

Professional nursing practice environments as interconnected systems: A scoping review of measurement instruments

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Abstract

Background

Professional nursing practice environments influence workforce wellbeing, retention, quality and safety of care, patient outcomes and organisational performance. Despite extensive research and multiple measurement instruments, conceptual clarity regarding their constituent elements, configuration and interrelationships remains limited. This review aimed to identify, examine and synthesise the constituent elements represented within measurement instruments and explore how they are characterised and organised.

Methods

A scoping review was conducted using the Arksey and O'Malley framework and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews. CINAHL Ultimate, PubMed and ProQuest One Academic were searched for studies published from 1 June 2019 to 13 December 2025 describing the development, validation, adaptation or application of instruments measuring professional nursing practice environments. Two reviewers independently screened the publications. The first author extracted the study and instrument data and led the conceptual synthesis. All authors reviewed and refined the extraction matrix, emerging categories and the conceptual model. Instrument domains, subscales, constructs and items were iteratively compared, grouped according to conceptual similarity and synthesised into higher-order domains. Measurement instruments were treated as the units of analysis; their psychometric properties were not evaluated.

Results

Eighty-five publications were included: 74 empirical studies involving 46,488 nurses and midwives and 11 reviews collectively incorporating 514 studies. Fourteen instruments were identified, with the Practice Environment Scale of the Nursing Work Index and related instruments predominating. Despite variation in terminology and structure, substantial conceptual convergence was evident. Constituent elements were synthesised into three interdependent domains: Leadership, Organisational Culture and Climate, and High-Quality Practice. Leadership was qualitatively distinct, operating as both a measurable constituent domain and an enabling influence intersecting with all elements.

Conclusions

Professional nursing practice environments are dynamic, interdependent systems rather than collections of discrete organisational characteristics. Existing instruments capture observable structures, resources,

processes and behaviours more readily than the relational mechanisms through which practice environments are enacted. The proposed model clarifies how leadership, organisational conditions and high-quality practice interact and provides a foundation for measurement refinement, organisational improvement and future research.

Background

Positive practice environments are described as “settings that support excellence and decent work, that strive to ensure the health, safety and personal wellbeing of staff, support quality patient care and improve the motivation, productivity and performance of individuals and organisations” (1). Positive professional practice environments in healthcare have a well-established influence on clinician performance, staff engagement, satisfaction, retention and staff wellbeing (2, 3), and specifically benefit from relational leadership (4). They also contribute to organisational capacity to recruit and retain the nursing workforce (2, 5). Environmental and population neuroscience demonstrate that the environments in which people live and work influence cognitive, emotional and behavioural processes (6, 7). Within healthcare organisations, these processes shape how individuals perceive, respond to and interact within their environment, contributing to the everyday behaviours and relationships through which professional practice environments are experienced and enacted. Evidence demonstrates that professional practice environments are also associated with improved care quality (8), patient satisfaction and outcomes such as readmission, mortality rates, failure to rescue, medication errors, and adverse events (9, 10). Evidence indicates that patients treated in Magnet Hospitals have 14% lower odds of mortality, and 12% lower odds of failure to rescue (11), whilst staff burnout decreases by 15%, and turnover by 11.4% (2). Furthermore, recent research indicates that focused programs promoting professional practice environments protect patient satisfaction during crisis situations such as the COVID-19 pandemic (12).

Positive professional practice environments reduce consumer anxiety, clinician stress, fatigue, burnout and institutional costs (8). Despite this, constituent elements and mechanisms of action underpinning these environments are difficult to differentiate. A comprehensive understanding of the elements that comprise practice environments is necessary to inform their creation, implementation, and sustainability. This is imperative in supporting healthcare organisations to deliver safe, high-quality, reliable care within the constraints of an ever-increasing pressured workforce (9, 13). Consideration of workplace cultures is important because organisational cultures shape, and are shaped by, practice environments, through interacting relationships, systems and continuous adaptations (9).

The International Council of Nurses’ (ICN) Definition of Nursing report (2025) (14) highlights that research into ‘the work’ of nursing and ‘the worker’, the nurse, informs practice and enables the profession to flourish. Extending this perspective, it is equally important to examine the environments in which nursing work is performed. Within the ICN’s Definition of Nursing Report (2025), safe and sustainable environments are described through the lens of creating environments that are safe for patients and communities, and sustainable for the planet (14). Other than describing the role of

government to ensure that nurses have 'safe working conditions, decent work, and decent remuneration', and acknowledging that there are many and varied practice contexts, no other reference has been made to the practice environment or its constituent elements, where a nurse engages in, and practices nursing (14). These environments are comprised of supportive policies and structures, including effective leadership, safe workloads, appropriate staffing and resources, recognition and remuneration, along with opportunities for ongoing training, development and quality improvement (15).

The World Health Organisation projects a global shortage of 4.8 million nurses by 2030 (16). The characteristics and consequences of poor practice environments are well established, including burnout, workforce turnover, and patient harm, while positive, professional practice environments seek to mitigate these effects (17–20). However, how the constituent elements of these environments operate and interact within clinical contexts, and how their configuration contributes to the development and sustainability of these environments, remains less well understood. Addressing this gap is particularly important in the context of global workforce challenges and the need to improve outcomes for patients, women, and families, while supporting healthcare professional wellbeing. Job dissatisfaction, burnout, intention to leave, poor motivation, low morale and workforce turnover are consistently associated with poor practice environments (5, 21–25). Given the capacity of practice environments to influence both workforce and patient outcomes, greater understanding of their constituent elements, their interrelationships, and the mechanisms through which these operate is needed to inform the intentional development and sustainability of positive, professional practice environments.

Despite decades of research demonstrating the importance of positive, professional practice environments and their influence on workforce and patient outcomes, conceptual clarity regarding what constitutes and formulates these environments remains limited. Numerous studies and measurement instruments describe practice environments using overlapping and variable terminology, domains, and constructs. Consequently, while there is broad agreement regarding the importance of positive professional practice environments considerably less consensus exists regarding their constituent elements, how these elements are configured and the mechanisms through which they shape practice environments. Addressing this conceptual ambiguity is important, because measurement instruments establish the underlying conceptualisations of practice environments and, consequently, authorise what is measured, prioritised, and subsequently targeted for improvement. Examining the domains, subscales, and items represented within existing instruments provides a systematic means of identifying elements that have been consistently recognised as constituting positive professional practice environments. Identification, clarification and understanding of their composition are essential for subsequent analysis of how they operate; and how this operation is measured.

The assumptions, beliefs and values held within organisations contribute to the formulation of Organisational Culture and Climate (26). Within normative organisations such as healthcare, individuals typically accept role-related authority and delegation where these align with personal values and shared organisational goals, such as the provision of reliable, safe, high-quality care (27, 28). This highlights that practice environments are shaped not only by formal organisational structures, but also by the alignment

between individual values, organisational expectations, and the relational and behavioural processes through which these are enacted.

Understanding how these constituent elements are configured and interact to align personal values with organisational goals is therefore critical to the development and sustainability of positive professional practice environments and dominant features in their measurement. Continued evidence of burnout and intention to leave among nurses and midwives (3, 29, 30), further reinforces the need to understand not only which elements underpin positive professional practice environments, but their configuration and interrelationships. This scoping review contributes to this understanding by systematically identifying and synthesising the constituent elements of positive professional practice environments, as reflected in the constructs, domains, subscales and items of existing measurement instruments.

Methods

This scoping review was conducted to identify, synthesise, and organise the constituent elements of positive professional nursing practice environments, represented in existing measuring instruments reported in the literature. Scoping reviews are used to map the breadth and nature of evidence on a given topic (31).

Search results were imported into Covidence and duplicates were removed. Two reviewers independently screened titles and abstracts against the eligibility criteria, followed by full-text assessment of potentially eligible publications. Disagreements were resolved through discussion and consensus. The study selection process is presented in Fig. 1.

Review Question

Professional nursing practice requires knowledge, skills, and governance processes that enable nurses to practice in accordance with professional standards, and codes of ethical and professional conduct (32, 33). As a relational profession, nursing occurs between, and with, people across diverse clinical, organisational, and community contexts (34). The environments within which nursing occurs therefore shape how professional practice is experienced and enacted.

Measurement instruments operationalise theoretical and conceptual understandings into measurable domains, subscales, and items. Although narrative descriptions of practice environments vary in terminology and emphasis, measurement instruments require researchers to explicitly define and organise the elements they consider important. Examining these instruments therefore provides a systematic and transparent means of identifying how positive professional practice environments have been defined, described and operationalised in the literature.

This scoping review used measurement instruments as the unit of analysis to identify, compare and synthesise the constituent elements of positive professional practice environments. The purpose was not to evaluate the psychometric properties, validity or reliability of individual instruments, and instead to

examine their content as a source through which the conceptual composition of these environments could be explored. By synthesising elements across instruments, the review sought to move beyond descriptions of individual practice environment characteristics towards greater conceptual clarity regarding their composition, organisation and interrelationships.

The review was guided by the following question: What are the constituent elements of positive professional nursing practice environments represented within measurement instruments, and how are these elements conceptualised and organised?

Design

The review was conducted using Arksey and O'Malley (2005) scoping review framework, comprising identification of the review question, identification and selection of relevant evidence, charting of the data, and collation, synthesis and reporting of the findings (35). The review was reported in accordance with Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). The optional consultation stage was not undertaken, and a review protocol was not registered. Consistent with the purpose of the scoping review, which was to map and synthesise instrument content rather than evaluate intervention effectiveness, no formal methodological quality or risk-of-bias assessment was undertaken.

Search Methods

The search strategy was developed using the Population, Concept, Context (PCC) framework (Table 1). The population comprised nurses; the concept focused on measurement instruments and the constituent elements of positive professional nursing practice environments represented within them; and the context encompassed hospital, community, primary care and other health service settings.

Table 1
PCC framework and search terms used to develop database searches

PCC element	Scope	Search terms used
Population	Nurses	"Nursing"; "Nursings"; "Nurses"; "Nurse"
Concept	Instruments used to assess professional nursing practice environments Constituent elements or components of positive professional nursing practice environments represented within measurement instruments	"Work Environment"; "Healthy Work Environment"; "Positive Work Environment"; "Professional Practice"; "Professional Practices"
Context	Healthcare environments, extending beyond hospitals to community, primary care and other health-service settings	"Hospitals"; "Hospital"; "Community Hospital"; "Health Service"; "Clinic"; "Community Health Service"; "Healthcare Environment"; "Health Care Environment"; "Health Care"; "Healthcare Environments"
Note: The terms shown represent the concepts and keywords used to develop the searches. Terms were combined using Boolean operators and adapted to the indexing conventions and search functions of each database. The original database-specific search histories were not retained; consequently, complete line-by-line search syntax cannot be reproduced.		

The search strategy extended the work of Ribeiro et al. (36) by including a broader range of healthcare environments and measurement instruments. CINAHL Ultimate, PubMed and ProQuest One Academic were searched for peer-reviewed publications describing the development, validation, adaptation or application of instruments designed to measure professional nursing practice environments. Search terms relating to community hospitals, health services, clinics, community health services and healthcare environments were included to capture settings beyond hospitals and literature aligned with the American Association of Critical-Care Nurses Healthy Work Environment framework. Reference lists of included publications and relevant literature reviews were handsearched to identify additional potentially eligible publications. The search and study-selection process is summarised in Fig. 1.

