

REVIEW

Nursing Strategies for Preventing Hospital-Acquired Pressure Injuries in Bedridden Patients: A Scoping Review

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Conflict of Interest:

The authors declare no conflict of interest

Abstract

Hospital-acquired pressure injuries (HAPI) are localised damage to the skin and underlying tissues caused by sustained pressure and shear after hospital admission. Bedridden patients are at heightened risk due to immobility and comorbid conditions. Despite increasing research on pressure injury prevention, there is a growing but fragmented body of evidence addressing nursing strategies for preventing HAPI in bedridden patients, with no comprehensive synthesis specifically examining the nursing role. This scoping review aimed to map and synthesise existing evidence and identify gaps in nurse-led strategies for preventing HAPI in bedridden patients. This scoping review was conducted according to Arksey and O'Malley's framework and adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). Three electronic databases were systematically searched (PubMed, ScienceDirect, and Google Scholar). ~~Only 30~~ **Thirty** research studies, published in English between January 2020 and December 2025, were included. Editorials, opinion pieces, commentaries, and articles that focused on interventions not led by nurses have been excluded. Extracted data were synthesized using descriptive and thematic analysis. Four main themes emerged from this review relating to nurse-led prevention strategies for HAPI in bedridden patients: early risk assessment, standardised skincare, prophylactic dressings, and positioning. Nurse-led care bundles and silicone foam dressings were associated with reduced rates of HAPIs, while PURPOSE-T was associated with enhanced early risk detection of HAPIs. Biomarkers appeared to enhance risk identification, and the extended repositioning intervals could be safe when accompanied by appropriate monitoring and support. Overall, the evidence indicates that nursing strategies contribute substantially to the prevention of HAPIs in bedridden patients. However, further research and practice development are needed to strengthen the evidence-based care in pressure injury management.

Keywords: bedridden patients, hospital-acquired pressure injury, nursing, patient safety, scoping review

1 | Introduction

Hospitalised patients are at high risk of developing pressure injuries, often damaging the skin and tissues over the bony prominences. The hospital-acquired pressure injuries (HAPIs) are defined as localised damage to the skin and the underlying tissues that occurs during the hospital stay (Helden et al., 2025; Melhem et al., 2025). The primary risk factor for the development of HAPI is immobility, as the unrelieved body weight exerts pressure on the bony prominences of the body, which leads to tissue damage (Coyer et al., 2024). These are serious threats to the patient's safety that can lead to increased readmission rates, pain, systemic infection, decreased quality of life, and eventually lead to death. The global prevalence of HAPI is approximately 8.4% among hospitalised patients, and this prevalence changes with the specific settings and cohorts (Melhem et al., 2025; Walker et al., 2026). Especially, the patients in the intensive care units have a fourfold chance of developing pressure injuries due to sedation, immobility and mechanical ventilation, compared to those who are in the general wards (Latimer et al., 2024). The consequences of HAPI, extended hospital stays, increased nursing workload, cost and the requirement for complex wound care led to increased economic burden on the health system (Walker et al., 2026).

Nurses play a primary and central role in the prevention, assessment, and management of skin breakdown among patients through the implementation of evidence-based interventions (Melhem et al., 2025; Zhang et al., 2024). A HAPI is considered a quality indicator of nursing care (Alnami et al., 2025), and the routine nursing preventive strategies involve comprehensive skin assessments, turning schedules, moisture management, risk identification using different scales, nutritional assessment and use of support surfaces (Melhem et al., 2025). Nurses' clinical competence, knowledge, and systematic skin assessment are associated with a reduced HAPI incidence rate (Melhem et al., 2025). In addition, the leadership role assumed by nurses in complex healthcare settings, including intensive care units and operating theatres, is fundamental to preventing hospital-acquired pressure injuries (HAPIs). Key responsibilities such as patient positioning, management of intraoperative micro-movements, and prevention of device-related pressure injuries are integral components of nursing care that support patient safety and quality outcomes (Zhang et al., 2024). Furthermore, staff and patient empowerment are essential for optimising the safety outcomes in healthcare (Mistri et al., 2023). For the purposes of this review, "nurse-led interventions" are defined as a broad range of activities in which nurses play the primary role in the assessment, planning, and implementation of care (Rakhshani, 2026). Nurse-led interventions have been identified as essential components of pressure injury prevention programs. However, variations in clinical practice, staffing levels, resource availability, and adherence to evidence-based guidelines may affect their effectiveness (Melhem et al., 2025).

Recent evidence demonstrates a shift towards specialised nurse-led technological interventions and procedural improvements in the prevention of HAPI (Walker et al., 2026). Most of these nurse-led interventions are effective in improving patient outcomes. This success can be attributed to the advancing nursing education and clinical mastery (Ruksakulpiwat et al., 2025).

This scoping review aimed to synthesise original studies on nursing strategies in the prevention of HAPI published between 2020 and 2025 to provide a comprehensive understanding of nurses' roles in preventing HAPI and improving long-term safety outcomes. Understanding the effectiveness of current nursing practices and identifying barriers to implementation strategies in nurse-led models for HAPI can help healthcare organisations develop targeted interventions to improve patient outcomes. The available reviews have examined the effectiveness of a specific preventive intervention for pressure injury in general. Most of them have not specifically examined the role of nurses in the prevention of HAPI (Fulbrook et al., 2019; Gaspar et al., 2019; Pott et al., 2023). Fullbrook et al. (2019), focused mainly on one intervention, which is the clinical efficacy of prophylactic sacral protective dressings, rather than a nursing multidisciplinary approach. Similarly, a systematic review by Gaspar and Peralta (2019), evaluated the general effectiveness

of various hospital-acquired pressure ulcer prevention strategies but did not explicitly isolate the nurse's leadership role or clinical accountability in the implementation of those strategies. Furthermore, Pott et al. (2023) provided a broad overview of systematic reviews relating to general prevention measures; however, the study lacks a dedicated focus on the nursing process, specifically the role of nurses in risk assessment, real-time monitoring, and individualised clinical decision-making.

