Quality and safety education for nurses: A bibliometric analysis

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Abstract

Purpose: Since its origin in the United States in 2005, Quality and Safety Education for Nurses (QSEN) has guided nurses' preparation for alleviating preventable harm and improving quality safe care. QSEN's value is illustrated through specific inclusion in the competency-based 2021 American Association for Colleges of Nursing (AACN) Essentials. The purpose of this bibliometric analysis is to explore publication patterns of the extant QSEN literature to assess QSEN's spread and global penetration and to map the available knowledge and data regarding quality and safety education for nurses.

Design: Bibliometric analysis.

Method: Two QSEN investigators and two health science librarians completed database searches to identify articles with keywords QSEN or Quality and safety education for nursing. Inclusion criteria were (1) QSEN-specific and (2) published in a peer-reviewed journal. Using PRISMA screening, the final sample included 221 articles between 2007 and 2021.

Results: Average annual QSEN publications was 14.5 articles; the highest was 26 publications in 2017. Article types were 84 research, 77 descriptive/reviews, 28 quality improvement projects or case studies, 20 statements, and 12 editorials. Focus analysis revealed 165 education articles, 35 clinical practice, 17 professional development, and 4 leadership/administration. Fourteen journals published three or more; eight were education journals. Nine topic clusters indicated areas of publication focus, including clinical teaching, simulations, performance, context, and criteria of analysis, factors of efficacy, innovation and advanced practice, patient care and outcomes, academic concepts, and research frameworks.

Conclusions: Results reveal far less QSEN penetration for guiding professional practice, research measuring outcomes and impact, and global collaboration to examine cultural implications for diversity and inclusion. Results present future recommendations to assure all nurses worldwide have access to competency development to alleviate preventable healthcare harm.

Clinical Relevance: Originating in the United States (US), the QSEN project provided the seminal framework for transforming education and practice through defining the six quality and safety competencies (patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics) essential to alleviate preventable healthcare harm. Results reveal opportunities to advance

QSEN penetration in developing professional practice, guiding research measuring outcomes and impact, and extending global collaboration to examine cultural implications for diversity and inclusion.

INTRODUCTION

Delivering safe, high-quality care is a global concern, with almost every country reporting poor quality of care on one or more key outcome metrics (National Academies of Sciences, Engineering, and Medicine, NASEM, 2018). The World Health Organization (WHO) has cited patient care quality and safety as a global crisis (WHO, 2021). The US-based Institute of Medicine (IOM, now the National Academy of Science, Engineering and Medicine, NASEM) first brought to light staggering reports of preventable errors and harm in healthcare (IOM, 2000), and later (2003) issued an imperative for transforming health professions education based on essential quality and safety competencies to mitigate patient harm. A subsequent IOM report (2004) focused specifically on nurses' work environment and safety, and recognized nurses as frontline caregivers that are key to developing high-reliability processes and organizations that are focused on alleviating preventable patient harm. Patient safety and quality are overlapping concepts. A seminal IOM report (2001) defined quality care as care that achieves six aims: safe, effective, patient-centered, timely, efficient, and equitable. Patient safety, as a key component of quality, is foundational to achieving the IOM aims. Patient safety refers to the overall management of harmful but preventable risks to patients unrelated to the disease or reason for seeking care (IOM, 2003). Applying quality improvement strategies alleviate risks through mindful engagement, system-level process improvement, and systematic reporting of adverse events, and near misses. Education is considered the bridge to changes in practice, hence, the QSEN project was launched to transform nursing education to lead to application in practice (Cronenwett & Barnsteiner, 2022; Cronenwett et al., 2007).

The Quality and Safety Education in Nursing (QSEN; https://qsen.org) initiative was launched in the United States (US) in 2005 as the seminal framework for integrating the six quality and safety competencies outlined in the 2003 IOM health professions education report: *patient-centered care*, *teamwork and collaboration*, *evidence-based best practice*, *quality improvement*, *safety*, *and informatics*. Using a series of steps to engage stakeholders from both academic and practice settings spanning a series of years, the QSEN initiative represented a strategic effort to embed the competencies into nursing curricula and practice guidelines throughout nursing. Led by the University of North Carolina at Chapel Hill, the four phases of QSEN were funded by the Robert Wood Johnson Foundation (2005–2012) to ensure that future generations of nurses possess deep knowledge derived from the six IOM competencies. QSEN's development and

evolution over the past 17 years have had a major impact on the field, with enthusiasts calling it a social movement contributing to a renaissance in nursing (Cronenwett & Barnsteiner, 2022). As with all such movements, the time comes to consider future directions by examining past achievements of the original purpose. Consequences of the COVID-19 pandemic have illuminated ongoing and urgent quality and safety concerns, particularly those arising from the nursing work environment, burnout, staffing, and workforce shortages. It is time to ask essential questions about QSEN's spread, impact, and gaps. Therefore, we conducted a bibliometric analysis of QSEN publications to determine the extent to which QSEN competencies have been addressed in nursing education, practice, and research literature. The goals of this analysis were twofold: (1) to report key bibliometric metrics of QSEN publications, including the topical focus of articles identified, their primary authors, the top journals of publication, and types of articles published in peer-reviewed journals and (2) to document the spread of QSEN across education, practice, and international borders. Results can be used to develop future recommendations and directions to expand the boundaries for improving patient safety and quality outcomes and develop future policies that position nurses to drive patient care quality and safety initiatives.

The QSEN backstory: Transforming education and practice

Led by a thought leader Dr. Linda Cronenwett, QSEN launched at the University of North Carolina at Chapel Hill School of Nursing in 2005 (Cronenwett et al., 2007). A QSEN Steering Team led the planning and evolution of QSEN through four phases of development across the US (Table 1). A QSEN Faculty Team included 10 national faculty representing expertise in each of the six IOM competencies (patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics) and the pedagogies (e.g., narrative pedagogy, simulation, interactive case studies, interprofessional education) identified in the 2003 IOM health professions education report. An interprofessional Advisory Board of leaders in nursing and healthcare professions education and accreditation were engaged to help lead the project to ensure consensus with national standards guiding curricular integration and nursing practice (lists are available at https://qsen.org/about-qsen/qsen-history; Cronenwett & Barnsteiner, 2022).

