



Knowledge, Attitude, and Practice of Nurses in the Intensive Care Unit Regarding Pressure Ulcer Prevention: A Systematic Review

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ABSTRACT

Background: Constant pressure on certain body regions can cause bedsores, also called pressure ulcers, which are lesions to the skin or soft tissues that can have fatal implications if left untreated. This study highlights areas where nurses' competencies are lacking. It demonstrates how evidence-based interventions, targeted education, and institutional support can effectively reduce the prevalence of pressure ulcers and enhance patient safety in intensive care units. **Purpose:** The purpose of this review is to summarize and critically evaluate the body of research on ICU nurses' knowledge, attitude, and practice regarding pressure ulcer prevention. **Methods:** This review analyzed pressure ulcer prevention studies among ICU nurses using keywords like "prevalence, incidence, risk factors, complications, knowledge, attitude, and practice". Relevant peer-reviewed articles were retrieved from multiple databases, including PubMed (via Medline), ScienceDirect, Google Scholar, ResearchGate, and the Cochrane Library. Methodological quality was ensured to maintain reliability and validity. The articles were retrieved from the period between 2015 and 2025. **Results:** The study identified 515 articles, screened 477, and selected 19 for inclusion in a narrative review. The studies examined nurses' knowledge, attitude, and practice regarding pressure ulcer prevention in intensive care settings. **Conclusion:** Nurses play a critical role in preventing pressure ulcers, and educating them about risk assessment and prevention can improve patient outcomes. Best practices include routine skin exams, systematic risk assessments, care planning, continuous pressure mapping, and the use of prophylactic dressings. **Implications for Nursing:** The review highlights the importance of ongoing education and competency-based training in nursing practice for preventing pressure ulcers in ICUs. It suggests integrating standardized guidelines, ensuring adequate staffing, and fostering accountability roles, can advocate for improved water management policies that prioritize health outcomes.

Keywords: Nurses' knowledge, Intensive care, Pressure ulcer prevention, Jordan.

What does this paper add?

1. This review identifies key deficiencies in nurses' awareness and application of preventive measures, emphasizing the importance of continuous education and competency-based training programs.
2. Many strategies for pressure ulcer prevention could be applied, including the use of standardized risk assessment tools, routine skin examinations, and evidence-based care planning.
3. Enhancing nurses' competence and accountability

directly contributes to improved patient outcomes and reduced pressure ulcer incidence in critical care settings.

4. The findings provide valuable insights to guide policy development, nursing education, and quality improvement initiatives aimed at strengthening evidence-based practice in intensive care units.

Introduction

Constant pressure on certain body regions can cause bedsores, also called pressure ulcers, which are lesions to the skin or soft tissues that can have fatal implications if left untreated (Aqoulah et al., 2025). Pressure ulcers, also known as pressure sores, are quite common in patients in intensive care units (ICUs), where patients are often immobilized for extended periods due to critical conditions (Zarei et al., 2019). According to a study performed by Nguvulu (2022) on 534 ICU patient, it was reported that there were 18.48 pressure sores for every 1000 patient days, or a 5.2% incidence of pressure sores in at Kenyatta National Hospital. Hemodynamic instability, the administration of vasoactive medications, and increasing device use put patients in critical care units at a greater risk of developing pressure ulcers (AL-Dalaen & Alzayyat, 2024; Digesa et al., 2023).

For patients admitted to the ICU, the prevention of pressure ulcers is crucial, since, in the absence of preventative measures, these patients may suffer serious damage or possibly pass away (González-Méndez et al., 2018). Furthermore, managing pressure ulcers is costly for the healthcare system; care institutions worldwide incur significant annual costs to prevent and treat them. Therefore, patients in the intensive care unit (ICU) who are unconscious, need help with tasks, have high risk ratings, and are not cooperative, need to be treated more carefully to avoid developing pressure ulcers (Homauni et al., 2020). Besides, nurses in the ICU play a critical role in preventing pressure ulcers through evidence-based practices, such as regular repositioning, skin assessments, and the use of pressure-relieving devices (Khojastehfar et al., 2020). However, gaps in nurses' knowledge, inconsistent attitudes, and inadequate practices regarding pressure ulcer prevention can contribute to higher incidence rates. The lack of a comprehensive understanding of ICU nurses' knowledge, attitudes, and practices (KAP) regarding pressure ulcer prevention hinders the development of targeted interventions to improve patient outcomes. This

review aims to assess the KAP of ICU nurses concerning pressure ulcer prevention to identify deficiencies and inform strategies for enhancing care quality and reducing pressure ulcer incidence.

Understanding nurses' KAP can improve patient outcomes, enhance care quality, reduce costs, inform policy and training development, and contribute to nursing science (Osman et al., 2024). It can identify gaps in knowledge and practices, leading to better adherence to evidence-based prevention protocols and reduced pressure ulcer incidence. Hence, this review aimed to summarize and critically evaluate the body of research on ICU nurses' knowledge, attitudes, and practices regarding pressure ulcer prevention.

Methods

Search Strategy

This narrative review was conducted to synthesize evidence on the knowledge, attitudes, and practices (KAP) of ICU nurses regarding pressure ulcer prevention. A systematic search was conducted across five major databases—PubMed (*via* Medline), ScienceDirect, Google Scholar, ResearchGate, and the Cochrane Library—for relevant articles published in English between 2015 and 2025. The review includes studies published between 2016 and 2023 to reflect current clinical practices, educational interventions, and healthcare policies related to pressure ulcer prevention in ICU settings. Older studies were excluded to minimize outdated practices and ensure accurate evidence-based recommendations for nursing practice.

A combination of keywords and Boolean operators was used, including “prevalence,” “incidence,” “risk factors,” “complications,” “intensive care unit,” “knowledge,” “attitude,” and “practice”. Additionally, the ancestry method was used to identify relevant studies through the reference lists of included articles (Poirier & Behnen, 2014).

