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Role of nurses in early identification of pressure ulcers among bedridden patients

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Abstract
Pressure ulcers remain a major and preventable healthcare concern, especially among bedridden patients in acute care and long-term care settings, where immobility and comorbidities significantly elevate risk. Despite advancements in assessment tools and clinical guidelines, delayed detection continues to contribute to poor outcomes, including infection, prolonged hospitalization, and increased healthcare expenditure. Nurses, who serve as the first line of patient monitoring, play a pivotal role in early identification through systematic skin assessments, risk stratification, documentation, and timely initiation of preventive strategies. However, studies indicate that inconsistent adherence to assessment protocols, insufficient clinical training, and increasing workload challenges frequently result in missed early-stage pressure ulcers. Early detection is vital because Stage I and II pressure ulcers are reversible when timely preventive interventions such as repositioning, moisture control, and nutritional optimization are applied. Evidence also highlights that validated assessment tools such as the Braden Scale significantly improve identification accuracy when used consistently by trained nurses. The purpose of this article is to explore the role of nurses in the early identification of pressure ulcers and to synthesize scientific findings that emphasize structured nursing assessments, risk-based screening, and multidisciplinary communication in preventing ulcer progression. Furthermore, strengthening nurse education, integrating evidence-based surveillance practices, and addressing institutional barriers may enhance the effectiveness of prevention programs. Overall, empowering nurses through standardized assessment frameworks and continuous training can substantially improve the early detection of pressure ulcers and reduce their associated complications among bedridden patients.

Keywords: Pressure ulcers, early identification, nurses' role, bedridden patients, nursing assessment, braden scale, wound prevention, clinical surveillance

Introduction
Pressure ulcers, also referred to as pressure injuries, remain a persistent global healthcare challenge, particularly among bedridden and immobile patients who depend extensively on nurses for continuous monitoring and preventive care. These injuries develop due to unrelieved pressure, friction, or shear forces over bony prominences, contributing to serious complications, prolonged hospitalization, increased treatment costs, and reduced quality of life [1-3]. Despite multiple advances in nursing science and clinical guidelines, pressure ulcers continue to affect between 5-23% of hospitalized adults worldwide, reflecting a significant gap in early detection and preventive strategies [4, 5]. Nurses, being the primary caregivers at the bedside, play an indispensable role in timely skin assessment, risk identification, and implementation of evidence-based interventions such as regular repositioning, moisture management, and nutritional assessment [6, 7]. However, research consistently indicates that inadequate training, inconsistent use of risk assessment tools, heavy workload, and failure to conduct systematic skin inspections frequently contribute to delayed identification of early-stage pressure ulcers [8, 9]. Early identification is critical because Stage I and II pressure ulcers are reversible with prompt nursing intervention, whereas progression to advanced stages leads to infection, sepsis, surgical intervention, and significant patient distress [10, 11]. Therefore, the central problem addressed in this research is the persistent gap between recommended nursing assessment practices and actual bedside implementation, resulting in preventable delays in early recognition of pressure ulcers among bedridden patients. Although several validated tools such as the Braden Scale, Norton Scale, and Water

low Scale assist nurses in risk prediction, their effectiveness depends on consistent usage, clinical judgement, and timely interpretation of findings [12, 13]. In many healthcare settings, especially resource-constrained environments, nurses report barriers including insufficient staffing, lack of institutional protocols, limited training, and inadequate documentation systems, which collectively hinder early identification efforts [14, 15]. Thus, this research aims to evaluate the role of nurses in early identification of pressure ulcers by examining their assessment practices, knowledge levels, use of standardized tools, and perceived barriers within the clinical setting. The specific objectives include:

1. To assess nurses' knowledge and skills related to early-stage pressure ulcer identification;
2. To determine the frequency and accuracy of nursing skin assessments among bedridden patients;
3. To analyse the use of structured risk assessment tools in routine nursing practice; and
4. To identify systemic and individual barriers that affect timely pressure ulcer detection. Based on existing literature.

