

PERMANENT HEALTH EDUCATION IN NURSING AND EDUCATIONAL TECHNOLOGIES FOR IMPROVING HOSPITAL CARE

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Abstract: This study examined barriers to permanent health education in nursing and contributions of educational technologies in hospitals. An integrative review used a targeted PubMed search and verification of a previous bibliography, covering publications from 2020 to 2025. Of 86 records identified, 23 full texts were assessed and 16 studies entered a descriptive and thematic synthesis. Findings addressed participation conditions, educational strategies, and measured outcomes. Workload, lack of time, funding constraints, and digital access restricted participation. Simulation and learning platforms showed favorable findings for knowledge, confidence, or implementation, with methodological limitations. In one Brazilian study, simulation and interactive lectures improved theoretical performance without a significant difference between methods. Perceptions and educational indicators predominated and did not establish reduced adverse events. Improving care requires alignment between service needs, staff participation, managerial support, and assessment of learning transfer. Restricted coverage, screening without independent duplication, and unretrieved texts limit the conclusions.

Keywords: permanent health education; nursing; educational technology; hospital care; patient safety.

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INTRODUCTION

Learning on the job integrates the challenges of hospital nursing, whose performance involves updating knowledge and decisions in complex clinical situations. Continuing Education in Health (PHE) places everyday problems as a starting point for analyzing and transforming practices. In Brazil, Ordinance No. 1,996/2007 guides the articulation between training, service needs and development of workers in the Unified Health System (Brasil, 2007). This perspective requires understanding how hospital organization allows teams to identify problems, discuss alternatives and monitor changes in care.

The provision of training, however, does not ensure participation or application of learning. In hospitals, professionals report difficulties in reconciling educational activities, care demands, and personal responsibilities. The existence of available content also does not eliminate barriers to internet access, availability of equipment, or time to study (Yu; Huang; Liu, 2022; Hamukoto et al., 2025). Such conditions help explain why initiatives valued by the teams may remain punctual or poorly integrated into the service.

Simulations and digital environments expand the possibilities of teaching, but their results need to be examined according to the outcomes effectively measured. Gains in tests of knowledge, satisfaction, and trust do not in themselves equate to a reduction in harm to the patient. This distinction is relevant to guide the choice of educational resources and to avoid attributing to a technology effects that the study did not demonstrate (Nazário et al., 2025; Lee et al., 2025).

The guiding question was: what barriers and contributions of educational technologies are described in continuing education and in the professional development of the nursing team in hospitals? The objective was to analyze these barriers and contributions, identifying conditions of implementation, strategies used and limits of evidence for the qualification of hospital care. The study brings together Brazilian and international production, preserving the differences between their conceptual references.



CONTINUING EDUCATION AND LEARNING ON THE JOB

PEH is based on the collective analysis of work and health needs, seeking to modify practices and institutional relations. Continuing Education (CE), in turn, usually organizes the updating of knowledge and skills through courses, training and other delimited activities. Although they can complement each other, periodic training is not enough to characterize PEH: it is necessary to relate learning to the problems of the service and to the participation of workers in the production of changes (Ceccim, 2005; Brasil, 2007).

In the international literature, continuing professional development (CPD) designates professional development processes throughout the career, which may involve formal education, informal learning, and requirements to maintain professional registration. The metasynthesis of Mlambo, Silén, and McGrath (2021) highlights the relevance of organizational conditions for this development. In this article, CPD is a concept related to professional learning, without automatic equivalence with Brazilian PHE. International findings allow us to compare barriers and resources, but do not necessarily demonstrate collective processes of work transformation.

Educational technologies also need to be examined from their pedagogical purpose. A platform can facilitate the distribution of content; simulation can organize situations of practice and discussion. Its insertion in a PHE proposal depends on how the problems are chosen, who participates in the planning and subsequent follow-up. The articulation between education, safety and quality requires spaces for interaction between care and management, as evidenced by Koerich, Erdmann and Lanzoni (2020).

