

## EFFECTIVENESS OF FOAM DRESSING VERSUS HYDROGEL DRESSING IN THE HEALING OF PRESSURE ULCERS AMONG ELDERLY PATIENTS IN INTENSIVE CARE UNITS OF A PUBLIC SECTOR TERTIARY CARE HOSPITAL IN ISLAMABAD: A QUASI-EXPERIMENTAL STUDY

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### Abstract

**Background:** Pressure ulcer (PUs) is a major concern among elderly patients due to immobility, reduced skin integrity, and comorbidities that impair wound healing. Selecting an effective dressing is essential to promote faster recovery, reduce infection risk, and improve patient comfort.

**Objective:** The purpose of this study was to compare the efficacy of foam and hydrogel dressings in the healing of pressure ulcers in elderly patients attending a tertiary care centre.

**Methodology:** A Quasi-experimental design was used to assess twenty elderly patients with pressure ulcers using Purposive non-probability sampling technique for selecting the participants, where ten participants was added to each group for comparison. Data were collected using the adapted PUSH scale and analysed using descriptive statistics in SPSS and Microsoft Excel. Ten patients received foam dressing (intervention group), while ten received hydrogel dressing (control group).

**Findings:** Results revealed that foam dressing showed greater effectiveness than hydrogel dressing in healing pressure ulcers among elderly patients, with a higher mean PUSH score reduction (7.1 vs. 4.3). Furthermore, 70% of patients in the foam dressing group showed significant improvement compared to 30% in the hydrogel group.

**Conclusion:** Foam dressing effectively accelerates pressure ulcer healing in elderly patients and should be incorporated into routine wound care practices, particularly in resource-limited healthcare settings.

## INTRODUCTION

Pressure ulcers (PUs) are a major concern among elderly patients due to immobility, reduced skin integrity, and comorbidities that impair wound healing (Santamaria et al., 2021). Furthermore, they are associated with pain, infection, increased hospitalization time, and healthcare costs (Nakagami et al., 2020). Consequently, the risk of developing pressure ulcers is especially pronounced in geriatric and long-term care populations, where effective prevention strategies and timely wound management play a crucial role in improving patient outcomes (Worsley et al., 2022).

Effective dressing selection plays a crucial role in accelerating wound healing and preventing further tissue damage (Campanili et al., 2022). Preventing and managing pressure ulcers continue to pose a major challenge for nurses and healthcare professionals across the globe (Ousey et al., 2021).

In addition, effective and timely interventions are crucial to minimize the complications associated with pressure ulcers among elderly patients (Worsley et al., 2022). Pressure ulcers pose a substantial burden on healthcare systems worldwide, with evidence showing that up to 25% of hospitalized elderly patients develop these wounds during their stay, leading to extended hospitalization, higher medical costs, and a decline in overall quality of life (Cochrane Review, 2019–2021).

Foam dressings are widely acknowledged for their ability to safeguard susceptible skin areas and promote wound healing by preserving moisture balance and offering protective cushioning (Campanili et al., 2022). Research indicates that silicone-based multilayer foam dressings markedly decrease the occurrence of pressure ulcers in hospitalized and elderly individuals (Santamaria et al., 2021; Worsley et al., 2022). Their affordability, practicality, and ease of application make them highly suitable for use in both acute and long-term care environments (Li et al., 2024; Cavazana et al., 2024).

On the other hand, hydrogel dressings maintain a moist wound environment, promote autolytic debridement, and help alleviate pain (Patel et al., 2022). Studies on diabetic and chronic wounds have shown that these dressings can accelerate healing and minimize infection risk,

particularly in elderly patients with dry or necrotic tissue (Khalid et al., 2023).

During clinical rotations, it was observed that pressure ulcers in elderly patients healed slowly regardless of regular dressing changes. The inconsistent use of foam and hydrogel dressings and unclear outcomes caused delayed healing and increased costs, highlighting the need to study the effectiveness of foam and hydrogel dressings in promoting faster recovery among elderly patients. The need for effective wound management among elderly patients is evident because delayed healing of pressure ulcers increases pain, infection risk, and hospital stay, ultimately affecting patient wellbeing. In Pakistan, many public hospitals lack standardized wound care protocols and consistent use of evidence-based dressings. This study was conducted to provide local evidence on using foam and hydrogel dressings as simple and cost-effective methods to promote pressure ulcer healing and improve recovery among patients in limited-resource hospitals. This study aimed to observe the changes in wound healing using the PUSH score and compare the impact of foam and hydrogel dressings in promoting the healing of pressure ulcers among elderly patients.

### Research Question; PICOT Framework

Among elderly patients (>50 years) with pressure ulcers, does the application of foam dressing, compared to hydrogel dressing, improve wound healing effectiveness in terms of reduction in ulcer size, improved epithelialization, improvement in PUSH score, and decreased healing time over a treatment period of 2–4 weeks?

