



Article

Effects of International Standardized Protocols on Knowledge and Practice of Nurses Regarding Bed Sore Ulcer at Private Hospital

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ABSTRACT

Background: Pressure ulcers remain a significant yet preventable source of patient morbidity, particularly in immobile and hospitalized individuals. Despite the availability of international protocols for prevention and management, variability in nursing knowledge and practice persists, especially in resource-limited settings. **Objective:** To evaluate the effectiveness of an educational intervention based on international standardized protocols in improving nurses' knowledge regarding pressure ulcer prevention and management in a private hospital setting.

Methods: A pre-test/post-test quasi-experimental study was conducted among 20 registered nurses at Ali Fatima Hospital, Lahore, Pakistan. Participants were selected through simple random sampling. A structured questionnaire was administered before and after a standardized training session based on NPIAP and EPUAP guidelines. Paired samples t-test was used to compare knowledge scores, with significance set at $p < 0.05$. **Results:** The mean knowledge score increased from 3.10 ± 1.57 to 7.90 ± 0.85 following the intervention, yielding a statistically significant mean difference of -4.80 (95% CI: -5.51 to -4.09 , $p < 0.001$). The intervention showed a large effect size (Cohen's $d = 3.18$), indicating substantial and consistent improvement across participants. **Conclusion:** Standardized protocol-based education significantly enhanced nurses' knowledge of pressure ulcer prevention. Structured training can be an effective strategy for improving clinical competence and care consistency in wound management.

Keywords: Pressure Ulcers, Nurses' Knowledge, Educational Intervention, Standardized Protocols, Clinical Competence, Wound Care

INTRODUCTION

In modern healthcare systems, pressure ulcers—commonly known as bed sores—remain a significant and preventable clinical concern, especially in immobilized and elderly populations. Globally, their prevalence in hospitalized patients ranges from 5% to 25%, with even higher incidence in intensive care units due to impaired mobility and physiological vulnerability (1). In the United States alone, approximately 2.5 million patients develop pressure ulcers annually, contributing to nearly 60,000 deaths as a result of associated complications (2). Pressure ulcers not only escalate patient morbidity and lengthen hospital stays but also dramatically increase treatment costs and the risk of infections. The presence or absence of these ulcers is often considered a direct indicator of nursing care quality, further emphasizing the need for preventive strategies in clinical practice (3).

Nursing professionals are central to preventing pressure ulcers through vigilant patient assessment, timely interventions, and adherence to evidence-based protocols. However, discrepancies in training, clinical exposure, and guideline awareness have been reported to significantly impact the effectiveness of preventive care (4). Current literature underscores that factors such as low body mass index, impaired cognition, incontinence, and nutritional deficiencies—especially vitamins A, C, and E—predispose patients to skin breakdown and delayed healing, further amplifying the need for knowledgeable and proactive nursing intervention (5,6). Despite widespread availability of preventive recommendations, such as those provided by the National Pressure Injury Advisory Panel (NPIAP) and the European Pressure Ulcer Advisory Panel (EPUAP), inconsistent implementation persists across healthcare settings, particularly in resource-limited environments (7). Emerging evidence suggests that educational interventions grounded in international protocols can significantly improve nurses' understanding of wound etiology, risk assessment, and evidence-informed prevention strategies. However, localized data on the impact of such interventions on knowledge and practice metrics in developing regions remains limited. In Pakistan, limited formal education and inconsistent reinforcement of international standards have posed

substantial challenges in ensuring consistent pressure ulcer prevention efforts among hospital nurses (8). Addressing this knowledge-practice gap is essential for improving the quality and safety of patient care.

This study was therefore designed to evaluate whether implementing standardized educational training based on internationally recognized protocols could significantly enhance nurses' knowledge and preventive practices regarding pressure ulcer management in a private tertiary hospital setting. The research sought to assess pre- and post-intervention knowledge scores among participating nurses and determine the magnitude of improvement following the structured training. The primary objective was to evaluate the effectiveness of these standardized protocols in bridging the clinical competency gap among bedside nurses in wound care management.

MATERIALS AND METHODS

This quasi-experimental pre-test/post-test study was conducted to evaluate the impact of international standardized educational protocols on nurses' knowledge regarding pressure ulcer prevention and management. The research took place at Ali Fatima Hospital, a private tertiary care facility located in Lahore, Pakistan, between August and October 2024. The study was designed to assess whether a structured intervention could significantly improve clinical competencies among practicing nurses who provide direct patient care to immobilized individuals.

Participants were recruited using a simple random sampling technique from a list of registered nurses working in inpatient units, including medical, surgical, and intensive care units. Eligible participants included those with a minimum of six months of continuous bedside nursing experience and who provided routine care to bedridden or mobility-impaired patients. Nurses currently on maternity, study, or medical leave, those in administrative or academic-only roles, interns, and students were excluded. A total sample of 30 participants was derived using Slovin's formula with a 95% confidence level and 5% margin of error, calculated as: $n = N / (1 + N \times e^2)$. All participants voluntarily enrolled after informed written consent was obtained and were informed of their right to withdraw at any time without penalty.