Eligibility criteria

Peer reviewed publications written in English and published between 1 June 2019 and 13 December 2025 were eligible for inclusion. Publications were required to describe the development, validation, adaptation or application of an instrument designed to measure the broader professional nursing practice environment. Studies examining only a single component of the practice environment, rather than an instrument intended to assess the broader professional practice environment, were excluded. Abstract-only publications, non-English publications and grey literature were also excluded.

Data extraction

The first author (FC) extracted data from each included study according to study design, country, healthcare setting, participant population and sample size. Instrument-level data comprised the name of the measurement instrument and its reported domains, subscales, constructs, and constituent items relevant to professional nursing practice environments. These data were retained within the context of their originating publication and instrument to preserve their intended meaning and provide a traceable link between the source data and subsequent analysis. Where the same instrument was reported across multiple publications, its content was consolidated at instrument level and was not treated as a separate instrument on each occasion.

The extracted instrument data were documented in the cross-instrument matrix which recorded each instrument alongside the original domains, subscales, constructs and items. The completed extraction matrix and supporting source data were shared with the other authors to enable review of the extracted content and transparency of the subsequent analytic process. Study characteristics and the measurement instruments identified across the included publications are presented in Additional file 1. The extracted domains, subscales and items that informed the conceptual synthesis are presented in Additional file 2.

Data synthesis and conceptual development

Data synthesis was led by the first author (FC) through an iterative comparative process in which measurement instruments, rather than their psychometric properties, were treated as the units of analysis. Analysis progressed through four stages: examination of instrument content within its original context; comparison of conceptually similar content across instruments; progressive grouping and abstraction into subdomains and higher-order domains; and development of the conceptual model.

First, the domains, subscales, constructs, and individual items of each measurement instrument were examined within the originating instrument to preserve their intended meaning. Second, instrument content was compared across instruments using the cross-instrument matrix to identify similarities, differences and areas of conceptual overlap. Categorisation was based on the conceptual intent of each item rather than the title of the domain or subscale in which it appeared. This was necessary because conceptually similar elements were frequently located within differently named domains, while individual subscales sometimes contained items representing more than one emerging concept. For example, elements relating to communication, professional relationships, autonomy, organisational support, quality of care and professional development were represented across instruments but were positioned and labelled differently.

Third, items and constructs with similar conceptual meanings were grouped into preliminary categories. Instrument content was deconstructed from its original organisational structure and reconstructed conceptually across instruments, enabling comparison irrespective of differences in terminology or instrument design. Similar or overlapping elements were progressively grouped, while conceptually distinct elements were retained as separate categories. Elements that did not readily align with an emerging category were retained and further examined during subsequent comparisons. This prevented

allocation based on terminology or superficial similarity alone and supported progressive clarification of the conceptual boundaries between categories.

Through repeated comparison, refinement and abstraction, preliminary categories were organised into conceptually coherent subdomains and subsequently into three higher-order domains: Leadership, Organisational Culture and Climate, and High-Quality Practice (Fig. 2). The developing categories, subdomains and higher-order domains were repeatedly checked against the original instrument items and subscales, to confirm that they remained grounded in the extracted data and reflected the breadth and intended meaning of the identified concepts.

The extraction matrix, emerging categories, subdomains and higher-order domains were presented to the co-authors at successive stages of analysis. The co-authors reviewed

the alignment between the extracted instrument content and the developing conceptual structure, questioned and discussed proposed categorisations, and contributed to the refinement of the domain boundaries and conceptual model. Differences in interpretation were discussed collectively and resolved through consensus.

Finally, patterns of conceptual overlap and intersection across the domains and subdomains were examined to inform development of the conceptual model. Attention was given to elements represented across more than one area of the practice environment and to the ways in which instrument content connected leadership behaviours, organisational and relational conditions, and the enactment of professional practice. This final stage informed the proposed relationship among the three higher-order domains and the conceptualisation of Leadership as both a constituent domain and an enabling mechanism operating across the professional practice environment. The resulting conceptual model is presented in the Results.

Use of generative artificial intelligence

During manuscript preparation, the authors used ChatGPT (OpenAI) to support language editing, reduction of repetition and journal-specific presentation of author-generated content. Generative artificial intelligence was not used to conduct the literature search, screen publications, extract primary data or make analytical decisions. All outputs were reviewed and revised by the authors, who retain full responsibility for the accuracy, interpretation and integrity of the manuscript.

Results

The outcomes of the search and study-selection process are summarised in Fig. 1.

Methodological design of included studies

Of the 85 included studies, 74 reported primary research and 11 were literature reviews. Cross-sectional studies predominated ($n = 56$): of these 16 were described as correlational, 13 as descriptive and three

as exploratory and the remaining 24 reported only as cross-sectional. The remaining primary studies comprised six mixed-methods studies, three descriptive correlational studies and nine using distinct methodological designs: correlational, quantitative, exploratory quantitative, descriptive with prospective data collection, longitudinal cohort, longitudinal quasi-experimental, quasi-experimental study, quantitative observational, and prospective descriptive and validation (n = 1 each).

The 11 literature reviews included six systematic reviews, three integrative reviews, one scoping review and one meta-analysis. Further details of the methodological designs are provided in Additional file 1. Grey literature was excluded in accordance with the eligibility criteria. Consequently, all included evidence was derived from peer-reviewed publications.

Temporal and geographical details

Consistent with the inclusion criteria, all included studies were published between June 2019 and the final search date of 13 December 2025. The 74 primary studies represented a broad geographical distribution. Brazil contributed the greatest number of studies (n = 16), followed by China (n = 9), Portugal (n = 7), the United States (n = 6), and the Republic of Korea (n = 5). Three studies each were conducted in Australia and The Netherlands, while Saudi Arabia, Philippines, Egypt, Norway, and Finland contributed two studies each. Poland, Spain, Slovenia, Ghana, Jordan, Sweden, Kenya, Peru, New Zealand, Japan, Iran, Turkey, Italy, Malaysia and the Czech Republic contributed one study each. One study included data from both Portugal and Spain; consequently, the country count represents 75 study locations across the 74 primary studies (see Additional file 1).

Settings

The predominant setting was tertiary public hospitals, primarily in acute care contexts (37–89). Additional settings included acute private hospitals (n = 7) (52, 54, 61, 71, 80, 90, 91), primary health care settings (n = 6), oncology nursing (n = 3) (92–94), nursing homes (n = 1) (95), and the military health system (n = 1) (96). One study focused exclusively on midwives (97). Other contexts included rural public hospitals (98), home healthcare or home visiting nursing (99), palliative and hospice care (100), and adult outpatient care (92).

Population

The 11 literature reviews collectively included 514 studies. The total sample across the remaining 74 studies was 46 488 nurses and midwives.

Instruments identified

Fourteen instruments were identified across the included publications (see Additional file 1 for the full list of included studies). The most frequently used instrument was the Practice Environment Scale of the Nursing Work Index (PES-NWI), which was derived from the Nursing Work Index (NWI) developed by Kramer and Hafner in 1989 (36), closely followed by the NWI and its related iterations (36, 72, 101, 102).

The PES-NWI, and the revised-NWI (NWI-R) have been subsequently used independently, having been translated, adapted, and applied across multiple languages, healthcare settings, and geographical contexts (101, 103). Alongside these established instruments, a smaller number of alternative measures were identified, reflecting different conceptualisations of positive professional practice environments with attempts to capture characteristics relevant to specific professional populations, healthcare settings, and organisational contexts (68, 72, 75, 88, 89, 94, 95, 99, 104).

The predominance of the PES-NWI and related NWI instruments indicates that measurement of positive professional nursing practice environments has been largely shaped by a small number of foundational instruments. Their sustained use and adaptation across diverse healthcare contexts suggests considerable consistency in the characteristics historically considered important to positive professional practice environments. However, the identification of 14 instruments, and the variation in their constructs, domains, subscales, and terminology also indicates, understandably, that the practice environment has not been operationalised uniformly. Rather, conceptually similar characteristics are represented and organised differently across instruments, with some instruments including elements reflective of their specific population, context, or conceptual purpose (36, 72, 75, 88, 89).

Summary of constituent elements

The constituent elements identified across the included instruments are summarised in Table 2. Instrument domains, subscales and individual items were synthesised into three primary domains: Leadership, Organisational Culture and Climate, and High-Quality Practice. Despite variation in terminology and organisation across instruments, item-level comparison demonstrated recurrent conceptual patterns that informed the composition of these domains and the relationships proposed between them.

Table 2
Constituent elements identified across instruments

Primary domain	Constituent element	Key indicators	Example instrument domains
Leadership	Leadership	• Supportive management • Visibility • Empowerment • Decision-making	PES-NWI; AACN HWEAT
Organisational Culture and Climate	Professional relationships and conduct	• Collaboration • Teamwork • Recognition • Interpersonal respect	NWI-R; NPPEQ
	Communication	• Interdisciplinary communication • Feedback • Information exchange	PES-NWI
	Safe operational and empowered structures	• Staffing and resources • Policies • Role clarity	NWI-R; Alberta Context Tool
High-quality practice	Patient-centred care	• Continuity of care • Teamwork • Shared decision-making	NPPEQ
	Autonomy	• Clinical decision-making • Control over practice • Governance participation	PES-NWI
	Mutual professional respect	• Shared governance • Participation • Recognition of expertise	NWI-R
	Quality of care	• Organisational readiness • Safety culture • Continuous improvement	PES-NWI

Primary domain	Constituent element	Key indicators	Example instrument domains
	Proficiency, contribution, and growth	• Education • Mentoring • Career pathways • Research engagement	Various

Abbreviations: AACN HWEAT, American Association of Critical-Care Nurses Healthy Work Environment Assessment Tool; NPPEQ, Nursing Professional Practice Environment Questionnaire; NWI-R, Nursing Work Index–Revised; PES-NWI, Practice Environment Scale of the Nursing Work Index.

Leadership emerged as a distinct primary domain through its consistent representation across instruments and its intersection with elements subsequently synthesised within Organisational Culture and Climate, and High-Quality Practice (36, 39, 40, 54, 55, 63, 67, 68, 70, 72, 80, 83, 84, 88, 94, 96–99, 103, 105–109). This dual positioning reflected the way leadership was operationalised within the included instruments, whereby it was represented as a distinct domain while simultaneously influencing the relational, structural and professional conditions of the broader practice environment. Leadership was operationalised through constructs including authentic and transformational leadership, nurse manager ability and support, efficient leadership, supervisory support, administrative responsiveness and leadership communication (36, 39, 40, 54, 67, 74, 94, 103).

Across instruments, leadership-related content extended beyond characteristics of individual leaders, to encompass behaviours such as supporting staff decision-making, responding to staff concerns, providing recognition and feedback, resolving conflict, facilitating learning and professional development, enabling participation in governance, and fostering autonomy and organisational conditions (39–42, 51, 54, 57, 61–63, 67, 68, 70, 74, 77, 78, 81–83, 85, 87–89, 94, 97, 100, 106–108, 110–113).