Inclusion/Exclusion Criteria

Studies were included if they were (1) focused on ICU nurses or healthcare providers directly involved in pressure ulcer prevention, (2) reported quantitative, qualitative, or mixed-method findings on knowledge, attitudes, or practices, and (3) were published in peer-reviewed journals in English. Studies were excluded if they were grey literature, conference abstracts, dissertations, or lacked full-text availability.

Screening and Selection Process

A total of 515 records were initially identified through database searches. After removing 38 duplicates, 477 unique records remained for title and abstract screening. Of these, 385 records were excluded, because they did not meet the inclusion criteria based on title and abstract review (e.g. irrelevant topic, non-ICU setting, or non-nursing population). The remaining 92

articles were retrieved for full-text assessment to determine eligibility. After excluding 73 studies that did not meet the inclusion criteria (12 non-English, 13 not full-text accessible, 12 classified as grey literature, and 36 outside the scope of this review), 19 studies were finally included in the narrative synthesis. The updated selection process follows PRISMA 2020 guidelines and is illustrated in Figure 1.

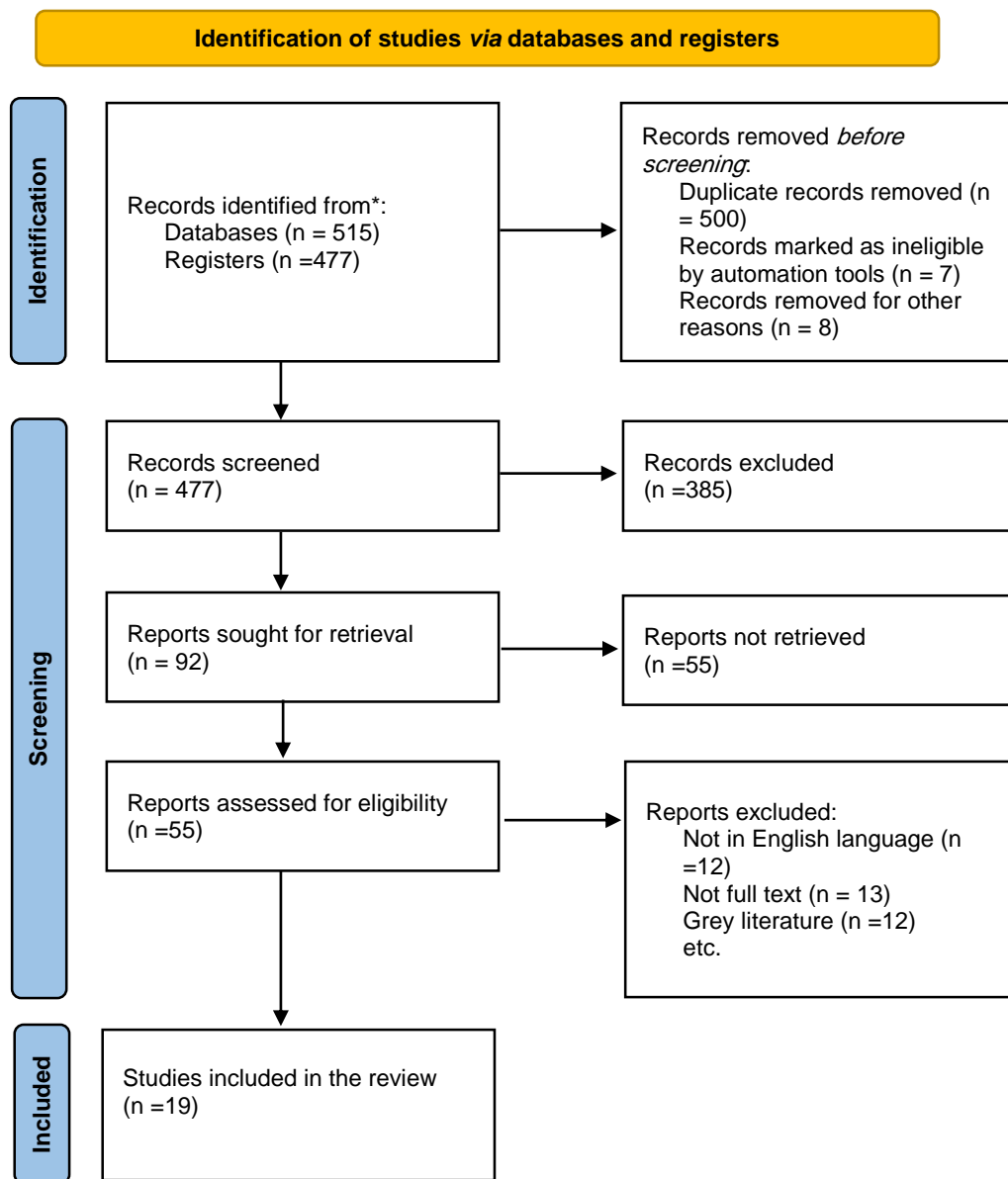


Figure 1. PRISMA flowchart

Data Extraction and Quality Appraisal

Data from the included studies was extracted into a

standardized table summarizing the author(s), year, country, study design, and key findings. See Table 1.