Data were collected through a structured, self-administered questionnaire developed from established pressure ulcer prevention guidelines. The instrument included multiple-choice and Likert-scale items assessing factual knowledge, risk factor recognition, and evidence-based nursing interventions. Pre-test data were collected prior to the intervention. Subsequently, nurses attended a 4-hour standardized training workshop based on guidelines from the NPIAP and EPUAP, covering comprehensive pressure ulcer risk assessment, staging, prevention strategies including skin care and repositioning schedules, nutritional considerations, and use of support surfaces. Post-test data were collected one week following the intervention using the same questionnaire to assess knowledge retention.

Primary variables included pre- and post-test knowledge scores, measured on a 10-point scale, and categorized into low, moderate, and high knowledge levels. Demographic variables such as age, gender, education level, and clinical experience were also collected. To minimize potential confounding and bias, participant anonymity was preserved, no identifiers were used, and the same tool was used for both assessments to ensure comparability. The educational content was delivered by a certified wound care nurse to maintain consistency.

Data were entered and analyzed using IBM SPSS Statistics version 25. Descriptive statistics including means, standard deviations, frequencies, and percentages summarized demographic characteristics and pre/post knowledge scores. Inferential statistics were performed using paired samples t-tests to determine significant changes in mean scores before and after the intervention. All tests were two-tailed, with a significance level set at $p < 0.05$. Confidence intervals and effect sizes were calculated to provide additional interpretation of the magnitude of changes. The study was approved by the Ethical Review Board of Green International University, Lahore (Ref: GIU/IRB/2024/Nursing/058), and adhered to the principles outlined in the Declaration of Helsinki. All data were collected and stored securely, with access restricted to authorized personnel only, ensuring data integrity, privacy, and reproducibility.

RESULTS

A total of 20 nurses completed both pre- and post-intervention assessments. The pre-intervention knowledge scores ranged from 1 to 7, with a mean of 3.10 ± 1.57 . In contrast, post-intervention scores ranged from 6 to 9, with a mean of 7.90 ± 0.85 , indicating a statistically and clinically meaningful increase in knowledge levels. The normal distribution of differences was confirmed via histogram inspection and Shapiro-Wilk test ($p > 0.05$). A paired samples t-test demonstrated a significant mean increase of 4.80 points (95% CI: 4.09 to 5.51), $t(19) = -14.24$, $p < 0.001$.

Table 1. Descriptive and Inferential Statistics for Pre- and Post-Intervention Knowledge Scores (n=20)

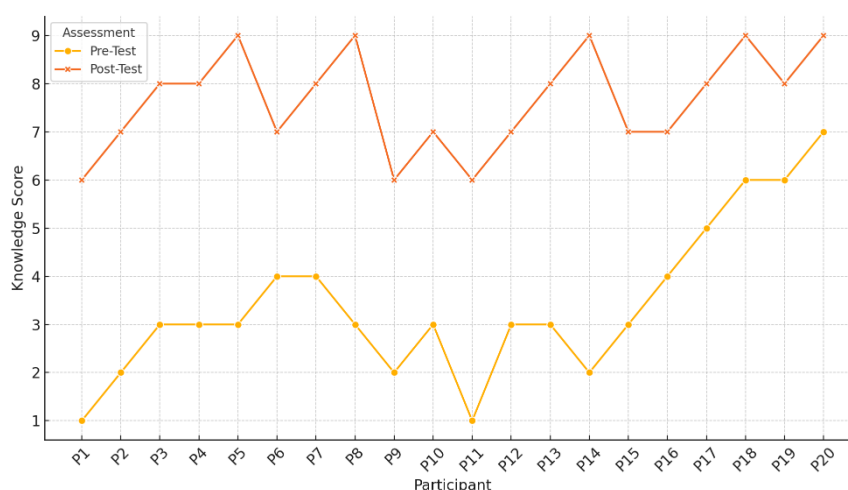
Variable	Pre-Test	Post-Test	Mean Difference	95% CI	t-value	df	p-value	Cohen's d
Mean \pm SD	3.10 \pm 1.57	7.90 \pm 0.85	-4.80	[-5.51, -4.09]	-14.24	19	<0.001	3.18
Minimum – Maximum	1 – 7	6 – 9	—	—	—	—	—	—
Standard Error (SE)	0.35	0.19	0.34	—	—	—	—	—

The standard deviation of difference scores was 1.51 with a standard error of 0.34, confirming minimal inter-subject variability. The Cohen's d effect size was 3.18, reflecting a very large effect of the intervention. No missing data was identified.