In Phase I, a national survey of US nursing schools and focus groups of nursing faculty revealed a lack of curricular focus on the six

TABLE 1 Description of QSEN phases I–IV with primary goals

Phase	Year	Primary goals
Phase 1	2005–2006	Evaluate and enhance patient safety and quality in curricula in US schools of nursing
		Develop knowledge, skills, and attitude statements for each competency for prelicensure education
		Launch an open-access robust website repository of resources, references, teaching strategies, etc. www.qsen.org available globally
Phase 2	2007–2008	Develop knowledge, skills, and attitude statements for each competency for graduate education
		Design and implement 15 Pilot School Learning Collaborative integrate into nursing education curricula guidelines
Phase 3	2009–2011	Offer faculty development workshops for integrating QSEN competencies in nursing curricula
		Work with publishers to integrate competencies into textbooks and licensing, accreditation, and certification standards
		Promote innovation in implementing QSEN
Phase 4	2012	Continue faculty development workshops and competency dissemination

competencies (Smith et al., 2007). Survey results and an intense iterative literature review guided the development of 162 knowledge, skills, and attitude (KSAs) objective statements to further explicate the six competencies in prelicensure nursing curricula (Cronenwett et al., 2007). Open sharing was a key strategy; therefore, the Steering Team created a robust open-access website (https://qsen. org) with resources, peer-reviewed teaching strategies, and other supporting information to facilitate educators, clinicians, and students in competency development for delivering safe quality care. Available to all, the website became the mechanism through which QSEN was initially spread globally. Applying principles of small tests of change, 15 schools were selected through competitive review to participate in a Pilot School Learning Collaborative in collaboration with practice partners to assess usability for broader implementation (Cronenwett, Sherwood, & Gelmon, 2009). A Delphi study recommended beginning, intermediate, and advanced placement of the 162 KSAs across nursing curricula (Barton et al., 2009).

Because safety and quality competencies are essential components of all healthcare, the same competency definitions apply to all levels of nursing education. However, recognizing different levels

of practice between prelicensure and graduate practice, the project team collaborated with advanced practice specialty organizations to develop higher-level KSAs for each competency to guide graduate education (Cronenwett, Sherwood, Pohl, et al., 2009). Key US accreditation bodies—including the American Association of Colleges of Nursing (AACN, 2008, 2009, 2011) and the National League for Nursing (NLN, 2010)—adopted these competencies for both prelicensure and graduate nursing curricula. Confirming their enduring application, the quality and safety competencies and related descriptors and concepts are integrated throughout the AACN competency-based curricular essentials documents guiding undergraduate and graduate programs approved in 2021 (AACN, 2021). Elements have been incorporated into curricula in other countries as well, for instance, QSEN was adopted by the Swedish Nursing Society as an essential curriculum component (Nygårdh et al., 2017). Faculty development and resources have been hallmarks of QSEN's integration. QSEN leaders identified 40 early adopter nurse educators as QSEN facilitators to develop resources, model curricular innovation and transformation, and integrate into nursing practice. In 2010, the Steering Team initiated an annual national forum for sharing innovations and inspiring continued change subsequently becoming an international forum with attendees from multiple countries. In phases 3 and 4, the Steering team collaborated with AACN to deliver a series of regional faculty development workshops (Barnsteiner et al., 2013) and partnered with textbook publishers to include the competencies in relevant publications.

A special-topic issue of *Nursing Outlook* (November–December 2007) reported the initial QSEN framework. According to Google Scholar, the lead article (Cronenwett et al., 2007) has been cited 1549 times (January 16, 2022), demonstrating the extent of QSEN's influence across nursing and the increasing global integration.

Upon conclusion of Phase 4, Case Western University FP Bolton School of Nursing assumed oversight of the QSEN initiative, creating the QSEN Institute. To deepen the spread, the QSEN Institute partnered with three nursing schools to establish three QSEN Regional centers: the University of North Carolina at Chapel Hill, Jacksonville University, and the University of Alabama at Birmingham. [Correction added on February 07, 2023 after the first online publication: The text 'XXX' has been replaced with the appropriate text in previous sentence.] An overview of the Institute and QSEN history is available at https://qsen.org/about-qsen/project-overview/ with a more detailed history in Cronenwett and Barnsteiner (2022).

The QSEN competency framework remains the major initiative to transform nursing education and practice to close gaps in safe quality care. Over the past 17 years, QSEN integration has been documented in a variety of publications, presentations, and workshops nationally and internationally, impacting nursing education and patient care quality and safety by nurses graduating from educational programs infused with QSEN competencies. Yet, there has been no systematic analysis of the spread or penetration of QSEN documented in the literature or a published examination of the most prevalent types of publications.

Therefore, we used a bibliometric analysis of publications to examine patterns and trends in mapping the developments and

advances in QSEN since its inception. The purpose of bibliometric studies is to describe the development of a field (Nicoll et al., 2020) by providing a quantitative analysis of a body of literature to identify the most prevalent features or characteristics, collaborations, and emerging research as well as impact and future directions for continued scholarly development (Kokol & Blažun Vošner, 2019). Bibliometric analysis is defined as "the quantitative study of physical published units, or of bibliographic units, or of the surrogates for either." (Broadus, 1987). This paper reports the findings of our bibliometric analysis of papers published in peer-reviewed journals since the initial QSEN publication in 2007 through 2021. Results identify authors, institutions, topics, and countries contributing to the spread of QSEN to determine gaps in the literature, examine the penetration of QSEN through geographic locations, and present future recommendations to assure all nurses worldwide have access to competency development to alleviate preventable healthcare harm.

Design

To conduct the bibliometric analysis, a team of two health sciences librarians and two QSEN investigators were engaged. The health science librarians conducted the literature search and the analysis and visualizations. The two QSEN experts screened all search results, reviewed all relevant articles for inclusion, and categorized reviewed articles. As a team, we used an iterative process of reviewing findings and making analytic adjustments.

MATERIALS AND METHODS

Information sources and search strategy

The librarians searched PubMed, CINAHL with Full Text (EBSCOhost), and Scopus from 2007 to early 2022, and Web of Science from 2007 through January 6, 2021 (when the available subscription ended). No results were found in a search of SciELO and Global Index Medicus engines. Searches included the following keywords: "Quality and safety education for nurses" or "QSEN" or "quality and safety education for nursing." Results were limited to articles slated for publication in peer-reviewed journals prior to 2022. Because databases included intended publication dates, some publication dates may have changed since data extraction. Citations counts were retrieved at the time of article submission (07/11/2022). No other filters were applied to the search. Search results were exported to EndNote X9 where duplicates were removed. References were imported into Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia, available at www.covidence.org) for further analysis.