RESEARCH METHODOLOGY

An integrative review was carried out with descriptive and thematic synthesis, guided by the



six stages of Mendes, Silveira and Galvão (2008): definition of the problem; search and selection; data extraction; evaluation of studies; interpretation; and presentation of the synthesis. The directed search was conducted in September 2026, with a publication cut from 2020 to 2025, corresponding to six full years. When there was a divergence between early publication and final edition, the year of the final edition was considered for eligibility.

Empirical articles in Portuguese or English on in-service education, professional development or its conditions of implementation, involving nursing workers in hospitals, were included. Multiprofessional studies were admitted when they included nursing and dealt with hospital programs or institutional conditions. In samples with students or other levels of care, the possibility of separating the pertinent results was required. Descriptive evaluations of programs with systematized data were admitted. Reviews, protocols, opinion texts, reports without structured empirical evaluation, and studies in which education appeared only as a recommendation, without analysis of the educational process or its conditions, were excluded.

The main query was performed in PubMed, a platform that gathers bibliographic records from different sources, with the expression: (“permanent education”[Title/Abstract] OR “permanent health education”[Title/Abstract] OR “continuing professional development”[Title/Abstract]) AND nurs*[Title/Abstract] AND hospital*[Title/Abstract] AND (2020:2025[dp]). A total of 74 records were retrieved. The complementary query with controlled terms was: “Education, Nursing, Continuing”[MeSH Terms] AND “Educational Technology”[MeSH Terms] AND hospital*[Title/Abstract] AND (2020:2025[dp]), with no records retrieved. The counts correspond to these final strategies, without incorporating exploratory queries.

The search was complemented by the verification of 12 articles from 2020 to 2025 present in the bibliography gathered in the preparatory stage. Conceptual and methodological references were treated separately from the sample. Title, authorship, and DOI were checked to identify duplicates. The screening of titles and abstracts preceded the full reading of those eligible; unretrieved texts were recorded as such, without using their abstracts to compose results. The selection was not carried out



by independent reviewers in duplicate.

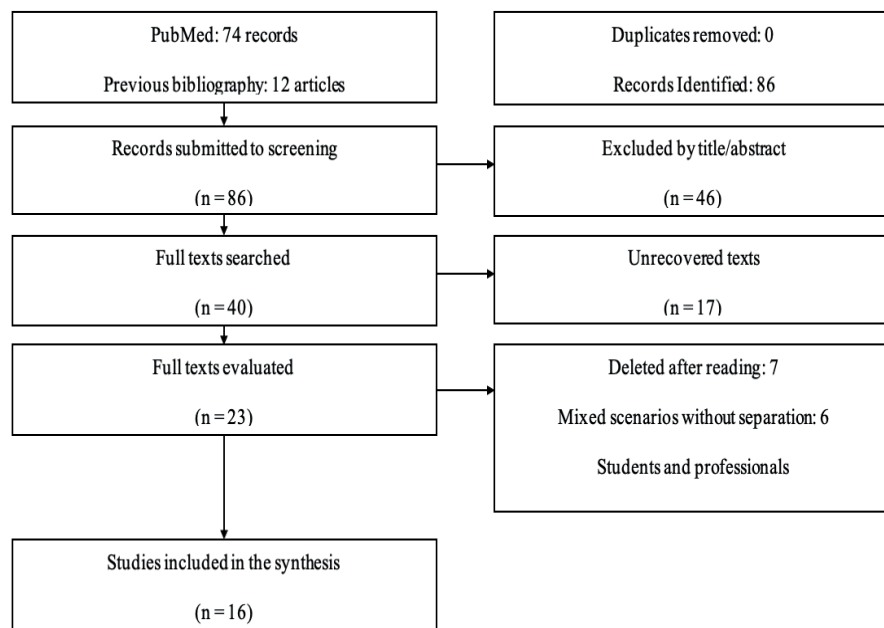
The extraction matrix included authorship, year, country, setting, participants, design, educational strategy, results, and limitations. The critical assessment was descriptive, examining sample selection, clarity of procedures, nature of the instruments, presence of comparison, follow-up, and compatibility between results and conclusions. No standardized risk of bias scale or global quality score was applied. The findings were compared and grouped by recurrence in conditions of participation, educational strategies, and achievement of outcomes. No meta-analysis was performed due to the heterogeneity of the designs, measures, and interventions. The selection flow was organized based on the presentation structure of PRISMA 2020, without equating this reporting resource to the integrative review method (PRISMA, n.d.).