However, the current review focuses on the central role of nurses in risk assessment, preventive care implementation, monitoring, and clinical decision-making related to HAPI prevention. By identifying key themes, implementation challenges, and research gaps, this review provides a comprehensive overview of current nursing practice and informs future research, education, and policy development in pressure injury prevention. Furthermore, the findings may contribute to the development of evidence-based policies, staff training programs, and quality improvement initiatives aimed at reducing the incidence of HAPIs

2 | Methods

This scoping review was conducted following the methodological framework proposed by Arksey and O'Malley (2005), further refined by Levac et al. (2010), as follows: (a) identifying the initial research question; (b) identifying related studies; (c) selecting specific studies; (d) charting the data; (e) collating, summarising and reporting the results. It was also conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines (Arksey & O'Malley, 2005; Levac et al., 2010; Tricco et al., 2018).

Identification of Initial Research Question

The research question was developed using the Population, Concept, Context (PCC) framework according to the Joanna Briggs Institute (JBI) for scoping reviews (Peters et al., 2020). Accordingly, the elements are as follows: Population (P): Hospitalised bedridden adult patients at risk of HAPIs; Concept (C): Nurse-led pressure injury prevention strategies; Context (C): Hospital-based healthcare settings, including medical, surgical, perioperative, and critical care environments. Therefore, the primary research question guiding this review was: What nursing strategies are used to prevent hospital-acquired pressure injuries among hospitalised bedridden adult patients across different hospital-based healthcare settings? In this context, "nursing strategies" are defined as comprehensive, evidence-based interventions and leadership processes designed to prevent skin damage in hospitalised patients, with nurses as the primary decision-makers and implementers. The term further includes either interventions independently designed or initiated by nurses or interventions in which nurses serve as the primary implementers, monitors, and decision-makers, including the application of specialised devices such as pressure-mapping systems, prophylactic dressings, and support surfaces, in which nursing assessment and oversight are integral to clinical outcomes. Studies in which nurses played no active clinical role were excluded. Further, studies involving intensive care unit patients, paralysed or paraplegic patients, surgical patients and other immobile adult populations were considered eligible as they represent a subpopulation of hospitalised patients with restricted mobility and have a high risk of developing pressure injuries.

Search Strategy

A comprehensive search was conducted in three major electronic databases: PubMed, Google Scholar and ScienceDirect. These databases provide a broad range of nursing, biomedical, and health sciences-related literature. These databases were considered sufficient to address the review objective. The search included studies published in the English language between January 2020 and 2025. Following keywords were used as a search terms: PubMed: ("nurse" OR "nursing") AND (prevent* OR prophylaxis OR prophylactic) AND ("hospital-acquired pressure injury" OR HAPI OR "pressure ulcer" OR "pressure injury" OR "decubitus

ulcer") AND ("hospitalized" OR "bedridden" OR "limited mobility" OR "immobilized" OR surgery), ScienceDirect: (nurse OR nursing) AND (prevention OR prophylaxis) AND ("pressure injury" OR "pressure ulcer" OR HAPI) AND (hospitalized OR immobilized) and Google Scholar: nurse OR nursing prevention "pressure injury" hospitalized. Google Scholar was used as a supplementary search source. Due to the large volume of results obtained from Google Scholar and according to the relevance filtering algorithm, only the first 500 studies were screened for inclusion, as these were considered the most likely to contain the relevant studies (Ungar & Muhanna, 2023).

Eligibility Criteria and Exclusion Criteria

This scoping review included studies published between 2020 and 2025, peer-reviewed empirical studies, including those available online ahead of print and accessible during the search period (up to December 2025), articles focusing on nursing strategies to prevent HAPI, and English-language publications. The conference abstracts without full texts, studies not relevant to nurses or related to HAPI, and editorials, opinion pieces, published thesis documents and non-peer-reviewed content were not included in this review.

Study Selection

The study selection process involved two independent reviewers who screened the titles and abstracts of all identified articles. Discrepancies were resolved through discussion or consultation with a third reviewer. The full texts of potentially eligible studies were retrieved and reviewed for inclusion. Duplicate records were identified and removed (see Figure 01 for the systematic screening process).

Data Charting Process

Data extraction was conducted independently by a pair of reviewers using a structured data charting form. The extracted data included author(s), year of publication, country/region of study, study design, nurse-led intervention described, key findings and limitations related to nurse-led HAPI prevention strategies and outcomes (see table 02 for the summary of included articles).

Quality Assessment

The methodological quality of the included studies was assessed using the JBI Critical Appraisal Tools appropriate for each study design (Randomised controlled trials, cross-sectional studies, and systematic reviews). The JBI tools evaluate methodological validity, potential bias, and transparency of reporting across key domains such as participant selection, study design, reliability, confounding factors, and outcome assessment. Scores represent the number of criteria met out of the total applicable criteria for each checklist. Overall quality was classified as High (>75% of applicable criteria met), Moderate (50–75%), or Low (<50%) (Joanna Briggs Institute, 2020). The summary of the quality appraisal is provided in the Table 1 below.