Eligibility criteria and study selection

Two researchers independently reviewed titles and abstracts of all identified references based on eligibility criteria. Articles for this bibliometric analysis if QSEN were included if QSEN was identified and featured prominently in the article (i.e., in the conceptualization or methods), and the articles were published in a peer-reviewed journal. Articles were excluded if QSEN was referenced in the article but analysis of elements of the QSEN framework was not the purpose of the study. Dissertations, conference proceedings, and other reference types not published in a peer-reviewed journal were excluded. Conflicts between reviewers were resolved during discussions with the full research team.

Data extraction

Full-text articles were retrieved and screened by the two researchers independently; any conflicts were resolved through discussions in team meetings. Guided by the work of Nicoll et al. (2020), the research team created a spreadsheet for coding and extracting data from each reference, among the categories shown in Table 2. To ensure quality and interrater reliability, both researchers extracted 20% of the same articles independently and resolved any conflicts;

TABLE 2   Data extraction of study characteristics.

Characteristic	Terms
Article type	- Research report (using quantitative or qualitative methods and report of findings) - Descriptive or review article to describe a concept, phenomenon, or topic, including literature reviews - Quality improvement project or case study that describes an improvement project implemented locally or among several organizations - Editorials - Statements, letters to the editor, position papers, or executive summaries
Area of focus	- Clinical practice - Leadership/administration - Education - Professional development - Combination of these
Authorship	- Discipline of the first author (nursing or outside of nursing) - Geographic location (US state and country) of first authors, and - Total number of authors

the remaining articles were divided and reviewed by the two reviewers independently.

Bibliometric analysis

Bibliometric analysis reflects trends in QSEN-specific articles. We conducted four separate analyses, allowing us to present results through data visualizations: (1) topic analysis, (2) country analysis, (3) counts by article type, and (4) counts by research focus. The VOSviewer application (Perianes-Rodriguez et al., 2016) was used for network and aggregation analyses. We analyzed country co-authorship networks based on data provided in the Scopus affiliation field and identified articles with the most citations. A full counting method identified countries with one or more articles, citing the number of articles per country.

We also constructed topic networks by examining terms found within the title and abstract fields of articles. We normalized terms to address variation in singular/plural forms as well as acronyms/full-term equivalence. Terms with three or more occurrences were included within the network. The top 400 terms with the highest relevance score, as calculated by the VOSViewer application, were presented within the visualization. Network clusters are based on co-occurrence links and assigned by application algorithms. Each node represents a term or phrase found in the title or abstract field, while size and proximity reflect term co-occurrence. Colors delineate clusters of occurrences for a given node, as determined by VOS clustering.

RESULTS

Searching the four databases yielded 808 QSEN-focused articles (Figure 1). After removing 507 duplicates, an additional 54 references were excluded during the title and abstract screening process. After reviewing full texts, 26 articles were removed because they did not meet the inclusion criteria. A total of 221 articles met eligibility criteria and were retained for this bibliometric analysis. The data set for this article can be found at the following URL: https://cdr.lib.unc.edu/concern/data_sets/1r66j9866?locale=en

The search was not limited to the English language, however, all articles retrieved were published in English.

Study characteristics

Since the first QSEN peer-reviewed journal articles were published in 2007, an average of 14.7 articles were published each year
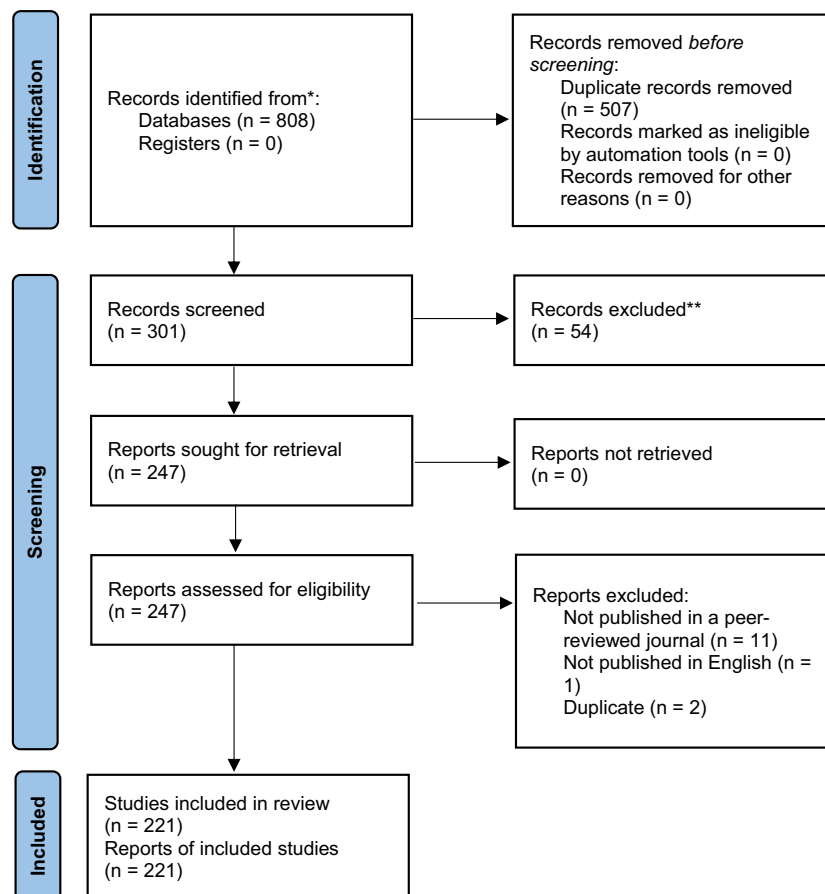

Identification

Records identified from*:
Databases (n = 808)
Registers (n = 0)

Records removed *before screening*:
Duplicate records removed (n = 507)
Records marked as ineligible by automation tools (n = 0)
Records removed for other reasons (n = 0)

Screening

Records screened (n = 301)

Records excluded** (n = 54)

Reports sought for retrieval (n = 247)

Reports not retrieved (n = 0)

Reports assessed for eligibility (n = 247)

Reports excluded:
Not published in a peer-reviewed journal (n = 11)
Not published in English (n = 1)
Duplicate (n = 2)

Included

Studies included in review (n = 221)
Reports of included studies (n = 221)

FIGURE 1 PRISMA flow diagram for Quality and Safety Education for Nurses articles in peer-reviewed journals.

between 2007 and 2021. The peak year was 2017 when 26 articles were published (Figure 2). The two second-highest publication years were 2013 and 2021, with about 22 articles published each year.