Table 1. Summary of studies included in the review (2015-2025)

Author (s), Year	Country	Design	Focus Area	Key Findings
(Almutairi et al., 2025)	Saudi Arabia	Review	NPIAP/ICD-11 classification, risk instruments, and outcome reports	Reduced incidence, accelerated healing, and limited recurrence are achieved through standardized nomenclature, early risk assessment, reliable off-loading and microclimate management, careful debridement and dressings, nutritional optimization, and interdisciplinary collaboration.
(Ahmed et al., 2020)	Egypt	Cross-sectional	Practice	Insufficient preventive practices due to a lack of training and a heavy workload.
(Chaboyer et al., 2018)	Australia	A systematic review and meta-analysis	Knowledge and Practice	Good awareness of prevention, but inconsistency in risk assessment.
(Al-Shaikh, 2019)	Palestine	Quasi-experimental study	Knowledge	Knowledge gaps in staging and prevention; linked to years of experience.
(Tolossa et al., 2020)	Ethiopia	A systematic review and meta-analysis	Knowledge and Attitude	Poor knowledge and unfavorable attitudes toward prevention measures.
(Kısacık & Sönmez, 2020)	Turkey	Observational study	Knowledge and Practice	Turkish nursing students showed positive attitudes but insufficient knowledge about pressure ulcer prevention, suggesting that improving their knowledge could enhance their attitudes towards pressure ulcer prevention practices.
(Saleh et al., 2019)	Jordan	Cross-sectional	Practice	A significant gap in nurses' knowledge and implementation of pressure ulcer prevention and treatment practices, particularly in military hospitals, with implementation rates higher than in other settings and an inverse relationship between bed count and care quality.
(Nuru et al., 2015)	Ethiopia	Cross-sectional	Knowledge and Practice	Nurses' knowledge and practice of pressure ulcer prevention are insufficient, with higher education, formal training, and experience positively influencing knowledge. Facilities, leadership dissatisfaction, and staff shortages negatively impact prevention.
(Tayyib et al., 2016)	Saudi Arabia	Prospective cohort study	Practice	The study found a higher incidence rate of PU compared to other international studies, indicating the need for urgent attention to prevent PU in this setting.
(Mkoka & Andwilile, 2024)	Uganda	Cross-sectional	Knowledge & Attitude	Nurses face barriers to effective pressure ulcer prevention measures, requiring strategies like enhancing competencies, staffing, and device provision. Strengthening management oversight, providing comprehensive training, and researching clinical governance are crucial for improved outcomes.
(Hossain, 2022)	Bangladesh	Cross-sectional	KAP	High knowledge but low implementation due to staff shortage.
(Atkinson & Cullum, 2018)	UK	Systematic review	Practice Barriers	Interventions for pressure ulcer prevention and treatment in spinal cord injury patients are uncertain due to limited studies and the need for high-quality randomized trials.
(Yayeh et al., 2025)	Ethiopia	A systematic review and meta-analysis	Practice	In Ethiopia, nursing care quality is moderately good, influenced by job satisfaction, low workload, and good relationships with workers. Strategies to enhance satisfaction packages are needed.

(Aydin et al., 2019)	Turkey	Cross-sectional	Knowledge and practice	The study found that nurses' knowledge and practices regarding pressure injuries were lower than anticipated, suggesting the need for additional education and training activities.
(Nightingale & Musa, 2021)	United Kingdom	Cross-sectional	Knowledge, attitude, and practice	The incidence of pressure injuries and ulcers is consistently decreased when scanning technology is included in standard clinical practice.
(Saad Soliman et al., 2022)	Egypt	Cross-sectional	Knowledge and Practice	High awareness but limited skill application; need for workshops.
(Miligi et al., 2019)	Saudi Arabia	Cross-sectional	Knowledge	Weak knowledge of risk factors; institutional protocols are underused.
(Zuki et al.)	India	Cross-sectional	Knowledge and attitude	Significant correlation between knowledge and practice levels.
(Al-Mamari et al., 2024)	Oman	Retrospective, cross-sectional	Knowledge, attitude, and practice	Hospital-acquired pressure ulcer, a significant issue in ICU patients, leads to severe clinical consequences and adverse healthcare outcomes globally, including in Oman, requiring effective prevention.

Each study was appraised using the Joanna Briggs Institute (JBI) critical appraisal tools appropriate to its design (Munn et al., 2020), as demonstrated in Table 2.

Table 2. Quality appraisal of included studies using the JBI critical appraisal tools

Author(s), Year)	Design Type	JBI Appraisal Tool Used	Quality Domains Assessed	Overall Quality Rating	Comments / Notable Issues
(Almutairi et al., 2025)	Review	JBI Analytical Cross-sectional Checklist	Clear criteria, valid measures, and a response rate adequate	High	Well-defined variables; appropriate sampling.
(Ahmed et al., 2020)	Cross-sectional	JBI Analytical Cross-sectional Checklist	Measurement validity, confounding, and statistical analysis	Moderate	Missing confounder control.
(Chaboyer et al., 2018)	A systematic review and meta-analysis	JBI Mixed Methods Appraisal Tool (MMAT)	Integration of quantitative and qualitative data	High	Strong integration and methodological rigor.
(Al-Shaikh, 2019)	Quasi-experimental study	JBI Analytical Cross-sectional Checklist	Inclusion criteria, measurement accuracy	Moderate	Some reporting bias noted.
(Tolossa et al., 2020)	A systematic review and meta-analysis	JBI Analytical Cross-sectional Checklist	Sampling clarity, reliability of measures	Moderate	Limited justification for sampling.
(Kısacık & Sönmez, 2020)	Observational study	JBI Analytical Cross-sectional Checklist	Valid instrument, analysis clarity	High	Well-designed and analyzed.
(Saleh et al., 2019)	Cross-sectional	JBI Analytical Cross-sectional Checklist	Confounding, statistical testing	Moderate	Lack of multivariate analysis.
(Nuru et al., 2015)	Cross-sectional	JBI Analytical Cross-sectional Checklist	Objective measurement, bias control	High	Adequate reliability testing.
(Tayyib et al., 2016)	Prospective cohort study	JBI Quasi-experimental Checklist	Pre/post measures, control for bias	High	Strong educational intervention effect.
(Mkoka & Andwilile, 2024)	Cross-sectional	JBI Analytical Cross-sectional Checklist	Sampling clarity, bias assessment	Moderate	Small sample size.
(Hossain, 2022)	Cross-sectional	JBI Analytical Cross-sectional Checklist	Confounding, reliability, analysis	Moderate	Limited generalizability.

