What Do Nursing Students Learn About Patient Safety? An Integrative Literature Review

Susanna Tella, MNSc, RN; Mari Liukka, MNSc, RN;
David Jamookeeah, MEd, RGN, Cert. Ed.; Nancy-Jane Smith, PhD, MA, BA (Hons);
Pirjo Partanen, PhD, RN; and Hannele Turunen, PhD, RN

ABSTRACT

Preventing adverse events and enhancing patient safety in health care are key objectives of nursing education. This integrative literature review critically appraises the content of patient safety in prelicensure nursing education, the teaching and learning methods used, and subsequent nursing student learning. The studies (*N* = 20) reviewed reveal that patient safety in nursing curricula was not necessarily obvious. However, patient safety was taught within both academic settings and clinical environments. The identified content of patient safety was learning from errors, responsible individual and interprofessional team working, anticipatory action in complex environments, and patient safety–centered nursing. The teaching and learning methods used included combining multiple methods. Patient safety curricula included continuing improvement in patient safety competency, sensitivity to nursing students' role, and having a supportive learning environment. Patient safety in the nursing curriculum requires broad, comprehensive attention and development as a specific theme with an interprofessional approach. [*J Nurs Educ*. 2014;53(1):7-13.]

Worldwide studies (e.g., de Vries, Ramrattan, Smorenburg, Gouma, & Boermeester, 2008; Soop, Frysmark, Köster, & Haglund, 2008; Vlayen et al., 2012) established that adverse events causing harm for patients happen to approximately one of 10 patients while receiving health care. Medication errors and nosocomial infections are among the leading threats to patient safety, although many of these events could be prevented with using systematically the best practices. The Institute of Medicine (IOM) revealed the alarming situation, breaking the illusion of infallible health care professionals and launched an onward patient safety movement (Kohn, Corrigan, & Donaldson, 2000). In the recent years, legislation and guidelines for enhancing patient safety have been widely prepared at national and international levels (e.g., European Network for Patient Safety [EUNetPaS], 2010; Ministry of Social Affairs and Health [MSAH], 2009; World Health Organization [WHO], 2011). Investing in improving patient safety is one of the most remarkable opportunities for having a safe and effective health care system. Thus, nursing education has a substantial role in securing patient safety in a complex health care environment (James, 2010).

Patient safety is defined as minimizing a patient's exposure to hazards and near-misses and, likewise, reducing the risk of unnecessary harm associated with health care to an acceptable minimum (Kohn et al., 2000; WHO, 2009). *Hazard* is defined as an agent, an action, or a circumstance that has the potential to cause harm for a patient, whereas a *near-miss* is an event that did not reach the patient (WHO, 2009). To reduce these events in health care, increased emphasis on patient safety in the health care education is imperative, including reforming of nursing curriculum. Several nursing studies (Gregory, Guse, Dick, Davis, & Russell, 2009; Henneman et al., 2010; Mossey, Montgomery, Raymond, & Killiam, 2012) have established the need for change in expressing the truth of nursing students' unsafe practices. The international patient safety guidelines for health care education (EUNetPaS, 2010; WHO, 2011) highlight the importance of health care professionals having a foundation of knowledge, skills, behavior, and attitudes relevant to patient safety and to similarly underline the importance of practicing patient safety in all their actions. Furthermore, the focus should be increasingly on multiprofessional learning of patient safety to improve effective teamwork and communication

(EUNetPaS, 2010; WHO, 2011), as communication failures are major causes for hazards and near-misses (Leonard, Graham, & Bonacum, 2004; Rabøl et al., 2011).

In the United States, the Quality and Safety Education for Nurses (QSEN) initiative, launched by the IOM report (Kohn et al., 2000), has been created to establish the patient safety content in nursing curricula and, thus, to prepare future nurses with the knowledge, skills, and attitudes necessary for continuous improvement of the quality and safety of the health care system. The six QSEN competency areas are patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. QSEN defined *safety* as minimizing the risk to both patients and providers through systematic effectiveness and individual performance (Cronenwett et al., 2007; Sherwood, 2011.) Brady (2011) described five safety behaviors: hand washing, introduction of oneself to the patient and the patient's family, patient-centered communication, double identifiers, and the use of the SBAR (situation, background, assessment, and recommendation) communication strategy.