This recurrent pattern distinguished leadership from other constituent elements. Staffing, communication, professional relationships, autonomy and professional development predominantly described conditions or experiences within the practice environment, whereas leadership-related content frequently described behaviours through which these conditions were established, supported or influenced. Communication for example, was reflected through leaders listening and responding to staff concerns (41, 67, 74, 81, 91, 102, 107); autonomy was supported through leaders backing professional decision-making (39, 50, 54, 61, 62, 70, 82, 87, 94, 106, 111); professional growth was facilitated through mentorship and access to learning opportunities (42, 45, 67, 80, 105, 111); and mutual professional regard and respect was reinforced through recognition, consultation and inclusion in organisational decision-making (41, 51, 54, 57, 67, 74, 81, 82, 88, 91, 97, 100, 106–108, 110). This cross-domain pattern

informed the conceptualisation of Leadership as both a primary domain and an enabling mechanism within the proposed model.

Within the NWI-R, leadership and supervisory support similarly intersected with consultation, professional decision-making, staffing and organisational support, recognition, governance, education and expectations for high-quality care (48, 66, 70, 109). This recurring cross-domain influence distinguished leadership from the other constituent elements and informed its conceptualisation as both a primary domain and an enabling mechanism across the practice environment.

Organisational Culture and Climate domain represents the relational, social and structural foundations of professional practice. It encompasses professional relationships and conduct, effective communication, and safe, empowering organisational structures that support high-quality nursing practice (74). High-Quality Practice reflects the enactment of professional practice within these conditions and encompasses patient-centred care, autonomy, mutual professional regard and respect, quality of care, and proficiency, contribution, and growth (94, 103, 114). These domains were not conceptualised as discrete or independent constructs; rather, they were characterised by significant interrelationships and overlap among their constituent elements. Collectively, the findings informed the integrated conceptual model presented in Fig. 2, conceptualising positive professional practice environments as dynamic interrelated phenomena, with leadership operating both as a constituent domain and an enabling mechanism across the practice environment.

Primary domain 1: Leadership

Leadership encompassed supportive, visible, and effective management that empowers nurses, promotes professional respect, and strengthens clinical practice (48, 74, 96, 102, 105, 107, 109, 110). Authentic, transformational, and efficient leadership approaches were represented across the included studies, and whilst transformational and authentic leadership were the predominant leadership styles discussed, no single leadership style emerged as consistently preferred or ideal (5, 68, 74, 76, 96, 105, 111, 115).

Leadership effectiveness was reflected in nurse manager competence and capability, support for clinical and professional decision-making and constructive management of performance and conflict (40, 50, 54, 74, 94, 106). Effective leaders provided recognition, positive reinforcement and constructive feedback, while framing mistakes as opportunities for learning rather than occasions for criticism (54, 68, 97, 108, 110). Collaborative leadership practice included consulting staff regarding clinical and operational issues, listening and responding to concerns, fostering open communication and mutual professional respect (67, 74, 79, 81, 91, 93, 95, 102, 107). This participatory approach to leadership strengthens engagement and supports shared understanding across teams (55, 91, 104).

Senior nursing leadership also contributed through visibility, accessibility, organisational authority and advocacy for nursing perspectives within organisational decision-making, with influence of senior nursing leadership also contributing to positive professional practice environments (58, 60, 76, 96, 107).

Collectively, these behaviours enabled staff participation, professional growth, organisational support and engagement with workplace challenges (54, 62, 67, 81, 83, 100, 103, 105, 111). Leadership therefore represented both formal organisational authority and behaviours through which the conditions supporting positive professional practice environments were enabled.

Primary domain 2: Organisational culture and climate

The Organisational Culture and Climate domain comprised three subdomains: Professional Relationships and Conduct, Communication, and Safe Operational and Empowered Structures. Collectively, these represent the relational, social and structural conditions within which professional practice occurs. Positive organisational cultures were characterised by respect, ethical conduct, supportive professional relationships, effective communication and collaboration (61, 96, 100, 116) combined with adequate human, professional, and clinical resources and organisational structures that enable safe and effective practice (5, 43, 45, 71, 81, 86, 96, 100, 109, 115, 117).

Professional relationships and conduct

Professional relationships and conduct were characterised by collaboration, teamwork, recognition, and mutual professional respect (42, 63, 69, 78–80, 106, 116). Strong nurse–physician and interprofessional relationships, supported open communication, shared decision making and participation in problem-solving across disciplines (39, 44, 50, 51, 58, 59, 63, 64, 70, 77, 78, 81, 94, 96, 98, 103, 116, 118). These relationships fostered trust, belonging, cultural sensitivity, and professional identity, providing a relational foundation for collaborative practice and high-quality care (44, 51, 54, 57, 69, 79, 80, 96, 100, 109).

Communication

Communication encompassed interdisciplinary information exchange, clinical dialogue and communication between staff and organisational leadership (49, 63, 79, 90, 119). Effective communication was characterised by teamwork, mutual respect, shared clinical discussion, accessible channels for advice and feedback, and opportunities to raise clinical and workplace concerns (39, 41, 52, 57, 59, 63, 64, 78, 79, 81, 85). Adequate time for discussion, clear care plans and effective communication with patients and families further supported coordinated care (39, 63). Overall, formal and informal communication promoted psychological safety, collaboration, professional feedback, and shared governance, which underpin safe, reliable, high-quality care (38, 57, 93).

Safe operational and empowered structures

Safe operational and empowered structures encompassed human, professional, clinical, and organisational resources required for safe and effective practice (5, 40, 50, 65, 115). These included appropriate staffing levels and skill mix, access to clinical expertise, adequate equipment and supplies, clear policies and role boundaries, effective orientation, and opportunities to participate in resource and organisational decision-making (37, 41, 45, 50, 59, 61, 63–65, 75, 83, 87, 90, 93, 104, 105, 109, 114, 118). Flexible scheduling, manageable workloads, protected time away from work and sufficient time for

patient care further supported workforce wellbeing and sustainability (40–42, 44, 45, 60, 61, 64, 73, 75, 81, 86, 96, 98, 99, 104, 110, 111, 114). Overall, these elements represent the structural and operational conditions required to sustain positive professional practice environments (51, 114).

Primary domain 3: High-quality practice

High-Quality Practice comprised five subdomains: Patient-centred Care, Autonomy, Mutual Professional Regard and Respect, Quality of Care, and Proficiency, Contribution and Growth. This domain reflects the enactment of professional practice within supportive organisational and relational conditions. It encompasses nurses' capacity to exercise expertise and judgement, participate meaningfully in clinical and organisational decisions, practice collaboratively and autonomously, and contribute to safe, reliable, and continuously improving care (59, 63, 64, 111, 116).

Patient-centred care

Patient-centred care was reflected through collaborative and organisational practices that prioritised patients' needs, safety, and continuity of care (56, 94, 106). Skilled, compassionate communication, professional decision making and interprofessional collaboration, and nursing models that promote continuity supported nurses to provide safe and responsive care (39, 56, 73, 88, 105). Adequate staffing, sufficient time with patients, up-to-date care plans, and culturally sensitive practice further enabled safe, high-quality, patient-centred care contributing to improved patient outcomes (56, 60, 88, 117).

Autonomy (individual, clinical, and professional)

Autonomy encompassed individual, clinical, and professional independence, enabling nurses to apply their expertise, judgement, and accountability in patient care (48, 57, 97, 103, 106). It was reflected through control over practice, clinical and work-related decision-making, and participation in organisational governance (44, 45, 57, 70, 76, 78, 81, 87, 96, 106). Autonomy was enabled by supportive leadership and organisational conditions, including clear roles and policies, appropriate staffing, access to information, and professional practice models (39, 61, 62, 70, 82, 87, 111). Collectively, these conditions supported accountable, responsive, and high-quality professional practice (51, 61, 69, 78, 87, 94).

Mutual professional regard and respect

Mutual professional regard and respect reflected collaborative and inclusive interprofessional relationships characterised by shared governance, participatory decision-making, professional recognition, and constructive approaches to conflict (41, 51, 57, 77, 78, 100). Valuing professional expertise and enabling participation in policy, governance, equipment, and care-related decisions reinforced professional respect and shared authority (64, 74, 79, 106, 110, 120). These relational conditions supported collaboration, professional autonomy, and high-quality care (39, 41, 55, 57, 74, 86, 90, 97, 107, 118).

Quality of care

Quality of care reflected organisational capacity and readiness to consistently deliver high standards of care, rather than as a single clinical outcome (64). Factors that contribute to quality of care include adequate staffing and competence, professional autonomy, patient centredness, effective communication and collaboration, mutual professional respect and sufficient structural and clinical resources (41, 50, 60, 63, 66, 78, 84, 90, 97, 114, 117, 119).

Visible and participatory leadership, continuous learning, quality improvement and openness to innovation further supported environments in which quality practice could flourish (39, 55, 63, 65, 93, 97, 110, 111). Quality of care therefore reflected the integration of constituent elements across all three domains (64, 78, 90, 97, 100, 102, 110, 119).

Proficiency, contribution and growth

Proficiency, Contribution and Growth encompassed clinical competence, personal and professional development, professional identity, evidence-informed practice and the capacity of nurses to contribute their knowledge and expertise to practice (39, 42, 43, 52, 69, 80, 105, 118).

Structured and informal education, preceptorship, mentoring, career pathways, clinical placements, quality improvement and research participation supported continued development and competence (5, 39, 42, 45, 55, 63, 67, 69, 105). These elements were enabled by supportive organisational leadership conditions and contributed to workforce capability, continuous learning and safe, reliable high-quality care (37, 40, 41, 51, 58, 63, 83, 85, 89, 93, 96, 97, 105, 113, 118).

Discussion

This review systematically explored the constituent elements of professional nursing practice environments as operationalised within measurement instruments, and synthesised these into three primary domains: Leadership, Organisational Culture and Climate, and High-Quality Practice (Fig. 2). While previous literature has identified and described individual components of practice environments (121–125), this review extends these descriptions by examining how constituent elements are configured and interrelate within an integrated conceptual model. Rather than representing professional practice environments as collections of discrete organisational attributes, the proposed model conceptualises them as dynamic and interconnected systems, with reciprocal influence occurring across leadership, organisational conditions, and the enactment of professional practice.

Importantly, Leadership was qualitatively distinct from the other domains. Although consistently represented as a constituent element of the professional practice environment, leadership-related content intersected with elements of Organisational Culture and Climate and High-Quality Practice. Leadership is therefore conceptualised as a domain, and as an enabling mechanism through which relational, structural, and practice conditions are shaped and supported. The Organisational Culture and

Climate represents the relational, social, and structural context within which nursing work occurs, while High-Quality Practice reflects the enactment of professional practice within, and interaction with, these conditions. The bidirectional relationships within the model recognise that these domains are neither linear nor independent; experiences and outcomes of practice may, in turn, influence organisational conditions and leadership behaviours.

This conceptualisation shifts attention from what elements are present within a positive professional practice environment and towards how those elements are configured and operate together. Leadership shapes organisational culture and climate through influencing professional relationships, operational conditions and the social architecture of the organisation (126–130), while formal and informal leadership behaviours contribute to conditions that enable professional autonomy, shared governance, mutual respect, staff wellbeing and continuous quality improvement (126, 131–133). It is therefore the interaction and configuration of these constituent elements, rather than the presence of any single element in isolation, that influences how professional practice is experienced and enacted (134, 135). This systems perspective provides researchers and healthcare organisations with a framework for examining relationships between constituent elements and potential mechanisms through which practice environments influence healthcare professionals and patient outcomes.