(Atkinson & Cullum, 2018)	Systematic review	JBI Qualitative Appraisal Checklist	Credibility, dependability, ethical reporting	High	Strong thematic saturation.
(Yayeh et al., 2025)	A systematic review and meta-analysis	JBI Analytical Cross-sectional Checklist	Valid measures, confounding addressed	Moderate	Lacked tool validation.
(Aydın et al., 2019)	Cross-sectional	JBI Analytical Cross-sectional Checklist	Clarity, internal validity	High	Good control of bias.
(Nightingale & Musa, 2021)	Cross-sectional	JBI Analytical Cross-sectional Checklist	Sampling, validity, reliability	Moderate	Limited training description.
(Saad Soliman et al., 2022)	Cross-sectional	JBI Analytical Cross-sectional Checklist	Data collection, outcome measures	High	Transparent reporting.
(Miligi et al., 2019)	Cross-sectional	JBI Analytical Cross-sectional Checklist	Sampling and confounding	Moderate	Incomplete description of analysis.
(Zuki et al.)	Cross-sectional	JBI Analytical Cross-sectional Checklist	Validity, confounding, data analysis	High	Well-structured and analyzed.
(Al-Mamari et al., 2024)	Retrospective, cross-sectional	JBI Mixed Methods Appraisal Tool (MMAT)	Design integration, quality of both strands	High	Methodological triangulation achieved.

Note: JBI = Joanna Briggs Institute; MMAT = Mixed Method Appraisal Tool.

Data Analysis

A thematic synthesis approach was employed to analyze and integrate the findings. Extracted data was coded, compared, and grouped into overarching themes reflecting nurses' KAP. Patterns, methodological variations, and regional differences were identified to capture a comprehensive understanding of current evidence.

Results

A total of 515 articles were initially identified through database searches. After removing duplicates, 477 records remained for title and abstract screening. Of these, 92 full-text articles were assessed for eligibility. Ultimately, 37 articles met the inclusion criteria, and 19 studies were selected for inclusion in the current narrative review. These studies explored various aspects of nurses' knowledge, attitudes, and practices concerning pressure ulcer prevention in intensive care settings. The selection process is illustrated in the PRISMA flowchart (Figure 1).

Knowledge and Attitude of Nurses about Pressure Ulcer Prevention

A systematic review and meta-analysis study was performed by Wu et al. (2022) to evaluate the incidence of pressure injuries in hospitalized fracture patients and

to provide evidence for the prevention and treatment of pressure injuries, where the findings showed that nurses and nursing students do not know enough about pressure ulcer prevention.

Another quantitative exploratory cross-sectional study conducted by Grešš Halász et al. (2021) to identify the attitudes and knowledge of nurses on the prevention of pressure ulcers in a sub-set of Slovak hospitals, as well as the correlations and variations between a set of factors. The findings demonstrated nurses' inadequate attitudes (67.9%) and knowledge (45.5%) of pressure ulcer prevention. The knowledge and attitudes were shown to have a substantial positive connection ($p = 0.300$; $p = 0.000$). The knowledge of nurses varied considerably depending on their job department ($p = 0.048$) and educational level ($p = 0.031$). The results showed how crucial it is to focus on continuing education, nursing practice, and general education. By developing more educational initiatives and regularly measuring these two metrics, the quality of treatment could be greatly enhanced.

In addition, Gedamu et al. (2021) carried out a systematic review and meta-analysis study to assess nurses' overall knowledge of pressure ulcer prevention. All of the studies on nurses' awareness of PU prevention were evaluated using the PRISMA statement. A general understanding of pressure ulcer prevention was

possessed by 46.24 percent of nurses (95% CI: 26.63–65.85). The findings of this meta-analysis study supported the hypothesis that nurses' overall grasp of pressure ulcer prevention was poor. Continuous education regarding pressure ulcer prevention is essential for all nurses.

The absence of nurse knowledge and attitude about pressure ulcer prevention was confirmed by all prior studies. In contrast, a cross-sectional study was carried out by Abrahams et al. (2023) to determine undergraduate nursing students' knowledge, attitudes, and behaviours regarding the prevention and treatment of pressure ulcers. According to the results, student nurses exhibited good practices ($n = 47$; 94%), a favourable attitude ($n = 39$; 78%), and high knowledge ($n = 35$; 70%). No demographic group showed a significant correlation with the level of knowledge, attitudes, and behaviors. The study found that student nurses have a thorough understanding of how to prevent and treat pressure ulcers, and they also demonstrate positive attitudes and behaviors related to this topic.

Practices of Nurses in Intensive Care Units for Prevention of Pressure Ulcers

The practices of nurses in ICUs for preventing pressure ulcers involve various measures, such as risk assessment, repositioning, mobilizing, supporting body parts, and maintaining skin cleansing and moisturizing. Overall, the prevention of pressure ulcers in the ICU involves a combination of knowledge, risk assessment, and specific preventive measures to ensure patient safety and well-being.

According to the descriptive multi-method qualitative study performed by Adibelli and Korkmaz (2022), which investigated the ideas, discussions, and real-world actions of ICU nurses about the prevention of pressure injuries, among the techniques used by nurses are massage, mobilization, body part support, repositioning, easing mechanical strain, and taking precautions with medical equipment. Enhancing tissue tolerance involved washing and moisturizing the skin, avoiding over-moisturization, and making sure that enough food was consumed. However, the findings demonstrated that systematic approaches and evidence-based guidelines are lacking in ICU nurse practices related to pressure injury prevention. When preventative measures are put into real practice, these drawbacks manifest as intra- and inter-individual variations. It is

essential to take these divergences into account while managing pressure injury risk in patients.

