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EVALUATION OF NURSING INTERVENTIONS TO PREVENT PRESSURE ULCERS IN CHRONICALLY ILL PATIENTS IN A TERTIARY HEALTHCARE SETTING IN DISTRICT MARDAN

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ABSTRACT

Background

Pressure ulcers are a major patient safety concern and an important indicator of the quality of nursing care, particularly among chronically ill patients who experience prolonged immobility and extended hospital stays. Effective nursing interventions play a central role in preventing pressure ulcer development in tertiary healthcare settings.

Objective

To evaluate nursing interventions used to prevent pressure ulcers among chronically ill patients in a tertiary healthcare setting in district Mardan.

Methodology

A descriptive cross-sectional study was conducted among 175 registered nurses working in medical, surgical, and critical care units of a tertiary healthcare facility in district Mardan. Data were collected using a structured questionnaire adapted from international pressure ulcer prevention guidelines. The reliability of the instrument was confirmed using Cronbach's alpha (α = 0.884). Data were analyzed using SPSS version 27 using descriptive statistics and Chi-Square test.

Results

The findings revealed that nurses demonstrated good knowledge and generally positive practices regarding pressure ulcer prevention. Regular risk assessment (mean = 4.22 ± 1.04), repositioning (mean = 4.05 ± 1.15), skin care, and collaboration (mean = 4.27 ± 1.08) were commonly practiced. However, high workload (reported by 89% participants), limited staffing, and inadequate availability of pressure-relieving equipment were identified as major barriers to effective prevention. Inferential analysis using the Chi-square test revealed statistically significant associations between nurses' knowledge of pressure ulcer prevention and educational qualification (p = 0.020), clinical experience (p = 0.010), and formal training (p = 0.001). Nursing practice was significantly associated with clinical experience (p = 0.014), work area (p = 0.033), and formal training (p = 0.002).

Conclusion

Although nurses possess adequate knowledge regarding pressure ulcer prevention, institutional and resource-related challenges limit consistent implementation of preventive interventions. Strengthening organizational support, ensuring adequate staffing, and improving access to preventive resources are essential to reduce pressure ulcer incidence.

Keywords: *Pressure ulcers, nursing interventions, prevention, chronically ill patients, tertiary care hospital.*

INTRODUCTION

1.1 Background of the Study

Pressure ulcers, also known as pressure injuries or bedsores, are localized injuries to the skin and underlying tissue that usually occur over bony prominences as a result of prolonged pressure, shear, or friction. They remain a significant and largely preventable challenge in healthcare systems worldwide, particularly among patients who are chronically ill, immobile, or dependent on long-term nursing care. The development of pressure ulcers not only increases patient suffering but also leads to prolonged hospital stays, increased healthcare costs, and higher morbidity and mortality rates.

Globally, pressure ulcers are considered a key indicator of the quality and safety of nursing care. A systematic review and meta-analysis conducted by Li et al. reported a global prevalence of approximately 12.8% among hospitalized adult patients, with hospital-acquired pressure injuries accounting for nearly 8.4% of cases. These findings highlight the persistent burden of pressure ulcers despite advances in healthcare and the availability of evidence-based preventive strategies(1).

Patients with chronic illnesses are particularly vulnerable to pressure ulcer development due to factors such as limited mobility, impaired sensation, poor nutritional status, reduced tissue perfusion, and prolonged hospitalization. Chronic conditions including stroke, spinal cord injury, diabetes mellitus, chronic obstructive pulmonary disease, and malignancies significantly increase the risk of pressure injury formation. In such patients, continuous nursing surveillance and timely preventive interventions are essential to maintain skin integrity and overall patient wellbeing.

Nurses play a key role in the prevention of pressure ulcers as they are directly responsible for ongoing patient assessment, implementation of preventive interventions, and early identification of skin changes. Evidence-based nursing interventions such as regular repositioning, use of pressure-relieving support surfaces, skin inspection, moisture management, and nutritional support have been shown to significantly reduce the incidence of pressure ulcers. International guidelines developed by the European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance emphasize the importance of structured prevention bundles and systematic risk assessment using validated tools such as the Braden Scale(2).

Despite the availability of international guidelines, pressure ulcers continue to be prevalent in low- and middle-income countries due to limited resources, inadequate staffing, high patient-to-nurse ratios, and inconsistent implementation of preventive protocols. Developing countries face additional challenges related to lack of training opportunities, insufficient availability of pressure-relieving devices, and weak institutional support for evidence-based nursing practices.

In Pakistan, pressure ulcers represent a growing yet underreported healthcare problem, particularly in public-sector tertiary care hospitals. Studies conducted in various regions of the country have reported a concerning prevalence of pressure ulcers among hospitalized patients. Research from tertiary care hospitals in Peshawar and Lahore indicates that although many nurses possess basic knowledge about pressure ulcer prevention, the translation of knowledge into consistent clinical practice remains suboptimal.

Qazi et al. reported that pressure ulcers were commonly observed among patients with prolonged hospital stays and limited mobility in a tertiary care hospital in Peshawar(3). Similarly, Other studies found gaps in nursing practices related to repositioning frequency, documentation, and use of pressure-relieving equipment in tertiary hospitals of Khyber Pakhtunkhwa. These findings suggest that systemic and organizational factors play a significant role in hindering effective prevention.

District Mardan hosts several tertiary healthcare facilities that cater to a large population of chronically ill patients from both urban and rural areas. Due to high patient turnover, limited resources, and staffing constraints, nurses working in these settings often face difficulties in implementing comprehensive preventive measures. However, limited empirical data are available regarding the actual nursing interventions practiced in this context, highlighting the need for localized research.