RESULTS

The selection gathered 86 records, with no duplicates identified. After screening, 46 were excluded and 40 texts were searched. Seventeen were not retrieved from the sources accessed. Of the 23 texts evaluated in full, seven were excluded: six presented hospital and non-hospital scenarios without sufficient separation of the results; one aggregated students and professionals without discriminating the findings. The final synthesis comprised 16 studies, 12 of which came from PubMed and four from the previous bibliography (Figure 1).



Figure 1 – Flow of identification and selection of studies



Main search: 74; complementary search with MeSH: 0.

Exploratory stages are not part of these counts.

Source: prepared by the authors (2026)

The studies included twelve countries, with four Brazilian publications. Qualitative investigations predominated; cross-sectional studies, mixed approach, program evaluation, and educational interventions were also identified. Chart 1 distinguishes the observed results from the limits of interpretation, without adding participants from different designs and populations.

Chart 1 – Characterization of the studies and critical appraisal

Study	Design and context	Main result	Limit of evidence
Koerich, Erdmann and Lanzoni (2020)	Brazil; qualitative; 27 participants, 22 nurses, in hospital and state management.	Integration between HPS, safety and quality depends on leadership, communication and managerial support.	Predominance of the managers' perspective; it does not measure clinical effect.



Emmanuel et al. (2020)	England; cross-sectional; 2,959 respondents analyzed, in 48 hospitals.	Shifts ≥ 12 h were associated with lower educational opportunities: OR 0.58; 95%CI 0.44–0.76.	Self-report and data from 2009–2010; association without causation.
Maluwa, Mwalabu and Msiska (2021)	Malawi; qualitative; 73 participants from four hospitals.	Ethics education and supervision were described as supporting ethical competence.	Perceptions and intentional selection; does not assess change after intervention.
Melariri, Kalinda and Chimbari (2021)	South Africa; cross-sectional; 495 professionals in the total sample; analyzable hospital strata.	The tertiary stratum presented gaps in the provision of training for health promotion.	Separate hospital outcomes; self-report and variable denominators were used.
Rahmah, Hariyati and Sahar (2021)	Indonesia; qualitative; six nurses.	Professional development, accreditation and management support were related to the maintenance of competencies.	Small and non-probabilistic sample; no effect on patients.
Yu, Huang and Liu (2022)	China; qualitative; 14 tertiary hospital nurses.	Needs vary with professional trajectory; work and family make participation difficult.	Single center and perceptions; limited contextual transference.
Gomes and Ribeiro (2023)	Brazil; qualitative; 35 professionals from two adult ICUs.	Recognition of the relevance of PEH coexisted with specific educational practices and difficulties in participation.	44 refusals among 79 guests; daytime sample only.
W e h a b e , Gebretensaye and Bizuwork (2024)	Ethiopia; mixed method; 262 responses and nine informants.	90 of 262 nurses reported participation in CPD; time, funding, and information barriers.	Temporal definition of participation is not uniform; self-report.
Munyaneza et al. (2024)	Rwanda; qualitative; 35 hospital professionals, with nurses.	Availability did not guarantee access; relevance of the themes, mentoring and participation in planning were demands.	Multiprofessional results; not attributable only to nursing.
Mukamana et al. (2024)	Rwanda; transversal; 140 professionals, including 88 nurses.	Digital platforms were used, but internet connectivity and cost made access difficult.	Convenience; low consistency in two subscales; no measured clinical effect.
Gaus, Conway and Herrera (2024)	Ecuador; descriptive evaluation of the program; two hospitals; 108 participants in the nursing category.	Modules on the Chamilo platform had full participation and approval after up to two attempts.	Obligation linked to salary; without transfer control or evaluation.
Hamukoto et al. (2025)	Namibia; qualitative; 15 nurses from a reference hospital.	Lack of staff, time, digital resources, funding and trainers restricted participation.	Single hospital; perceptions without statistical generalization.
Karikari et al. (2025)	Ghana; transversal; 406 nurses from 11 district hospitals.	Refresher training was associated with an additional 3.3 percentage points in the knowledge test.	Intentional sampling in the day shift; association without causal inference.