Two reviewers independently assessed each study; any disagreements were resolved through discussion. The studies were rated as high, moderate, or low quality based on the proportion of “Yes” responses across the checklist items. Most of the included studies demonstrated moderate to high methodological quality, with common limitations being small sample sizes, limited blinding, and incomplete reporting of follow-up procedures. The quality appraisal findings were used to contextualise the confidence placed in synthesised evidence throughout the Discussion. Lower-quality or single-site studies, and studies considered to be of moderate quality, particularly those with small samples, convenience sampling, or quasi-experimental designs, were interpreted with caution, and their findings were presented as suggestive

rather than definitive. High-quality studies, including large multicentre RCTs, were given high interpretive weight when drawing thematic conclusions.

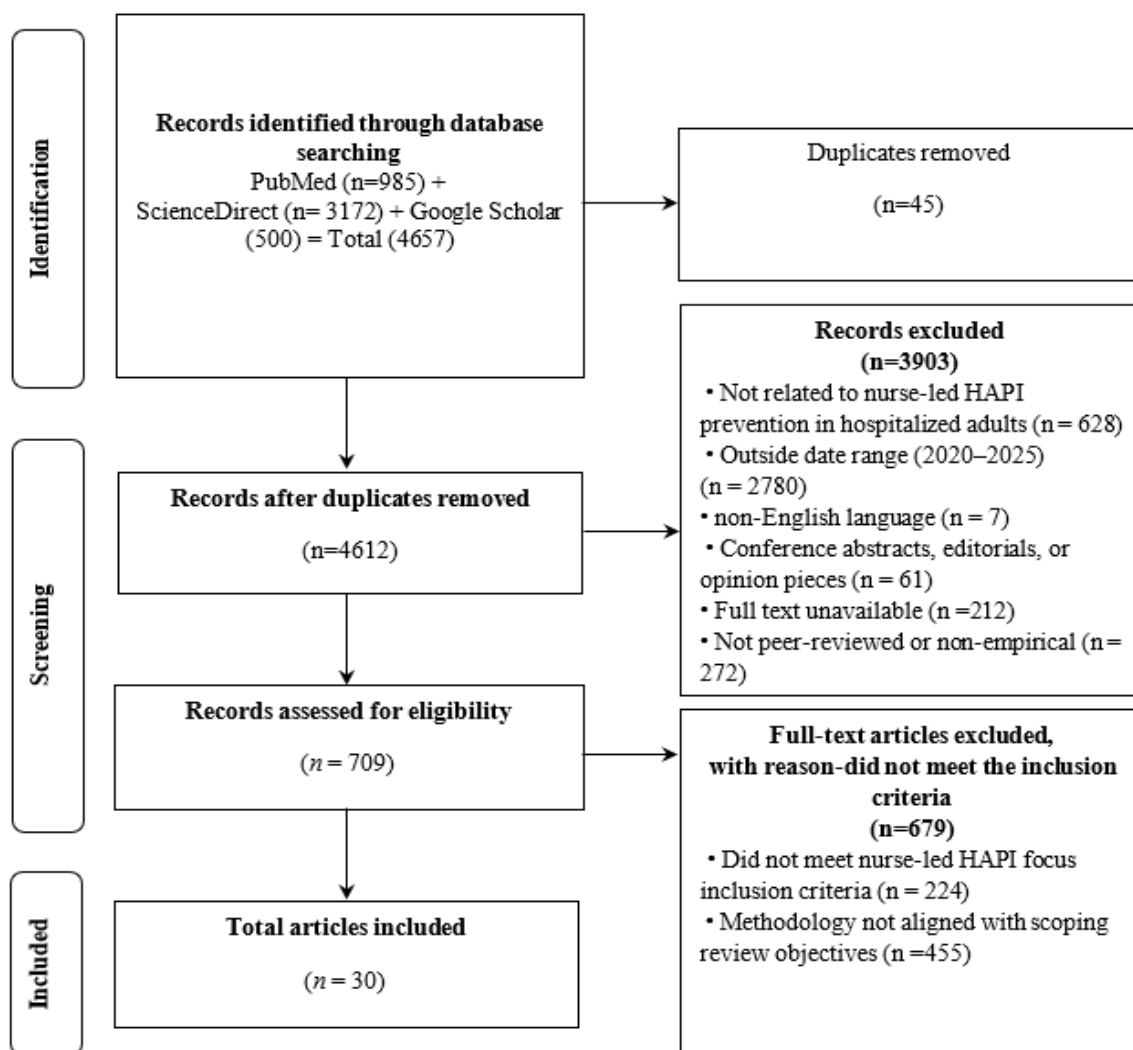


Figure 01: PRISMA flow chart for screening of the article

Table 01: Summary of Quality Appraisal

Author (Year)	JBİ Score	Overall Quality
Alnami et al. (2025)	7/9	Moderate
Chaboyer et al. (2023)	7/8	High
Chiannilkulchai et al. (2025)	9/13	High
Elsayed et al. (2025)	7/9	Moderate
Forni et al. (2022)	8/13	High
Gay et al. (2025)	9/13	High
Ho et al. (2023)	8/13	High