In Europe, the EUNetPaS (2010) project enhanced collaboration in the field of patient safety. The outcomes of the project include guidelines for education and training of patient safety with the aim to promote the transferability of the methods from a member state to another. In the United Kingdom, the National Patient Safety Agency (NPSA) works under the auspices of the Department of Health to determine, report, and address key patient safety issues. This incorporates a national reporting and learning service. However, there have been concerns that although the NPSA has raised awareness of adverse events in health care, it should do more to identify exemplars of good practice in the prevention and management of patient safety issues. Furthermore, the addition of the critical educational topic, improving both organizational and individual learning of patient safety, has been suggested by the Department of Health (2006) to enhance the work of the NPSA. Nursing education has a significant role in ensuring safe health care, and specific national guidelines exist related to nursing roles and responsibilities for safe and effective care management and delivery. In the United Kingdom, the Nursing and Midwifery Council (NMC) code of conduct (2008) specifies risk management, prevention, and reporting strategies as core components of professional practice for nurses and midwives, whereas in Finland, the Finnish Patient Safety Strategy for 2009 to 2013 (MSAH, 2009) emphasizes that promoting patient safety should be taken into account in health care education, including undergraduate nursing education.

It is essential that the content of patient safety and the used teaching and learning methods are properly considered in nursing education; the goal is to help nursing students implement evidence-based knowledge of patient safety in practice. Benner, Sutphen, Leonard, and Day (2010, p. 166) disclosed the importance of guided reflection on nursing students' clinical experiences to improve their everyday practices. Practice-driven learning is highlighted in several studies regarding patient safety education (Girdley, Johnsen, & Kwekkeboom, 2009; Lenburg, Klein, Abdur-Rahman, Spencer, & Boyer, 2009). However, some studies indicate there is a gap between university education and clinical practice, according to nursing students (Attree, Cooke, & Wakefield, 2008; Vaismoradi, Salsali, & Marck, 2011). To reduce the gap, simulation education is one efficient method for nursing students to safely practice complex care situations. Simulation education can include a variety of safety issues that closely mimic the complexity of patient care—for example, the identification of embedded medication errors (Gantt & Webb-Corbett, 2010; Henneman et al., 2010; Ironside, Jeffries, & Martin, 2009). Overall, clinical practice with supportive, blame-free supervision has a significant role in achieving the desired learning outcomes when teaching patient safety (Attree et al., 2008; Reid-Searl, Moxham, & Happell, 2010).

In summary, it is important to review and integrate the current knowledge about the nature of teaching patient safety in nursing education. In addition, understanding the effects of the teaching and learning methods used for patient safety education and how nursing students learn about patient safety are both important areas to consider when developing nursing education.

PURPOSE

The aim of this integrative literature review was to critically analyze peer-reviewed studies focusing on patient safety in nursing education and to synthesize the findings. The review considered the following questions:

- How does the nursing research literature describe the content of patient safety in nursing education?
- How does the nursing research literature describe the teaching and learning methods used in nursing education regarding patient safety?
- How does the nursing research literature describe the way nursing students learn about patient safety?

METHOD

An integrative literature review was conducted to synthesize the research literature related to the content of patient safety, the teaching and learning methods used, and nursing students' learning of patient safety. This integrative review uses Whittemore's and Knafl's (2005) five stages as a framework for data collection, analysis, and synthesis: (a) problem identification, (b) literature search, (c) data evaluation, (d) data analysis, and (e) presentation. A variety of independent studies were synthesized to determine the current knowledge of patient safety in nursing education (Burns & Grove, 2009).

Literature Search

The **Figure** presents the keywords, as well as the inclusion and exclusion criteria, used in the literature search of electronic databases, electronic journals, and QSEN Web pages. The search aimed to recognize the relevant studies made of the content of patient safety in nursing education and the teaching and learning methods used and nursing students' learning of patient safety. The year 2006 was selected to be the start point for the search because the WHO (2004) launched the first World Alliance for Patient safety in October 2004, and the nursing research literature was estimated to include these issues from 2006 forward. A librarian was consulted to help with the choice of search strategy. Altogether, 20 research studies about patient safety and prelicensure nursing education were included in this

integrative literature review. Another academician confirmed the validity of the selection process.