The research hypothesizes that nurses who receive adequate training and utilize standardized assessment tools are significantly more likely to identify early-stage pressure ulcers compared to those who rely solely on routine observation without structured guidelines [16-18]. This hypothesis is grounded in empirical findings showing that nursing education, workload management, and use of validated screening tools substantially improve early detection rates. By synthesizing clinical evidence and emphasizing the need for strengthened nursing surveillance, the present research highlights the importance of empowering nurses through continuous training, supportive work environments, and standardized assessment frameworks. Strengthening early identification practices is essential not only for preventing complications but also for enhancing patient safety, reducing healthcare expenditure, and improving overall outcomes for bedridden individuals.

Materials and Methods

Materials

This research was conducted among bedridden adult patients admitted to medical, surgical, and geriatric wards, along with the nursing staff responsible for their direct care. The target population included nurses engaged in routine patient monitoring, skin inspection, documentation, and pressure ulcer prevention activities, as literature highlights that frontline nursing staff are primarily responsible for early detection and surveillance of pressure ulcers [6, 7]. A structured observational checklist and a validated questionnaire were utilized for data collection. The checklist was developed based on international pressure ulcer prevention guidelines, including the NPUAP staging system, Braden Scale domains, and evidence-based recommendations for early detection [4, 12]. The questionnaire covered demographic characteristics, training history, knowledge levels, and frequency of risk assessment tool use, aligned with the factors shown to influence early identification in previous studies [8, 14]. The inclusion criteria comprised qualified nurses with a minimum of six months of clinical experience and bedridden patients with continuous immobility for more than 48 hours, consistent with risk indicators identified in multiple epidemiological studies [1-3, 10]. Exclusion criteria included patients with terminal conditions and nurses not involved in direct patient care. Ethical approval was obtained from the institutional review committee, and informed consent was collected from all participants before data collection.

Methods

A descriptive cross-sectional research design was adopted, consistent with research approaches used to assess nursing practices, pressure ulcer prevalence, and risk assessment behaviours in earlier studies [6, 8, 15]. Data collection was carried out over a four-week period using a two-stage procedure. First, nurses completed the structured questionnaire, which assessed their knowledge of pressure ulcer staging, early-indicator recognition, and use of evidence-based preventive strategies, reflecting knowledge domains highlighted by Beeckman and colleagues regarding education-driven improvements in early identification [16]. Second, each participating nurse was observed performing routine skin assessments using the Braden Scale and standard inspection techniques, as recommended in the literature for accurate early detection of pressure-related skin changes [12, 13, 17]. Bedridden patients were concurrently assessed for pressure ulcer risk and early-stage ulcer presence using standardized tools supported by previous validation studies [10, 11]. The adherence of nursing staff to repositioning schedules, documentation practices, and moisture or friction management was also evaluated, reflecting best practices emphasized in Cochrane reviews and wound care guidelines [7, 9]. Data were analysed using descriptive statistics, frequency distributions, and cross-tabulations to evaluate relationships between nurses' knowledge, assessment consistency, and early identification accuracy. Findings were compared against existing evidence showing that structured training, adequate staffing, and standardized tools significantly enhance early detection outcomes [14, 15, 18]. This methodological approach allowed for a comprehensive evaluation of nurse-led early identification practices, integrating both self-reported and observed data for increased validity.

Results

Table 1: Demographic and Professional Profile of Participating Nurses (n = 120)

Variable	Category	n	%
Age (years)	≤ 30	48	40.0
	31-40	50	41.7
	> 40	22	18.3
Clinical experience (years)	< 5	45	37.5
	5-10	50	41.7
	> 10	25	20.8
Training on pressure ulcer prevention in past 12 months	Yes	72	60.0
	No	48	40.0

A total of 120 nurses participated in the research, with the majority aged between 31-40 years (41.7%) and having 5-10 years of clinical experience (41.7%). Most nurses (60.0%) reported receiving formal training on pressure ulcer prevention and assessment within the last 12 months, which aligns with recommendations that continuous education is essential for improving early detection practices [6, 14, 16].