- Population (P): Elderly patients (>50 years) with pressure ulcers.
- Intervention (I): Foam dressing application.
- Comparison (C): Hydrogel dressing application.
- Outcome (O): Wound healing effectiveness measured by reduction in ulcer size, improved epithelialization, improvement in PUSH score, and healing time.
- Time (T): Over the treatment period (2–4 weeks or until ulcer shows significant healing).

**LITERATURE REVIEW**

The reviewed literature highlights the effectiveness of both foam and hydrogel dressings in the management of pressure ulcers among elderly patients. Studies from the United States, Sweden, the United Kingdom, India, Nigeria, China, South Korea, Spain, and Pakistan consistently reported positive outcomes with both dressing types. Foam dressings were commonly associated with prevention of ulcer progression, reduction in development of new ulcers, cost-effectiveness, and improved patient comfort. In contrast, hydrogel dressings were more effective in accelerating wound healing, improving re-epithelialization, maintaining moisture balance, reducing pain, and shortening healing time.

Several studies, such as Johansson and Larsen (2021), Chen et al. (2022), and Ahmed et al. (2023), demonstrated that hydrogel dressings promoted faster healing and epithelialization compared to foam dressings. On the other hand, studies by Thompson et al. (2020), Garcia et al. (2020), and Khan and Riaz (2022) found that foam dressings were superior in preventing ulcer deterioration and reducing progression of pressure ulcers.

Although findings are generally consistent, some contradictions exist. For example, Adeoye and Okafor (2022) reported faster healing with hydrogel dressings, while foam dressings were more economical. Similarly, Kim and Park (2021) found hydrogels better for comfort and healing time, whereas foam dressings were more effective in ulcer prevention. These differences may be due to variations in sample size, ulcer stage, healthcare settings, and duration of treatment.

**Research Gap**

Despite the availability of international evidence, limited comparative studies have been conducted in Pakistan focusing specifically on elderly patients with pressure ulcers. Most studies evaluated either prevention or healing outcomes separately, while few simultaneously assessed ulcer size reduction, epithelialization, PUSH score improvement, and healing time. In addition, variations in healthcare resources and wound care practices in Pakistani hospitals make it difficult to generalize international findings to the local context. Therefore, further

local research is needed to compare the effectiveness of foam and hydrogel dressings among elderly patients in Pakistani healthcare settings.

**Theoretical and Evidence-Based Framework**

This study was guided by the Iowa Model of Evidence-Based Practice, which offers a structured framework for applying research evidence to improve patient outcomes (Titler et al., 2001). The model supports the evaluation of foam and hydrogel dressings to determine which intervention is more effective. Moreover, the study was also based on Florence Nightingale's Environmental Theory, which emphasizes that a clean, well-ventilated, and hygienic environment is vital for healing and recovery. In this case, maintaining proper wound hygiene and selecting suitable dressings such as foam and hydrogel help create an optimal healing environment, prevent infection, and promote tissue repair.

**METHODOLOGY**

The study used a Quasi-experimental design to measure and compare the effectiveness of foam and hydrogel dressings on pressure ulcer healing among elderly patients. This design was appropriate for comparison between two groups and provided numerical evidence regarding their effectiveness (Creswell & Creswell, 2018; Polit & Beck, 2018).

The study was conducted in the intensive care unit (ICU) of a public sector tertiary care hospital located in Islamabad, Pakistan. The study population included elderly patients above 50 years admitted in ICUs having pressure ulcers. A purposive sampling technique was used to select patients receiving consistent wound care. A total of twenty patients were included. Ten were assigned to the intervention group and ten to the control group. Elderly patients aged  $\geq 50$  years diagnosed with pressure ulcers (stage II or higher as per NPIAP criteria) were included. Patients with non-pressure-related wounds such as diabetic foot ulcers, venous ulcers, and traumatic wounds were excluded.

After obtaining permission from the Chief Nursing Superintendent and Head of Department, the primary researchers collaborated with ICU nursing staff to identify

eligible patients. The purpose and procedure of the study were explained in simple language, and written informed consent was obtained from each patient or their legal guardian. The data collection tool used in this study was adapted from the Pressure Ulcer Scale for Healing (PUSH Tool 3.0) developed by the National Pressure Injury Advisory Panel (NPIAP). Data were collected over four weeks (September to October 2025). Clean technique was used during dressing procedures, including the use of gloves and normal saline without a sterile field. Patients were observed for wound healing and signs of infection according to NPIAP guidelines.

Data were analysed using Microsoft Excel and SPSS. Descriptive statistics, including mean, standard deviation, frequency, and percentage, were calculated for all variables and presented in the form of tables and figures.

**RESULT**

**Demographic Characteristics**

A total of 20 elderly patients participated in the study. The majority of participants (85%) were between 50 and 69 years of age, indicating a higher prevalence of pressure ulcers among older adults. Regarding gender distribution, 11 participants were male and 9 were female, demonstrating a nearly balanced representation.