Data Evaluation

The use of an integrative literature review method assists with the complexity of evaluating the quality of diverse primary studies (Whittemore & Knafl, 2005). In this review, further evaluation of selected primary studies was conducted by modifying the data evaluation form created by Hawker, Payne, Kerr, Hardey, and Powell (2002) to evaluate the studies (Jokelainen, Turunen, Tossavainen, Jamookeeah, & Coco, 2011). In the current study, the evaluation examined the following areas: background, aim and research questions, sample, data collection, data analysis, results, ethical issues, reliability, and usefulness of the results. Each section was evaluated using the following criteria, from 0 to 2 points: 0 = *does not meet the aim or lacks data*; 1 = *inaccurate or superficial*; 2 = *relevant and presented systematically*. The theoretical scale of points that a single primary study can score in the evaluation process varies from 0 to 18. The scale

A computerized search
Keywords: patient safety, health care errors, nursing education, nursing students, teaching methods, learning
Limits: Between 2006 and 2012, English language, Peer-reviewed
Databases: CINAHL, PubMed, EBSCOhost (n = 454)
Manual search browsing journals (n = 6)
Total n = 460

Exclusion based on the title:
Patient safety and registered nurses or patient safety and medical students or patient safety and residents or patient safety and patient education or patient safety and doctorate competencies
n = 300

Inclusion based on the title: Patient safety and nursing education or patient safety and nursing students or patient safety and nursing curriculum or root cause analysis and nursing education or errors and nursing education or unsafe nursing student
n = 160

Excluded duplicates (n = 41) **and exclusions based on the abstracts** (n = 75): Patient safety and leadership or studies specified in medication error types or patient safety and patient handling
n = 116

Inclusion based on the abstracts: Patient safety contents and nursing education or patient safety and teaching methods and nursing education or patient safety competence and nursing education or patient safety and learning and nursing education
After scoping of abstracts for further analysis
n = 44

Exclusion criteria:
Patient safety and service improvement or patient safety and student safety, patient safety and postgraduate nursing students, not empirical study, weaknesses in study quality
n = 24

Inclusion in this integrative literature review after evaluating full text:
Patient safety and prelicensure nursing education, empirical studies
n = 20

Figure. Systematic literature search process relating to patient safety in nursing education.

of scores of the included studies (*N* = 20) ranged from 8 to 18 points, with a mean of 14.1 and a mode of 14. To increase the reliability of the data evaluation process, a second academician assessed the quality of the selected studies. The interrater agreement, as evaluated by the kappa test, was very good, at 0.895 (Burns & Grove, 2009).