1.2 Problem Statement

Pressure ulcers remain a significant yet preventable complication among chronically ill patients admitted to tertiary healthcare facilities. Despite the availability of international guidelines and evidence-based nursing interventions, the

incidence of pressure ulcers continues to be high in Pakistani hospitals. In district Mardan, there is a lack of documented evidence evaluating the adequacy, frequency, and effectiveness of nursing interventions aimed at preventing pressure ulcers among chronically ill patients. Without such evaluation, gaps in practice remain unidentified, limiting opportunities for quality improvement and patient safety enhancement.

1.3 Significance of the Study

This study is significant as it evaluates nursing interventions used to prevent pressure ulcers in chronically ill patients within a tertiary healthcare setting in district Mardan. The findings will provide evidence-based insights into current nursing practices, identify existing gaps, and highlight barriers faced by nurses in implementing preventive measures. The results of this study may assist hospital administrators and policymakers in developing targeted strategies to strengthen nursing care standards, allocate resources effectively, and design training programs focused on pressure ulcer prevention. Additionally, the study will contribute to the limited body of local literature and serve as a reference for future research in similar healthcare settings.

1.4 Research Objectives

1. To know about nurses' knowledge and awareness regarding pressure ulcers prevention in chronically ill patients.
2. To determine nursing practices commonly employed to prevent pressure ulcers in chronically ill patients in a tertiary healthcare setting.
3. To explore perceived barriers faced by nurses in implementing pressure ulcer prevention measures.
4. To determine association between demographic variables and knowledge & practice of pressure ulcer prevention.

1.5 Research Questions

1. How much nurses know and aware regarding pressure ulcers preventions in chronically ill patients?
2. What nursing practices are commonly used to prevent pressure ulcers in chronically ill patients?
3. What barriers do nurses perceive in implementing effective pressure ulcer prevention practices?
4. What demographic variables are associated with knowledge and practice of pressure ulcer prevention?

1.6 Operational Definitions

Pressure Ulcer: A localized injury to the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure, shear, or friction.

Chronically Ill Patients: Patients suffering from long-term medical conditions requiring prolonged hospitalization and continuous nursing care.

Nursing Interventions: Preventive nursing actions including risk assessment, repositioning, skin care, moisture management, nutritional support, and use of pressure-relieving devices.

Pressure Ulcer Prevention Practices: Standardized nursing measures implemented to reduce the risk of pressure ulcer development among hospitalized patients.

CHAPTER 02
LITERATURE REVIEW

Pressure ulcers (also known as pressure injuries or bedsores) are localized areas of tissue damage that result from prolonged pressure, shear, or friction, typically over bony prominences such as the sacrum or heels. They represent a significant indicator of nursing care quality and patient safety worldwide. A systematic review of 37 studies reported a global prevalence of 12.8% and an incidence rate of 5.4 per 10,000 patient-days, indicating that approximately one in ten hospitalized patients is affected during admission (1). Hospital-acquired pressure injuries (HAPIs) account for about 8.4% of all pressure ulcers (1).

In developing countries, the burden is even higher due to limited resources and inconsistent adherence to preventive protocols (2). In Pakistan, a tertiary-care study in Peshawar found that pressure ulcers occurred in a significant proportion of hospitalized patients, particularly among those with prolonged stays and immobility (3). Other national reports highlight gaps in preventive practices and knowledge among nurses, suggesting that pressure ulcer prevention is not consistently prioritized (4,5).

The most common risk factors identified across global literature include advanced age, immobility, nutritional deficiencies, moisture/incontinence, prolonged hospitalization, diabetes, vascular

diseases, and reduced sensory perception (6,7). Critically ill and chronically bedridden patients are at the highest risk due to combined factors of immobility and comorbidities (8). Device-related injuries, such as those caused by oxygen masks and catheters, have also been increasingly reported in intensive care settings(9).

Systematic risk assessment using standardized tools such as the Braden Scale or the Waterlow Scale is the cornerstone of preventive care. A meta-analysis found that the Braden Scale demonstrates moderate predictive validity, but its sensitivity and specificity vary across populations (10). Regular documentation and reassessment enable early detection and timely interventions (11).

Repositioning is one of the oldest and most effective nursing interventions to prevent pressure ulcers. Evidence shows that systematic turning (every 2–4 hours) reduces pressure ulcer development (12). However, recent trials indicate that longer repositioning intervals may be feasible for selected patients using advanced support surfaces (13).

Pressure-redistributing mattresses and overlays have demonstrated significant effectiveness. A Cochrane review concluded that specialized foam mattresses reduce ulcer incidence by 60% compared to standard hospital mattresses (14). Air-fluidized and alternating-pressure devices are especially beneficial for high-risk or immobile patients (15).

Maintaining skin integrity through cleaning, moisturizing, and managing incontinence is essential. Regular inspection and prompt intervention for redness or blanching can prevent progression to ulcers (16).

Malnutrition and dehydration significantly increase ulcer risk. A systematic review confirmed that nutritional supplementation, particularly with protein, vitamin C, and zinc, improves healing and reduces ulcer incidence in at-risk patients (17).

Ongoing education improves adherence to preventive protocols. Interventional studies demonstrate that nurse training significantly enhances knowledge and compliance with evidence-based guidelines (18).

Multifaceted prevention programs combining risk assessment, repositioning, support surfaces, skin care, nutrition, and education are the most effective strategies (19). Such bundles have reduced hospital-acquired pressure injuries by 30–50% in several clinical trials (20). However, the success of these interventions largely depends on institutional support, staff-to-patient ratios, and resource availability (21).