Leadership as a central enabling domain

Leadership emerged both as a constituent domain and as a central enabling mechanism operating across all aspects of the professional practice environment. Through formal and informal leadership behaviours, leadership contributes to the relational, social and operational conditions associated with high-performing practice environments (128, 134, 136, 137). The findings emphasise visible, supportive, and participatory leadership that facilitates communication and professional relationships while enabling autonomy, professional development, and meaningful contribution (138–140). This aligns with literature identifying relational and transformational leadership as important contributors to positive professional practice environments (131, 132, 134, 135, 137, 141).

The dual positioning of leadership provides an important insight into how professional practice environments are conceptualised. While leadership was consistently represented as a discrete domain within measurement instruments, the findings also suggest that leadership functions as a critical influence on the organisational, relational and professional conditions through which practice environments are experienced and enacted. This interpretation supports a systems perspective in which leadership does not operate independently of the environment but contributes to the development and sustainment of the conditions that underpin high-quality nursing practice.

However, this review extends previous work by conceptualising leadership as operating across multiple organisational levels and through behaviours and influence, rather than being confined to formal positions of authority. Formal leaders hold greater responsibility for establishing and sustaining organisational conditions (126, 142), while clinicians also enact leadership through everyday clinical practice, professional relationships, decision making, communication, and influence (121, 143, 144).

Leadership within positive professional practice environments can therefore be understood as both positional and distributed. This does not diminish the accountability of formal leaders; rather, it recognises that the relational condition of practice is continually reinforced or undermined through interactions across all levels of the organisation. Leadership is consequently both something the professional practice environment contains and is a mechanism through which the environment is created, experienced, and sustained.

Organisational culture and climate as the context of practice

Organisational culture and climate were identified as the relational, social, and structural context within which nursing practice occurs (9, 120, 145). Communication, professional relationships, and safe operational and empowered structures collectively shape the conditions through which nursing work is enacted and experienced on a day-to-day basis (54, 144, 146). These findings reinforce that professional practice environments are not solely defined by the availability of staffing or resources, but by the quality of professional relationships, interactions, organisational support, and the systems and structures that enable safe, reliable, and effective care (147–149).

The prominence and interconnection of these elements across instruments suggest that relational and organisational factors are foundational to the development and sustainability of positive professional practice environments. Organisational Culture and Climate therefore represents more than the organisational setting in which practice occurs; it constitutes the conditions through which healthcare professionals experience the organisation and within which high-quality practice is enabled, constrained, enacted and delivered.

High-quality practice as the enactment of environment

High-quality practice reflects the enactment of professional nursing practice within, and in interaction with, leadership and organisational conditions (150, 151). Constituent elements, such as patient-centred care, professional autonomy, mutual professional regard and respect, and continuous quality improvement, reflect the ways in which nurses translate these contextual conditions into safe, effective, responsive, and patient-centred care (147, 151). Although patient-centred care was the predominant terminology represented within the included instruments, this review acknowledges the contemporary shift towards person-centred care as a broader and more inclusive conceptualisation of care delivery.

Importantly, High-Quality Practice is not conceptualised solely as an outcome of a positive professional practice environment, but as an integral and interacting domain that both emerges from, and contributes to, the conditions within which care is delivered. This reinforces the proposition that quality is not simply an outcome or an endpoint, but an emergent property of well-functioning and interconnected practice environments. This conceptualisation also aligns with Weller's conceptual model (152), which positions relationships as core infrastructure for safe care, reinforcing the importance of relational conditions in enabling communication, collaboration, professional autonomy, and mutual professional regard and respect through which high-quality care is enacted.

Implications for practice and health service organisations

These findings have important implications for healthcare organisations seeking to improve workforce and patient outcomes. Interventions targeting individual elements of the practice environment, such as staffing or professional development, may have limited effects when implemented in isolation (83). The findings indicated that strengthening positive professional practice environments involves a coordinated focus on leadership, organisational culture and climate, relational structures, and the conditions through which high-quality practice is enacted (153–155). The proposed conceptual model developed through this review provides a pragmatic framework through which organisations can examine these interconnected dimensions, identifying areas requiring targeted interventions across the domains and subdomains, and recognise how changes within one element may influence conditions elsewhere within the system.

A particular implication is the need to shift attention from identifying which leadership style is most effective, towards understanding what leaders do, how their behaviours operate within context, and the conditions those behaviours enable for others. Viewed in this way, leadership represents a mechanism through which the relational infrastructure, or social architecture, of the organisation is intentionally shaped. Trust, psychological safety, respect, collaboration, and shared accountability represent less visible relational structures through which everyday organisational life operates. These conditions influence how healthcare professionals communicate, make decisions, exercise autonomy, collaborate, learn, respond to risk, and contribute to patient safety and organisational performance.

Making these often-implicit relational structures more explicit provides opportunities for organisations to intentionally recognise, assess, develop, and strengthen them rather than assuming they will emerge from formal structures, policies, or leadership positions alone. This provides a conceptual bridge to humanity-based approaches to leadership, which foreground the relational and human conditions through which people experience their work and organisations. Rather than proposing a particular kind of leadership practice as a recommendation from this review, the findings suggest the value of approaches that intentionally attend to relationships, dignity, trust, psychological safety, human interaction, and the conditions that enable individuals to authentically be present and contribute meaningfully. Such approaches may assist in making the less visible relational infrastructure identified within the conceptual model more explicit and deliberately developed alongside readily measurable organisational structures and resources.

The distributed nature of leadership within the model is also important for organisational practice. While formal leaders hold greater authority and accountability for establishing organisational conditions, positive professional practice environments are co-created through the everyday behaviours and interactions of professionals and people working in healthcare. Every individual contributes to the relational environment through communication, professional conduct, collaboration, decision-making, and their capacity to influence others. Consequently, interventions directed towards formal

organisational structures without attending to the behaviours and relationships through which those structures are enacted, are likely to have limited effect.

Realist theory provides a useful lens through which to consider these less visible processes. Mechanisms are conceptualised as resources operating within a particular context-including constituent elements, behaviours, relationships and interacting processes-and how these influence individuals' reasoning, and subsequent outcomes (156, 157). Mechanisms are similarly central to normalisation process theory (NPT), described as a 'mechanism-based theory of how implementation processes work and how they are accomplished in practice' (p. 5) (158). Both perspectives direct attention towards processes that may otherwise become normalised or taken-for-granted, and towards understanding how practices become embedded in everyday work (159). Applying this lens to professional practice environments, shifts attention from measurable characteristics alone towards understanding the mechanisms through which these characteristics operate and interact within context (160). These findings suggest that leadership capabilities required to establish and sustain positive professional practice environments may operate through everyday behaviours and interactions that enable, reinforce, or constrain the relational and organisational conditions within which professional practice occurs.

Implications for measurement and research

This review demonstrates the value of measurement instruments as representations of the constructs through which professional practice environments have been conceptualised and operationalised. However, it also highlights an inherent limitation of standardised instruments: while they readily capture constructs that can be clearly defined and operationalised, including organisational structures, policies, resources, processes, and observable professional behaviours, they are less able to capture the complex, less visible social and relational conditions through which these environments are experienced, negotiated and enacted. Trust, psychological safety, informal influence, reciprocity and the quality of interpersonal relationships are dynamic and context-dependent and may therefore be more difficult to represent within standardised measures. Consequently, while existing instruments provide valuable insights into the characteristics associated with positive professional practice environments, they may only partially capture relational processes and interactions through which these characteristics are created, experienced and sustained.

The challenge for future research is therefore not simply to develop additional measures of individual practice environment characteristics, but to consider how measurement approaches might better capture their dynamic and interconnected nature. The proposed conceptual model provides a framework for examining both constituent elements and the relationships between them, including how leadership behaviours, relational conditions, organisational structures and high-quality practice interact across different contexts. This may require approaches that complement standardised instruments with methods capable of examining relational processes, contextual variation, and change over time.

Human-centred leadership, which accommodates the complexities of healthcare and the diversity of contexts in which healthcare is delivered (161), provides one potentially useful lens through which these

less visible relational processes can be examined. Human-centred leadership aligns with the proposed conceptual model through its attention to the interactions between people, relationships, organisational conditions and the enactment of practice. Human-centred leadership has been proposed as an approach for strengthening organisational culture and climate through collaborative relationships, accountability, and continuous learning (162). These conditions are consistent with those associated across the wider practice environment literature with workforce retention and resilience (86, 107, 109), innovation, continuous learning and evidence-informed practice (2, 11, 63, 70, 97, 111), strong patient safety culture (61, 63, 67, 108) and improved quality and sustainability of healthcare (64, 107, 108).

Importantly, measurement instruments do more than describe professional practice environments; what is measured can influence what organisations subsequently attend to and seek to change. Existing instruments make many formal structures and organisational characteristics visible, while the relational mechanisms through which these conditions function may remain comparatively obscured. Organisations may therefore inadvertently intervene on what is readily measurable without recognising the relational conditions that enable or constrain those characteristics in practice. For example, communication, autonomy, participation in decision-making, or professional relationships may be measured without revealing the underlying conditions that allow them to flourish or inhibit their expression. Greater attention to these underlying processes may help explain why apparently similar organisational structures or resources produce different experiences and outcomes across different practice contexts.

Human-centred healthcare, in which humanity and perspectives of those involved in care processes are valued (163), consequently requires attention to what organisations provide and measure, and how people experience and enact those conditions through relationships and interactions. Human-centred leadership offers one approach through which the interactions between leadership, organisational context, and practice enactment may be made more explicit. Future research could examine whether incorporating relational and contextual dimensions into practice environment assessment provides greater explanatory capacity for understanding how positive professional practice environments develop, are sustained, and influence workforce and patient outcomes.

Strengths and limitations

A key strength of this review is the systematic synthesis of a large and diverse body of literature, enabling identification of recurrent and conceptually consistent elements across multiple measurement instruments, healthcare contexts and geographical settings. Analysis of instrument domains, subscales, constructs, and individual items provided an empirically grounded approach to identifying and synthesising the constituent elements of professional practice environments into an integrated conceptual model. Importantly, this approach enabled examination not only of the characteristics most consistently represented across instruments, but also of how these elements were conceptually organised and interrelated.

However, the review is inherently limited by its reliance on published measurement instruments as the primary source of data. While this provided a systematic means of examining how professional practice environments have been conceptualised and operationalised, measurement instruments necessarily focus on constructs that can be defined and measured. Consequently, less visible relational and contextual mechanisms, including trust, psychological safety, informal influence, reciprocity, and the nuanced interactions through which practice environments are experienced and sustained, may therefore be less readily explicated within standardised instruments. The proposed conceptual model consequently represents the constituent elements and the relationships identifiable through existing measurement approaches, rather than an exhaustive representation of the mechanisms through which positive professional practice environments develop and operate.