Lee et al. (2025)	South Korea; multi-method intervention; 90 participants, of which 60 nurses were analyzed separately.	Risk simulation showed gains in dimensions of perceived competence and confidence.	No unexposed control; mostly self-reported measures and two-week follow-up.
Nazario et al. (2025)	Brazil; quasi-experimental; 41 professionals; two inpatient units.	Simulation and dialogue classes improved knowledge; there was no significant difference between methods.	Only two units; participant losses and theoretical outcome.
Weissenberg et al. (2025)	Brazil; qualitative; 41 professionals, 18 nurses and 23 technicians.	Simulation was perceived as an opportunity for technical learning, communication and teamwork.	Immediate and perceptual assessment; it does not demonstrate a reduction in adverse events.

Source: prepared by the authors based on the included studies (2026). ICU: intensive care unit; OR: odds ratio; 95%CI: 95% confidence interval. Total samples are indicated when the results of interest could be separated.

Conditions of participation and organization of work

The lack of time and team coverage during educational activities appeared recurrently. Hamukoto et al. (2025) identified, in the interviews, restrictions on personnel, funding, digital access, and availability of trainers. Yu, Huang, and Liu (2022) described conflicts between training, work, and family life. In Gomes and Ribeiro (2023), the recognition of the relevance of PEH did not translate into its continuous implementation. Brazilian studies also highlighted the distance between management and care as an obstacle to the articulation of education with safety and quality (Koerich; Erdmann; Lanzoni, 2020).

The quantitative results reinforced the presence of barriers, without demonstrating causality. Emmanuel et al. (2020) found a lower chance of reporting professional development opportunities among nurses in shifts of at least 12 hours, compared to those of up to eight hours. In Ethiopia, 90 of the 262 respondents reported participation in PCD, but the article varied in the definition of the reference period; the data should be understood as frequency reported in that sample (Wehabe;



Gebretensaye; Bizuwork, 2024).

Educational strategies and outcomes evaluated

Strategies included simulation of clinical situations, risk identification, dialogued classes, and digital modules. Nazário et al. (2025) observed an increase in knowledge about patient safety in both methods compared, with no statistical superiority of simulation. Lee et al. (2025) presented separate results for beginner and experienced nurses, allowing these groups to be considered without incorporating students into the professional synthesis. Weissenberg et al. (2025) identified favorable perceptions of simulation learning, but did not assess the frequency of adverse events after the activity.

In the program described by Gaus, Conway, and Herrera (2024), the nursing category brought together 108 participants. Full adherence to the modules cannot be interpreted as spontaneous motivation, as participation was linked to salary payment. Mukamana et al. (2024) identified connectivity difficulties in a multiprofessional sample, while Munyaneza et al. (2024) recorded demands for greater relevance of the contents and participation in planning. These findings describe implementation conditions, not demonstrated clinical effects.