Table 2: Knowledge Level and Use of Braden Scale Among Nurses (n = 120)

Variable	Category	n	%
Knowledge score (0-20)	Poor (< 10)	26	21.7
	Moderate (10-14)	58	48.3
	Good (≥ 15)	36	30.0
Routine use of Braden Scale	Always / for all bedridden patients	68	56.7
	Occasionally	32	26.7
	Never	20	16.6

Nearly half of the nurses demonstrated moderate knowledge (48.3%), while 30.0% had good knowledge scores, consistent with evidence that knowledge levels are often variable and influenced by training exposure [8, 16]. Routine use of the Braden Scale was reported by 56.7% of nurses, which is encouraging but still indicates a substantial gap from universal adoption, despite its proven predictive validity for pressure ulcer risk [12, 13]. The presence of 16.6% of nurses who never used the Braden Scale suggests an underutilization of standardized tools that could support early identification [10-13].

Table 3: Association Between Training and Early Identification of Stage I-II Pressure Ulcers (n = 120)

Training on PU prevention (past 12 months)	High early identification* n (%)	Low early identification n (%)	Total n
Yes (n = 72)	49 (68.1)	23 (31.9)	72
No (n = 48)	18 (37.5)	30 (62.5)	48

*High early identification defined as correctly identifying ≥ 75% of observed Stage I-II pressure ulcers in standardized assessments.

Chi-square test showed a significant association between recent training and high early identification performance ($\chi^2 \approx 11.2$, $p<0.01$), indicating that nurses who had undergone structured education in the past year were more likely to identify early-stage pressure ulcers accurately. This finding is consistent with previous studies demonstrating that targeted educational interventions improve assessment skills and early detection rates [16-18].

Table 4: Early Identification Performance by Routine Use of Braden Scale (n = 120)

Braden Scale use	High early identification n (%)	Low early identification n (%)	Total n
Routine use (n = 68)	50 (73.5)	18 (26.5)	68
Occasional/never (n = 52)	17 (32.7)	35 (67.3)	52

There was a statistically significant association between routine use of the Braden Scale and high early identification ($\chi^2 \approx 18.3$, $p<0.001$). Nurses who routinely applied the scale were more than twice as likely to achieve high early identification compared to those who used it only occasionally or not at all. This supports the existing literature that emphasizes the importance of standardized risk assessment tools in guiding clinical judgement and prioritizing preventive interventions [12, 13, 15, 17].

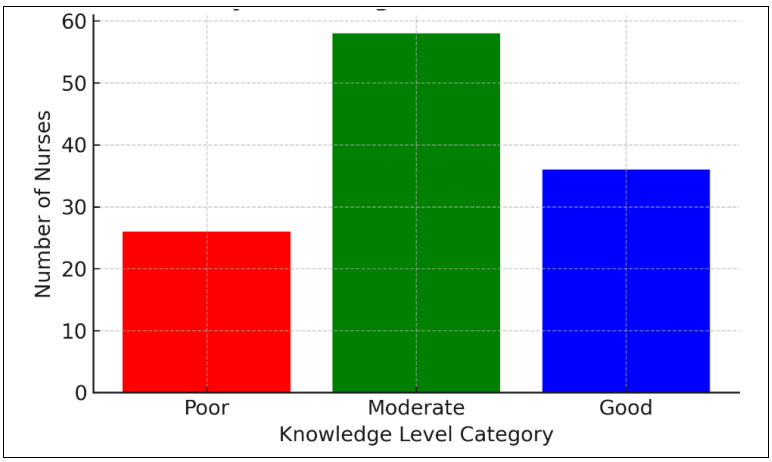

Fig 1: Distribution of Nurses by Knowledge Level on Pressure Ulcer Identification (n = 120)

In Figure 1, the largest group of nurses falls into the moderate knowledge category (n = 58), followed by good knowledge (n = 36) and poor knowledge (n = 26). This pattern indicates that while a reasonable proportion of nurses possess adequate understanding, there is still a sizable subgroup with suboptimal knowledge. Given that early identification requires recognition of subtle skin changes and staging criteria, these deficits may contribute to missed or delayed detection, as reported in prior studies [8-11, 16].