This model also predominantly reflects a nursing perspective and may not fully capture the wider interprofessional nature of healthcare practice contexts. All but two of the included studies focused specifically on nursing practice environments, and although other healthcare professionals were represented through constructs such as nurse-physician relationships and interprofessional collaboration, these were largely examined from nurses' perspectives. Only one study examined the practice environment from the perspectives of multiple professional groups within the same healthcare setting. This is important because professional practice environments are collectively experienced and co-created by all who work within them, with the behaviours, relationships, and interactions of different professional groups contributing to the wider environment. Although nurses and midwives comprise a substantial proportion of the healthcare workforce, the proposed model may therefore not fully represent the interprofessional nature of contemporary healthcare practice. Future research could examine its applicability across professional groups and whether additional constituent elements, relationships, or mechanisms emerge from a broader interprofessional perspective.

Finally, the exclusion of non-English language studies and grey literature may have limited the breadth and contextual diversity of the evidence. Conceptualisations or measurement approaches developed within different linguistic, cultural, or organisational contexts may therefore be underrepresented, and need to be considered when interpreting the transferability of the proposed model across healthcare professions, systems and contexts.

Conclusions

Professional nursing practice environments are not collections of isolated elements or organisational characteristics. Rather, they are dynamic and interdependent phenomena shaped through the interaction of leadership, organisational context, relational conditions and the enactment of professional practice. By synthesising the constituent elements represented within existing measurement instruments, this review proposes an integrated conceptual model comprising three interconnected domains: Leadership, Organisational Culture and Climate, and High-Quality Practice. The model moves beyond describing what constitutes a positive professional practice environment to clarify how its constituent elements interact to shape the creation, experience and sustainability of these environments.

Leadership is positioned as both a constituent domain and an enabling mechanism through which relational, social, structural and practice conditions are shaped. Although formal leaders retain greater authority and accountability for organisational conditions, professional practice environments are continually reinforced or constrained through the everyday relationships, communication, behaviours and professional practice of those working within them. This conceptualisation shifts attention beyond individual leader attributes or preferred leadership styles towards the behaviours and conditions that enable healthcare professionals to practice safely, autonomously and proficiently, and to contribute meaningfully to high-quality care.

The proposed model provides a foundation for future research, refinement of existing frameworks, and development of measurement approaches that better account for the interconnected structural, organisational, relational, and social dimensions of positive professional practice environments. This provides a stronger conceptual basis for intentionally developing and sustaining practice environments that support healthcare professionals' wellbeing, organisational performance, and high-quality patient care.

Abbreviations

AACN: American Association of Critical-Care Nurses; ICN: International Council of Nurses; NWI: Nursing Work Index; NWI-R: Revised Nursing Work Index; PCC: Population, Concept, Context; PES-NWI: Practice Environment Scale of the Nursing Work Index; PRISMA-ScR: Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews; RN: Registered nurse.

Declarations

Ethics approval and consent to participate

Not applicable. This scoping review analysed published literature and did not involve human participants, human data or human tissue.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analysed during this study are included in this article and its supplementary information files.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

FC: Conceptualization; Methodology; Investigation; Data Curation; Formal Analysis; Visualization; Writing – Original Draft; Writing – Review and Editing; Project Administration.

AH: Conceptualization; Methodology; Supervision; Validation; Visualization; Writing – Review and Editing.

TF: Conceptualization; Methodology; Supervision; Validation; Visualization; Writing – Review and Editing.

All authors contributed to the interpretation of the findings and refinement of the conceptual model, critically reviewed the manuscript for important intellectual content, approved the final manuscript and agree to be accountable for all aspects of the work.

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References

1. International Centre for Human Resources in Nursing ICoN, ICN. Positive Practice Environments - Fact sheet. In: International Council of Nurses I, editor. International Centre for Human Resources in Nursing. Geneva: International Centre for Human Resources in Nursing; 2007.
2. Aiken LH, Buchan J, Ball J, Rafferty AM. Transformative impact of Magnet designation: England case study. *Journal of Clinical Nursing*. 2008;17(24):3330-7.
3. Van Bogaert P, Peremans L, Van Heusden D, Verspuy M, Kureckova V, Van de Cruys Z, Franck E. Predictors of burnout, work engagement and nurse reported job outcomes and quality of care: A mixed method study. *BMC Nursing*. 2017;18:1-14.
4. Cummings GG, Tate K, Lee S, Wong CA, Paananen T, Micaroni SP, Chatterjee GE. Leadership styles and outcome patterns for the nursing workforce and work environment: A systematic review. *Int J Nurs Stud*. 2018;85:19-60.

5. Marufu TC, Collins A, Vargas L, Gillespie L, Almghairbi D. Factors influencing retention among hospital nurses: Systematic review. *British Journal of Nursing*. 2021;30(5):302-8.
6. Berman MG, Kardan O, Kotabe HP, Nusbaum HC, London SE. The promise of environmental neuroscience. *Nature human behaviour*. 2019;3(5):414-7.
7. Schumann G, Andreassen OA, Banaschewski T, Calhoun VD, Clinton N, Desrivieres S, et al. Addressing global environmental challenges to mental health using population neuroscience: A review. *JAMA psychiatry*. 2023.
8. Pereira S, Fassarella C, Ribeiro O. Development and validation of the "Program to Promote Positive Nursing Practice Environments": Modified delphi study. *Healthcare*. 2024;12(17):1748.
9. Braithwaite J, Herkes J, Ludlow K, Testa L, Lamprell G. Association between organisational and workplace cultures, and patient outcomes: Systematic review. *BMJ Open*. 2017;7(11):e017708.
10. Yu H, Brooks Carthon JM, Aiken LH, McHugh MD, Golinelli D. The influence of Pathway to Excellence ® designation on patient satisfaction. *JONA: The Journal of Nursing Administration*. 2025.
11. McHugh MD, Kelly LA, Smith HL, Wu ES, Vanak JM, Aiken LH. Lower mortality in magnet hospitals. *Medical care*. 2013;51(5):382-8.
12. Yu H, Golinelli D, Aiken LH, McHugh MD, Brooks Carthon JM. The protective effect of Pathway to Excellence designation on patient satisfaction during the COVID-19 pandemic. *International Journal for Quality in Health Care*. 2025;37(4).
13. Dans M, Lundmark V. The effects of positive practice environments: Leadership must-knows. *Nursing Management*. 2019;50(10):7-10.
14. White J, Gunn M, Chiarella M, Catton H, Stewart D. Renewing the definitions of nursing and a nurse: Final project report. *International Council of Nurses*. 2025:2025-06.
15. Baumann A. International Council of Nurses (ICN) positive practice environments: Quality workplaces= quality patient care, information and action tool kit.[Electronic version]. 2007.
16. World Health O. State of the world's nursing 2025: Investing in education, jobs, leadership and service delivery. *World Health Organization*; 2025. Report No.: 9240110232.
17. Peta D, Navarroli JE. Supporting a healthy work environment and just Cclture in the emergency care setting: JEN. *Journal of Emergency Nursing*. 2024;50(2):305-11.
18. Rabie T, Klopper HC, Coetzee SK. Creating positive practice environments in a primary health care setting. *International Journal of Nursing Practice (John Wiley & Sons, Inc)*. 2017;23(4).
19. Ulrich B, Cassidy L, Barden C, Varn-Davis N, Delgado SA. National nurse work environments - October 2021: A status report. *Critical Care Nurse*. 2022;42(5):58-70.
20. Wei H, Sewell KA, Woody G, Rose MA. The state of the science of nurse work environments in the United States: A systematic review. *International Journal of Nursing Sciences*. 2018;5(3):287-300.
21. Al-Hamdan Z, Manojlovich M, Tanima B. Jordanian nursing work environments, intent to stay, and job satisfaction. *Journal of nursing scholarship*. 2017;49(1):103-10.

22. Al Sabei SD, Labrague LJ, Miner Ross A, Karkada S, Albashayreh A, Al Masroori F, Al Hashmi N. Nursing work environment, turnover intention, job burnout, and quality of care: The moderating role of job satisfaction. *Journal of nursing scholarship*. 2020;52(1):95-104.
23. Baernholdt M, Mark BA. The nurse work environment, job satisfaction and turnover rates in rural and urban nursing units. *Journal of nursing management*. 2009;17(8):994-1001.
24. Laschinger HKS, Finegan J, Wilk P. New graduate burnout: The impact of professional practice environment, workplace civility, and empowerment. *Nursing Economic\$*. 2009;27(6):377-83.
25. Nantsupawat A, Kunaviktikul W, Nantsupawat R, Wichaikhum O-A, Thienthong H, Poghosyan L. Effects of nurse work environment on job dissatisfaction, burnout, intention to leave. *International Nursing Review*. 2017;64(1):91-8.
26. Schein EH. *Organisational culture and leadership*. 5th ed. Hoboken, New Jersey: Wiley; 2017.
27. Regan K. Leadership identity formation in nonprofit human service organizations. *Human Service Organizations: Management, Leadership & Governance*. 2016;40(5):435-40.
28. Arieli S, Lee F, Sagiv L. Roles affect individuals' preferences for organizations: A values perspective. *Journal of Experimental Psychology: Applied*. 2020;26(2):350-9.
29. Tabakakis C, McAllister M, Bradshaw J. Burnout in New Zealand registered Nurses: The role of workplace factors. *Kai Tiaki Nursing Research*. 2020;11(1):9-16.
30. Thumm EB, Flynn L. The five attributes of a supportive midwifery practice climate: A review of the literature. *J Midwifery Womens Health*. 2018;63(1):90-103.
31. Pollock D, Evans C, Jia RM, Alexander L, Pieper D, de Moraes ÉB, et al. "How-to": Scoping review? *Journal of clinical epidemiology*. 2024;176:111572.
32. Poitras M-E, Chouinard M-C, Fortin M, Gallagher F. How to report professional practice in nursing? A scoping review. *BMC nursing*. 2016;15(1):31.
33. Mark BA, Salyer J, Wan T. Professional nursing practice. *Journal of Nursing Administration*. 2003;33(4):224-34.
34. Nursing and Midwifery Board of Australia. Registered nurse standards for practice.: Nursing and Midwifery Board of Australia; 2016 [Available from: <https://www.nursingmidwiferyboard.gov.au/Codes-Guidelines-Statements/Professional-standards.aspx>].
35. Davis K, Drey N, Gould D. What are scoping studies? A review of the nursing literature. *Int J Nurs Stud*. 2009;46(10):1386-400.
36. Ribeiro OMPL, Vicente CMFdB, Martins MMFPdS, Vandresen L, Silva JMAVd. Instruments for assessing professional nursing practice environments: An integrative review. *Revista Gaúcha de Enfermagem*. 2020;41.
37. Ali M, Ameer W, Ahmad Z, Aljounaidi A, Atiek A-H. Exploring the quality of care and the nursing practice environment in Saudi Arabia. *Qlantic Journal of Social Sciences*. 2024;5(4):182-96.

