Healthcare Staff Engagement and Patient Safety Outcomes: A Systematic Review with Implications for Critical Care Nursing

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ABSTRACT:

Aim: To synthesize evidence on the association between healthcare staff engagement and patient safety outcomes and to consider implications for critical care nursing.

Design: Systematic review of quantitative observational and interventional evidence.

Methods: The thesis records report searches of MEDLINE, CINAHL, PsycINFO, Embase, the Cochrane Library, and National Institute for Health Research journals for English-language studies published from 1999 to 2024. Eligible studies measured staff engagement and a patient safety culture, error, incident, or adverse-event outcome. Study characteristics were narratively synthesized. The present manuscript was structured according to PRISMA 2020; however, search exports and screening records require verification before submission.

Results: Fourteen studies from hospitals and nursing homes were reported, including nurses, physicians, and mixed professional groups. Most studies found that stronger engagement or organizational commitment was associated with a more positive safety culture or fewer reported errors. Associations varied by measure, setting, and level of analysis. The evidence was predominantly cross-sectional, heterogeneous, and not specific to intensive care nurses.

Conclusion: Staff engagement may support patient safety, but causal conclusions are not justified. Prospective and intervention studies using validated engagement and objective safety measures are needed, particularly in intensive care nursing.

Keywords: critical care nursing; employee engagement; patient safety; patient safety culture; systematic review; work engagement

Introduction

Patient safety depends not only on clinical technology and protocols but also on the capacity of healthcare personnel to notice risk, communicate concerns, learn from incidents, and sustain reliable care under pressure. These human and organizational requirements are particularly visible in intensive care units, where

high patient acuity, rapid clinical deterioration, complex technology, interruptions, and multidisciplinary coordination create multiple opportunities for preventable harm. A positive patient safety culture is therefore expected to support open communication, teamwork, learning, and a non-punitive response to error (World Health Organization, 2021).

Work engagement describes a positive and persistent work-related state characterized by vigor, dedication, and absorption (Schaufeli et al., 2002). A broader organizational perspective also treats engagement as employees' willingness to contribute to organizational goals, collaborate with colleagues, and improve performance. These perspectives differ conceptually: the first emphasizes an individual psychological state, whereas the second includes attitudes, commitment, and organizational practices. The distinction matters because studies may label professional commitment, empowerment, employee engagement, or work engagement as equivalent exposures even though they do not measure exactly the same construct (Bailey et al., 2017).

Engagement may influence safety through several pathways. Engaged staff may be more attentive to clinical changes, more willing to speak up, and more likely to participate in incident reporting and improvement activities. Supportive working conditions that strengthen engagement may also improve teamwork and continuity. Conversely, low engagement can coexist with emotional exhaustion, withdrawal, reduced discretionary effort, and turnover, all of which may threaten safe care. These mechanisms are plausible in critical care, but association does not establish that increasing engagement will directly reduce adverse events.

A prior systematic review and meta-analysis identified a positive association between healthcare staff engagement and patient safety outcomes, while emphasizing substantial heterogeneity and a largely observational evidence base (Janes et al., 2021). The thesis chapter on which this manuscript is based reports the same set of 14 studies and many of the same study characteristics. Consequently, an article developed from the chapter must demonstrate an independently documented and genuinely updated search, correct the study-flow inconsistencies, and clearly establish its novel contribution. The present working draft reorganizes the chapter in the format required by the Central European Journal of Nursing and Midwifery, while preserving explicit verification markers where the underlying review records are incomplete.

A critical care focus is clinically important, but the reported evidence includes general hospital staff, physicians, mixed professional groups, and nursing-home personnel. The synthesis must therefore distinguish findings that apply to healthcare staff broadly from those derived specifically from nurses or intensive care settings. Overgeneralization to intensive care nurses would not be supported by the current sample of studies.

Patient safety culture and engagement are also measured at different analytical levels. An individual nurse may report high dedication while working in a unit with weak communication or punitive reporting practices, and a unit may obtain a strong average engagement score despite considerable variation among staff. Unit-level correlations can therefore be larger than individual-level correlations because both engagement and safety culture partly reflect shared organizational conditions. A rigorous synthesis should identify the level at which each variable was measured, whether data were aggregated, whether agreement within units was demonstrated, and whether statistical models accounted for clustering. Without this information, apparently similar effect estimates may represent different relationships.