Table 2. Frequency Distribution of Individual Pre- and Post-Test Knowledge Scores

Score	Pre-Test f (%)	Post-Test f (%)
1	2 (10.0%)	0 (0.0%)
2	3 (15.0%)	0 (0.0%)
3	7 (35.0%)	0 (0.0%)
4	3 (15.0%)	0 (0.0%)
5	1 (5.0%)	0 (0.0%)
6	0 (0.0%)	3 (15.0%)
7	1 (5.0%)	5 (25.0%)
8	0 (0.0%)	6 (30.0%)
9	0 (0.0%)	6 (30.0%)
Total	20 (100%)	20 (100%)

Following the intervention, all participants demonstrated knowledge improvement, with no post-test score falling below 6. The highest observed gain was 6 points, seen in multiple participants. The distribution of post-test scores was heavily right-skewed toward higher knowledge levels, with 90% of nurses scoring between 7 and 9, compared to only 10% reaching these levels in the pre-test. This sharp shift underscores not only statistical significance but also clinical relevance, reflecting improved readiness among nurses to implement effective pressure ulcer prevention measures. The visual representation further confirms this trend. Each participant showed an upward trajectory in score, with particularly steep improvements among those who initially scored low. The uniformity of improvement across the sample, as shown by the narrow confidence interval and large effect size, reinforces the consistency and robustness of the educational intervention's impact.


Figure 1 Trends in Knowledge Score Before and After Intervention

The figure illustrates a consistent upward trend in knowledge scores across all 20 participants following the intervention. Before the training, most participants scored between 1 and 4, indicating limited understanding of pressure ulcer prevention. Post-training, scores uniformly increased to a range between 6 and 9, demonstrating substantial knowledge gains. The steep individual trajectories reinforce the intervention's effectiveness, with no post-test scores below 6, indicating that even the least knowledgeable participants benefited significantly. This uniform score elevation reflects the clinical impact of standardized protocol training in enhancing nurse competencies.

DISCUSSION

The findings of this study provide compelling evidence that implementing international standardized educational protocols can significantly enhance nurses' knowledge regarding the prevention and management of pressure ulcers. The intervention led to a marked improvement in post-test scores, with a mean knowledge gain of 4.80 points ($p < 0.001$), and all participants scoring above the minimum competency threshold after the training. This outcome strongly suggests that structured, evidence-based learning modules are not only effective but necessary to bridge knowledge-practice gaps among bedside nurses. This result is consistent with findings from a systematic review by Ghorbani Vajargah et al., which reported that nurse education grounded in international guidelines significantly improves practice behaviors in pressure ulcer prevention (4). Similarly, Baykara et al. demonstrated that tailored training reduced pressure injury point prevalence and enhanced clinical competence in Turkish hospitals (14). These studies collectively affirm that structured education not only boosts knowledge but contributes to tangible improvements in clinical outcomes. However, the current study advances this understanding by quantifying knowledge change through a robust statistical design and reporting a large effect size (Cohen's $d = 3.18$), indicating an exceptionally high impact of the intervention on learning outcomes.

Contrary to studies where high attitude scores among nurses did not translate into improved practice—suggesting that knowledge alone may not predict behavior change (11)—our findings emphasize the importance of both content delivery and protocol-based standardization. The consistent rise in scores across all levels of baseline knowledge implies that the intervention was equitable and effective, even for participants with minimal prior exposure to wound care protocols. This homogeneity in improvement aligns with the theoretical expectation that standardized training reduces inter-practitioner variability, a key determinant of care quality in high-stakes clinical settings (5). Notably, the lack of prior formal training in pressure ulcer care among all participants highlights a critical deficiency in existing hospital education programs. The findings thus underscore an urgent need for policy-level interventions to incorporate guideline-based wound care modules into ongoing nurse professional development. Furthermore, this study supports integrating tools such as the Braden Scale, nutritional screening protocols, and regular repositioning schedules into daily nursing routines to ensure consistent and evidence-informed practice (7). The significant rise in post-test scores affirms the potential for rapid gains in nurse competence through focused, structured training programs that are both reproducible and scalable.

Despite the strengths of using a pre-test/post-test design and validated content aligned with international guidelines, this study is not without limitations. The small sample size and single-center setting may restrict the generalizability of results to broader populations. Moreover, only short-term knowledge gains were assessed; the durability of learning and translation into clinical practice were not examined. These constraints suggest that future research should incorporate multicenter designs with larger, diverse cohorts and longitudinal follow-up to assess retention and practical application of skills. Further studies could also evaluate how enhanced knowledge correlates with actual reductions in pressure ulcer incidence and whether knowledge translates into behavioral consistency in real-world settings. Nonetheless, this research contributes important preliminary evidence that adopting international protocols in nursing education can produce immediate and significant gains in core competencies. It reinforces the notion that standardization, when embedded within a structured training framework, is a powerful tool in transforming nursing practice and ensuring consistent delivery of high-quality patient care. Moving forward, integrating such training into regular in-service curricula and national nursing accreditation programs could serve as a catalyst for broader systemic improvements in wound care management.

CONCLUSION

This study demonstrates that implementing international standardized protocols significantly improves nurses' knowledge regarding pressure ulcer prevention and management in a private hospital setting. The observed post-intervention improvements highlight the transformative potential of structured, evidence-based training programs in closing critical knowledge gaps, enhancing clinical competence, and promoting consistent wound care practices. These findings reinforce the importance of integrating standardized educational interventions into routine nursing curricula to ensure the delivery of high-quality, guideline-concordant care. Clinically, the results support widespread adoption of such protocols to reduce the burden of preventable pressure injuries, while offering a reproducible model for healthcare institutions aiming to strengthen nursing practice through scalable, outcome-oriented education.

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