Analysis according to type revealed most articles were either research ($n = 84$) or descriptive/review articles ($n = 77$) (Figure 3). The remaining articles were quality improvement projects and/or case studies ($n = 28$), professional or position statements ($n = 20$), and editorials ($n = 12$). Analysis by focus area indicated 165 articles concentrated on education, 35 articles on clinical practice, 17 on professional development, and 4 on leadership and administration (Figure 4). Categories were not mutually exclusive as some articles had multiple foci, for example, research and education or research and clinical practice.

Most articles ($n = 216$) were published in nursing education journals (Table 3). Of the 16 journals publishing three or more QSEN

articles, eight were nursing education journals. The *Journal of Nursing Education* published the greatest number of QSEN articles ($n = 34$), followed by *Nurse Educator* ($n = 29$) and the *Journal of Professional Nursing* ($n = 16$). Other journals publishing three or more included professionally focused journals (e.g., *Nursing Outlook*, $n = 12$) and practice-related journals (e.g., *AORN Journal*, *Archives of Psychiatric Nursing*, *Journal of Nursing Administration*, $n = 3$ each). Other articles were published in journals with less than three QSEN-related articles.

Authors by country and discipline

A total of 13 countries/territories were represented by author affiliations within the data set. In descending order, United States
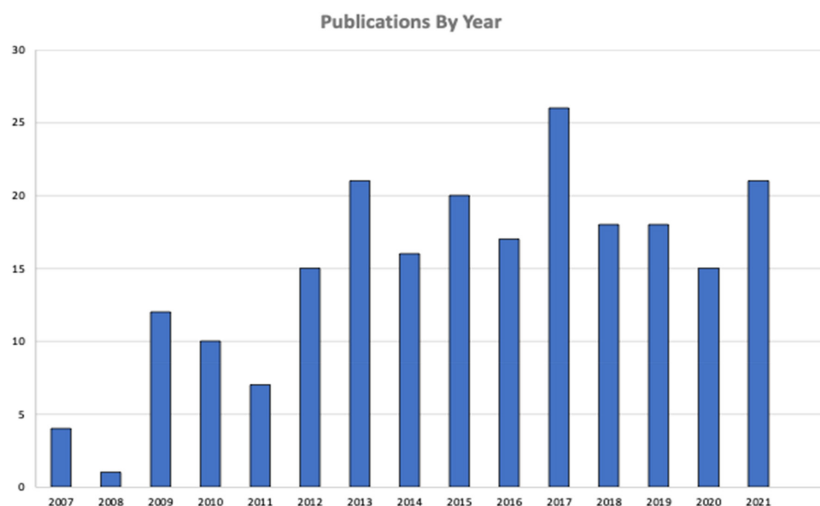

FIGURE 2 Quality and Safety Education for Nurses publications per year from 2007 to 2021 ($n = 221$).
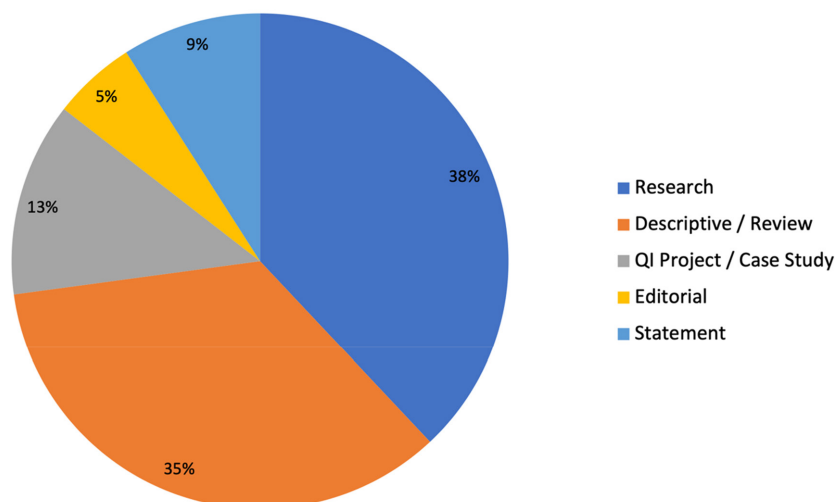

FIGURE 3 Percentage of Quality and Safety Education for Nurses publications by type ($n = 221$).
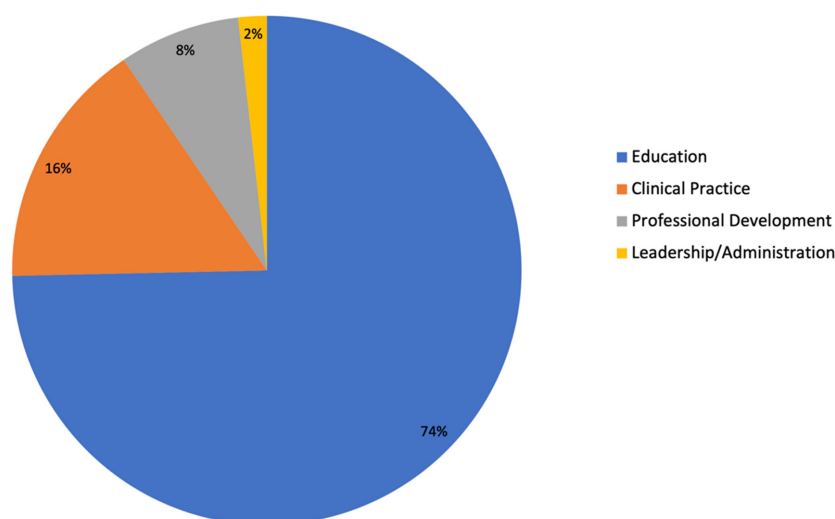
Publications By Focus

FIGURE 4 Percentage of Quality and Safety Education for Nurses articles by focus (*n* = 221)

TABLE 3 Sixteen Journals publishing three or more QSEN articles.

Journal of Nursing Education	34
Nurse Educator	29
Journal of Professional Nursing	16
Nursing Education Perspectives	14
Nursing Outlook	12
Teaching and Learning in Nursing	12
Journal of Continuing Education in Nursing	9
Journal of Research in Nursing	5
Clinical Simulation in Nursing	5
Nursing Management	4
Nurse Education Today	4
Nursing Forum	3
Archives of Psychiatric Nursing	3
AORN Journal	3
Nurse Education in Practice	3
Journal of Nursing Administration	3

authors contributed 208 articles, Japan 3, China and Sweden 2 each, and all other nations 1 each (Australia, Canada, Ireland, Italy, Mexico, South Africa, South Korea, Spain, and the United Kingdom). All first authors were nurses or nurse researchers.