In low- and middle-income countries, several barriers hinder implementation: inadequate staff, lack of pressure-relieving equipment, insufficient training, and poor documentation (4,5,22). In Pakistani tertiary hospitals, nurses often rely on traditional rather than evidence-based practices due to limited access to updated guidelines (23).

While international guidelines, such as the 2019 EPUAP/NPIAP/PPPIA guideline, outline clear standards for prevention (24), there is limited local evidence evaluating whether these nursing interventions are effectively practiced in tertiary hospitals like MMC Mardan. Evaluating nursing interventions in this setting will help identify implementation gaps, resource shortages, and training needs, thereby guiding evidence-based improvements in patient safety and nursing care quality.

Pressure ulcer prevention is primarily a nursing responsibility, requiring proactive assessment and consistent implementation of preventive strategies. Global evidence supports multifactorial approaches, but local evaluation remains essential to ensure that these practices are translated into effective bedside care. Conducting this study in a tertiary healthcare setting in Mardan will contribute valuable context-specific insights into improving chronic patient care outcomes.

CHAPTER 03
MATERIALS AND METHODS

3.1 Study Design

A descriptive cross-sectional study design was adopted to evaluate nursing interventions used to prevent pressure ulcers among chronically ill patients.

3.2 Study Setting

The study was conducted in medical, surgical, and critical units of a tertiary healthcare facility located in district Mardan, Khyber Pakhtunkhwa, Pakistan.

3.3 Study Population

The study population consisted of registered nurses working in medical, surgical, and critical units.

3.4 Sample Size Determination

The sample size was calculated using the Raosoft sample size calculator with a 95% confidence level, 5% margin of error, and 50% anticipated response distribution. Based on these parameters, the minimum required sample size was 175 participants.

3.5 Sampling Technique

A non-probability sampling technique was employed to recruit participants.

3.6 Inclusion and Exclusion Criteria

Inclusion Criteria:

- Registered nurses with at least six months of clinical experience.
- Nurses working in medical, surgical, and critical units.
- Nurses directly involved in the care of chronically ill patients.

Exclusion Criteria:

- Student nurses
- Administrative nursing staff
- Nurses unwilling to participate in the study

3.7 Study Instrument

Data were collected using a structured questionnaire adapted from international pressure ulcer prevention guidelines developed by the European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance (6). The instrument consisted of five sections: demographic information, knowledge and awareness, nursing practices, institutional support, and perceived barriers to pressure ulcer prevention.

The questionnaire utilized Likert-scale responses to assess nurses' knowledge, attitudes, and practices.

3.8 Validity and Reliability of the Instrument

Content validity of the study tool was ensured through review by nursing faculty members and clinical experts. Reliability analysis was conducted using SPSS version 27. The internal consistency of the instrument was assessed using Cronbach's alpha, which yielded a value of 0.884, indicating excellent reliability and suitability of the tool for data collection.

Table 1. Data Reliability Test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.884	.880	27

3.9 Data Collection Procedure

After obtaining formal permission from the hospital administration, data collection was carried out over a period of one months. Nurses were informed about the purpose of the study, and written informed consent was obtained prior to participation. Questionnaires were distributed during duty hours, and participants were given adequate time to complete them.

3.10 Ethical Considerations

Ethical principles were strictly observed throughout the study. Participation was voluntary, and confidentiality of participants was maintained by anonymizing all data. No personal identifiers were recorded. Participants were informed of their right to withdraw from the study at any stage without any consequences.

3.11 Data Analysis Procedure

Data were coded and entered into SPSS version 27 for analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic characteristics and study variables. Statistical significance was defined as a p-value of less than 0.05. Results were presented using tables and figures for clarity and ease of interpretation.

CHAPTER 04
RESULTS

4.1 Demographic Characteristics of Participants

Table 2. Demographic Characteristics of Participants (n=175)

Variables	Classification	n	%
Age	20-25	65	37.1
	26-30	47	26.9
	31-35	38	21.7
	Above 35	25	24.3
Gender	Male	67	38.3
	Female	108	61.7
Education	Diploma	15	8.6
	BSN	92	52.6
	Post RN BSN	53	30.3
	MSN	15	8.6
Clinical Experience	<1	52	29.7
	1-3	54	30.9
	4-6	42	24.0
	>6	27	15.4
Work Area	Medical	62	35.4
	Surgical	36	20.6
	Critical Units	77	44.0
Formal Training	Yes	137	78.3
	No	38	21.7

A total of 175 nurses participated in the study. Regarding age distribution, 65 (37.1%) participants were aged between 20–25 years, 47 (26.9%) were between 26–30 years, 38 (21.7%) were between 31–35 years, and 25 (14.3%) were above 35 years of age.