Huang et al. (2024)	9/13	High
Hunt et al. (2024)	8/13	High
Kara & Sönmez (2025)	8/13	High
Latimer et al. (2024)	9/13	High
Latimer et al. (2025)	9/13	High
Li & Li (2024)	9/13	High
Melhem et al. (2025)	7/9	Moderate
Miao et al. (2025)	9/13	High
Mkoka & Andwilile (2024)	9/10	High
Neo et al. (2021)	9/13	High
Neyt et al. (2024)	10/11	High
Pittman et al. (2021)	7/9	Moderate
Qiao et al. (2025)	9/13	High
Seton et al. (2025)	7/9	Moderate
Taylor & Mulligan (2021)	9/10	High
Tervo-Heikkinen et al. (2023)	8/8	High
Walker et al. (2026)	9/13	High
Xie et al. (2025)	9/13	High
Xue & Yang (2021)	8/13	High
Yilmaz & Gürlek Kisacik (2025)	8/8	High
Zarrin et al. (2024)	9/13	High
Zhang et al. (2024)	9/13	High
Zhang et al. (2025)	9/13	High

Data Synthesis and Thematic Analysis

A qualitative thematic analysis was performed on the included studies. The reviewers synthesised the findings into themes related to nursing strategies for preventing hospital-acquired pressure injuries among bedridden patients.

3 | Results

A total of 30 studies met the eligibility criteria and were included in this scoping review. The included studies were published between 2020 and 2025, and the inclusion of 2026 citations is limited to those that became accessible during this timeframe. Studies originated from 16 countries across five continents, with the highest representation from China (n = 10), Australia (n = 7), and Turkey (n = 3). Study designs included randomised controlled trials (n = 15), quasi-experimental studies (n = 3), observational or longitudinal studies (n = 4), qualitative studies (n = 2), feasibility trials (n = 2), an economic evaluation (n = 1), a correlational study (n = 1), and cross-sectional studies (n = 2). Settings spanned intensive care units, general medical-surgical wards, operating theatres, and specialist units including cardiac surgery, spinal surgery, and orthopaedic surgery. Table 02 presents the characteristics and key findings of all included studies. Thematic analysis identified four primary themes: (i) early risk assessment, (ii) standardised skin care, (iii) prophylactic dressing management, and (iv) therapeutic positioning practices.

Table 02: Characteristics and Key Findings of Studies on Nursing Strategies for Preventing Hospital-Acquired Pressure Injuries in Bedridden Patients.

Author, Year & Country	Study Type	Setting	Nursing Intervention	Findings	Limitations
Alnami et al. (2025) Saudi Arabia	Quasi-experimental	Critical and inpatient departments, King Salman Hospital	Capacity building via focused training, "turn clock" strategies, and increased supply availability.	HAPI incidence decreased by over 80% (from 55 to 6 cases); significant improvement in nurse knowledge and attitudes.	Convenience sampling; single-site focus; lacks random assignment.
Chaboyer et al. (2023) Australia	Longitudinal observational sub-study	Hospitalised medical and surgical units	Daily sacral sub-epidermal moisture (SEM) measurements using point-of-care technology.	Abnormal SEM deltas (≥ 0.6) were found in 82.9% of at-risk patients, serving as an objective early-warning system for nurses.	High attrition rate (patients exiting daily); limited to sacral measurements.
Chiannilkulchai et al. (2025) Thailand	Paired matching randomised controlled trial (RCT)	Cardiac surgery unit	The nurse's use of a rotating-leg prepper for skin preparation during surgery.	Effectively reduced pressure injuries while increasing nurse satisfaction and relieving physical strain during patient handling.	Small sample size (60 patients, 30 staff).
Elsayed et al., (2025) Egypt	Quasi-experimental	Intensive care units of a Governmental University Hospital	Standardised skin care protocol (7 days) featuring pH-balanced cleansing (3% dimethicone), barrier application (zinc oxide), and avoiding diapers unless necessary.	Significant reduction in incidence and severity of incontinence-associated dermatitis (IAD) and pressure injury risk.	Short 7-day period; initial staff resistance; small sample size (N=100)
Erdem & Kultur (2025) Turkey	RCT	Spinal surgery (prone position)	Novel facial wrapping and draping technique using cast padding over prone pads.	Significantly reduced the incidence of Stage 3 facial pressure ulcers compared to standard prone padding.	Single surgical context (prone spinal surgery).
Forni et al., 2022 (Italy)	Multi-centre randomised controlled trial (RCT)	25 medical, surgical, and intensive care	Multi-layer silicone-adhesive polyurethane foam dressing applied to the sacrum in addition to standard care.	Effectively reduced any-stage sacral pressure ulcers in medical and surgical units; no significant effect found in ICUs.	Terminated early due to COVID-19; unable to blind staff (performance