A descriptive and correlational study by Kaçmaz et al. (2023) aimed to determine critical care nurses' abilities and knowledge in preventing pressure injuries and to highlight the link between pressure injury prevalence and this proficiency. About 82% of the 111 nurses in the research group fully participated. In terms of pressure injury prevention, nurses' average knowledge score was $43.2 \pm 11.4\%$. When asked how pressure injury preventative methods are used therapeutically, the most common response was "always applied." This study discovered that although nurses reported utilizing pressure injury preventative methods in the ICU, their level of related knowledge was insufficient.

Besides, a study performed by Saleh et al. (2019) aimed to determine the frequency and variables influencing nurses' use of pressure ulcer preventive and treatment strategies, as well as their understanding of PU prevention and treatment in Jordan. The development of training programs is required to enhance the clinical practices and understanding of nurses about the prevention and management of pressure ulcers. By helping young and senior nurses as well as other important stakeholders (including hospital management, legislators, and educators) to enhance the efficacy of PU services, these programs will lessen patient suffering.

According to a systematic review performed by Alshahrani et al. (2024), which aimed to synthesize the research on the best nursing practices for preventing pressure injuries in patients receiving critical care, the findings demonstrated that critical care unit nurses are well equipped to take the lead in preventing pressure injuries. Preventing pressure injuries is necessary for all critically sick patients, and it should be seen as a complicated intervention. Nurses must strategize and execute evidence-based care to avert all forms of pressure injuries, including those caused by medical devices. Pressure injury prevention requires that nurses participate in education and training programs on pressure injury prevention. In order to mitigate the risk of pressure injuries in patients in critical condition, nurses need to possess the necessary skills and education, and make sure that basic techniques are consistently applied to enhance movement and relieve pressure.

According to a multi-center, cross-sectional study

performed by Tervo-Heikkinen et al. (2023), which aimed to examine how pressure injury prevention is handled in acute inpatient treatment in Finland, 30% of the participants had their risk of pressure injuries evaluated throughout their treatment, and 19% had it done within eight hours of their arrival. For 16% of individuals who had a pressure injury and 22% of participants who were bedridden or in a wheelchair, the risk assessment time limit was met. For 30% of all individuals, 29% of participants who had a prior pressure injury, and 38% of participants who were bedridden or in a wheelchair, a skin state evaluation was performed within 8 hours of arrival. Twenty percent of the individuals had their risk of malnutrition tested. Rather than individuals at high risk of pressure injury, participants with a pressure injury were the focus of preventive treatments. The findings highlighted the weaknesses in evidence-based nursing practice, necessitating more work to stop pressure injuries. Increasing the national emphasis on pressure injury prevention measures is essential to enhancing patient care.

Patient Education for Prevention of Pressure Ulcers

A study performed by Grešš Halász et al. (2021) confirmed the recognition of healthcare personnel education as a crucial element in the prevention of pressure ulcers. The objective of these training programs is to modify the behavior of healthcare professionals by promoting preventive measures that could lower the risk of pressure ulcer formation. The primary goal of the study was to evaluate how training interventions for healthcare personnel affected the prevention of pressure ulcers. The influence of educating healthcare professionals about pressure ulcer prevention on the prevalence of pressure ulcers or nurses' awareness of the condition is uncertain. Therefore, additional information is required to clarify how healthcare staff education affects the prevention of pressure ulcers.

Another study performed by Ursavaş and İseri (2020) showed that pressure ulcers pose a serious global health concern. Nurse educators must guarantee that students possess enhanced attitudes, knowledge, and skills concerning the prevention of pressure ulcers. Additionally, they must set aside adequate time to instruct students using a range of teaching techniques. To do this, a quasi-experimental study was conducted using a control group. The study population consisted of

ninety-six second-year nursing students. In terms of knowledge and attitudes regarding the treatment, evaluation, and prevention of pressure ulcers, the control group performed poorly. In addition to revising the national nursing curriculum's material on pressure ulcers, educators should update their lectures and teaching materials to meet current national and international standards, focusing on the prevention of pressure ulcers and the improvement of nurses' knowledge of the issue.

Another study performed by Karimian et al. (2020) verified that individuals may have incapacity as a result of pressure ulcers, which may compromise their safety and cause problems regularly. Sixty-seven ICU nurses at Ilam University of Medical Sciences were randomly assigned to the experimental group or the control group. It was concluded that educational interventions made nurses more informed and proactive in preventing pressure ulcers. Appropriate educational interventions must be implemented to further improve these qualities.

Discussion

This review synthesized findings from nineteen studies exploring nurses' knowledge, attitudes, and practices (KAP) regarding pressure ulcer (PU) prevention in intensive care settings. Overall, the evidence reveals persistent gaps in nurses' understanding and implementation of PU prevention measures, despite the availability of international guidelines and the high burden of pressure injuries in critical care units.

The reviewed studies consistently indicate that nurses' knowledge regarding PU prevention remains sub-optimal, particularly in identifying risk factors, performing risk assessments, and applying evidence-based preventive strategies. Although some recent studies reported satisfactory knowledge among nursing students (Wu et al., 2022), the majority of practicing ICU nurses demonstrated limited understanding of PU etiology, staging, and guideline-based interventions (Grešš Halász et al., 2021).

This knowledge deficit appears multi-factorial, rooted in insufficient educational preparation, limited access to ongoing training, and variability in institutional policies on PU prevention. Moreover, studies conducted in high-income countries reported slightly better awareness compared to those conducted in developing settings, suggesting disparities in access

to evidence-based resources and clinical mentorship (Hagtorn & Larsson, 2016; Zuniga et al., 2024). Reinforcing continuing professional development programs and integrating PU prevention into competency-based training are essential to bridge these knowledge gaps.