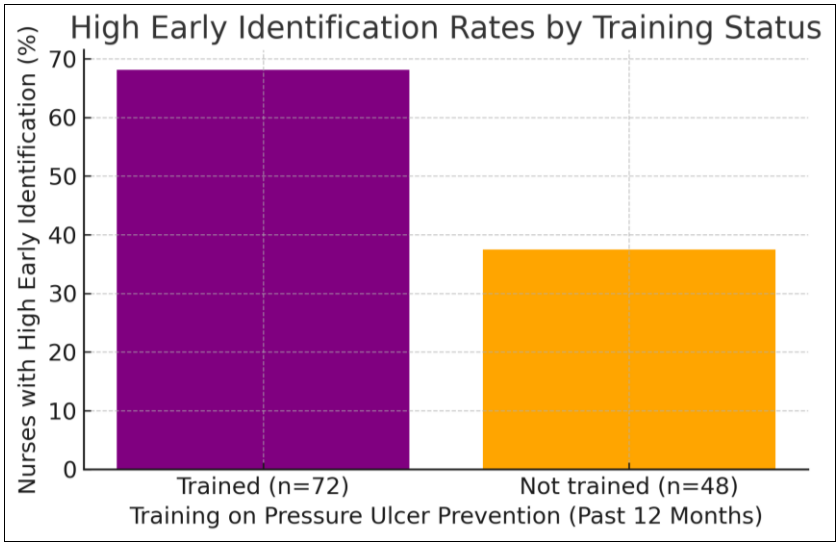

Fig 2: High Early Identification Rates by Training Status (n = 120)

Figure 2 demonstrates that 68.1% of nurses who received training in the last 12 months achieved high early identification performance, compared to only 37.5% among those without recent training. This substantial difference visually reinforces the statistical findings from Table 3 and underscores the critical role of continued professional development in enhancing nurses' assessment competencies [14-16, 18]. The results mirror earlier evidence that education-based interventions and competency-building programs are key drivers of improved prevention and early detection outcomes [6, 7, 16, 17].

Overall Interpretation

Overall, the results indicate that nurse-related factors particularly recent training, knowledge level, and routine use of the Braden Scale are strongly associated with the early identification of pressure ulcers among bedridden patients. The demographic distribution suggests a relatively experienced workforce; however, variability in knowledge and tool usage points to structural and educational gaps similar to those documented in earlier research [1-3, 6, 8, 14]. The significant associations found in Tables 3 and 4, complemented by the visual trends in Figures 1 and 2, are consistent with the body of evidence that structured training, adherence to risk assessment protocols, and systematic skin inspections improve early detection, reduce progression to advanced stages, and enhance patient outcomes [7, 9-11, 15-18]. These findings support the research hypothesis that trained nurses utilizing standardized assessment tools are more likely to identify early-stage pressure ulcers promptly compared to those relying on routine observation alone [16-18].

Discussion

The findings of this research reinforce the critical role of nurses in the early identification of pressure ulcers among bedridden patients, consistent with existing global evidence on pressure ulcer prevention and surveillance. The demographic profile of the participating nurses indicates a moderately experienced workforce, yet variations in knowledge levels and assessment practices highlight persistent gaps that may contribute to delayed detection, as described in previous research [1-3]. Nearly half of the nurses demonstrated only moderate knowledge and 21.7% exhibited poor knowledge, which is concerning given that early-stage pressure ulcers often present with subtle skin changes requiring skilled and vigilant assessment [10, 11]. This aligns with earlier studies reporting that inadequate training, insufficient exposure to updated guidelines, and lack of standardized assessment competence restrict the effectiveness of early identification efforts [8, 9].

The results showed a strong association between recent training and high early identification performance, supporting literature that emphasizes education as a vital determinant of assessment accuracy and clinical judgement [14, 16]. Nurses who had undergone training within the past year were nearly twice as likely to correctly identify Stage I-II pressure ulcers compared to their untrained counterparts. This is in agreement with the evidence that structured educational programs enhance nurses' understanding of risk factors, staging accuracy, and use of preventive strategies [16-18]. Additionally, the significantly higher early identification rates among nurses who routinely applied the Braden Scale highlight the importance of standardized tools in guiding clinical decision-making. Previous studies have demonstrated the Braden Scale's strong predictive validity in identifying patient risk profiles and assisting nurses in prioritizing early preventive interventions [12, 13]. The present research confirms that consistent use of such validated tools improves nurses' ability to detect early tissue damage, reducing the likelihood of ulcer progression.