		units across 12 hospitals			bias); unblinded outcome assessors
Gay et al. (2025) France	Stepped- wedge cluster RCT	9 Intensive Care Units (ICUs)	Multi-component nurse bundle (head rotation, skin protection, body inclination) for ARDS patients.	No significant reduction in Day 7 PI incidence; identified high discrepancy in photographic staging by bedside nurses.	Implementation overlap between periods; high degree of staging discrepancy.
Ho et al. (2023) Canada	RCT	ICU and non- ICU acute care settings	Continuous Bedside Pressure Mapping (CBPM) for real- time visual feedback.	No significant difference in overall PI incidence, but reduced skin changes in patients with baseline injuries.	High data attrition due to technical failure; underpowered for clinical endpoints.
Huang et al. (2024) China	Prospective RCT	ICU (COVID-19 ARDS patients)	Nurse management of modular prone positioning tools for awake patients [Huang 1040, 1042].	Significantly improved patient comfort and reduced incidence of pressure injuries and dizziness.	Population limited to COVID-19 ARDS.
Hunt et al. (2024) Australia	Phase II Feasibility RCT	ICUs	Nurse application of hyper- oxygenated fatty acids (HOFA) to facial skin.	Preliminary efficacy and feasibility trial protocol identified a high baseline facial PI rate of 32%.	Exploratory phase II design; limited sample size planned.
Kara & Sönmez (2025) Turkey	RCT	Internal medicine and surgical wards	Delivery of "Toolbox Trainings" (short, on-the-job sessions) by nurse managers.	Significant reduction in HAPI rates, patient falls, and catheter complications; decreased average hospital stay.	Single hospital centre; potential observer bias; short 12-week follow-up.
Latimer et al. (2024) Australia	Three-arm feasibility RCT	ICU	Prophylactic sacral foam dressings (Mepilex vs. Allevyn vs. Usual Care).	Trial feasible; 12% cumulative PI incidence; established that RNs are effective data collectors for HAPI research.	Single centre; underpowered to detect a treatment effect.
Latimer et al. (2025) Australia	Two-arm pilot RCT	Adult ICU	Comparative effectiveness of two sacral dressing brands.	High dressing failure rate (49.5%) due to rolled edges/adhesion, necessitating daily nurse-led vigilance.	Single site; high rates of missing sacral photograph data (19.5%).
Li & Li (2024) China	Single-center RCT	Orthopaedic surgery unit	Comprehensive nursing bundle (psychological, dietary, and skin care).	Significant reduction in PI incidence (3.3% vs 21.7%) and improved patient recovery time and satisfaction.	Limited sample size (120 participants); short intervention duration; residual confounders.

Miao et al. (2025) China	Comparative study	Multiple tertiary hospital units	Real-time interface pressure and temperature monitoring to guide turns.	Reduced 12-month PI incidence (4.5% vs 20%); allowed for individualised (extended) repositioning intervals.	Small sample size (89 participants); selection bias risk.
Pittman et al. (2021) USA	Pre/post comparative QI project	Operating Room (OR) and ICU	Nurse management of alternating pressure (AP) overlays.	AP overlays improved skin blood flow and achieved near-zero HAPI rates in complex cardiovascular patients.	Used aggregate unit data rather than individual data; single-centre focus.
Mkoka & Andwilile (2024) Tanzania	Qualitative study	Tertiary teaching hospital	Analysis of care organisation, competency, and oversight.	Themes include the necessity of "provider competency"; identified lack of air mattresses as a foundational barrier.	Limited to one hospital; small sample (n=15); no physician/family perspectives.
Neo et al. (2021) Singapore	Single-centre RCT	Prolonged surgery setting	Alternating pressure (AP) overlays vs. standard gel pads.	AP overlays significantly reduced sacral interface pressure during prolonged surgery.	No detailed long-term follow-up is reported in the excerpt.
Neyt et al. (2024) Belgium	Economic evaluation	High-risk hospital departments	Nurse-led application of silicone adhesive multilayer foam dressings.	Adjuvant use of foam dressings is cost-neutral and reduces sacral PI risk by 41%.	Follow-up was limited to 14 days; couldn't link surgical procedures to PI outcomes.
Qiao et al. (2025) China	RCT	ICU (Older patients)	Nursing program applying Lithospermum Oil for IAD and skin care.	Significantly reduced IAD incidence (11.8% vs 26.5%) and maintained better skin integrity than saline.	Small sample (68 participants); single centre.
Seton et al., (2025) Sweden	Cross-sectional (pre-post evaluation)	University hospital with approximately 900 beds	Implementation of the evidence-based PURPOSE T risk assessment tool, replacing the Modified Norton Scale.	Notable increase in preventive interventions; shift to earlier detection (Category I +23.0%) and reduction in severe PIs (Category III -35.5%, Category IV -35.3%).	Not all wards participated; high personnel strain from COVID-19; point prevalence data may be less reliable than individual record reviews
Taylor & Mulligan (2024) Australia	Qualitative study	ICU, general, and COVID wards	Barriers and enablers assessed via the Theoretical Domains Framework.	Facilitators include teamwork and audits; barriers include knowledge gaps and pandemic-related stress.	Most participants were experienced nurses; COVID-19 skewed emotional data.

Tervo-Heikkinen et al. (2023) Finland	Multicentred cross-sectional study	16 acute care hospitals	Analysis of compliance with risk assessment and nursing actions.	Found high variability in compliance; repositioning and surfaces were the most common interventions.	Snapshot design; risk assessments were only documented for 30% of participants.
Walker et al. (2026) Australia (Available online from 2025)	Multi-site RCT	Medical-surgical wards	Prophylactic silicone foam dressings (EEPOC trial).	No significant difference in HAPI incidence in this general ward population.	The study may have been underpowered due to lower-than-expected event rates; limited to low-risk general wards.
Xie et al. (2025) China	Single-blind RCT	Head and neck cancer surgery	Silicone foam vs. liquid-plus-foam prophylactic dressings.	Dressings effectively managed skin microclimate and reduced intraoperative PI incidence.	Very small sample size (30 participants).
Xue & Yang (2021) China	Randomized trial	Post-nephrolithotomy surgery	Nurse-designed special postoperative position cushion.	Effectively reduced postoperative PIs and increased patient comfort.	Time constraints; lack of previous research on the specific tool.
Yilmaz & Kisacik (2025) Turkey	Correlational study	Adult ICUs	Knowledge, attitudes, and self-efficacy assessment in MDRPI prevention.	Found that nurse attitudes serve as a mediator in translating knowledge into self-efficacy for prevention.	Cross-sectional design limits causal inferences; self-reported data.
Zarrin et al. (2024) Iran	Five-arm clinical trial	ICU	Zinc Oxide vs. Vaseline prophylactic dressings.	Both Zinc Oxide and Vaseline <i>with</i> dressings resulted in zero PI occurrence in high-risk patients.	Not explicitly detailed in the research snippet.
Zhang et al. (2024) China	Randomized clinical trial	Lumbar fusion surgery patients	Nurse-implemented "micro-movement" scheme (15° table tilts).	Significantly reduced intraoperative pressure injury incidence (2.9% vs. 8.6%).	No objective physiological indicators used; single center.
Zhang et al. (2025) China	Prospective RCT	ICU (Acute pancreatitis)	Implementation of refined ICU nursing care plans.	Refined care resulted in 97.6% effectiveness and significantly lower complication rates, including PIs.	Single center; limited analysis of team dynamics.