Nurses' attitudes toward PU prevention were found to be moderately positive, but not consistently translated into practice. While most nurses acknowledged the significance of PU prevention for patient safety, a lack of confidence in their preventive abilities, time constraints, and heavy workload often undermined proactive behaviors (Grešš Halász et al., 2021). Studies also revealed a positive correlation between knowledge and attitudes, implying that better-informed nurses tend to exhibit more favorable attitudes toward prevention (Alhawsah et al., 2025; Asiri et al., 2025).

However, in several ICU settings, the perception that PU prevention is a secondary task compared to life-saving interventions continues to persist. This suggests that institutional culture and leadership play pivotal roles in shaping nurses' motivation and prioritization of preventive care. Empowering nurses through supportive management, adequate staffing, and access to pressure-relieving resources can enhance accountability and foster positive preventive attitudes.

Despite awareness of recommended measures, such as regular repositioning, risk assessment, skin care, and use of pressure-relieving devices, actual nursing practices often fall short of best-practice standards. Many studies highlighted inconsistencies in implementing risk assessment tools, like the Braden scale, delayed evaluation upon ICU admission, and irregular documentation of preventive care (Ellis, 2019; Floyd et al., 2021).

These practice deficiencies are commonly attributed to organizational barriers, including inadequate staffing, lack of standardized protocols, and limited equipment availability (Adibelli & Korkmaz, 2022; Saleh et al., 2019).

Educational interventions have proven effective in enhancing both knowledge and preventive behavior. Studies demonstrated that structured training, simulation-based learning, and curriculum revision can significantly improve nurses' implementation of preventive measures (Razi-Chafi et al., 2023). Therefore, nurse educators and clinical leaders should collaborate to sustain educational reinforcement and

embed PU prevention competencies within continuous quality improvement initiatives.

The KAP triad demonstrates an interdependent relationship: inadequate knowledge negatively influences attitudes, which in turn limit the quality of preventive practices. This dynamic was evident across multiple studies showing that nurses with higher knowledge scores were more likely to exhibit favorable attitudes and adopt consistent preventive practices. Addressing any component in isolation may yield limited outcomes; hence, comprehensive interventions that integrate education, motivation, and system-level support are necessary. Creating a culture of safety, where PU prevention is viewed as a shared responsibility, can transform both attitudes and behaviors, leading to measurable improvements in patient outcomes.

Strengths and Limitations

This review synthesizes recent evidence on ICU nurses' KAP regarding pressure ulcer prevention, ensuring that it aligns with clinical standards and educational trends. It uses a systematic search strategy and includes studies from diverse international contexts, utilizing the KAP framework. The review offers actionable insights for policymakers, nurse educators, and clinical leaders. However, the included studies varied widely in design, sample size, and measurement tools, which may affect comparability. Many studies relied on self-reported questionnaires, introducing potential response and social desirability biases. The majority of them were cross-sectional, limiting causal inference between KAP components and preventive outcomes. Additionally, most studies were conducted in single-center settings, reducing generalizability to broader ICU populations.

For this review, publication bias cannot be excluded, as only English-language, peer-reviewed studies were included. Moreover, the synthesis was narrative rather than meta-analytic, which restricts the quantification of pooled effects. Future research should employ longitudinal and interventional designs using standardized KAP assessment tools to evaluate the impact of targeted educational and organizational interventions on PU prevention outcomes.

Implications for Nursing

The prevention of pressure ulcers in ICUs has

important nursing practice implications. To improve nurses' understanding and confidence in applying evidence-based PU prevention methods, the results highlight the significance of competency-based training and ongoing education. Even with generally positive attitudes, there are nevertheless gaps in actual application, frequently as a result of inconsistent protocols, workload demands, or a lack of resources. Healthcare institutions should make it a priority to include standardized PU prevention principles into routine ICU practice, ensure that there is enough staffing and equipment, and promote an accountable and interdisciplinary team culture to enhance the results. Additionally, consistent audits and feedback systems can support compliance monitoring and best practice reinforcement. Putting money into these areas can result in lower medical expenses, improved patient outcomes, and higher-quality care.

Conclusion

This narrative study emphasizes how important ICU nurses' behaviors, attitudes, and knowledge are to managing and preventing pressure ulcers. Even with the availability of evidence-based guidelines, disparities in preventative measures and knowledge levels among studies are still noticeable. Although most nurses have positive attitudes toward prevention, optimal results are nonetheless hampered by gaps in knowledge application

REFERENCES

- Abrahams, F.R., Daniels, E.R., NiiKondo, H.N., & Amakali, K. (2023). Students' knowledge, attitude and practices towards pressure ulcer prevention and management. *Health SA Gesondheid*, 28(1).
- Adibelli, S., & Korkmaz, F. (2022). Pressure injury prevention practices of intensive care unit nurses in Turkey: A descriptive multiple-method qualitative study. *Journal of Tissue Viability*, 31(2), 319-325.
- Ahmed, S., Barwick, A., Butterworth, P., & Nancarrow, S. (2020). Footwear and insole design features that reduce neuropathic plantar forefoot ulcer risk in people with diabetes: A systematic literature review. *Journal of Foot and Ankle Research*, 13(1), 30.
- Al-Dalaen, B.D., & Alzayyat, A. (2024). A literature review of self-care behaviors among patients with diabetes using the theory of planned behavior. *Jordan Journal of Nursing Research*, 1, 16.

and a lack of institutional support. It is crucial to improve nurses' competencies through simulation-based learning, ongoing professional development, and incorporating revised protocols into routine practice. Hospital administrators also need to make sure that there are enough staff members, that pressure-relieving equipment is available, and that there are supportive leadership structures in place to encourage adherence to preventative guidelines.

Future interventions should include education, policy reinforcement, and audit-feedback mechanisms to improve pressure ulcer prevention. Collaborative research linking nurses' practices with patient outcomes and fostering accountability and patient-centered care is crucial.