38. Antoszewska A, Gutysz – Wojnicka A. Rationing of nursing care and assessment of work safety and a healthy work environment in intensive care units: A cross-sectional, correlational study. *Intensive & critical care nursing*. 2024;83:103667.
39. Bloemhof J, Knol J, Van Rijn M, Buurman BM. The implementation of a professional practice model to improve the nurse work environment in a Dutch hospital: A quasi-experimental study. *Journal of Advanced Nursing*. 2021;77(12):4919-34.
40. Borges EMdN, Sequeira CAdC, Queirós CML, Mosteiro-Díaz MP. Workaholism, engagement and family interaction: Comparative study in Portuguese and Spanish nurses. *Journal of Nursing Management*. 2021;29(4):731-40.
41. Brešan M, Erčulj V, Lajovic J, Ravljen M, Sermeus W, Grosek Š. The relationship between the nurses' work environment and the quality and safe nursing care: Slovenian study using the RN4CAST questionnaire. *PloS one*. 2021;16(12):e0261466.
42. Chen X, Tao Z, Tang Y, Yan X. Status and associations of nursing practice environments in intensive care units: A cross-sectional study in China. *Journal of Nursing Management*. 2022;30(7):2897-905.
43. Cheng L, Cui Y, Chen Q, Ye Y, Liu Y, Zhang F, et al. Paediatric nurses' general self-efficacy, perceived organizational support and perceived professional benefits from Class A tertiary hospitals in Jilin province of China: the mediating effect of nursing practice environment. *BMC Health Services Research*. 2020;20(1):12.
44. Collins Atta P, Donkor E, Naab F. Impacts of nursing work environment on turnover intentions: The mediating role of burnout in Ghana. *Nursing Research and Practice*. 2022;2022.
45. Dan X, Huang Y, Ren J-H, Tian Y-L, He Y-L. Professional nursing practice environment and work engagement: The mediating roles of self-efficacy and achievement motivation. *The Journal of Nursing Research*. 2023;31(4):1-11.
46. de Oliveira Riboldi C, Gasparino RC, Wegner W, Henriqson E, Saurin TA, de Magalhães AMM. The nursing practice environment and hospital sociotechnical complexity: A mixed-methods study. *Revista Brasileira de Enfermagem*. 2024;77(6):1-8.
47. Dutra CKDR, Guirardello EDB. Nurse work environment and its impact on reasons for missed care, safety climate, and job satisfaction: A cross-sectional study. *Journal of Advanced Nursing*. 2021;77(5):2398-406.
48. Dutra HS, Guirardello EdB. Nursing work environment and accreditation: Is there a relationship? *Journal of Nursing Management*. 2021;29(7):2183-8.
49. Eriksson M, Johannesson E, Kerekes N, Emilsson M, Pennbrant S, Nunstedt H. Development and psychometric test of the salutogenic survey on sustainable working life for nurses: Identifying resistance resources against stress. *International Journal of Environmental Research and Public Health*. 2024;21(2).
50. Falguera CC, De los Santos JAA, Galabay JR, Firmo CN, Tsaras K, Rosales RA, et al. Relationship between nurse practice environment and work outcomes: A survey study in the Philippines. *International journal of nursing practice*. 2021;27(1):e12873.

51. Furlan JAdS, Guirardello EdB. Practice environment and burnout in intensive care units: Is job satisfaction a mediator in this relationship? *Revista latino-americana de enfermagem*. 2025;33.
52. Gasparino RC, Ferreira TDM, de Carvalho KMA, Rodrigues ESA, Tondo JCA, da Silva VA. Evaluation of the professional practice environment of nursing in health institutions. *Acta paulista de enfermagem*. 2019;32(4):449-55.
53. Gasparino RC, Martins MCP, dos Santos Alves DF, Ferreira TDM. Validation of the Practice Environment Scale among nursing technicians and aides. *Acta Paulista de Enfermagem*. 2020;33(3):1-6.
54. Gasparino RC, Thelen Daiana Mendonça F, Henrique Ceretta O, Daniela Fernanda dos Santos A, Balsanelli AP. Leadership, adequate staffing and material resources, and collegial nurse–physician relationships promote better patients, professionals and institutions outcomes. *Journal of Advanced Nursing*. 2021;77(6):2739-47.
55. Gomes de Paula A, Gasparino RC, Bohomol E. The nursing practice environment in a university hospital during the COVID-19 pandemic. *Texto & Contexto Enfermagem*. 2024;33:1-14.
56. Hlebichuk J, Lancaster R, Tuzik Micek W, Perusich S, Fick K, Perumalswamy K. Exploring nurses' personal and professional values and care quality: A convergent mixed-methods analysis. *Western journal of nursing research*. 2025;47(2):61-70.
57. Hou Y, Timmins F, Zhou Q, Wang J. A cross-sectional exploration of emergency department nurses' moral distress, ethical climate and nursing practice environment. *International Emergency Nursing*. 2021;55:100972.
58. Jingxia C, Longling Z, Qiantao Z, Weixue P, Xiaolian J. The changes in the nursing practice environment brought by COVID-19 and improvement recommendations from the nurses' perspective: A cross-sectional study. *BMC Health Services Research*. 2022;22(1):754.
59. Kim SO, Kim JS. Association of work environment and resilience with transition shock in newly licensed nurses: A cross-sectional study. *Journal of Clinical Nursing*. 2021;30(7-8):1037-45.
60. Kasmai Kiptulon E, Elmadani M, Mbaabu Limungi G, Szóllósi A, Adi Galgalo D, Murage P, et al. Validation of the psychometric properties of the Practice Environment Scale of Nursing Work Index (PES-NWI) questionnaire in the context of Kenya's nursing organizational work culture. *International Journal of Africa Nursing Sciences*. 2024;20:100750.
61. Labrague LJ. Linking nurse practice environment, safety climate and job dimensions to missed nursing care. *International nursing review*. 2022;69(3):350-8.
62. Lai W, Jin R, He R, Ding X. Current situation and influencing factors of the nursing practice environment in five tertiary general hospitals in Shenzhen: A cross-sectional study. *Journal of Public Health*. 2023;31(2):213-20.
63. Lee W, Jang I. Effect of nurses' professionalism, work environment, and communication with health professionals on patient safety culture (AHRQ 2.0.): A cross-sectional multicenter study. *Journal of Nursing Management*. 2023;2023.

64. Liu X, Guo Y, Zhou Y, Zhou Y. The present situation of the nursing practice environment and its influence on nursing quality in a post-epidemic era: A cross-sectional study. *BMC Nursing*. 2024;23(1):543.
65. Lopes RP, Oliveira RM, Gomes MSdB, Santiago JCdS, Silva RCR, de Souza FL. Professional practice environment and nursing work stress in neonatal units. *Revista da Escola de Enfermagem da USP*. 2021;55.
66. Magalhães AMMd, Cunha DRMdF, Moura GMSSd, Urbanetto JdS, Wegner W, Oliveira JLCd. The environment of the nursing team's professional practice in inpatient units of a university hospital. *Revista Gaúcha de Enfermagem*. 2020;41.
67. Membrillo-Pillpe NJ, Zeladita-Huaman JA, Jauregui-Soriano K, Zegarra-Chapoñan R, Franco-Chalco E, Samillan-Yncio G. Association between the nursing practice environment and safety perception with patient safety culture during COVID-19. *International Journal of Environmental Research and Public Health*. 2023;20(10):5909.
68. Monroe M, Morse E, Price JM. The relationship between critical care work environment and professional quality of life. *American Journal of Critical Care*. 2020;29(2):145-9.
69. Perondi AR, Trindade LdL, Ribeiro OMPL, Gomes JT, Menegaz JdC, Amestoy SC, et al. Nursing professional practice environments and job satisfaction: Process and outcome interfaces. *Revista brasileira de enfermagem*. 2025;78(2).
70. Pursio K, Kankkunen P, Mikkonen S, Kvist T. Organizational characteristics of nursing practice environments related to registered nurses' professional autonomy and job satisfaction in two Finnish Magnet-aspiring hospitals: Structural equation modeling study. *BMC Nursing*. 2024;23(1):100.
71. Pereira Lima Silva R, Gonçalves Meneguetti M, Dias Castilho Siqueira L, de A, Thamiris Ricci, Auxiliadora-Martins M, Mantovani Silva Andrade L, Laus AM. Omission of nursing care, professional practice environment and workload in intensive care units. *Journal of Nursing Management*. 2020;28(8):1986-96.
72. Ribeiro OMPL, Vicente CMFdB, Sousa CN, Teles PJFC, Trindade LdL, Martins MMFPdS, Cardoso MFPT. Scale for the Environment Evaluation of Professional Nursing Practice: Construct validation. *Journal of Nursing Management*. 2021;29(6):1809-18.
73. Ribeiro OMPL, Cardoso MF, de Lima Trindade L, da Rocha CG, Teles PJFC, Pereira S, et al. From the first to the fourth critical period of COVID-19: What has changed in nursing practice environments in hospital settings? *BMC Nursing*. 2023;22(1):53.
74. Ribeiro OM, Coimbra VM, Pereira SC, Faria AD, Teles PJ, Rocha CG. Impact of COVID-19 on the environments of professional nursing practice and nurses' job satisfaction. *International Journal of Environmental Research and Public Health*. 2022;19(24):16908.
75. Rivaz M, Tavakolinia M, Momennasab M. Nursing professional practice environment and its relationship with nursing outcomes in intensive care units: A test of the structural equation model. *Scandinavian Journal of Caring Sciences*. 2021;35(2):609-15.

76. Ryoo E, Jeong SH, Shin NY, Yu S. Hospital nurse managers' perspectives of the Magnet recognition program using an importance-performance analysis: A quantitative cross-sectional study. *Nursing open*. 2024;11(8):e70015.
77. Salas-Bergües V, Lizarazu-Armendáriz E, Eraso-Pérez de Urabayen M, Mateo-Manrique P, Mendivil-Pérez M, Goñi-Viguria R. Levels of burnout and exposure to ethical conflict and assessment of the practice environment in nursing professionals of intensive care. *Enfermería Intensiva (English ed)*. 2023;34(4):195-204.
78. Salem SM, Bakeer HM, El Shrief HA. Nurses' perception of the professional practice environment and its relation to organizational dehumanization and work passion. *BMC nursing*. 2025;24(1):668.
79. Santos JLGd, Balsanelli AP, Freitas EdO, Menegon FHA, Carneiro IA, Lazzari DD, et al. Work environment of hospital nurses during the COVID-19 pandemic in Brazil. *International Nursing Review*. 2021;68(2):228-37.
80. Sarıköse S, Göktepe N. Effects of nurses' individual, professional and work environment characteristics on job performance. *Journal of Clinical Nursing*. 2022;31(5-6):633-41.
81. Sheng H, Tian D, Sun L, Hou Y, Liu X. Nurse practice environment, perceived organizational support, general well-being, occupational burnout and turnover intention: A moderated multi-mediation model. *Nursing Open*. 2023;10(6):3828-39.
82. Su L, Wichaikhum O-A, Abhicharttibutra K. Predictors of organizational commitment among Chinese nurses during the COVID-19 pandemic. *International nursing review*. 2023;70(1):111-6.
83. van Kraaij J, de Vries N, Wessel H, Vermeulen H, van Oostveen C. Enhancing work environments and reducing turnover intention: A multicenter longitudinal cohort study on differentiated nursing practices in Dutch hospitals. *BMC nursing*. 2025;24(1):39.
84. Ventura-Silva JM, Martins MM, Trindade LL, Faria AC, Barros SC, Castro SF, et al. Implementation of the primary nursing care model in a hospital service: A quasi-experimental study. *Nursing Forum*. 2024;2024.
85. Yanarico DMI, Balsanelli AP, Gasparino RC, Bohomol E. Classification and evaluation of the environment of the professional nursing practice in a teaching hospital. *Revista latino-americana de enfermagem*. 2020;28:e3376.
86. Ying LY, Ramoo V, Ling LW, Nahasaram ST, Lei CP, Leong LK, Danaee M. Nursing practice environment, resilience, and intention to leave among critical care nurses. *Nursing in critical care*. 2021;26(6):432-40.
87. Yuk S, Yu S. The effect of professional autonomy and nursing work environment on nurses' patient safety activities: A perspective on Magnet hospitals. *Journal of Nursing Management*. 2023;2023(1):5587501.
88. Zelenikova R, Jarosova D, Plevova I, Janikova E. Nurses' perceptions of professional practice environment and its relation to missed nursing care and nurse satisfaction. *International Journal of Environmental Research and Public Health*. 2020;17(11):3805.