Topic networks from title and abstract map

Terms from titles, abstracts, and keywords were organized into nine clusters using VOS clustering. Clusters 1 and 6 present terms associated with clinical teaching, simulations, and performance. Clusters 2 and 5 reflect terms associated with context and criteria of analysis and factors of efficacy. Cluster 3 terms pertain to innovation and advanced practice. Cluster 4 terms reflect patient care and outcomes. Clusters 7–9 represent terms associated with academic concepts and research frameworks (Figure 5).

Visibility and citation patterns of QSEN articles

Of the 221 articles included in this analysis, 212 are indexed in Scopus. As a group, these articles have been cited 2981 times. The remaining nine articles are indexed in CINAHL. The original 2007 article titled "Quality and Safety Education for Nurses" received by far the largest number of Scopus citations, at 724 (although Google Scholar lists 1549 citations at the end of 2021). The top 10 most cited articles in the data set all have been cited at least 46 or more times (Table 4). *Nursing Outlook* has published six of the top 10 cited articles.

DISCUSSION

To our knowledge, this is the first bibliometric analysis of the extant QSEN literature. The reviewed articles describing QSEN-specific advancements provide insights about the true impact of QSEN on the field, and the magnitude of its effects revealing important findings that provide future direction for QSEN. First, a preponderance of articles focused on education topics; although QSEN did put a great deal of emphasis on education, the intended purpose of QSEN was to instill quality and safety as a foundation of professional nursing identity and practice. Also, we found that peer-reviewed journals have supported the publication of education-focused QSEN work and that academic audiences have been interested in learning about how to apply the QSEN framework and understanding how the six
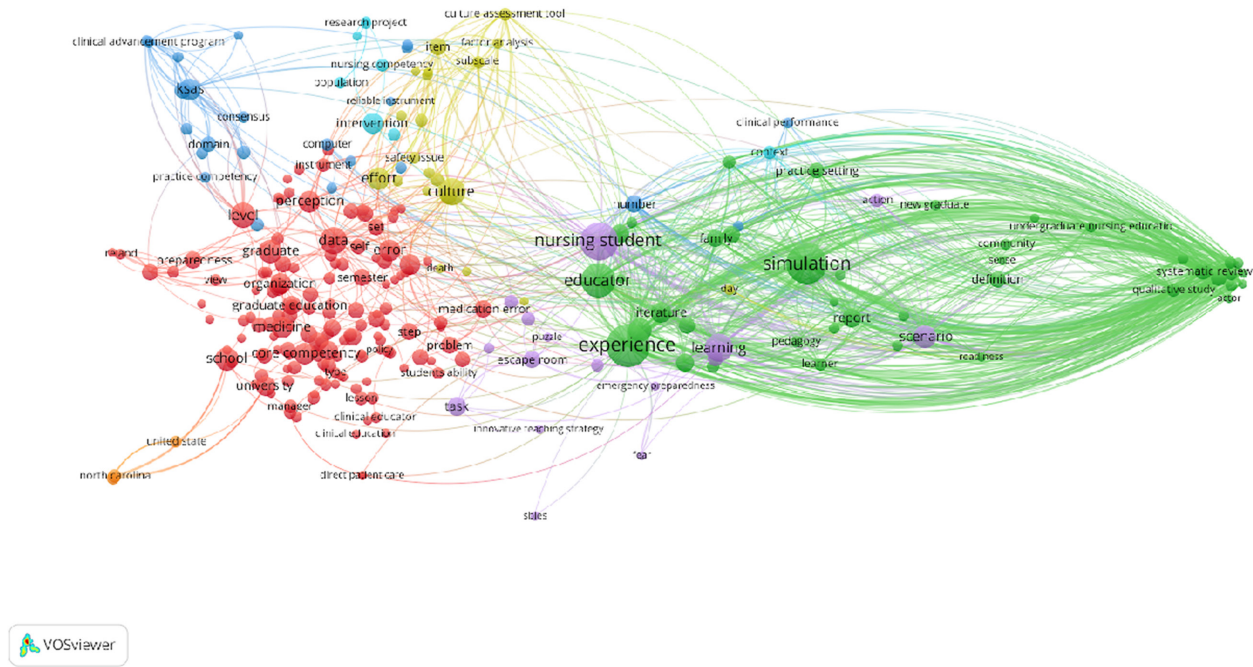
FIGURE 5 Topic analysis of Quality and Safety Education for Nurses.

TABLE 4 Top 10 QSEN publications by citations.

First author	Title	Year	Source title	Cited by
Cronenwett L.	Quality and safety education for nurses	2007	Nursing Outlook	746
Cronenwett L.	Quality and safety education for advanced nursing practice	2009	Nursing Outlook	99
Dolansky M. A.	Quality and safety education for nurses (QSEN): The key is systems thinking	2013	Online Journal of Issues in Nursing	91
Smith E. L.	Current assessments of quality and safety education in nursing	2007	Nursing Outlook	74
Sullivan D. T.	Assessing quality and safety competencies of graduating prelicensure nursing students	2009	Nursing Outlook	70
Cronenwett L.	Improving quality and safety education: The QSEN Learning Collaborative	2009	Nursing Outlook	68
Barton A. J.	A national Delphi to determine the developmental progression of quality and safety competencies in nursing education	2009	Nursing Outlook	56
Chenot T. M.	Frameworks for patient safety in the nursing curriculum	2010	Journal of Nursing Education	56
Leighton K.	Updating the Simulation Effectiveness Tool: Item modifications and reevaluation of psychometric properties	2015	Nursing Education Perspectives	54
Morrison A. M.	High-fidelity simulation and emergency preparedness	2010	Public Health Nursing	46

QSEN competencies have collectively and differentially affected nursing education. These articles also suggest that QSEN has been taken up or integrated into nursing curricula. The predominant focus in nursing education, while appropriate in the early developmental stages of QSEN, also creates an opportunity to expand QSEN's reach more broadly, by deploying research designs beyond descriptive research, and by studying the uptake and implementation of QSEN in settings outside of education.

Second, a particular area of need uncovered in this analysis is understanding how QSEN has been integrated or adopted in clinical nursing practice and care delivery. Specifically, practice-based research is needed to provide evidence about how knowledge of QSEN competencies is demonstrated in practice or affects nursing graduates' performance when they enter clinical care delivery; how QSEN competencies are integrated into nurse residency or transition programs; and how practicing nurses are introduced to QSEN

and, in turn, apply and demonstrate QSEN competencies in their daily clinical practice.