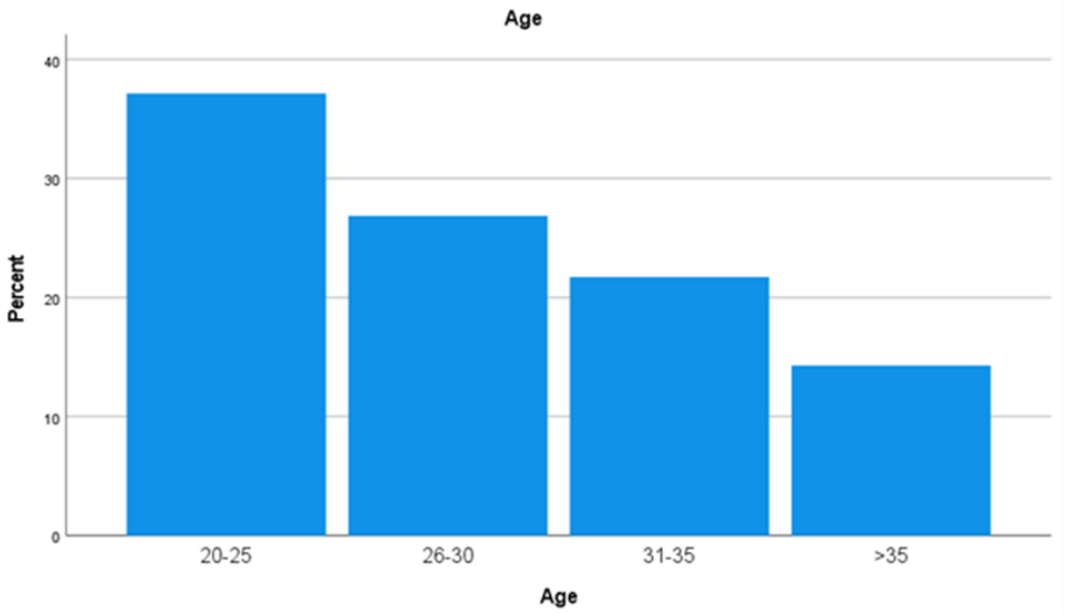

Figure 1. Age of Participants

Female nurses constituted the majority of the sample, with 108 (61.7%) participants, while 67 (38.3%) were male.

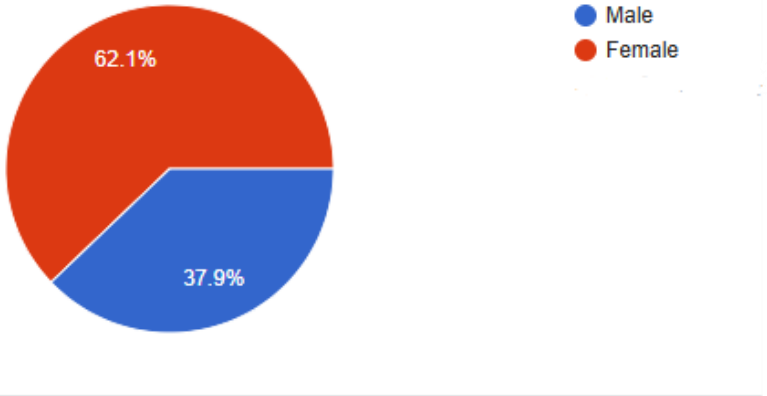

Figure 2. Gender Distribution

In terms of educational qualification, most participants held a Bachelor of Science in Nursing degree (n = 92, 52.6%), followed by Post RN BSN (n = 53, 30.3%). Nurses with diploma-level education and Master of Science in Nursing each accounted for 15 (8.6%) participants.

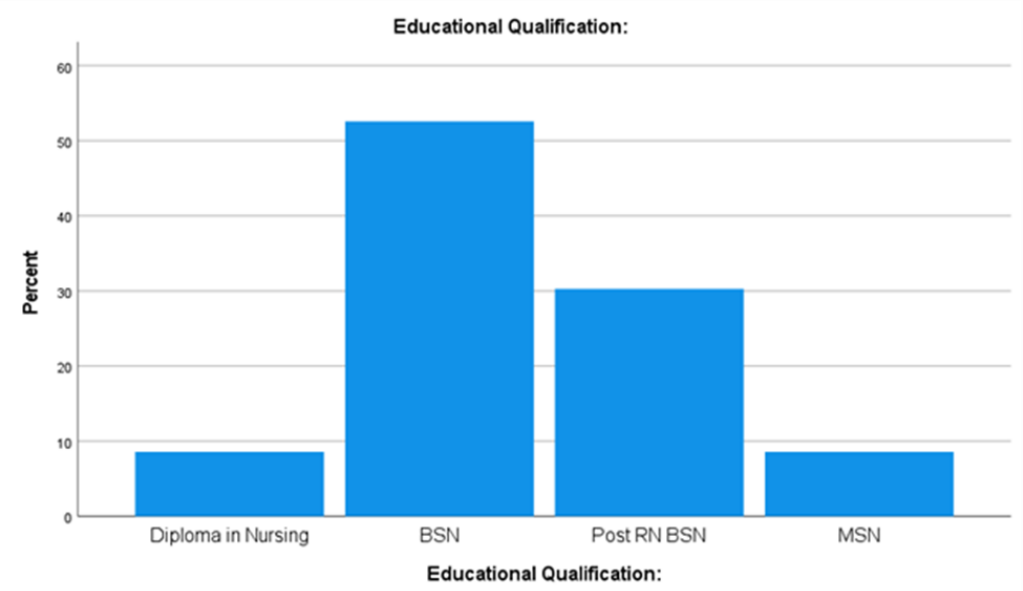

Figure 3. Education Qualification of Participants

Regarding clinical experience, 54 (30.9%) nurses had 1–3 years of experience, 52 (29.7%) had less than one year, 42 (24.0%) had 4–6 years, and 27 (15.4%) had more than six years of experience.