89. Schadewaldt V, McElduff B, D'Este C, McInnes E, Dale S, Gunaratne A, et al. Validating the Alberta Context Tool in a multi-site Australian emergency department nurse population. *PLOS ONE*. 2019;14(4):e0215153.
90. Mihdawi M, Al-Amer R, Darwish R, Randall S, Afaneh T. The influence of nursing work environment on patient safety. *Workplace health & safety*. 2020;68(8):384-90.
91. Dorneles Nery Galiotti V, Almeida de Moura A, Kowal Olm Cunha IC, Gasparino RC, Pazetto Balsanelli A. Nurses' leadership coaching and its relationship with the professional practice environment in nursing. *Texto & Contexto Enfermagem*. 2024;33:1-14.
92. Banks J, Thapa DK, Lopez V, Sahay A, Cleary M. Prevalence and predictors of compassion fatigue among Australian oncology nurses caring for adult cancer patients: A cross-sectional study. *European journal of oncology nursing : the official journal of European Oncology Nursing Society*. 2025;74:102792.
93. Ibrahim El-Sayed AA, Ramadan Asal MG, Farghaly Abdelaliem SM, Alsenany SA, Elsayed BK. The moderating role of just culture between nursing practice environment and oncology nurses' silent behaviors toward patient safety: A multicentered study. *European journal of oncology nursing : the official journal of European Oncology Nursing Society*. 2024;69:102516-.
94. Shin S-U, Yeom H-E. The effects of the nursing practice environment and self-leadership on person-centered care provided by oncology nurses. *Journal of hospice and palliative care*. 2021;24(3):174.
95. Igland J, Potrebny T, Bendixen BE, Haugstvedt A, Espehaug B, Titlestad KB, Graverholt B. Translation and validation of the Alberta Context Tool for use in Norwegian nursing homes. *PLOS ONE*. 2021;16(10):e0258099.
96. Williams KM, Campbell CM, House S, Hodson P, Swiger PA, Orina J, et al. Healthy work environment: A systematic review informing a nursing professional practice model in the US Military Health System. *Journal of advanced nursing*. 2024;80(9):3565-76.
97. Lukasse M, Henriksen L. Norwegian midwives' perceptions of their practice environment: A mixed methods study. *Nursing open*. 2019;6(4):1559-70.
98. Smith S, Lapkin S, Halcomb E, Sim J. Job satisfaction among small rural hospital nurses: A cross-sectional study. *Journal of Nursing Scholarship, suppl Special Issue: Health Policy Implications: Lessons Learned From Covid-19*. 2023;55(1):378-87.
99. Ogata Y, Sasaki M, Fujiyoshi-Ito A, Lapreziosa N, Yonekura Y. Developing a revised short form of the Practice Environment Scale for home healthcare: A nationwide cross-sectional study for healthcare professionals. *Cureus*. 2025;17(11):e97403.
100. Lowe MA, Prapanjaroensin A, Bakitas MA, Hites L, Loan LA, Raju D, Patrician PA. An exploratory study of the influence of perceived organizational support, coworker social support, the nursing practice environment, and nurse demographics on burnout in palliative care nurses. *Journal of hospice and palliative nursing : JHPN : the official journal of the Hospice and Palliative Nurses Association*. 2020;22(6):465-72.

101. Janíková E, Zeleníková R, Jarošová D, Plevová I, Mynaříková E. Work environment assessment instruments used in nursing. *KONTAKT-Journal of Nursing & Social Sciences related to Health & Illness*. 2021;23(4):263-73.
102. Lake ET, Zhang B, Tong J, Mpundu G, Gross KN, Correa MH, et al. International benchmarks for the Practice Environment Scale of the Nursing Work Index: A meta-analysis. *Nursing & health sciences*. 2024;26(4):e70013.
103. Danno CH, Esteves LSF, Bohomol E. Quality improvement programs and the professional nursing practice environment: An integrative review. *Revista Brasileira de Enfermagem*. 2021;74(1):1-7.
104. Jäppinen K, Roos M, Slater P, Suominen T. Connection between nurse managers' stress from workload and overall job stress, job satisfaction and practice environment in central hospitals: A cross-sectional study. *Nordic Journal of Nursing Research*. 2021;42(2):109-16.
105. Al Yahyaei A, Hewison A, Efsthathiou N, Carrick-Sen D. Nurses' intention to stay in the work environment in acute healthcare: A systematic review. *Journal of Research in Nursing*. 2022;27(4):374-97.
106. de Lima Trindade L, Guerreiro BdC, de Oliveira SMS, Ventura-Silva JMA, Rostirolla L, Zuge SS, Ribeiro OMPL. Evaluation of professional nursing practice environments in primary health care. *Frontiers in public health*. 2024;12:1477067.
107. Gensimore MM, Maduro RS, Morgan MK, McGee GW, Zimbro KS. The Effect of Nurse Practice Environment on Retention and Quality of Care via Burnout, Work Characteristics, and Resilience: A Moderated Mediation Model. *The Journal of nursing administration*. 2020;50(10):546-53.
108. Lucas P, Élvio J, Almeida S, Araújo B. Relationship of the nursing practice environment with the quality of care and patients' safety in primary health care. *BMC Nursing*. 2023;22:1-10.
109. Reinhardt AC, León TG, Amatya A. Why nurses stay: Analysis of the registered nurse workforce and the relationship to work environments. *Applied nursing research*. 2020;55:151316.
110. Moloney W, Cheung G, Jacobs S. Key elements to support primary healthcare nurses to thrive at work: A mixed-methods sequential explanatory study. *Journal of Advanced Nursing*. 2024;80(9):3812-24.
111. Lucas P, Élvio J, Almeida S, Costa P, Cruchinho P, Teixeira G, Araújo B. The nursing practice environment and job satisfaction, intention to leave, and burnout among primary healthcare nurses: A cross-sectional study. *Nursing Reports*. 2025;15(7):224.
112. Pursio K, Kankkunen P, Sanner-Stiehr E, Kvist T. Professional autonomy in nursing: An integrative review. *Journal of Nursing Management*. 2021;29(6):1565-77.
113. George N, Pascale A, Warshawsky NE. Practice environment and nurse outcomes by ANCC Designation: Insights from NDNQI. *Journal of Nursing Management*. 2025;2025(1):7.
114. Chiminelli-Tomás V, Tutte-Vallarino V, Ferreira-Umpiérrez A, Hernández-Morante JJ, Reche-García C. Impact of nursing practice environments in work engagement and burnout: A systematic review. *Healthcare (Basel)*. 2025;13(7).

115. Lu H, Zhao Y, While A. Job satisfaction among hospital nurses: A literature review. *Int J Nurs Stud*. 2019;94:21-31.
116. Maassen SM, Weggelaar Jansen A, Brekelmans G, Vermeulen H, van Oostveen CJ. Psychometric evaluation of instruments measuring the work environment of healthcare professionals in hospitals: A systematic literature review. *International Journal for Quality in Health Care*. 2020;32(8):545-57.
117. Zhao Y, Ma D, Wan Z, Sun D, Li H, Sun J. Associations between work environment and implicit rationing of nursing care: A systematic review. *Journal of Nursing Management*. 2020;28(8):1841-50.
118. Abdulla Almadani N. Assessment of nursing practice environment in primary healthcare centers in Saudi Arabia: A cross-sectional study. *Sage Open*. 2023;13(4):21582440231208930.
119. Lucas P, Jesus E, Almeida S, Araújo B. Validation of the psychometric properties of the Practice Environment Scale of Nursing Work Index in primary health care in Portugal. *International Journal of Environmental Research and Public Health*. 2021;18(12):6422.
120. Trus M, Galdikiene N, Balciunas S, Green P, Helminen M, Suominen T. Connection between organizational culture and climate and empowerment: The perspective of nurse managers. *Nursing & health sciences*. 2019;21(1):54-62.
121. Sari N. Key elements of professional nursing practice: A scoping review. *Open Access Macedonian Journal of Medical Sciences*. 2021.
122. Gea-Caballero V, Castro-Sánchez E, Juárez-Vela R, Díaz-Herrera MÁ, de Miguel-Montoya I, Martínez-Riera JR. Essential elements of professional nursing environments in primary care and their influence on the quality of care. *Enfermería Clínica (English Edition)*. 2018;28(1):27-35.
123. Maurício LF, Okuno MF, Campanharo CR, Lopes MC, Belasco AG, Batista RE. Professional nursing practice in critical units: Assessment of work environment characteristics. *Revista Latino-Americana de Enfermagem*. 2017;25:e2854.
124. Papastavrou E, Acaroglu R, Sendir M, Berg A, Efstathiou G, Idvall E, et al. The relationship between individualized care and the practice environment: An international study. *Int J Nurs Stud*. 2015;52(1):121-33.
125. American Association of Colleges of Nursing. Hallmarks of the professional nursing practice environment. *Journal of Professional Nursing*. 2002;18(5):295-304.
126. Hult M, Terkamo-Moisio A, Kaakinen P, Karki S, Nurmeksela A, Palonen M, et al. Relationships between nursing leadership and organizational, staff and patient outcomes: A systematic review of reviews. *Nursing Open*. 2023;10(9):5920-36.
127. Cummings GG, Lee S, Tate K, Penconek T, Micaroni SPM, Paananen T, Chatterjee GE. The essentials of nursing leadership: A systematic review of factors and educational interventions influencing nursing leadership. *Int J Nurs Stud*. 2021;115:103842.
128. Althobaiti FM. The effects of leadership on patient safety culture in health care: a systematic review. *BMC Nursing*. 2026;25(1):125.