Central to the integration of QSEN competencies in practice is the engagement of nurse leaders. Certainly, the extent to which QSEN competencies are embraced, understood, and emphasized in practice depends on the understanding, application, and articulation of those competencies by nurses, nurse administrators, and organizational leaders at all levels. Although the integration of QSEN competencies in the education and preparation of nurse leaders should be included in graduate education (Miltner et al., 2012; Murphy et al., 2013; Pawlak et al., 2013), only four published articles focusing specifically on QSEN within nurse leadership and administration (Figure 4). Thus, the extent to which QSEN competencies have been integrated into nurse administration and leader education is unclear. This gap could be addressed through stronger academic–practice partnerships for bidirectional workforce planning and education, the transition of new graduates to practice, and regulatory updates. A new model of nurse leader competencies recently released in the US (American Organization of Nurse Leaders, 2022) characterizes quality and safety as an area of focus within the broader domains of professionalism and knowledge of the healthcare environment, yet the depth of training specific to QSEN as it informs these domains should be made clearer. Moreover, the conveyance of sustaining advanced QSEN knowledge, skills, and attitudes needed by clinicians and nurse administrators has not been investigated nor is the science needed to assess the effectiveness of quality and safety competencies across the nursing practice. Only through substantive grounding in quality and safety science, can arguments by nurse administrators and clinical leaders in demonstrating the value of nursing and nursing's impact on quality and safety outcomes for patients and nurses be attenuated.

The 2003 IOM Health Professions Education report that inspired the development of QSEN cited education as the bridge for improving quality and safety outcomes by integrating the six essential competencies across health professions education. While QSEN gained clear support as an educational framework (Marcomini et al., 2021), the small number of articles from practice perspectives indicates a gap in practice implementation. Education is a forerunner for practice change, but it may be that the initial focus of QSEN on education limited its adoption in practice settings. While regulatory mandates assure quality and safety are addressed in healthcare organizations, a few examples of professional practice models grounded in QSEN are reported in peer-reviewed articles and journals. The importance of practice and academic partnerships was underscored in the Phase II Pilot Learning Collaborative requirement for participating schools to establish partnerships with a clinical agency, yet these results raise the question of whether trying to change practice through academic education is the most effective strategy. To validate the importance of this partnership requirement, AACN (2016) called for the establishment of Academic Nursing partnerships that deeply integrate education, practice, and research within schools of nursing granting baccalaureate and graduate degrees. The

vision for achieving Academic Nursing is that faculty and practice partners be collectively committed to the generation of new disciplinary knowledge, establishing education–practice connections, and together improving health and healthcare, including nursing's long-time focus on building the science and implementation of quality and safety initiatives in nursing care (AACN, 2016).

Research across both education and practice is needed to explore the extent to which QSEN has been embedded in clinical care delivery, and the "durability" of nurses' QSEN knowledge in improving outcomes for patients and families, as well as for staff and organizations at large. While current studies report evidence of specific pedagogical strategies particularly noted in the topical diagram, we need additional studies to identify the time points at which additional "doses" of QSEN are needed to maintain currency of knowledge and expand the body of QSEN-specific knowledge. Moreover, a critical next step for both education and practice is the expansion of QSEN to integrate systems thinking as part of "high reliability" organizations – the unwavering commitment to create an environment in which "potential problems are anticipated, detected early, and responded to early enough to prevent catastrophic consequences" (https://psnet.ahrq.gov/primer/high-reliability).

Implementation science can push boundaries to examine how QSEN has been introduced, adopted, and demonstrated in organizations through "…routine practices to improve the quality and effectiveness of health services" (Bauer et al., 2015). Introducing QSEN in any educational or practice setting necessarily means that a change is introduced, specifically the systematic, intentional steps of understanding context, planning, and the identification and modification of strategies to integrate QSEN into education and practice. The use of implementation science can foster a deeper understanding of how QSEN implementations have subsequently improved quality and safety.

Finally, this analysis revealed that the vast majority of QSEN research has been conducted within the US by US-based researchers. The databases lacked studies representing international languages and publications, suggesting opportunities for further integrating QSEN in educational curricula and conducting QSEN-focused research in countries across the globe. Language remains a consideration, although the competencies are translated into at least five languages (Chinese, Korean, Italian, Swedish, and Spanish) as posted on the QSEN website. While many of the 40 QSEN facilitators have reported global presentations and workshops, there has been no systematic examination of the cultural impacts of the competencies in other countries. Our bibliometric analysis includes a few exemplars of global implementation, but collaborations could help improve such as this example from Sweden where the nursing council officially adopted QSEN as its professional practice model (Nygårdh et al., 2017). The QSEN Institute Regional Center at the University of North Carolina at Chapel Hill has created a partnership with PAHO (Pan American Health Organization) for a WHO Collaborating Center to spread QSEN across the Americas (https://nursing.unc.edu/global/paho-who-collaborating-center-in-quality-and-safety-education-in-nursing-and-midwifery).

Limitations

This study does have limitations. The method itself could be viewed as a limitation in that bibliometric analysis does not assess the scientific rigor of the articles included, only the incidence and spread according to focus and topic (Kokol & Blažun Vošner, 2019). The search only included keywords in titles and abstracts. Therefore, articles in which authors wrote about QSEN in the full text but not in these two fields were missed. Because the search included only QSEN-specific keywords, we did not include a large body of articles focused more broadly on patient safety and quality care in nursing, outside of QSEN. Lastly, our study is limited to journals indexed within the databases we searched, thereby missing potential publications and gray literature that may offer other perspectives. These limitations, however, create opportunities for future QSEN and quality- and safety-related practice initiatives and research to be undertaken.

Implications

This bibliometric analysis examined a significant topic of interest that has had a profound impact on nursing education, research, and practice. The study examined patterns and ripple effects to guide future work exploring broader QSEN dissemination in education and practice. While QSEN exceeded expectations in achieving its goal for integration into nursing curricula in the US, patient harm persists as errors continue to occur in healthcare, nurses and other clinicians still rely on workarounds or fail to report adverse events, and organizations still operate outside a culture of safety (Sherwood, 2022).