Conflict of Interests

The authors have no conflict of interests to declare.

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Author Contributions

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- Alhaw, K.T. (2025). Knowledge and attitude regarding pressure ulcer care among nurses in Saudi Arabia. *Journal of Pioneering Medical Sciences*, 14, 117-126.
- Al-Mamari, F., Al-Rawajfah, O., Al Sabei, S., & Al-Wahaibi, K. (2024). Hospital-acquired pressure ulcers among adult ICU patients in tertiary hospitals in Oman: A one-year prevalence study. *Journal of Wound Care*, 33(Sup. 10), S10-S16.
- Al-Shaikh, K. (2019). *Pressure ulcer: Nurses' knowledge and attitude towards preventive measures in intensive care units in Palestine* [Master's thesis, An-Najah National University].
- Almutairi, M.N., Alghamdi, M.S., Almutairi, K.A.M., Alotaibi, A.A., Alhafi, A.H., Alanazi, M.M., Almutairi, N.Q., Alrahimi, A.N.O., Almutairi, Y.M., & Almntshre, A.A. (2025). Pressure ulcer: An updated review for healthcare professionals. *Egyptian Journal of Chemistry*, 68(13), 1221-1233.
- Alshahrani, B., Middleton, R., Rolls, K., & Sim, J. (2024).

- Pressure injury prevalence in critical care settings: An observational pre-post intervention study. *Nursing Open*, 11(2), e2110.
- Aqoulah, E.A.A., Manaf, R.A., Ismail, S., Hani, S.B., & Al-Ali, A. (2025). Effect of an educational intervention on pressure ulcer documentation among tertiary hospital nurses in Jordan. *British Journal of Nursing*, 34(12), S30-S42.
- Asiri, M.Y., Baker, O.G., Alanazi, H.I., Alenazy, B.A., Alghareeb, S.A., Alghamdi, H.M., Alamri, S.B., Almutairi, T., Alshumrani, H.M., & Alnassar, M. (2025). Nurses' knowledge, attitudes, and practices in pressure injury prevention: A systematic review and meta-analysis. *Healthcare*, 13(1).
- Atkinson, R.A., & Cullum, N.A. (2018). Interventions for pressure ulcers: A summary of evidence for prevention and treatment. *Spinal Cord*, 56(3), 186-198.
- Aydın, A.K., Karadağ, A., Gül, Ş., Avşar, P., & Baykara, Z.G. (2019). Nurses' knowledge and practices related to pressure injury: A cross-sectional study. *Journal of Wound Ostomy & Continence Nursing*, 46(2), 117-123.
- Chaboyer, W.P., Thalib, L., Harbeck, E.L., Coyer, F.M., Blot, S., Bull, C.F., Nogueira, P.C., & Lin, F.F. (2018). Incidence and prevalence of pressure injuries in adult intensive care patients: A systematic review and meta-analysis. *Critical Care Medicine*, 46(11), e1074-e1081.
- Digesa, L. E., Baru, A., Shanko, A., Kassa, M., Aschalew, Z., Moga, F., Beyene, B., & Mulatu, T. (2023). Incidence and predictors of pressure ulcers among adult patients in intensive care units at Arba Minch and Jinka Hospitals, Southern Ethiopia. *BioMed Research International*, 2023(1), Article 9361075.
- Ellis, M.B. (2019). Exploring perceptions of pressure ulcer risk assessment and pressure ulcer prevention practice among registered nurses in the acute hospital setting. *Risk*, 2, 8.
- Floyd, N.A., Dominguez-Cancino, K.A., Butler, L.G., Rivera-Lozada, O., Leyva-Moral, J.M., & Palmieri, P.A. (2021). The effectiveness of care bundles including the Braden Scale for preventing hospital acquired pressure ulcers in older adults hospitalized in ICUs: A systematic review. *The Open Nursing Journal*, 15(1).
- Gedamu, H., Abate, T., Ayalew, E., Tegenaw, A., Birhanu, M., & Tafere, Y. (2021). Level of nurses' knowledge on pressure ulcer prevention: A systematic review and meta-analysis study in Ethiopia. *Heliyon*, 7(7), Article e07575.
- González-Méndez, M.I., Lima-Serrano, M., Martín-Castaño, C., Alonso-Araujo, I., & Lima-Rodríguez, J. S. (2018). Incidence and risk factors associated with the development of pressure ulcers in an intensive care unit. *Journal of Clinical Nursing*, 27(5-6), 1028-1037.
- Grešš Halász, B., Bérešová, A., Tkáčová, E., Magurová, D., & Lizáková, E. (2021). Nurses' knowledge and attitudes towards prevention of pressure ulcers. *International Journal of Environmental Research and Public Health*, 18(4), 1705.
- Hagtorn, F., & Larsson, G. (2016). Pressure ulcer prevention in Costa Rica.
- Homauni, A., Jame, S.Z.B., Hazrati, E., & Markazi-Moghaddam, N. (2020). Intensive care unit risk assessment: A systematic review. *Iranian Journal of Public Health*, 49(8), 1422-1432.
- Hossain, B. (2022). Evaluation of pressure ulcer among the critically ill patients admitted in a tertiary hospital. *Journal of Bangladesh College of Physicians and Surgeons*, 40(3), 177-183.
- Kaçmaz, H.Y., Ceyhan, Ö., Güler, H.B., & Balçılar, F. (2023). Nurses' knowledge and practice in preventing pressure injuries in intensive care units. *Journal of Wound Care*, 32(Sup. 4), S22-S28.
- Karimian, M., Khalighi, E., Salimi, E., Borji, M., Tarjoman, A., & Mahmoudi, Y. (2020). The effect of educational intervention on the knowledge and attitude of intensive care nurses in the prevention of pressure ulcers. *International Journal of Risk & Safety in Medicine*, 31(2), 89-95.
- Khojastehfar, S., Ghezeljeh, T.N., & Haghani, S. (2020). Factors related to knowledge, attitude, and practice of nurses in intensive care unit in the area of pressure ulcer prevention: A multicenter study. *Journal of Tissue Viability*, 29(2), 76-81.
- Kıscık, Ö.G., & Sönmez, M. (2020). Pressure ulcer prevention: Turkish nursing students' knowledge and attitudes and influencing factors. *Journal of Tissue Viability*, 29(1), 24-31.
- Miligi, E., Alshutwi, S., & Alqahtani, M. (2019). The impact of work stress on turnover intentions among palliative care nurses in Saudi Arabia. *International Journal of Nursing*, 6(2), 84-88.
- Mkoka, D.A., & Andwilile, R. (2024). Nurses' perceptions on barriers for implementing pressure ulcer preventive measures among critically ill patients at a tertiary teaching hospital, Tanzania. *International Journal of Africa Nursing Sciences*, 20, Article 100676.