Aim

The aim was to synthesize quantitative evidence on the relationship between healthcare staff engagement and patient safety outcomes. Secondary objectives were to compare findings across engagement conceptualizations and to

identify implications and evidence gaps relevant to critical care nursing.

Methods

Design

The thesis describes a systematic review conducted in accordance with the PRISMA statement. This manuscript uses the PRISMA 2020 reporting structure (Page et al., 2021). Because the original search exports, review protocol, and screening database were not available in the submitted thesis file, all numerical results and procedural claims must be checked against primary review records before submission.

Eligibility criteria

Studies were eligible when they were peer-reviewed, published in English from 1999 onward, involved healthcare personnel, quantitatively measured staff engagement or a related commitment construct, and reported a separable patient safety outcome. Cross-sectional, prospective, and interventional designs were eligible. Patient safety outcomes included safety culture or climate, incident reporting, medication errors, self-reported errors, adverse events, and other measurable safety indicators. Studies reporting only general satisfaction or composite quality outcomes from which patient safety could not be separated were excluded.

The reported criteria were broad and admitted nurses, physicians, mixed staff groups, hospitals, intensive care units, and nursing homes. This breadth permits an overview of healthcare staff evidence but does not support describing the review as exclusively concerned with nurses or intensive care. A revised review should use a prespecified population-exposure-outcome framework and decide whether the final scope is healthcare staff generally or hospital nurses specifically.

Information sources and search strategy

The thesis records state that MEDLINE, CINAHL, PsycINFO, Embase, the Cochrane Library, and National Institute for Health Research journals were searched for the period 494-504. Search concepts covered healthcare personnel, staff or employee engagement, and patient safety or quality of care. Citation tracking was also reported. [VERIFY BEFORE SUBMISSION: provide the exact platform for each database, the complete line-by-line search strategy, the final date searched, language and publication filters, grey-literature procedures, and the method used to deduplicate records.]

Study selection

Titles and abstracts were reportedly screened, followed by full-text assessment. The chapter also states that uncertainties were resolved through discussion and that two reviewers independently categorized engagement definitions, extracted data, and completed quality assessment.

Evaluation of methodological quality

The chapter reports a six-point appraisal assembled from guidance for observational studies, the Cochrane risk-of-bias tool, and review-specific criteria. Scores of 494-504 were considered high quality, 494-504 fair, and 494-504 poor. This custom summary score is insufficiently transparent for publication because the appraisal domains and item-level judgments are not shown. The revised review should use an established design-appropriate instrument, such as a Joanna Briggs Institute checklist, and report domain-level judgments for each study rather than relying only on a total score.

Data extraction and synthesis

Reported extraction fields included authorship, country and setting, professional group, sample size, engagement definition and instrument, patient safety measure, analytical approach, limitations, and conclusions. Owing to heterogeneity in constructs, instruments, units of analysis, and safety outcomes, findings were narratively organized by study setting, engagement conceptualization, and type of safety outcome. No new meta-analysis is presented in this working draft. Before submission, the authors should state whether effect estimates were transformed, whether

clustering at unit level was considered, and how multiple estimates from the same study were handled.

For a revised review, results should be grouped prospectively rather than after examining the findings. Recommended groups include safety culture or climate, incident-reporting behavior, self-reported clinical errors, and objective adverse events. Engagement exposures should be separated into work engagement, employee engagement, organizational commitment, professional commitment, and empowerment. The synthesis should report the direction, magnitude, precision, and adjusted status of each association, rather than classifying findings only as significant or non-significant. Where studies are sufficiently comparable, a random-effects meta-analysis may be considered; otherwise, structured synthesis without meta-analysis should be used. Any meta-analysis would also need to avoid double-counting correlated outcomes from the same sample and to distinguish individual-level from unit-level estimates.

Results

Study selection

The chapter reports that 14 studies were included. It also presents multiple incompatible totals for database retrieval, deduplication, title-and-abstract screening, and full-text review. For example, the narrative reports 13,382 records after duplicate removal, whereas other reported totals do not reconcile mathematically with the numbers screened and excluded. No valid PRISMA diagram can therefore be produced from the thesis document alone. Figure 1 is retained as a replacement marker until the database exports and screening log are audited.