The first step in changing practice is education. The six QSEN competencies are firmly embedded in the AACN Essentials that guide nursing curricula in the US. However, the implementation of QSEN competencies in practice on a global scale remains uneven. The 2018 global report on healthcare quality and safety indicates healthcare systems often rely on specific patient safety strategies rather than an organizational mindset that puts patient safety at the center of patient care decisions (NASEM, 2018). If nurses possess and are to apply knowledge of the QSEN competencies as expected by curricula essentials, why are the competencies not continued as they transition to practice? Clearly additional work is needed to strategically implement QSEN competencies in practice to intentionally embed these critical aspects of nursing practice in and throughout the organizations and settings where nurses practice. Doing so will not only improve the safety of patient care provided by nurses—the largest single group of health professionals globally—but it makes sense that when nurses are equipped with the knowledge, skills, and attitudes to deliver quality, safe care, and they work in environments grounded in quality and safety cultures, their work experiences will be enhanced (Fitzpatrick et al., 2019; Jeffs, 2018). This phenomenon, often referred to as the Quadruple Aim, extends the original Triple Aim framework of reducing costs, improving population health, and enhancing patients' experiences by adding the importance of creating joy at work for clinicians to ensure safe, quality

care for patients (Bodenheimer & Sinsky, 2014). The link between nurses' work environment and safety points to gaps in how safety cultures are implemented and supported (Tawfik & Ioannidis, 2020). The COVID-19 pandemic exposed extreme conditions that created stressors in nurses' working conditions, with nurses reporting spikes in workplace violence, inadequate resources for safe quality care, and unsatisfactory working conditions (Fitzsimons, 2020). Future work should focus on developing policies to improve working conditions, balance staffing needs, and provide psychologically safety working conditions (Janes et al., 2021).

To achieve safe high-quality care for patients, and integrate the Quadruple Aim of joy at work, research evaluating the integration of QSEN competencies in practice and the extent of nurse administrators' and leaders' engagement in spreading those competencies at all levels of nursing is essential. As eloquently stated by Joseph et al. (2022),

> ...a gap remains in providing a systematic understanding of how to implement the [quality] evidence into practice. Proficiency in [information science] and practice is needed to close the gap between what is known to be effective (research evidence) and what is needed to ensure its application in everyday practice. (p. 20)

Therefore, future efforts should focus on evaluating the extent to which QSEN competencies are embedded in settings where nurses work, and the impact of nurse administrators and leaders in the diffusion of QSEN competencies aimed at achieving the quadruple aim of improving quality and safety outcomes for patients, the costs of care, and patient and staff experiences.

Conducting QSEN-focused practice-based research in international settings is needed to foster the development of a deep understanding of how QSEN works, for whom (i.e., with different cultures and populations) and under what conditions (settings and policies). Such an analysis would enable cross-country comparisons and promote learning between and among countries. Finally, understanding the perspectives of international nurses and researchers about QSEN could be used to promote discussions of how QSEN can be enhanced or refocused to address cross-national quality and safety nursing educational needs (Steven et al., 2019).

CONCLUSIONS

The dominance of education as a literature focus suggests two things: (1) there is an opportunity to spread QSEN to practice and (2) there is a need for practice-based studies that address how the integration of QSEN in clinical care delivery has affected the outcomes of care for patients, staff, and organizations. Few articles reported professional practice or clinical nurse performance models on the competencies.

Few studies reported global spread, which could be hindered by barriers in publication more than lack of implementation given

language challenges. Thus, there is an opportunity to spread QSEN broadly to countries outside of the US and document through joint publications and conduct QSEN-based research in international settings, both assessing its applicability and usability with comparisons among countries for lessons learned, pedagogical strategies, practice integration, and clinical assessments. Does the question remain how to engage researchers across countries to collaborate?

Preventable healthcare harm is clearly an unresolved global challenge. More research to evaluate best practices in both education and practice remains priorities. Both the US (IHI, 2020) and the WHO (2021) have issued patient safety action plans that detail steps for the improvement of a vexing global issue. Studying the results reported in this bibliometric to learn from the topics, focus, authorship, and country spread can clarify future directions for educators, researchers, and clinicians in assuring all nurses have the essential competencies for alleviating preventable harm in every country, with every patient, every time.

CONFLICT OF INTEREST

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REFERENCES

American Association of Colleges of Nursing. (2008). *The essentials of doctor of nursing practice*. American Association of Colleges of Nursing.

American Association of Colleges of Nursing. (2009). *The essentials of baccalaureate education for professional nursing practice*. American Association of Colleges of Nursing.

American Association of Colleges of Nursing. (2011). *The essentials of master's education for professional nursing practice*. Author.

American Association of Colleges of Nursing. (2016). *Advancing healthcare transformation: A new era for academic nursing*. American Association of Colleges of Nursing. https://www.aacnnursing.org/Portals/42/Publications/AACN-New-Era-Report.pdf

American Association of Colleges of Nursing. (2021). *AACN essentials domains, descriptors, contextual statements, and competencies*. https://www.aacnnursing.org/Portals/42/Downloads/Essentials/DRAFT-Domains-Descriptors-Competencies-May-2020.pdf

American Organization of Nurse Leaders (AONL). (2022). *AONL nurse leader core competencies*. AONE, AONL. www.aonl.org/compe tencies https://www.aonl.org/resources/nurse-leader-compe tencies

Barnsteiner, J., Disch, J., Johnson, J., McGuinn, K., Chappell, K., & Swartwout, E. (2013). Diffusing QSEN competencies across schools of nursing: The AACN/RWJF Faculty development institutes. *Journal of Professional Nursing*, 29(2), 68–74. https://doi.org/10.1016/j.profnurs.2012.12.003

Barton, A. J., Armstrong, G., Preheim, G., Gelmon, S. B., & Andrus, L. C. (2009). A national Delphi to determine developmental progression of quality and safety competencies in nursing education. *Nursing Outlook*, 57(6), 313–322.

Bauer, M. S., Damschroder, L., Hagedorn, H., Smith, J., & Kilbourne, A. M. (2015). An introduction to implementation science for the nonspecialist. *BMC Psychology*, 3(1), 32. https://doi.org/10.1186/s40359-015-0089-9

Bodenheimer, T., & Sinsky, C. (2014). From triple to quadruple aim: Care of the patient requires care of the provider. *Annals of Family Medicine*, 12(6), 573–576. https://doi.org/10.1370/afm.1713

Broadus, R. N. (1987). Toward a definition of "bibliometrics". *Scientometrics*, 12(5–6), 373–379. https://doi.org/10.1007/BF02016680

Cronenwett, L., & Barnsteiner, J. (2022). A National Initiative: Quality and safety education for nurses (QSEN), an update. In G. Sherwood & J. Barnsteiner (Eds.), *Quality and safety in nursing: A competency approach to improving outcomes* (2nd ed.). Wiley-Blackwell.

Cronenwett, L., Sherwood, G., Barnsteiner, J., Disch, J., Johnson, J., Mitchell, P., Sullivan, D. T., & Warren, J. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55(3), 122–131.