*Table 1. Demographic Characteristics of Patients by Age Group (N=20)*

Age Group	Frequency	Percentage (%)
50-59	8	40
60-69	9	45
70+	3	15
Total	20	100

**Mean PUSH Scores**

*Table 2. Mean PUSH Scores Over Four Weeks by Dressing Type*

Group	Baseline	Week 1	Week 2	Week 3	Week 4	Mean Reduction
Hydrogel dressing	13.8	13.0	12.0	10.9	9.5	4.3
Foam dressing	14.4	12.8	10.9	8.9	7.3	7.1

The findings showed a continuous decline in PUSH scores in both groups. By week 4, the mean PUSH score dropped to 9.5 in the hydrogel group and 7.3 in the foam group. The

foam dressing group showed a greater mean reduction (7.1) compared to the hydrogel group (4.3), confirming a quicker healing trajectory.

**Frequency and Percentage of Healing Improvement**

*Table 3. Frequency and Percentage of Healing Improvement*

Improvement Category	Hydrogel (n=10)	Foam (n=10)	Total Percentage (%)
Significant	3	7	70% vs 30%
Moderate	6	3	30% vs 60%
Mild	1	0	—
Total	10	10	100%

The findings showed that a higher proportion of patients in the foam dressing group (70%) achieved significant healing compared to the hydrogel group (30%). Most hydrogel-treated patients demonstrated only moderate improvement.

**DISCUSSION**

The findings of this study revealed that both hydrogel and foam dressings contributed to pressure ulcer healing over a four-week period; however, foam dressings demonstrated more significant improvement in PUSH scores and overall wound recovery. Patients in the foam

dressings group showed a mean PUSH score reduction of 7.1 points compared to 4.3 points in the hydrogel group, indicating faster healing. These results align with the findings of Santamaria et al. (2021) and Worsley et al. (2022), who reported that foam dressings are highly effective in maintaining optimal moisture balance, reducing friction, and protecting the wound area, thus accelerating the healing process.

Similarly, the current study supports Campanili et al. (2022), who found that foam dressings enhance granulation tissue formation and prevent secondary infections. On the other hand, hydrogel dressings, while beneficial for maintaining moisture and promoting autolytic debridement, demonstrated slower progress, consistent with Patel et al. (2022) and Khalid et al. (2023).

The results further indicated that 70% of patients treated with foam dressings showed significant improvement, compared to 30% in the hydrogel group. These findings are consistent with Li et al. (2024) and Cavazana et al. (2024), who concluded that foam dressings are practical, cost-effective, and suitable for both acute and long-term care settings.

From a clinical standpoint, these results carry significant implications for wound care management in Pakistan and other developing countries where standardized wound care protocols are often lacking. Effective implementation of evidence-based dressing practices can reduce wound healing duration, decrease infection risk, and lower hospitalization costs among elderly patients with pressure ulcers.

Utilization of the validated Pressure Ulcer Scale for Healing (PUSH) tool enhanced the accuracy of healing measurement. Weekly wound assessment improved the precision of healing trend analysis. The study was conducted in a single tertiary hospital, which may limit external validity. Foam dressings should be adopted as a

standard evidence-based practice for treating moderate to heavily exuding pressure ulcers among elderly patients. Nursing education should include structured training on wound assessment and selection of appropriate dressing materials. Larger, multicentre randomized controlled trials should be conducted to assess long-term healing outcomes, patient satisfaction, and cost-effectiveness in various clinical settings.

**Conclusion**

The study concluded that foam dressings are more effective than hydrogel dressings in promoting pressure ulcer healing among elderly patients. Foam dressings resulted in greater reductions in PUSH scores, faster healing rates, and higher patient comfort levels. Implementing evidence-based dressing practices, ensuring proper nurse training, and maintaining consistency in wound care protocols can significantly improve healing outcomes and patient quality of life. In summary, the use of foam dressings should be prioritized as a standard approach for effective pressure ulcer management in clinical settings.

**Data availability statement**

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

**Ethics statement**

Written permission was obtained from the Chief Nursing Superintendent to access patient records and nursing procedures in intensive care units. Written informed consent was obtained from participants or their legal guardians. Patient safety was ensured by adhering to standard clinical guidelines, and participants were free to withdraw at any time without affecting their care.

**Author contributions**

S. No.	Author(s)	Contribution/Role
1	Fouzia Pervaiz	Data collection, manuscript drafting, and coordination of clinical information.
2	Anila Naz & Sajjullah	literature review, data organization, and manuscript formatting, statistical support, referencing.

3	Syed Maaz Hussain	Data interpretation, editing, and proofreading of the manuscript.
4	Ashfaq Ahmad	Provided expertise in infection prevention and contributed to scientific review and technical guidance.
5	Hina Hashim	Data Collection, Data Organization, finalized the manuscript for publication.
6	Abdullah Khan	Conceptualized the study, supervised research activities, guided methodology, performed critical revision, and finalized the manuscript for publication.
7	Komal Nawaz	Assisted in literature search, data Collection and compilation.
8	Salman Khan	Supervised statistical analysis, contributed to interpretation of findings, and critically reviewed the manuscript for finalization.

**Conflict of interest**

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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