4 | Discussion

The synthesis of the findings from 30 identified studies highlights a significant shift from traditional pressure injury care to specialised prophylactic materials, educational protocols and technology-integrated strategies. The findings of the review suggest that the effective prevention of HAPI has transformed from a single preventive measure to a multifaceted approach. Four primary themes related to nurse-led prevention strategies for HAPI have emerged: i) Early risk assessment, ii) Standardised skin care, iii) Prophylactic dressing management, and iv) Therapeutic positioning practices.

Early Risk Assessment

The risk assessment is a vital part of nursing care, which is more effective than curative treatments. Traditional scales were commonly used by nurses to identify patients at risk of pressure injuries. While the scales, such as the Braden scale, demonstrate high accuracy in predicting injuries, the holistic complexity of critical care patients cannot be fully assessed by that scale, as the scoring system has several inconsistencies (Latimer et al., 2025). The nurses are utilising tools like the Pressure Ulcer Risk Primary or Secondary Evaluation Tool (PURPOSE-T), which provides more accurate early detection by focusing on clinical reasoning and the skin status indicators (Seton et al., 2025).

Evidence from many studies suggests that the traditional schedule-based intervention may not address the individual patient at risk of pressure injury. The traditional 2-hour position change has several limitations in preventing pressure ulcers in patients. Further, some innovative technologies such as real-time pressure monitoring, skin temperature, and sub-epidermal moisture measurement support nurses to identify tissue damage early. For instance, a study by Miao et al. (2025) identified that, rather than 2-hour schedules, personalised position change, depending on real-time sacral pressure and skin temperature monitoring by nurses, could reduce long-term HAPI in patients (Miao et al., 2025). Similarly, another study by Chaboyer et al. (2023) found that sub-epidermal moisture (SEM) could provide more reliable warning systems for preventing HAPI than subjective scales, which could help nurses intervene prior to tissue damage (Chaboyer et al., 2023).

Collectively, these findings suggest a transition from static, time-based risk assessment schedules to dynamic and personalised approaches integrating physiological monitoring. Despite these technological developments, there exist systemic and organisational barriers to risk assessment. A study by Tervo-Heikkinen et al. (2023) identified that compliance with risk assessment across 16 acute care hospitals in Finland was poor. Further heavy workload, poor institutional support and lack of resources were significant barriers to systematic risk identification (Mkoka & Andwilile, 2024). The majority of the nurses in the Western Australian teaching hospital lacked knowledge of the stages, causes and preventive practices (Coventry et al., 2024). These findings from multiple studies suggest that technological and tool-based innovations can attain their potential benefit when supported by adequate nurse education, institutional resources, infrastructure and policy.

Standardised Skin Care

Standardised skin care and bundled care have been effective in the prevention of HAPI. These bundles provide step-by-step protocols that reduce the variability among nurses during individualised decision-making (Alnami et al., 2025; Li & Li, 2024).

A quasi-experimental study conducted in Saudi Arabia found that capacity-building nurses reduced HAPIs by more than 80%. The capacity building mainly included the use of the turning clock strategy and increasing the number of supplies needed in the departments (Alnami et al., 2025). The study emphasised that standardised skin care protocols cannot be effectively implemented through education alone. Their success depends on nurses' competence in pressure injury prevention and the availability of appropriate

skin assessment tools, preventive products, and clinical resources necessary to translate knowledge into practice. A comprehensive nursing bundle trialled in an orthopaedic surgical setting in China, including dietary management with increased water intake, light diet, and post-operative interventions, including keeping the skin dry and clean, cleaning the skin regularly with warm water, performing local massage, application of petroleum jelly and skin care powder if necessary, three times a day for the first 3 days and thereafter once a day (Li & Li, 2024). A statistically significant reduction in the HAPI was observed after this multi-component approach, which improved patient satisfaction and recovery.

Incontinence-associated dermatitis (IAD) is a recognised precursor for pressure injury, particularly among immobile patients in intensive care settings (Elsayed et al., 2025; Qiao et al., 2025). A randomised controlled trial found that Lithospermum oil usage significantly reduced IAD incidence and maintained superior skin integrity when compared with standard saline-based care (Qiao et al., 2025). Similarly, Elsayed et al. (2025) demonstrated a reduction in IAD incidence among critical care patients by the implementation of a standardised nurse-led skin care protocol (Elsayed et al., 2025).

Collectively, the evidence suggests the importance of systemic nursing protocols that address multiple factors that influence the development of pressure injury. The success of these interventions depends on the knowledge, motivation and capacity of the nurses to implement these evidence-based protocols across the settings where they work. The toolbox training programme that delivered on-the-job training to the ward nurses led to the reduction of HAPI rates and other relevant complications (Kara & Sönmez, 2025).