Study characteristics

The 14 reported studies were published between 2009 and 2018 and were conducted in North America, Europe, and Asia. Settings included hospitals, intensive care units, and a nursing home. Participants included nurses, physicians, and mixed professional groups, while several studies analyzed data at the unit or organizational level rather than the individual level. Sample sizes ranged from 63 physicians to more than 27,000 healthcare employees; unit-level investigations included between 26 and 129 clinical units.

Engagement was operationalized using the Utrecht Work Engagement Scale, the Gallup Q12, organizational or professional commitment scales, an employeeship scale, and adapted engagement or empowerment instruments. Safety outcomes were similarly diverse and included the Hospital Survey on Patient Safety Culture, the Safety Attitudes Questionnaire, nursing-home safety culture measures, self-reported medical or medication errors, incident reporting, and composite indicators. This heterogeneity limits direct comparison and makes a single pooled interpretation difficult.

The temporal design was another important source of variation. Most investigations assessed engagement and safety at one time point, whereas a small number used repeated organizational surveys or examined whether earlier engagement predicted later safety culture. Several studies adjusted for selected professional characteristics, but adjustment strategies were inconsistent and important organizational confounders were often unavailable. Reporting also varied: some articles provided correlations, others regression coefficients, and some only descriptive comparisons between engagement groups. These differences affect both the interpretability and the potential comparability of the evidence. A new extraction form should therefore capture timing, unit of analysis, covariates, missing-data management, response rate, and whether the reported outcome represented actual harm, perceived culture, or reporting behavior.

Engagement and patient safety culture

Most studies assessing safety culture or climate reported associations in the expected direction. In 26 intensive care units, Collier et al. (2016) reported a strong unit-level association between engagement and total safety culture, with positive associations for incident reporting and

overall safety perceptions. Biddison et al. (2016) found that unit-level engagement was positively associated with safety climate at three time points, although the correlation weakened over time. Thorp et al. (2012) reported that earlier workplace engagement scores predicted later patient safety culture scores at unit level.

At individual level, Toode et al. (2015) reported positive associations between engagement or empowerment and overall safety perceptions, safety grades, and event reporting among nurses. Arnetz et al. (2011) found small positive relationships between employeeship and non-punitive response to error, communication about incidents, and compliance with safety procedures in nursing homes. Rathert et al. (2009) also reported associations between engagement-related constructs and safety perceptions. In contrast, Lotfi et al. (2018) found a small, non-significant association between organizational commitment and patient safety culture among nurses. These findings suggest that the strength of association varies considerably and may be influenced by construct selection, aggregation level, and work setting.

Engagement and errors or adverse events

Studies using error or event outcomes generally indicated that higher engagement or commitment was associated with fewer reported errors. Prins et al. (2009) found small inverse associations between engagement and self-reported errors among resident physicians, particularly errors attributed to lack of time. Rezaiamin et al. (2018) reported that stronger work commitment among intensive care nurses was associated with fewer medication errors, including total and non-intravenous errors. Tsiga et al. (2017) identified an inverse relationship between engagement and reported medical errors among surgeons. Teng et al. (2009) found associations between professional commitment and several nurse-reported patient safety indicators, although not all outcomes reached statistical significance.

Interpretation of error outcomes requires caution. Self-report can be affected by recall, social desirability, reporting culture, and willingness to disclose mistakes. In a psychologically safe unit, increased engagement could increase incident reporting even if the true event rate falls. Event-report counts therefore cannot automatically be interpreted as direct measures of harm, and objective or independently verified safety outcomes are needed.

Conceptualization of engagement

The chapter groups engagement as either a positive work-related state or a broader organizational practice or attitude. Evidence did not clearly show that one conceptualization produced consistently stronger relationships with safety. However, the small number of studies, inconsistent instruments, and mixing of engagement with organizational commitment prevent firm comparative conclusions. Future reviews should avoid treating engagement, commitment, empowerment, and job satisfaction as interchangeable and should analyze each construct separately where possible.

Methodological quality

The reported quality scores ranged from 1 to 6. Only two studies were classified as high quality, while most were fair or poor under the chapter's custom criteria. Common limitations included cross-sectional design, self-reported outcomes, unclear response rates, unvalidated or adapted measures, failure to address clustering, limited adjustment for confounding, and uncertainty about temporal direction. These limitations substantially lower confidence in causal claims.