Data Analysis

A constant comparison method was used for the data analyses. The method included data reduction, data display, data comparison, the drawing of conclusions, and verification (Whittemore & Knafl, 2005). In the reduction phase, the data from the selected studies were organized into a manageable framework, comprising three sections: the content of patient safety in nursing education, the teaching and learning of patient safety, and nursing students' learning. Studies are presented in **Table A** (available in the online version of
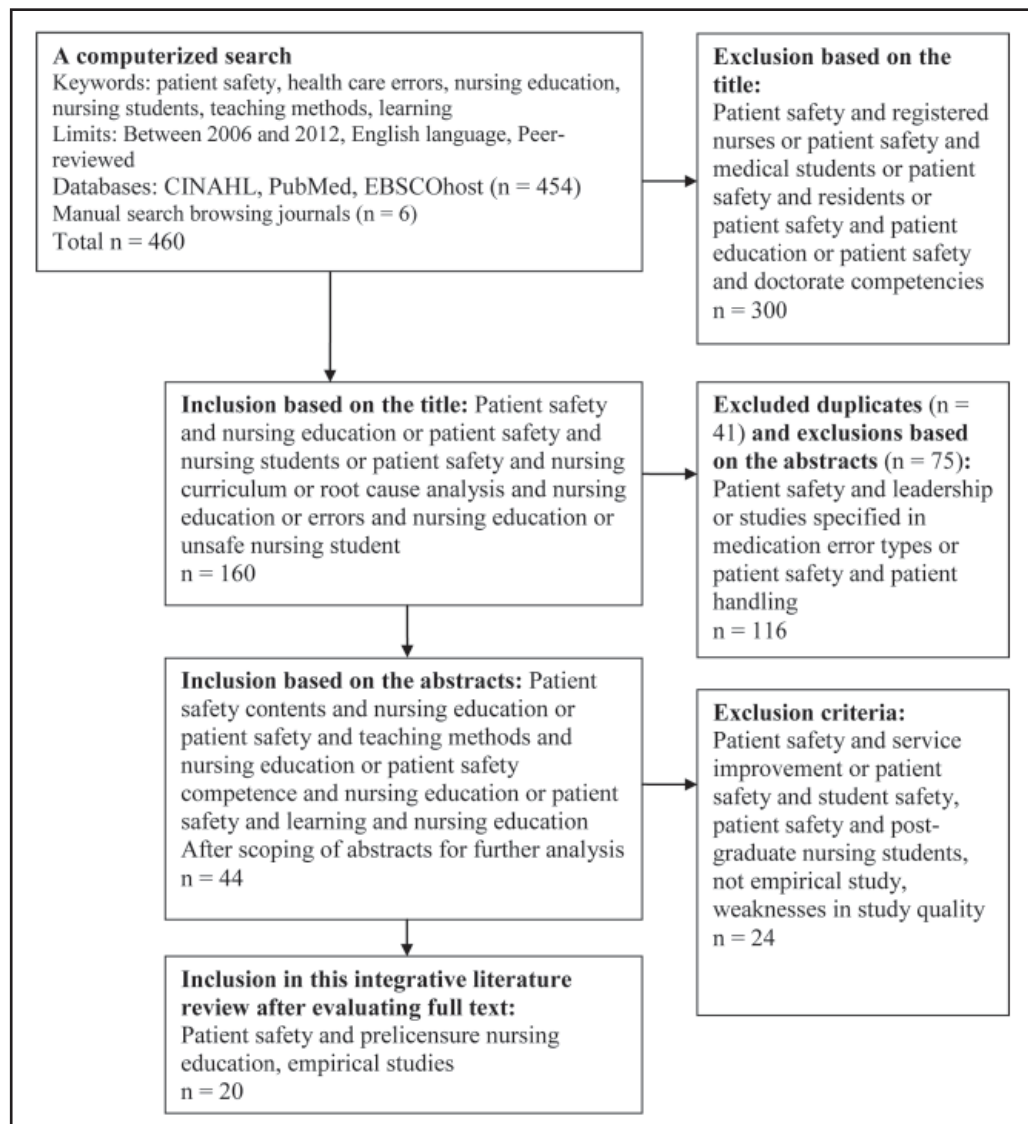
this article). In the data comparison phase, the data were ordered into groups and themes were identified. The drawing of conclusions and verification was the last phase and included identification of communalities and differences, as well as verification with the primary source data. The final step was to synthesize the important elements into an integrated summation of the topic.

RESULTS

The studies (*N* = 20) reviewed were published from 2006 to 2012, with many published in 2009 (*n* = 6). Many of the studies were from the United States (*n* = 11); the remainder were from Australia (*n* = 2), Canada (*n* = 3), Iran (*n* = 2), Norway (*n* = 1), and the United Kingdom (*n* = 1). The studies were quantitative (*n* = 7) and qualitative (*n* = 8), and triangulation (*n* = 5) was used in some (**Table A**).

Content of Patient Safety in Nursing Education

The results related to the content of patient safety in nursing education showed that if patient safety was not evident as a subject in the nursing curricula but rather integrated in several modules, it could disappear. There was a risk that patient safety was not taught comprehensively in any module (Chenot & Daniel, 2010; Smith, Cronenwett, & Sherwood, 2007; Vaismoradi et al., 2011). The subjects that concerned patient safety in nursing education included learning from errors, responsible individual and interprofessional teamwork, anticipatory action in complex environments, and patient safety–centered nursing (**Table A**).

Learning From Errors. Learning from errors had an outstanding role in patient safety education for nursing students. To learn from errors requires that nursing students understand why errors occur, identify errors, report errors, analyze the type of errors that occurred, and learn from the process. In nursing education, error identification was taught (e.g., categorizing errors as being rules based, skills based, and knowledge based) (Currie et al., 2007; Henneman et al., 2010.) A nursing student needed to have the knowledge and skills to identify an error and, subsequently, possess the courage to stop the process from continuing. If errors had occurred, nursing students needed to know about them and have the skills to correct them. Furthermore, nursing students had to have the competence to report hazards and near-misses (Currie et al., 2007). Analyzing errors and learning from them was described less in this integrative review. Overall, patient safety and learning from errors required responsible behavior and attitude from nursing students.