Prophylactic Dressing Management

Nurses play a specialised role in the management of prophylactic dressings, which represent one of the most extensively studied and evidence-based nurse-led interventions for the prevention of HAPIs. A study by Mattias Neyt et al. (2024) conducted to evaluate the economic dimensions of prophylactic dressing adoption stated that the use of silicone adhesive multilayer foam dressings was cost-neutral but effective in reducing pressure injury risk by up to 40%, but this depends on the clinical setting and on nursing monitoring. Further, according to the study, these are beneficial for high-risk ICU and surgical patients compared to general medical wards, as the risk is low (Neyt et al., 2024). In addition, a large multicenter study conducted across 25 Italian hospital units revealed that multilayer silicone adhesive polyurethane form dressings, applied by nurses to the sacrum, reduced the incidence of sacral pressure injuries compared with standard care alone (Forni et al., 2022). This RCT provided large-scale evidence for the effectiveness of prophylactic foam dressing in hospitalised patients at risk of HAPI.

The literature further indicates that the majority of prophylactic dressing failures are associated with deficiencies in nurse-led application, ongoing assessment, and maintenance, highlighting the critical role of nursing competence in achieving optimal outcomes. A study by Latimer et al. (2025) reported that the failure of the prophylactic adhesive is attributed to rolled edges and poor adhesion. The failure to maintain the structural integrity of the prophylactic dressing would not produce the intended protective benefit, which emphasises the necessity for the competency development related to the selection of the dressing, application techniques and monitoring protocols (Latimer et al., 2024).

In addition, a multi-site RCT conducted by Walker et al. (2026) found that there was no significant difference in HAPI incidence with prophylactic silicone foam dressing when compared to standard care. This finding suggests that the effectiveness of the prophylactic dressing may depend on the settings used, with most effectiveness in high-risk environments like ICUs and perioperative settings, rather than general wards. The contradictory findings demonstrate the differences across patient populations, application techniques of the dressings and nurses' adherence to monitoring protocols. While prophylactic dressings were effective in high-risk patients when the baseline incidence is low in certain patient groups, the effectiveness also tends to be low. Therefore, the selection of appropriate patients and nursing assessment is crucial for determining success.

Another nursing-led intervention, the application of Zinc Oxide and Vaseline dressing was effective in preventing HAPI, especially among ICU patients. It was also cost-effective and affordable for countries with limited financial resources (Zarrin et al., 2024). These findings suggest that the clinical benefit can be achieved with cost-effective and widely available materials when the nursing application is rigorous, compared to expensive commercial products. A study by Hunt and colleagues evaluated the feasibility and practical strategy of applying hyper-oxygenated fatty acid (HOFA) dressings to prevent facial pressure injuries. The study confirmed the practicality of this intervention while revealing a stark 32% baseline injury rate (Hunt et al., 2024).

A study by Xie et al. (2025) evaluated silicone foam and liquid-plus-foam prophylactic dressings in head and neck cancer surgery. The findings stated that both types of dressings effectively managed skin microclimate and reduced intraoperative PI incidence, which broadens the evidence base for prophylactic dressings in the perioperative nursing context (Xie et al., 2025). Further, a study by Gay and co-authors evaluated a multicomponent nurse care bundle in the ICU. While no significant reduction in pressure injury rates was observed, the study identified a high disparity in photographic pressure injury staging by bedside nurses. This highlights the need for nurses to be educated on wound assessment and pressure injury classification for effective dressing management (Gay et al., 2025).

Overall, the evidence from the above studies related to dressings suggests that nurse competence, monitoring and clinical reasoning influence the outcomes related to HAPI as much as the biophysical properties of the dressings themselves.

Therapeutic Positioning Practices

Therapeutic positioning practices are a longstanding nurse-led strategy used to prevent HAPI. Due to technological advancement, the traditional two-hour turning schedule has been replaced with individualised repositioning protocols (Miao et al., 2025). Findings from the literature state that the repositioning intervals could be safely extended beyond the conventional two hours with the real-time monitoring of sacral interface pressure and skin temperature by the nurses (Miao et al., 2025). This paradigm shift towards individualised, data-driven repositioning reflects a significant opportunity for innovation in nursing practice. Further, the nurses have introduced innovative “micro-movement” strategies such as 15-degree operating table tilts and rotating leg preparation techniques to improve tissue perfusion, especially during prolonged surgical procedures. This was effective and safe for preventing pressure injuries, especially in overweight patients (Zhang et al., 2024). This highlights how simple nurse-led interventions can significantly improve pressure injury prevention without requiring specialised equipment.

Due to the introduction of wearable technology and continuous bedside pressure mapping (CBPM) the nurses could monitor interface pressure in real time and change the position accordingly (Ho et al., 2023). However, the study did not identify a significant reduction in overall pressure injury incidence with CBPM, but the technology was associated with reduced skin changes in patients with baseline injuries, suggesting a targeted benefit for the highest-risk patients. Similarly, a study by Chiannilkulchai and Pichaiphanupatt found that rotating-leg prepper application by the nurse applied during the cardiac surgery significantly reduced pressure injuries compared with a rolled gauze bandage (Chiannilkulchai & Pichaiphanupatt, 2025).

Further, a study revealed that a nurse-led management of alternating pressure overlays on operating theatre and ICU beds reduced the HAPI rate to a significant extent and decreased the cost for the treatment (Pittman et al., 2021). Similarly, Neo et al. (2021), identified that alternating pressure overlays significantly reduced sacral interface pressure, particularly during prolonged surgery, compared to standard gel pads (Neo et al., 2021).