Discussion

Principal findings

The reported evidence indicates a broadly positive relationship between healthcare staff engagement and patient safety. Stronger associations were frequently observed when both variables were measured at unit or organizational level, while individual-level studies often reported smaller and less consistent effects. Engagement may therefore reflect shared working conditions, leadership, teamwork, communication, and organizational

capacity as much as an individual psychological state.

The findings are consistent with the prior systematic review and meta-analysis by Janes et al. (2021), which concluded that engagement was associated with safety culture and error or adverse-event outcomes but that the evidence base was limited and heterogeneous. This overlap is a central publication issue. A thesis-derived manuscript cannot be presented as an independent new systematic review unless the authors can document their own search and screening process, identify additional eligible evidence, and explain how the updated synthesis advances knowledge beyond the prior review.

The evidence does not establish that an engagement intervention will improve patient safety. Nearly all reported studies were observational, and reverse causation is plausible: personnel may be more engaged because they work in safer, better-led, and better-resourced units. Shared causes, including staffing adequacy, leadership support, teamwork, psychological safety, and workload, may influence both engagement and safety. Intervention studies are required to distinguish direct effects from common organizational antecedents. Several mechanisms should be tested rather than assumed. Engagement could improve safety through greater attentiveness, participation in handovers, willingness to question unsafe decisions, adherence to protocols, or involvement in quality improvement. It could also operate indirectly through reduced turnover and more stable team relationships. Conversely, strong leadership, adequate staffing, psychological safety, and manageable workload may simultaneously increase engagement and safety, creating an association even when engagement itself is not the primary causal mechanism. Longitudinal mediation analyses and cluster trials can help distinguish these pathways. Qualitative process evaluation is also important because an intervention may increase survey engagement scores without changing everyday speaking-up behavior or access to organizational resources.

Implications for critical care nursing

For critical care leaders, engagement should not be interpreted as a request for individual nurses to display more enthusiasm under unchanged conditions. Sustainable engagement is more likely when nurses have adequate resources, manageable demands, opportunities to participate in decisions, access to learning, and confidence that concerns will receive a fair response. Safety huddles, structured debriefing, recognition, professional development, and shared governance may be useful components, but they should be evaluated as organizational interventions rather than isolated motivational activities. Safety outcomes selected for future trials should include both perceptions and observable indicators. Patient safety culture instruments can detect changes in communication, teamwork, and non-punitive response to error, while incident reports, medication-error surveillance, infection rates, missed care, and audited protocol adherence provide complementary evidence. Analyses should account for clustering by unit, baseline differences, staffing, patient acuity, and concurrent quality-improvement initiatives.

Only a small subset of the reported studies directly involved intensive care nurses. Consequently, the current synthesis can justify a need for intensive care-specific research but cannot establish that the association is identical across critical care, general wards, nursing homes, and physician groups. A revised review limited to nurses or critical care may be more clinically coherent, although it may identify fewer eligible studies. Future intensive care studies should prespecify a logic model linking intervention components to engagement processes and safety outcomes. For example, leadership training might be expected to improve psychological safety and speaking up; simulation and team training might improve communication and coordination; shared decision-making might strengthen dedication and ownership; and workload or staffing interventions might preserve vigor. Measurements should be collected at baseline and at multiple follow-up points to determine

sustainability. Researchers should also document implementation fidelity, participation, contamination between groups, and concurrent patient safety initiatives. Because culture is a shared property, cluster allocation at unit or hospital level will often be more appropriate than individual randomization. Economic and workforce outcomes, including absence, turnover intention, retention, and intervention cost, would strengthen the practical relevance of the evidence.

Strengths and limitations

The reported review searched several major databases and considered different engagement and safety measures. The broad scope illustrates the conceptual diversity of the field and identifies clinically relevant pathways linking workforce experience with patient safety. The structured evidence table also allows comparison across professional groups and settings.

The limitations are substantial. The search date and full strategies are not documented in reproducible detail; numerical study-flow data are inconsistent; the review protocol and registration are unavailable; the independent roles of reviewers are unclear; and the custom quality score lacks item-level reporting. The included evidence is old relative to the stated 2024 search endpoint and substantially duplicates the evidence base of Janes et al. (2021). The review mixes nurses, physicians, mixed staff, hospitals, intensive care units, and nursing homes, limiting applicability to intensive care nursing. The predominance of cross-sectional self-report studies also restricts causal inference.