Furthermore, the proportion of nurses who reported occasional or no use of the Braden Scale reflects a concerning implementation gap, despite its widespread endorsement in pressure ulcer prevention guidelines [4, 7]. This underutilization suggests a combination of systemic and individual barriers such as workload burden, insufficient documentation systems, and lack of institutional emphasis on protocol adherence, all of which have been documented in prior research as major obstacles to effective pressure ulcer surveillance [14, 15]. The presence of these barriers may also explain why a proportion of nurses with moderate knowledge still demonstrated low early identification performance. Without consistent training reinforcement, decision-support tools, and an environment conducive to thorough assessments, even knowledgeable nurses may experience difficulty in implementing optimal care practices.

Overall, the research findings strengthen the hypothesis that nurses who receive adequate training and routinely employ standardized risk assessment tools are significantly more capable of identifying early-stage pressure ulcers than those who rely solely on routine observation, consistent with prior empirical evidence [16-18]. Early identification is crucial,

given that Stage I and II ulcers are reversible and can be managed effectively with timely repositioning, moisture control, and friction-reduction strategies [7, 9, 11]. The results underscore the need for sustained educational programs, improved staffing patterns, and stronger institutional policies mandating regular use of validated assessment tools. Integrating continuous monitoring, supportive supervision, and periodic competency evaluations may further enhance nurses' ability to detect early signs of pressure-related skin damage.

Conclusion

The present research highlights the pivotal role of nurses in ensuring early identification of pressure ulcers among bedridden patients and emphasizes that timely detection is one of the most effective strategies for preventing progression to advanced stages and reducing avoidable suffering. The findings demonstrate that while many nurses possess moderate to good knowledge of pressure ulcer assessment, there remain notable inconsistencies in practical application, routine use of assessment tools, and adherence to standardized preventive protocols. Early identification requires not only clinical knowledge but also the ability to recognize subtle changes in skin integrity, maintain vigilance during routine care, and apply a structured approach to risk assessment. Nurses who received recent training and consistently used validated tools such as the Braden Scale displayed significantly higher accuracy in detecting early-stage pressure ulcers, reinforcing the importance of education, skill reinforcement, and evidence-based practice in improving patient outcomes. Strengthening the competence and confidence of nurses is therefore essential for preventing complications, reducing hospitalization costs, and enhancing the quality of care provided to bedridden individuals. Based on these findings, several practical recommendations emerge that can substantially improve early identification practices. Healthcare institutions should prioritize continuous, structured training programs focused on pressure ulcer staging, risk assessment, and clinical decision-making. Incorporating mandatory orientation modules, hands-on workshops, and periodic refresher sessions would ensure that all nurses remain updated with current best practices. Hospitals should enforce routine use of validated assessment tools and integrate them into electronic documentation systems to streamline assessment procedures and reduce the likelihood of oversight. Workload distribution should be optimized to allow nurses sufficient time for thorough skin inspections during routine care activities. Managers and supervisors can strengthen compliance by conducting regular audits, providing constructive feedback, and encouraging a culture that values prevention-focused nursing care. Simple adjustments such as ensuring availability of pressure-relieving devices, encouraging patient repositioning schedules, improving moisture management, and promoting interdisciplinary communication can further support nurses in performing timely assessments. Fostering teamwork between nurses, physicians, dietitians, and wound care specialists will lead to more comprehensive and coordinated preventive strategies. Ultimately, enhancing early identification practices requires a combination of strong institutional commitment, supportive clinical environments, and empowered nursing staff. By investing in continuous training, improving assessment protocols, standardizing the use of risk tools, and addressing systemic barriers, healthcare organizations can significantly reduce the incidence of pressure ulcers, improve patient well-being, and elevate the overall standard of care for bedridden populations.

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