- Munn, Z., Barker, T.H., Moola, S., Tufanaru, C., Stern, C., McArthur, A., Stephenson, M., & Aromataris, E. (2020). Methodological quality of case series studies: An introduction to the JBI critical appraisal tool. *JBI Evidence Synthesis*, 18(10), 2127-2133.
- Nguvulu, F.N. (2022). *Incidence and risk factors of pressure ulcer among critically ill patients at Kenyatta National Hospital* [Master's Thesis, University of Nairobi].
- Nightingale, P., & Musa, L. (2021). Evaluating the impact on hospital acquired pressure injury/ulcer incidence in a United Kingdom NHS Acute Trust from use of sub-epidermal scanning technology. *Journal of Clinical Nursing*, 30(17-18), 2708-2717.
- Nuru, N., Zewdu, F., Amsalu, S., & Mehretie, Y. (2015). Knowledge and practice of nurses towards prevention of pressure ulcers and associated factors in Gondar University Hospital, Northwest Ethiopia. *BMC Nursing*, 14(1), 34.
- Osman, R., Saleh, N.A.M., Maria, N.E., & Yusop, N. (2024). Evaluating nurses' knowledge, attitudes, and practices (KAP) in modern wound care techniques and their impact on patient healing outcomes in government hospitals. *Semarak International Journal of Public Health and Primary Care*, 2(1), 28-44.
- Poirier, T., & Behnen, E. (2014). Where and how to search for evidence in the education literature: The WHEEL. *American Journal of Pharmaceutical Education*, 78(4), 70.
- Razi-Chafi, Z., Esmailpour-Bandboni, M., & Salmalian, Z. (2023). Prevalence of pressure ulcer and its related factors in elderly patients hospitalized to teaching hospitals in East Guilan. *Journal of Current Oncology and Medical Sciences*, 3(1), 375-381.
- Saad Soliman, E., Mostafa Ragheb, M., Abd El-Salam Sheta, H., & Hamed Mohamed, S. (2022). Effect of an educational program on nurses' performance regarding reducing pressure ulcer and safety of immobilized patients. *Journal of Nursing Science, Benha University*, 3(2), 856-872.
- Saleh, M.Y., Papanikolaou, P., Nassar, O.S., Shahin, A., & Anthony, D. (2019). Nurses' knowledge and practice of pressure ulcer prevention and treatment: An observational study. *Journal of Tissue Viability*, 28(4), 210-217.
- Tayyib, N., Coyer, F., & Lewis, P. (2016). Saudi Arabian adult intensive care unit pressure ulcer incidence and risk factors: A prospective cohort study. *International Wound Journal*, 13(5), 912-919.
- Tervo-Heikkinen, T., Heikkilä, A., Koivunen, M., Kortteisto, T., Peltokoski, J., Salmela, S., Sankelo, M., Ylitörmänen, T., & Junttila, K. (2023). Nursing interventions in preventing pressure injuries in acute inpatient care: A cross-sectional national study. *BMC Nursing*, 22(1), 198.
- Tolossa, T., Mengist, B., Mulisa, D., Fetensa, G., Turi, E., & Abajobir, A. (2020). Prevalence and associated factors of foot ulcer among diabetic patients in Ethiopia: A systematic review and meta-analysis. *BMC Public Health*, 20(1), 41.
- Ursavaş, F.E., & İşeri, Ö. (2020). Effects of education about prevention of pressure ulcer on knowledge and attitudes of nursing students. *Journal of Tissue Viability*, 29(4), 331-336.
- Wu, J., Wang, B., Zhu, L., & Jia, X. (2022). Nurses' knowledge on pressure ulcer prevention: An updated systematic review and meta-analysis based on the pressure ulcer knowledge assessment tool. *Frontiers in Public Health*, 10, 964680.
- Yayeh, M.B., Dinkayehu, T.E., Endrias, E.E., & Assegie, M.M.T. (2025). Prevalence and associated factors of caring behavior among nurses in Ethiopia: A systematic review and meta-analysis. *BMC Health Services Research*, 25(1), 756.
- Zarei, E., Madarshahian, E., Nikkhah, A., & Khodakarim, S. (2019). Incidence of pressure ulcers in intensive care units and direct costs of treatment: Evidence from Iran. *Journal of Tissue Viability*, 28(2), 70-74.
- Zuki, M.A.A.B., Saini, N.N.B., & Kamarulzaman, N.A.F.B. *Knowledge and attitude towards pressure ulcer prevention among nursing students in Universiti Kuala Lumpur Royal College of Medicine Perak*.
- Zuniga, J., Mungai, M., Chism, L., Frost, L., Kakkar, R., & Kyololo, O.B. (2024). Pressure ulcer prevention and treatment interventions in Sub-Saharan Africa: A systematic review. *Nursing Outlook*, 72(3), 102151.