Conclusion

Healthcare staff engagement is consistently associated with several patient safety culture and error-related outcomes, but the magnitude and certainty of the relationship vary across settings, measures, and analytical levels. The evidence supports engagement as a potentially important organizational marker and intervention target, not as a proven independent cause of safer care. Critical care nursing research should prioritize prospective and cluster-randomized evaluations that combine validated engagement measures with objective and perception-based safety outcomes. Before this review can be submitted, the authors must independently rerun and document the search, reconcile the PRISMA flow, verify all extracted data and references, use a recognized appraisal method, and establish novelty beyond the 2021 systematic review.

Ethical aspects and conflict of interest

Ethics approval was not required because the review used published data and did not recruit human participants. The author declares no conflict of interest.

Ethical aspects and conflict of interest statement

This review uses data reported in published studies and does not involve direct recruitment of human participants; therefore, research ethics committee approval and informed consent are not applicable. The author declares no conflict of interest.

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Table 1. Characteristics and findings of included studies (Part 1)

Study	Country/setting	Participants	Engagement measure	Safety outcome	Main finding	Quality
Arnetz et al. (2011)	USA; nursing home	Mixed staff, n=312	Employeeship scale	Nursing-home safety culture	Small positive associations with non-punitive response, incident communication, and safety-procedure compliance.	3
Biddison et al. (2016)	USA; hospital units	494-504 units	Gallup Q12	Safety Attitudes Questionnaire	Positive unit-level safety-climate correlations at three time points (rho=0.494-504.69).	3
Collier et al. (2016)	USA; 26 ICUs	Unit-level staff data	Gallup Q12	Hospital safety culture	Engagement correlated with total safety culture (r=0.65) and incident reporting (r=0.56).	3
Georganta et al. (2014)	Europe; hospitals	Mixed staff, n=532	UWES	Safety culture/event reporting	Vigor and dedication showed small associations with event-reporting outcomes.	4
Horwitz & Horwitz (2017)	USA; hospital	Physicians, n=63	Organizational commitment	Patient safety climate	Affective commitment correlated with safety culture (r=0.26).	1
Lotfi et al. (2018)	Iran; hospital	Nurses, n=340	Organizational commitment	Hospital safety culture	Small non-significant	3

					association (r=0.08).	
Lowe (2012)	Canada; hospitals	Mixed staff, n=27,018	Engagement scale	Patient safety culture	Highly engaged staff were more frequently in the highest safety-culture quartile.	1

Note. HSOPSC = Hospital Survey on Patient Safety Culture; ICU = intensive care unit; UWES = Utrecht Work Engagement Scale. Quality scores are those reported in the thesis custom 494-504 assessment and require verification against item-level appraisal.

Table 2. Characteristics and findings of included studies (Part 2)

Study	Country/setting	Participants	Engagement measure	Safety outcome	Main finding	Quality
Prins et al. (2009)	Netherlands; hospital	Resident physicians, n=2,115	UWES	Self-reported errors	Higher engagement was weakly associated with fewer errors, especially time-related errors.	2
Rathert et al. (2009)	USA; hospital	Mixed staff, n=252	Engagement/commitment	Hospital safety culture	Engagement-related constructs were associated with overall safety perceptions.	2
Rezaiamin et al. (2018)	Iran; ICU	Nurses, n=117	Work commitment	Medication errors	Higher commitment was associated with fewer total and non-intravenous medication errors.	4
Teng et al. (2009)	Taiwan; hospital	Nurses, n=284	Professional commitment	Six safety indicators	Commitment was associated	5

					with overall safety and several reported adverse-event indicators.	
Thorp et al. (2012)	USA; hospitals	Up to 129 units	Gallup Q12	Hospital safety culture	Earlier unit engagement predicted later patient safety culture (beta=0.77).	6
Toode et al. (2015)	Estonia; hospital	Nurses, n=201	Engagement/empowerment	Hospital safety culture	Positive associations with safety perceptions, safety grade, and event reporting.	3
Tsiga et al. (2017)	Greece; hospital	Physicians, n=117+	UWES	Medical errors	Engagement was inversely associated with errors among surgeons (r=-0.33).	2

Note. HSOPSC = Hospital Survey on Patient Safety Culture; ICU = intensive care unit; UWES = Utrecht Work Engagement Scale. Quality scores are those reported in the thesis custom 494-504 assessment and require verification against item-level appraisal.