-Kottner, Lahmann, & Kottner, 2020).

Repositioning may reduce prolonged tissue loading by redistributing pressure away from vulnerable anatomical sites. The observed reduction in risk is consistent with the clinical rationale for regular repositioning and with evidence supporting multicomponent pressure injury prevention in critically ill patients (Alshahrani et al., 2021; Badrujamaludin et al., 2021). Nevertheless, systematic reviews have not established a universally optimal turning interval, and repositioning schedules should be adapted to the patient's clinical stability, mobility, skin condition, and support surface (Asiri, 2023; Avsar et al., 2020; Gillespie et al., 2021).

Effleurage massage with VCO may support preventive skin care by facilitating gentle topical application, maintaining moisture, and limiting friction during nursing care. Previous studies involving ICU, stroke, and immobilised patients have reported improved pressure ulcer risk scores following effleurage massage with VCO or VCO combined with regular repositioning (Andayani et al., 2023; Zahra & Dwiningsih, 2023; Darmareja et al., 2020; Nuzulullail et al., 2023). Research on olive oil and other topical preparations also suggests that selected emollients may contribute to skin protection in high-risk patients (Fallahi et al., 2022; Lupiañez-Perez et al., 2017; Sonmez & Yapucu Gunes, 2020). These products should be incorporated into comprehensive prevention rather than used as substitutes for pressure redistribution and clinical monitoring.

Pressure ulcer prevention in the ICU should also address device-related pressure, moisture, nutrition, support surfaces, and frequent skin assessment. Evidence from ICU prevention trials indicates that effective care usually involves several coordinated components rather than a single intervention (Coyer, Cook, Brown, Vann, & Doubrovsky, 2020; Lovegrove et al., 2022). In the present study, repositioning and effleurage massage were administered together; therefore, their individual contributions cannot be distinguished.

The findings should be interpreted in light of the one-group pretest-posttest design, the absence of a control group, the short intervention period, and recruitment from a single ICU. The outcome was a change in assessed risk rather than the incidence of newly developed pressure ulcers. In addition, risk-assessment scales have limitations and should be interpreted alongside clinical examination (Zhang et al., 2021). Controlled multicentre studies with longer follow-up are needed to determine whether the combined protocol prevents pressure ulcer occurrence and to identify which component provides the greatest benefit.

CONCLUSION

Pressure ulcer risk decreased substantially after the combined repositioning and effleurage massage intervention in bedridden ICU patients. Most participants were at high risk before the intervention, whereas most were classified as having no risk after the three-day intervention. The difference between the pre-intervention and post-intervention assessments was statistically significant ($p < 0.001$). These findings support the use of the combined protocol as part of preventive nursing care, while recognising that the study design does not establish causality.

SUGGESTION

Future studies should use controlled multicentre designs, larger samples, longer follow-up periods, and clearly standardised intervention protocols. Subsequent research should also measure the actual incidence and stage of pressure ulcers and examine repositioning and effleurage massage separately to determine their individual and combined contributions.

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