129. Britto MT, Fuller SC, Kaplan HC, Kotagal U, Lannon C, Margolis PA, et al. Using a network organisational architecture to support the development of learning healthcare systems. *BMJ Quality & Safety*. 2018;27(11):937.
130. Schmidt A. The architecture of resilience: Nursing leadership for sustainable care systems. *Nurse Leader*. 2026;24(2).
131. Ferreira TDM, de Mesquita GR, de Melo GC, de Oliveira MS, Bucci AF, Porcari TA, et al. The influence of nursing leadership styles on the outcomes of patients, professionals and institutions: An integrative review. *Journal of Nursing Management*. 2022;30(4):936-53.
132. Ystaas LMK, Nikitara M, Ghobrial S, Latzourakis E, Polychronis G, Constantinou CS. The impact of transformational leadership in the nursing work environment and patients' outcomes: A systematic review. *Nursing reports*. 2023;13(3):1271-90.
133. Tlhako N, Coetzee SK, Ajanaku OJ, Fourie E. The impact of workplace relationships on nurse-reported quality of care and patient safety in the North West Province. *PLoS ONE*. 2025;20(5):1-16.
134. Al-Rjoub S, Alsharawneh A, Alhawajreh MJ, Othman EH. Exploring the impact of transformational and transactional style of leadership on nursing care performance and patient outcomes. *Journal of Healthcare Leadership*. 2024;16:557-68.
135. Labrague LJ, Obeidat AA. Transformational leadership as a mediator between work–family conflict, nurse-reported patient safety outcomes, and job engagement. *Journal of Nursing Scholarship*. 2022;54(4):493-500.
136. Akbiyik A, Akin Korhan E, Kiray S, Kirsan M. The effect of nurses' leadership behavior on the quality of nursing care and patient outcomes. *Creative Nursing*. 2020;26(1):e8-e18.
137. Alhalal E, Alharbi JF, Alharbi ST, Alotaibi SS, Albagami NS, Alruwaili SM, Alshammari SA. Impact of authentic leadership on nurses' well-being and quality of care in the acute care settings. *Journal of nursing scholarship : an official publication of Sigma Theta Tau International Honor Society of Nursing*. 2024;56(5):718-28.
138. Wei H, King A, Jiang Y, Sewell KA, Lake DM. The impact of nurse leadership styles on nurse burnout: A systematic literature review. *Nurse Leader*. 2020;18(5):439-50.
139. Hughes V, Frangieh J, Fernandes JC. Exploring the dimensions of authentic leadership and its impact on nursing outcomes: An integrative review. *Nursing management*. 2024;55(9):22-8.
140. Labrague LJ. Relationship between transformational leadership, adverse patient events, and nurse-assessed quality of care in emergency units: The mediating role of work satisfaction. *Australasian emergency care*. 2024;27(1):49-56.
141. Deng C, Gulseren D, Isola C, Grocutt K, Turner N. Transformational leadership effectiveness: An evidence-based primer. *Human Resource Development International*. 2023;26(5):627-41.
142. Gadolin C, Larsman P, Skyvell Nilsson M, Pousette A, Törner M. How do healthcare unit managers promote nurses' perceived organizational support, and which working conditions enable them to do so? A mixed methods approach. *Scandinavian Journal of Psychology*. 2022;63(6):648-57.

143. Allwood D, Koka S, Armbruster R, Montori V. Leadership for careful and kind care. *BMJ Leader*. 2022;6(2):125.
144. Dai M, Qiu Y, Xie S, Li X, Xue X, Wang Y, et al. Effect of nurse leadership on national survey and evaluation of inpatient satisfaction: a single-center correlation study. *BMC Nursing*. 2026;25(1):244.
145. Ali Saji Abdullah A, Yousef Awadh Mazi A, Turki Abdulaziz Hamed A, Muhammad Musleh Hammoud A-H, Abdulraheem Basheer A, Ibrahim Saeed A, et al. The role of organizational culture in shaping healthcare service quality: A theoretical perspective. *Journal of international crisis and risk communication research (Print)*. 2024;7(S5):321.
146. de Abreu Pereira SC, Pimenta Lopes Ribeiro OM, Silva Fassarella C, Ferreira Santos EJ. The impact of nursing practice environments on patient safety culture in primary health care: A scoping review. *BJGP Open*. 2024;8(1):1-13.
147. Halm M. The influence of appropriate staffing and healthy work environments on patient and nurse outcomes. *American Journal of Critical Care*. 2019;28(2):152-6.
148. Bourgault AM. Appropriate staffing is necessary for healthy work environments. *Critical care nurse*. 2023;43(1):7-9.
149. Pereira S, Ribeiro M, Mendes M, Ferreira R, Santos E, Fassarella C, Ribeiro O. Positive nursing practice environment: A concept analysis. *Nursing Reports*. 2024;14(4):3052-68.
150. White E, Woodford E, Britton J, Newberry LW, Pabico C. Nursing practice environment and care quality in nursing homes. *Nursing Management*. 2020;51(6):9-12.
151. Stavropoulou A, Rovithis M, Kelesi M, Vasilopoulos G, Sigala E, Papageorgiou D, et al. What quality of care means? Exploring clinical nurses' perceptions on the concept of quality care: A qualitative study. *Clinics and Practice*. 2022;12(4):468-81.
152. Weller JM. Reframing patient safety: Relationships as the core infrastructure of safe care. *Anesthesia and analgesia*. 2026.
153. Paguio JT, Yu DSF, Su JJ. Systematic review of interventions to improve nurses' work environments. *Journal of Advanced Nursing*. 2020;76(10):2471-93.
154. Babaei S, Amini K, Ramezani-Badr F. Unveiling missed nursing care: a comprehensive examination of neglected responsibilities and practice environment challenges. *BMC Health Services Research*. 2024;24(1):1-8.
155. Park SH, Hanchett M, Ma C. Practice environment characteristics associated with missed nursing care. *Journal of Nursing Scholarship*. 2018;50(6):722-30.
156. Shaw J, Gray CS, Baker GR, Denis J-L, Breton M, Gutberg J, et al. Mechanisms, contexts and points of contention: Operationalizing realist-informed research for complex health interventions. *BMC Medical Research Methodology*. 2018;18(1):178.
157. Lemire S, Kwako A, Nielsen SB, Christie CA, Donaldson SI, Leeuw FL. What is this thing called a mechanism? Findings from a review of realist evaluations. *New Directions for Evaluation*. 2020;2020(167):73-86.

158. May C, Finch T, Rapley T. Normalisation Process Theory: Its consolidation and application in implementation research and practice [version 1; peer review: 2 approved with reservations]. NIHR Open Research. 2026;6(79).
159. Dalkin SM, Hardwick RJL, Haighton CA, Finch TL. Combining realist approaches and Normalization Process Theory to understand implementation: A systematic review. Implementation Science Communications. 2021;2(1):68.
160. Dalkin SM, Greenhalgh J, Jones D, Cunningham B, Lhussier M. What's in a mechanism? Development of a key concept in realist evaluation. Implementation Science. 2015;10(1):49.
161. Leclerc L, Campis S, Kennedy K. Human-centered leadership in healthcare®: From concept to movement. Nurse Leader. 2026;102817.
162. Kennedy K, Campis S, Leclerc L. Human-centered leadership: Creating change from the inside out. Nurse Leader. 2020;18(3):227-31.
163. Makoul G. Human-centered healthcare: An organizing principle for reinforcing the humanity of healthcare. Patient Education and Counseling. 2026;148:109559.

Figures

Figure 1 – PRISMA diagram

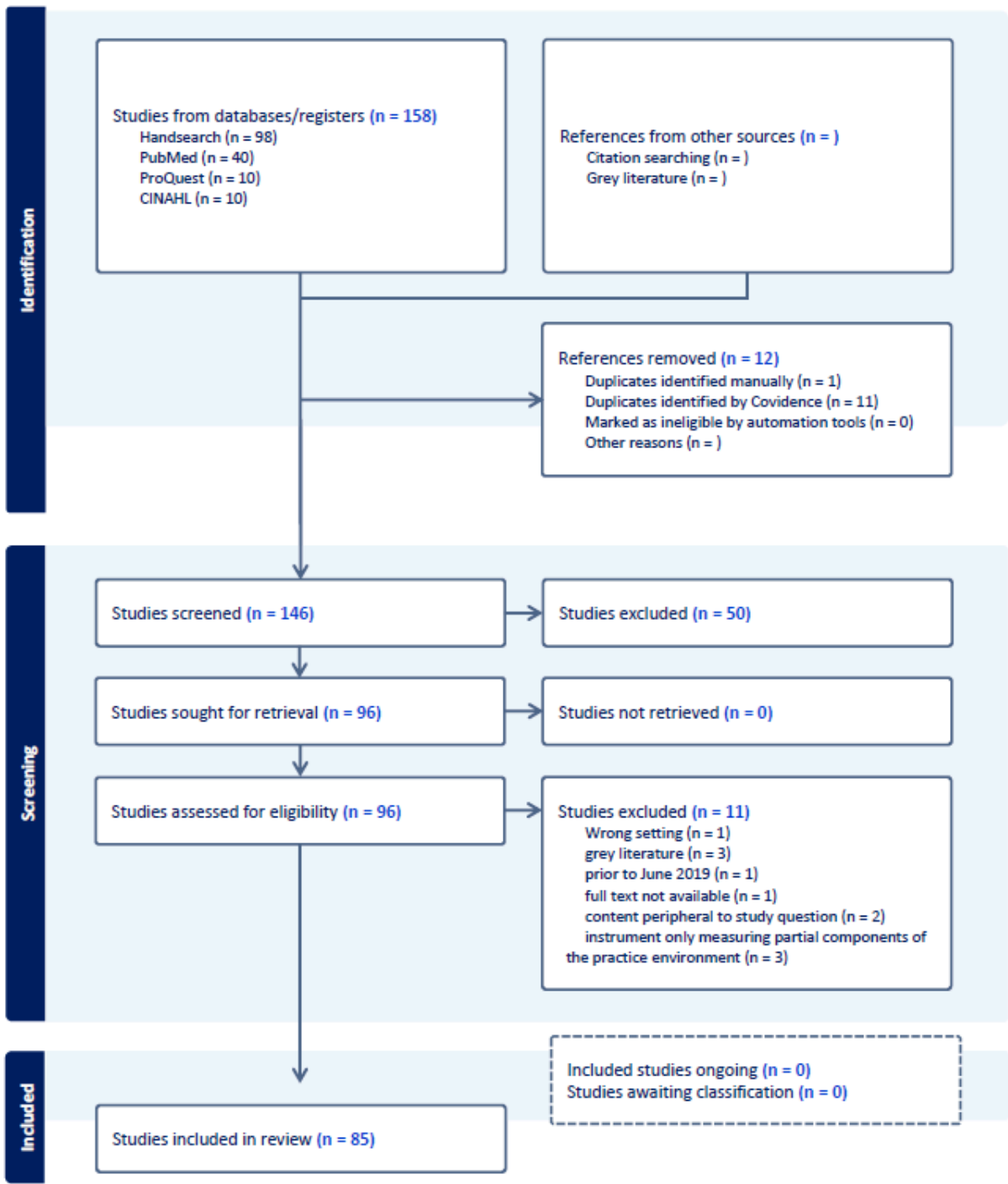


Figure 1

PRISMA flow diagram of study identification and selection.

Flow diagram showing the identification, screening, eligibility assessment and inclusion of publications in the scoping review. PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Figure 2



Figure 2

Conceptual model of professional nursing practice environments as interconnected systems.

The model comprises three interconnected domains: Leadership, Organisational Culture and Climate, and High-Quality Practice. Leadership is positioned as both a constituent domain and an enabling mechanism that intersects with the relational, structural and practice conditions through which professional nursing practice environments are created, experienced and sustained. The bidirectional relationships represent reciprocal and non-linear influences among the domains.

Supplementary Files

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- [Additionalfile1.Characteristicsofincludedpublicationsandmeasurementinstrumentsfinal.docx](#)
- [Additionalfile2Crossinstrumentmappingofconstituentelements.docx](#)