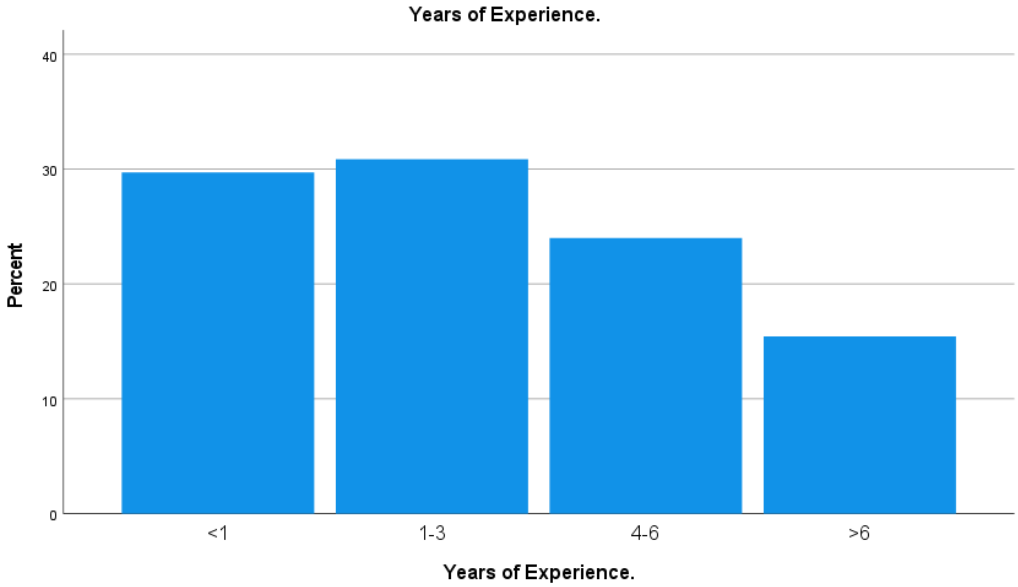

Figure 4. Clinical Experience

With respect to work area, 77 (44.0%) nurses were working in critical care units, 62 (35.4%) in medical wards, and 36 (20.6%) in surgical wards.

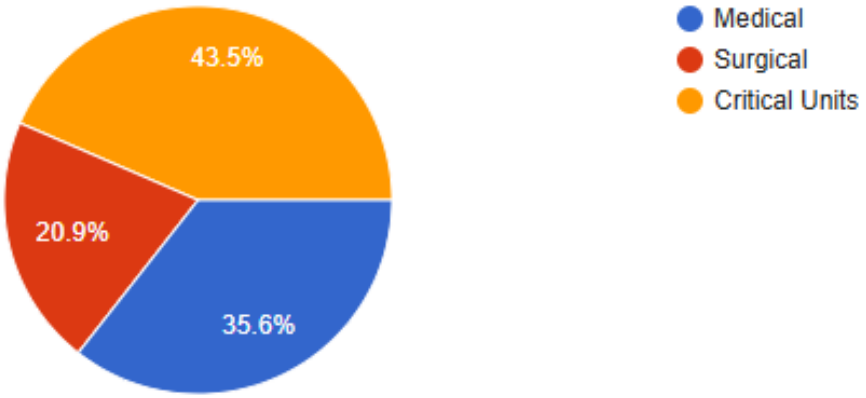

Figure 5. Work Area

A majority of the participants, 137 (78.3%), reported having received formal training on pressure ulcer prevention, while 38 (21.7%) had not received any formal training.

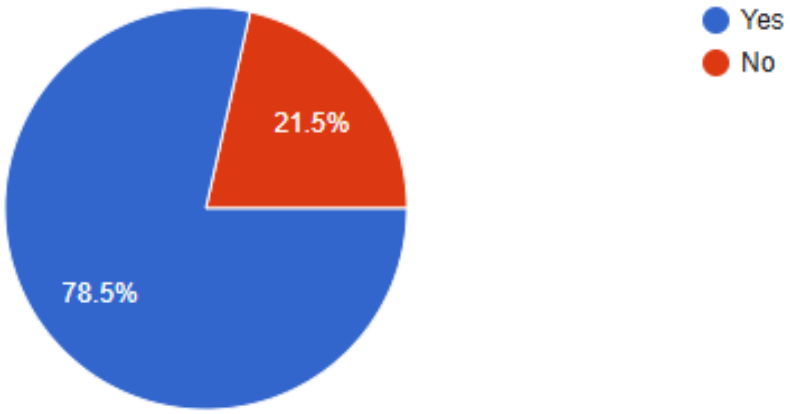

Figure 6. Received Formal Training on Pressure Ulcer Prevention

4.2 Reliability of the instrument

The internal consistency of the study questionnaire was assessed using Cronbach's alpha reliability test. The overall Cronbach's alpha value for the 27-item instrument was 0.884, while the Cronbach's alpha based on standardized items was 0.880 as shown in table 1. These values indicate excellent internal consistency and confirm that the questionnaire was a reliable tool for assessing nursing interventions and perceptions related to pressure ulcer prevention.

4.3 Knowledge and Awareness Regarding Pressure Ulcer Prevention

The findings revealed that nurses demonstrated a generally good level of knowledge regarding pressure ulcer prevention. The mean score for familiarity with international guidelines

(EPUAP/NPIAP) was 3.65 (SD = 1.51). Participants strongly acknowledged the importance of regular risk assessment in preventing pressure ulcers, with a mean score of 3.97 (SD = 1.25).

Knowledge regarding the Braden Scale as a reliable risk assessment tool showed a high mean score of 4.03 (SD = 1.09). Similarly, nutritional status was recognized as a key preventive factor, with a mean score of 4.03 (SD = 1.10). Repositioning patients every 2–4 hours had a mean score of 4.09 (SD = 1.36), indicating strong agreement. Moisture management and skin care also scored highly (Mean = 4.05, SD = 1.22). The use of pressure-relieving mattresses or cushions was acknowledged as effective, with a mean score of 4.07 (SD = 1.24).

4.4 Nursing Practices Related to Pressure Ulcer Prevention

Regarding preventive practices, nurses reported high levels of compliance with recommended interventions. Assessing patients for pressure ulcer risk on admission had a mean score of 4.22 (SD = 1.04). Documentation of skin assessments during each shift demonstrated a mean score of 4.06 (SD = 1.05).

Repositioning immobile patients every two hours showed a mean score of 4.05 (SD = 1.15), while educating family members or attendants about repositioning had a mean score of 3.98 (SD = 1.21). Proper use of pressure-relieving devices showed a mean score of 3.99 (SD = 1.40).