Critical assessment of the body of evidence

The literature gathered experiences consistent with the need for institutional support, but with uneven reach. Qualitative studies deepened perceptions in specific contexts; cross-sectional studies investigated associations, subject to confounding and memory. Karikari et al. (2025) used a knowledge test, offering a different measure of simple self-confidence, but without prospective comparison before and after training. In Mukamana et al. (2024), two subscales showed low internal consistency, which reduces the security of interpretations about these domains. In the interventions, small samples, absence of unexposed control, or restriction to two units limited inferences of efficacy.



None of these results, in isolation, supports a reduction in care harm.

DISCUSSION

Studies indicate that the performance of educational activities depends on both pedagogical choices and concrete working conditions. The association between long working hours and less opportunity for training, observed by Emmanuel et al. (2020), converges with reports of scarcity of time and personnel. However, convergence does not eliminate differences between contexts nor does it authorize the conclusion that the duration of the shift alone explains adherence. Planning training requires considering care coverage, opportunities for different shifts, and available resources, without attributing non-participation exclusively to individual availability.

The distinction between PHE and CPD modifies the interpretation of the results. A requirement for credits or completion of modules may produce formal participation, but it does not evidence collective reflection on the problems of the service. The Ecuadorian case shows this tension: the platform enabled a learning routine, while the link to the salary conditioned the behavior of the participants (Gaus; Conway; Herrera, 2024). In the light of Ceccim (2005), the approach to PHE also requires discussing labor relations, autonomy, and participation in the definition of educational priorities.

Brazilian studies offer elements for this articulation. Gomes and Ribeiro (2023) highlight the distance between recognizing the importance of PEH and incorporating it into the routine. Koerich, Erdmann, and Lanzoni (2020) situate professional interaction and management support as components of safety-oriented education. In the studies by Maluwa, Mwalabu and Msiska (2021) and Rahmah, Hariyati and Sahar (2021), supervision and development support also appear as important resources. These results support the interpretation that learning is not sustained only by the provision of material or by individual mastery of techniques.

Technologies should therefore be chosen according to the objectives and conditions of the



service. Simulation allows exploring situations and discussing decisions, but the result of Nazário et al. (2025) advises against assuming its superiority over a dialogued class. Likewise, access to platforms does not automatically solve connectivity and cost problems (Mukamana et al., 2024). In Melariri, Kalinda, and Chimbari (2021), the results separated from the tertiary hospital level point to gaps in training for health promotion, reinforcing that the content also needs to correspond to the needs of action.

For hospital practice, the synthesis suggests relating the diagnosis of needs to problems identified by the team and monitoring what happens after the activity. Attendance and approval in modules can inform reach; tests can assess knowledge; observation of practice and care indicators, when properly defined, can investigate transfer and care outcomes. This sequence is an implication of the analysis, not an effect proven by all studies. The available data support educational benefits and participation conditions with greater certainty than conclusions about patient outcomes.

The review has limitations. The directed search on a single platform and the complementation by previous bibliography restrict coverage and may favor already known studies. The main expression favors certain denominations of professional education, while the consultation with MeSH did not retrieve records; the absence of results in this consultation does not mean the absence of evidence on technologies. Seventeen texts that were not retrieved introduce possible availability bias. Added to this are the selection without double independent review, the non-standardized critical appraisal, the restriction of languages, and the conceptual heterogeneity between PHE, CS, and CPD. The results do not constitute an exhaustive estimate of efficacy, nor do they allow for the hierarchization of technologies for all hospitals.

FINAL CONSIDERATIONS

The review identified barriers related to time, personnel, resources, digital access, and managerial support. Simulations, dialogued classes, and platforms presented contributions to learning



or to the organization of educational activities, with limited evidence on transfer to care and patient outcomes. The incorporation of these resources into PHE requires a link with service problems, worker participation, and post-training evaluation. The objective was achieved by identifying the conditions for implementation and differentiating between observed educational benefits and care effects not yet demonstrated. Research with follow-up, appropriate comparators, and practice indicators are needed to clarify the sustainability of changes in the hospital context.

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