Cronenwett, L., Sherwood, G., & Gelmon, S. B. (2009). Improving quality and safety education: The QSEN learning collaborative. *Nursing Outlook*, 57(6), 304–312.

Cronenwett, L., Sherwood, G., Pohl, J., Barnsteiner, J., Moore, S., Sullivan, D. T., Ward, D., & Warren, J. (2009). Quality and safety education for advanced nursing practice. *Nursing Outlook*, 57(6), 338–348.

Fitzpatrick, B., Bloore, K., & Blake, N. (2019). Joy in work and reducing nurse burnout: From triple aim to quadruple aim. *AACN Advanced Critical Care*, 30(2), 185–188. https://doi.org/10.4037/aacnacc2019833

Fitzsimons, J. (2020). Quality & Safety in the time of coronavirus-design better, learn faster. *International Journal for Quality in Health Care*, 33(1), mzaa051.

Institute for Healthcare Improvement, National Steering Committee for Patient Safety. (2020). *Safer together: A National Action Plan to advance patient safety*. Institute for Healthcare Improvement. www.ihi.org/SafetyActionPlan

Institute of Medicine. (2000). *To err is human: Building a safer health system*. National Academies Press.

Institute of Medicine. (2003). *Health professions education: A bridge to quality*. National Academies Press.

Institute of Medicine. (2004). Committee on the work environment for nurses and patient safety. In A. Page (Ed.), *Keeping patients safe: Transforming the work environment of nurses*. National Academies Press (US).

Institute of Medicine. (2001). *Committee on the quality of health Care in America. Crossing the quality chasm: A new health system for the 21st century*. National Academy Press.

Janes, G., Mills, T., Budworth, L., Johnson, J., & Lawton, R. (2021). The association between health care staff engagement and patient safety outcomes: A systematic review and meta-analysis. *Journal of Patient Safety*, 17, 207–216. https://doi.org/10.1097/PTS.0000000000000807

Jeffs, L. (2018). Achieving the quadruple aim in healthcare: The essential role of authentic, complex and resilient nurse leaders. *Nursing Leadership*, 31(2), 8–19. https://doi.org/10.12927/cjnl.2018.25607

Joseph, M. L., Nelson-Brantley, H. V., Caramanica, L., Lyman, B., Frank, B., Hand, M. W., Parchment, J., Ward, D. M., Weatherford, B., & Chipps,

E. (2022). Building the science to guide nursing administration and leadership decision making. *Journal of Nursing Administration*, *52*, 19–26. https://doi.org/10.1097/NNA.0000000000001098

Kokol, P., & Blažun Vošner, H. (2019). Historical, descriptive and exploratory analysis of application of bibliometrics in nursing research. *Nursing Outlook*, *67*(6), 680–695. https://doi.org/10.1016/j.outlook.2019.04.009

Marcomini, I., Terzoni, S., & Destrebecq, A. (2021). Teaching strategies and tools for ensuring safe and quality care: A scoping review. *Nursing Education Perspectives*, *42*(6), 339–343. https://doi.org/10.1097/01.NEP.0000000000000809

Miltner, R., Patrician, P., Dawson, M., & Jukkala, A. (2012). Incorporating quality and safety education into a nursing administration curriculum. *Journal of Nursing Administration*, *42*, 478–482. https://doi.org/10.1097/NNA.0b013e31826a20ab

Murphy, L. S., Scott, E., & Pawlak, R. (2013). Crossing our quality chasm: Heeding the case for graduate preparation of nurse managers and leaders. *Journal of Nursing Administration*, *43*, 431–433. https://doi.org/10.1097/NNA.0b013e3182a23ab7

National Academies of Sciences, Engineering, and Medicine, Health and Medicine (NASEM) Division, Board on Health Care Services, Board on Global Health, & Committee on Improving the Quality of Health Care Globally. (2018). *Crossing the global quality chasm: Improving health care worldwide*. National Academies Press (US).

National League for Nursing. (2010). *Outcomes and competencies for graduates of practical/vocational, diploma, associate degree, baccalaureate, master's, practice doctorate, and research doctorate programs in nursing*. National League for Nursing.

Nicoll, L. H., Oermann, M. H., Carter-Templeton, H., Owens, J. K., & Edie, A. H. (2020). A bibliometric analysis of articles identified by editors as representing excellence in nursing publication: Replication and extension. *Journal of Advanced Nursing*, *76*(5), 1247–1254. https://doi.org/10.1111/jan.14316

Nygårdh, A., Sherwood, G., Sandberg, T., Rehn, J., & Knutsson, S. (2017). The visibility of QSEN competencies in clinical assessment tools in Swedish nurse education. *Nurse Education Today, 59*, 110–117. https://doi.org/10.1016/j.nedt.2017.09.003

Pawlak, R., Scott, E., Murphy, L. S., et al. (2013). Crossing our quality chasm: Continuing the case for graduate preparation of nurse managers and leaders. *Journal of Nursing Administration, 43*, 627–629. https://doi.org/10.1097/NNA.0000000000000003

Perianes-Rodriguez, A., Waltman, L., & Van Eck, N. J. (2016). Constructing bibliometric networks: A comparison between full and fractional counting. *Journal of Informetrics, 10*(4), 1178–1195.

Sherwood, G. (2022). Driving forces for quality and safety: Changing mindsets to improve health care. In G. Sherwood & J. Barnsteiner (Eds.), *Quality and safety in nursing: A competency approach to improving outcomes* (3rd ed., pp. 3–32). Wiley.

Smith, E. L., Cronenwett, L., & Sherwood, G. (2007). Current assessments of quality and safety education in nursing. *Nursing Outlook*, *55*(3), 132–137.

Steven, A., Tella, S., Turunen, H., Flores Vizcaya-Moreno, M., Pérez-Cañaveras, R. M., Porras, J., Bagnasco, A., Sasso, L., Myhre, K., Sara-Aho, A., Ringstad, Ø., & Pearson, P. (2019). Shared learning from national to international contexts: a research and innovation collaboration to enhance education for patient safety. *Journal of research in nursing: JRN, 24*(3–4), 149–164.

Tawfik, D. S., & Ioannidis, J. (2020). Evidence relating health care provider burnout and quality of care. *Annals of Internal Medicine, 172*(6), 438–439. https://doi.org/10.7326/L19-0827

World Health Organization (WHO). (2021). *Global Patient Safety Action Plan 2021–2030*. https://www.who.int/publications/i/item/9789240032705