Daily inspection of common pressure areas such as the sacrum and heels yielded a mean score of 3.95 (SD = 1.19). Maintaining skin dryness and preventing moisture from incontinence had a mean score of 4.09 (SD = 1.14). Nutritional screening for high-risk patients demonstrated a mean score of 3.93 (SD = 1.20). Reporting early signs of skin damage to physicians showed a high mean score of 4.17 (SD = 1.19), while collaboration with colleagues scored the highest mean of 4.27 (SD = 1.08).

4.5 Institutional Support for Pressure Ulcer Prevention

Institutional support was perceived as moderate by the participants. Availability of adequate pressure-relieving equipment had a mean score of 3.53 (SD = 1.44). The nurse-to-patient ratio allowing sufficient time for preventive care showed a lower mean score of 3.33 (SD = 1.30). Pressure ulcer prevention as a documented nursing standard in wards had a mean score of 3.73 (SD = 1.34).

Regular training opportunities for nurses demonstrated a mean score of 3.82 (SD = 1.23), while management support for implementing prevention protocols had a mean score of 3.90 (SD = 1.23).

4.6 Perceived Barriers to Pressure Ulcer Prevention

Table 3. Barriers Faced by Nurses regarding Pressure Ulcer Prevention

Barriers	Mean Score	Std. Deviation	Percentage
High Workload & Limited Staff	1.11	0.31	89%
Lack of Pressure-relieving Devices	1.47	0.50	53%
Inadequate Training on Prevention Techniques	1.45	0.49	55%
Poor Documentation Practices	1.57	0.49	43%
limited Supervision or Feedback from Management	1.47	0.50	53%

The most frequently reported barrier was high workload and limited staff, with a mean score of 1.11 (SD = 0.31), indicating strong agreement among participants. Lack of pressure-relieving

devices was also commonly reported (Mean = 1.47, SD = 0.50). Inadequate training on prevention techniques had a mean score of 1.45 (SD = 0.49). Poor documentation practices (Mean = 1.57, SD = 0.49) and limited supervision or feedback from management (Mean = 1.47, SD = 0.50) were additional barriers perceived by nurses.

4.7 Association Between Demographic Variables and Knowledge & Practice of Pressure Ulcer Prevention

Chi-square tests were performed to determine the association between selected demographic variables and nurses' knowledge level and practice level regarding pressure ulcer prevention. Knowledge and practice scores were categorized into adequate and inadequate levels based on the mean score. A p-value of < 0.05 was considered statistically significant.

4.7.1 Association Between Demographic Variables and Knowledge Level

Table 4. Association Between Demographic Variables and Knowledge Level of Nurses Regarding Pressure Ulcer Prevention (n = 175)

Demographic Variable	Knowledge Level	n (%)	χ^2 value	p-value
Age	Adequate	105 (60)	2.29	0.144
	Inadequate	70 (40)		
Gender	Adequate	96 (54.9)	1.92	0.166
	Inadequate	79 (45.1)		
Educational Qualification	Adequate	121 (69.1)	9.86	0.020*
	Inadequate	54 (30.9)		
Clinical Experience	Adequate	118 (67.4)	11.42	0.010*
	Inadequate	57 (32.6)		
Work Area	Adequate	114 (65.1)	4.21	0.121
	Inadequate	61 (34.9)		
Formal Training	Adequate	127 (72.6)	14.75	0.001*
	Inadequate	48 (27.4)		

**p < 0.05 statistically significant

The Chi-square analysis revealed a statistically significant association between nurses' educational

qualification and their level of knowledge regarding pressure ulcer prevention (χ^2 = 9.86, p = 0.020). Nurses holding a Bachelor of Science in Nursing or higher qualifications demonstrated significantly better knowledge compared to diploma-level nurses.

A significant association was also observed between clinical experience and knowledge level (χ^2 = 11.42, p = 0.010), indicating that nurses with longer years of experience possessed higher knowledge regarding preventive measures.

Furthermore, formal training on pressure ulcer prevention showed a strong and statistically significant association with knowledge level (χ^2 = 14.75, p = 0.001). Nurses who had received formal training demonstrated significantly higher knowledge scores compared to those who had not received training.

However, no statistically significant association was found between age and knowledge level (χ^2 = 2.29, p = 0.144), gender and knowledge level (χ^2 = 1.92, p = 0.166), nor between work area and knowledge level (χ^2 = 4.21, p = 0.121)

4.7.2 Association Between Demographic Variables and Nursing Practice

Table 5. Association Between Demographic Variables and Nursing Practice Related to Pressure Ulcer Prevention (n = 175)

Demographic Variable	Practice Level	n (%)	χ^2 value	p-value
Age	Good Practice	113 (64.6)	5.12	0.164
	Poor Practice	62 (35.4)		
Gender	Good Practice	109 (62.3)	0.84	0.359
	Poor Practice	66 (37.7)		
Education Qualification	Good Practice	116 (66.3)	5.51	0.089
	Poor Practice	59 (33.7)		
Clinical Experience	Good Practice	119 (68.0)	10.63	0.014*
	Poor Practice	56 (32.0)		
Work Area	Good Practice	122 (69.7)	8.74	0.033*
	Poor Practice	53 (30.3)		
Formal Training	Good Practice	128 (73.1)	12.89	0.002*
	Poor Practice	47 (26.9)		

**p < 0.05 statistically significant

The Chi-square test indicated a statistically significant association between clinical experience

and nursing practice related to pressure ulcer prevention (χ^2 = 10.63, p = 0.014). Nurses with more than four years of experience demonstrated better preventive practices compared to less experienced nurses.