During the COVID-19 period, nurses have practised innovative modular prone positioning, which has significantly reduced pressure ulcers among hospitalised COVID-19 patients (Huang et al., 2024). Further,

a special position cushion for percutaneous nephrolithotomy patients has demonstrated improved comfort and reduced the pressure ulcer occurrence rate (Xue & Yang, 2021). Development of such solutions by the nurses portrays an underrecognized clinical innovation in HAPI prevention (Xue & Yang, 2021). Preventing perioperative pressure ulcers is one of the vital responsibilities of the perioperative nurses. A rotating leg prepper application, compared to a rolled gauze bandage, has reduced pressure injury and surgical site infection (Chiannilkulchai & Pichaiphanupatt, 2025). Specifically, during spinal surgery, the prone position is widely preferred, which can cause a facial pressure ulcer. A prospective randomised trial has demonstrated that wrapping prone pads with cast padding and covering the face of the patient with a surgical drape is simple and effective (Erdem & Kultur, 2025).

Additionally, Zhang et al. (2025), who examined the refined ICU nursing care plans for acute pancreatitis, found that the pressure injury and related complications could be reduced significantly through systematic nursing plan refinement and nurse-led care planning that can reduce HAPI risk (Zhang et al., 2025). However, the success of therapeutic positioning practices interventions depends on the nursing competence, including not only technical skills, attitude, self-efficacy and institutional support. A study by Yilmaz and Kisacik (2025) identified nurses' attitudes as a mediating factor in the relationship between knowledge and self-efficacy in pressure injury prevention. This indicates that addressing both cognitive and attitudinal dimensions is necessary to be effective. A qualitative study by Taylor and Mulligan using the theoretical domains framework identified that for nurse-led pressure injury prevention, teamwork, auditing, and institutional support were the most influential factors and knowledge gap, and pandemic-related stress were identified to be the most significant barriers (Taylor & Mulligan, 2021).

Overall, these studies suggest that positioning has become an increasingly individualised strategy and is technology-assisted. Currently, nurses are utilising pressure distribution devices, pressure mapping technology and targeted repositioning techniques to individualise risk factors. This evolution also reflects a transformation towards individualised HAPI management.

A consistent pattern was observed among the thematic domains identified. That is the interventions were more effective in preventing HAPIs when implemented as part of a comprehensive strategy rather than as separate and isolated measures. Recent technological advancements, such as sub-epidermal moisture monitoring, pressure mapping systems, and skin temperature monitoring, demonstrated potential for early detection of tissue damage; their effectiveness depended on the nursing input (Chaboyer et al., 2023; Ho et al., 2023; Miao et al., 2025). In addition, skin care protocols, prophylactic dressings, and positioning demonstrated effectiveness when integrated within broader prevention programmes with multidisciplinary collaboration, education and quality improvement initiatives (Li & Li, 2024; Pittman et al., 2021). These findings suggest that a successful HAPI prevention does not depend on any isolated preventive strategy; rather, it requires a combination of skilled nursing practice, integrated evidence-based practice and supportive healthcare systems (Mkoka & Andwilile, 2024; Taylor & Mulligan, 2021; Yilmaz & Gürlek Kisacik, 2025).

Limitations

Several limitations of this review warrant acknowledgement. The generalizability of these findings is limited as the evidence is mainly derived from high-income and upper-middle-income countries. Future research should focus on evaluating the effectiveness, feasibility and implementation of nurse-led HAPI prevention strategies in Sri Lanka and South Asian countries. In addition, the search was limited to three databases; important nursing-specific databases such as CINAHL and Embase were not searched, which may have resulted in the omission of relevant studies (database restriction). Further, the review was limited to English-language publications, which may have excluded relevant evidence published in other languages (language restriction). Restricting Google Scholar screening to the first 500 results, while pragmatic, introduces the possibility of relevant studies being missed (potential screening bias). The included studies were heterogeneous in terms of design, setting, patient population, and outcome measures, limiting

comparability across findings (heterogeneity). Further, as with any review that relies on published literature, there is the potential for publication bias, whereby studies with positive or significant findings are more likely to be published than those with null results. These limitations should be considered when interpreting the findings of this review.

5 | Conclusions

This scoping review synthesises evidence from 32 studies and maps the available evidence suggesting that nursing strategies play a central role in preventing HAPIs in bedridden patients. The findings of the study reveal an evolution in the approach to HAPI prevention from single interventions to a multi-component approach and the use of technology. Across all four identified themes, the role of the nurses is vital for effective HAPI prevention. Given the exploratory nature of this scoping review, caution is needed in drawing conclusions about intervention effectiveness. The evidence suggests that integrating nurse-led, evidence-informed interventions into routine care has the potential to improve clinical outcomes and reduce HAPI rates, but definitive conclusions require further high-quality, well-powered experimental studies. Future research should focus on multisite and large-scale trials that address the identified gaps in the evidence, particularly in low- and middle-income countries. The findings of this review highlight the evolving role of nurses in hospital-acquired pressure injury prevention and identify priorities for future research by integrating the recent evidence on nurse-led preventive strategies and technology integration.

Author Contributions

E.S.: Conceptualization, methodology, investigation, data curation, formal analysis, writing – original draft, writing – review & editing.

U.V.: Conceptualization, investigation, data curation, writing – original draft, writing – review & editing.

G.K.: Conceptualization, methodology, validation, supervision, writing – review & editing.

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