A significant association was also found between formal training and practice level (χ^2 = 12.89, p = 0.002), suggesting that trained nurses were more likely to consistently implement recommended preventive interventions.

Additionally, work area was significantly associated with nursing practice (χ^2 = 8.74, p = 0.033), with nurses working in critical care units showing better compliance with preventive practices than those in medical and surgical wards.

No statistically significant association was observed between age group and practice level (χ^2 = 5.12, p = 0.164), between gender and practice level (χ^2 = 0.84, p = 0.359), or between education and practice level (χ^2 = 5.51, p = 0.089).

CHAPTER 05
DISCUSSION

5.1 Introduction

This chapter discusses the findings of the present study in relation to existing national and international literature. The discussion is organized according to the study objectives and focuses on nursing interventions used to prevent pressure ulcers among chronically ill patients, their adequacy in relation to global standards, the association between interventions and pressure ulcer prevention, and perceived barriers to effective implementation in a tertiary healthcare setting in district Mardan.

5.2 Demographic Characteristics of Participants

In the present study, the majority of participants were young nurses aged between 20–25 years, and females constituted a higher proportion of the sample. This finding is consistent with the nursing workforce demographics reported in Pakistan, where nursing is predominantly a female profession and younger nurses form a significant part of hospital staff due to recent expansion in nursing education programs (8). A large proportion of participants held a BS Nursing or Post RN BSN qualification, indicating an improving educational profile among nurses in tertiary care hospitals.

Most nurses had less than three years of clinical experience, which may influence both confidence and consistency in implementing preventive interventions. Similar findings were reported by Khan et al., who observed that nurses with limited experience often rely heavily on institutional protocols and available resources for pressure ulcer prevention (8).

5.3 Knowledge and Awareness Regarding Pressure Ulcer Prevention

The findings of this study revealed that nurses demonstrated a generally good level of knowledge and awareness regarding pressure ulcer prevention. High mean scores were observed for familiarity with international guidelines, the importance of regular risk assessment, and recognition of the Braden Scale as a reliable tool. These findings align with the results of Inayat et al., who reported satisfactory knowledge levels among nurses in tertiary hospitals of Pakistan (3).

The strong agreement regarding the role of nutrition, repositioning, moisture management, and use of pressure-relieving devices reflects adherence to evidence-based recommendations outlined in international guidelines (6). Similar levels of awareness have been reported in studies conducted in Saudi Arabia and other middle-income countries, suggesting that guideline dissemination has positively influenced nursing knowledge globally (5).

However, despite adequate knowledge, the translation of knowledge into consistent practice remains a challenge, particularly in resource-limited settings.

5.4 Nursing Practices Related to Pressure Ulcer Prevention

The present study found that most nurses reported regular assessment of patients for pressure ulcer risk on admission, documentation of skin assessments, and routine repositioning of immobile patients. These findings are consistent with the recommendations of the EPUAP/NPIAP guidelines, which emphasize early risk identification and continuous monitoring as core preventive strategies (6).

The reported frequency of repositioning every two hours aligns with findings from previous studies, which demonstrated that regular repositioning significantly reduces pressure ulcer incidence (4). Education of family members and attendants was also commonly practiced, reflecting the contextual reality of Pakistani hospitals, where family

caregivers play an active role in patient care.

Despite generally positive practices, some interventions such as consistent use of pressure-relieving devices and nutritional screening were less uniformly implemented. Similar gaps were identified by Qazi et al., who reported inconsistencies in preventive practices due to equipment shortages and workload pressures (3).

5.5 Institutional Support and Availability of Resources

Institutional support was perceived as moderate in the current study. While most participants acknowledged the presence of documented nursing standards and management support, concerns were raised regarding nurse-to-patient ratios and availability of pressure-relieving equipment. These findings mirror those reported by Khan et al., who identified staffing shortages and limited resources as major constraints in tertiary hospitals of Khyber Pakhtunkhwa (8).

Regular training programs were reported by a majority of participants, which may explain the relatively good knowledge scores observed in this study. Tayyib and Coyer emphasized that continuous education and institutional commitment are critical for sustaining effective pressure ulcer prevention programs (5).

5.6 Perceived Barriers to Pressure Ulcer Prevention

High workload and limited staffing emerged as the most significant barriers to effective pressure ulcer prevention in the present study. This finding is consistent with a qualitative review by Hossain and Akhter, which highlighted workload, inadequate staffing, and lack of resources as common barriers in developing countries (10).

Lack of pressure-relieving devices and inadequate training opportunities were also reported as barriers, further supporting evidence from previous Pakistani studies that resource constraints directly affect the implementation of preventive nursing care (3,8). Poor documentation practices and limited supervision were additional challenges, indicating the need for stronger monitoring and feedback mechanisms.

5.7 Association Between Demographic Variables and Knowledge Level

5.7.1 Knowledge of Pressure Ulcer Prevention

The results revealed that nurses possessed good knowledge regarding key preventive measures such as risk assessment using the Braden Scale, regular repositioning, nutritional assessment, moisture management, and use of pressure-relieving devices.

Inferential analysis showed that **educational qualification**, **clinical experience**, and **formal training** were significantly associated with nurses' knowledge levels ($p < 0.05$). Nurses holding BSN or higher qualifications demonstrated better knowledge compared to diploma-level nurses, which is consistent with findings from previous studies that link higher education with improved clinical knowledge.

Similarly, nurses with greater clinical experience exhibited significantly higher knowledge levels. This finding suggests that prolonged exposure to clinical practice enhances understanding of pressure ulcer prevention strategies. Formal training emerged as the strongest predictor of knowledge, highlighting the importance of structured educational programs in improving nurses' awareness and understanding of evidence-based guidelines.

However, no significant association was observed between gender or work area and knowledge level, indicating that knowledge acquisition is more influenced by education and training rather than personal or unit-based characteristics.

5.7.2 Nursing Practices Related to Pressure Ulcer Prevention

The study found that nurses reported high compliance with recommended preventive practices, including risk assessment on admission, regular repositioning, skin inspection, documentation, and interdisciplinary collaboration. Chi-square analysis demonstrated that **clinical experience**, **work area**, and **formal training** were significantly associated with nursing practice ($p < 0.05$).

Nurses working in critical care units demonstrated better preventive practices compared to those in medical and surgical wards, likely due to higher patient acuity, closer monitoring, and stricter adherence to clinical protocols in intensive care settings. Additionally, experienced nurses were more consistent in implementing preventive measures, reinforcing the role of experiential learning in clinical practice.

Formal training was again found to be a key determinant of good practice, emphasizing that training not only improves knowledge but also

translates into better bedside implementation.

5.8 Implications for Nursing Practice

The findings of this study highlight the critical role of nurses in preventing pressure ulcers among chronically ill patients. Strengthening institutional support, ensuring adequate staffing, and improving access to pressure-relieving equipment are essential to enhance preventive care. Continuous professional development and adherence to standardized guidelines should be prioritized to bridge the gap between knowledge and practice.

5.9 Summary of Discussion

In summary, nurses in the studied tertiary healthcare setting demonstrated good knowledge and generally positive practices regarding pressure ulcer prevention. However, institutional and resource-related barriers limit the consistent application of preventive measures. Addressing these challenges through organizational support and policy-level interventions is essential to reduce the burden of pressure ulcers among chronically ill patients.

CHAPTER 06
CONCLUSION, LIMITATIONS, AND RECOMMENDATIONS

6.1 Conclusion

The findings of this study revealed that nurses demonstrated generally good knowledge and awareness regarding pressure ulcer prevention, including familiarity with international guidelines, the use of risk assessment tools such as the Braden Scale, and recognition of key preventive measures such as repositioning, skin care, moisture management, and nutritional support. Nursing practices related to pressure ulcer prevention were reported to be largely positive, with regular risk assessment, documentation, repositioning, and collaboration among healthcare staff being commonly practiced.

Educational qualification, clinical experience, and formal training were found to have a significant influence on nurses' knowledge, while clinical experience, work area, and training significantly affected preventive practices. A strong and statistically significant relationship between knowledge and practice highlights the importance of education in improving clinical outcomes.

Despite these strengths, the study identified several institutional and organizational challenges that hinder the consistent implementation of preventive interventions. High workload, inadequate staffing, limited availability of pressure-relieving equipment, and gaps in supervision and documentation were identified as major barriers. These challenges highlight the gap between knowledge and practice and underscore the need for systemic improvements to support nurses in delivering effective preventive care.

Overall, the study concludes that while nursing knowledge and attitudes toward pressure ulcer prevention are satisfactory, enhanced institutional support, adequate resources, and strengthened policy implementation are essential to reduce the burden of pressure ulcers among chronically ill patients in tertiary healthcare settings.

6.2 Limitations of the Study

Several limitations should be considered when interpreting the findings of this study. First, the cross-sectional study design limits the ability to establish causal relationships between nursing interventions and pressure ulcer outcomes. Second, the use of a non-probability convenience sampling technique may limit the generalizability of the findings to other healthcare settings.

Additionally, the study relied partly on self-reported data, which may be subject to response bias or social desirability bias. Although an observational checklist was used to enhance data validity, not all nursing practices could be observed continuously. Finally, the study was conducted in a single tertiary healthcare facility, which may limit the applicability of the findings to other regions or levels of healthcare.

6.3 Recommendations

Based on the findings of the study, the following recommendations are proposed:

6.3.1 Recommendations for Nursing Practice

- Regular and mandatory use of standardized risk assessment tools, such as the Braden Scale, should be enforced for all hospitalized chronically ill patients.
- Repositioning schedules should be strictly implemented and documented, particularly for immobile and high-risk patients.
- Nurses should be supported with adequate pressure-relieving equipment, including

mattresses and cushions, to facilitate effective prevention.
- Family members and caregivers should be actively involved and educated regarding pressure ulcer prevention strategies.

6.3.2 Recommendations for Nursing Education
- Continuous professional development programs focusing on pressure ulcer prevention should be organized regularly.
- Nursing curricula should emphasize evidence-based practices and practical skills related to pressure ulcer prevention.
- Simulation-based training and workshops should be introduced to enhance clinical competence and confidence among nurses.

6.3.3 Recommendations for Hospital Management and Policy Makers
- Adequate nurse-to-patient ratios should be maintained to allow sufficient time for preventive nursing care.
- Hospitals should ensure the availability of pressure-relieving devices and supportive resources in all wards.
- Pressure ulcer prevention protocols should be standardized, monitored, and audited regularly.
- Supportive supervision and feedback mechanisms should be strengthened to improve documentation and adherence to guidelines.

6.3.4 Recommendations for Future Research
- Longitudinal or interventional studies are recommended to establish causal relationships between nursing interventions and pressure ulcer outcomes.
- Future research should include multiple healthcare facilities to enhance generalizability.
- Studies exploring patient outcomes and cost-effectiveness of pressure ulcer prevention programs are also recommended.

DEDICATION
This thesis is dedicated to our beloved parents, whose prayers, sacrifices, and unwavering support have been the foundation of our academic journey. We also dedicate this work to our teachers and mentors who guided us with patience and wisdom, and to all nurses who serve humanity with compassion and commitment.

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