Responsible Individual and Interprofessional Teamwork. To facilitate nursing students' possibility to have adequate patient safety competence, they were taught about working responsibly as individuals and in teams. Nursing students were helped to reflect their own role as individual caregivers and members of a care team (Chenot & Daniel, 2010; DeBourgh, 2012; Miller & LaFramboise, 2009; Mulready-Shick, Kafel, Banister, & Mylott, 2009; Sullivan, Hirst, & Cronenwett, 2009; Vaismoradi et al., 2011). Strengths and limitations were identified, for example, through realistic simulation scenarios, including using interprofessional groups to understand interprofessional team performance and their own role within the group (DeBorough, 2012; Gantt & Webb-Corbett, 2010; Henneman et al., 2010; Ironside et al., 2009; Kyrkjebø, Brattebø, & Smith-Strøm, 2006; Mossey et al., 2012). In patient safety education, a debriefing session after a simulation scenario was used to facilitate a self-evaluation of the nursing students and to receive feedback from group members and educators, thus gaining information about their own strengths and limitations. Crew resources management (CRM) and best and systematic trauma care (BEST) principles were used to teach clear communication, cooperation, and leadership (Kyrkjebø et al., 2006). Overall, patient safety education included emphasizing the importance to communicate clearly in an interprofessional team to be able to act safely in a complex environment.

Anticipatory Action in Complex Environments. The prevention of errors in a complex health care environment must be systematic. The prevention of hazards and near-misses before they occurred was an essential part of patient safety education. One way this was taught was with the use of competency and critical thinking checklists in simulation education (Gantt & Webb-Corbett, 2010). In addition, good practices were used as evidence-based anticipatory actions that help to ensure patient safety in complex environments. For example, patient identification, hand hygiene, medication safety, and patient allergy verification were used as measures to prevent errors (Attree et al., 2008; Gantt & Webb-Corbett, 2010). In simulation education, nursing students practiced working in a clinical environment. The complexity of real patient care situations were closely mimicked in patient scenarios, which included minor and major disruptions (Henneman et al., 2010; Ironside et al., 2009; Kyrkjebø et al., 2006). It was essential for nursing students to practice in complex situations before starting a clinical practice placement. Good practices that develop as work habits help nursing students to ensure patient safety. Thus, nursing students needed to have information-seeking and critical-thinking skills to implement evidence-based, anticipatory practice (Chenot & Daniel, 2010; Gantt & Webb-Corbett, 2010; Miller & LaFramboise, 2009; Mulready-Shick et al., 2009; Sullivan et al., 2009). All anticipatory actions to confirm patient safety were important to nursing students for learning to provide care that was patient centered and safe.

Patient Safety–Centered Nursing. In nursing education, a patient-centered approach was taught as a prominent part of patient safety. Patient-centered care highlights the patient's viewpoint and the nursing student's role in enhancing patient safety. Ensuring the patient was in the center of care and a member of the care team was important for patient safety. In addition, a positive nursing role model about ensuring patient-centered care and patient safety was considered as outstanding (Chenot & Daniel, 2010; Miller & LaFramboise, 2009; Mulready-Shick et al., 2009; Sullivan et al., 2009). Thus, it was important to highlight patient safety–centered nursing in undergraduate nursing education.

Teaching and Learning Methods Used for Patient Safety Education

In nursing education, different teaching and learning methods were needed to help nursing students learn to act safely in real patient situations. In this integrative literature review, the teaching and learning methods used for patient safety in nursing education consisted of combining multiple methods for the learning of patient safety competence (**Table A**).

Embedding patient safety into nursing education and adequately preparing nursing students with the necessary competencies required multiple teaching and learning methods. It was important to include in the curricula the teaching and learning methods that were best suited for patient safety education. Logical order of used methods, continuing construction of patient safety competence, and forming comprehensive entirety of the used methods to support the learning process of patient safety competence were considered the most crucial for patient safety education (Attree et al., 2008; Miller & LaFramboise, 2009; Vaismoradi et al., 2011); these aspects could be implemented as follows: Structured patient safety lectures in academic settings, a Web-based hazard and near-miss reporting system in clinical practice, and conducting a root cause analysis of patient safety incidents were used as teaching and learning methods to reduce

the gap between education in academic settings and clinical practice (Currie et al., 2007; Miller & LaFramboise, 2009). Similarly, an academic and service partnership was implemented to promote effective nursing education and nursing students' clinical practice (DeBourgh, 2012). Other methods for deepening the learning of patient safety included interprofessional simulation scenarios, followed by debriefing sessions. Nursing students preferred interprofessional training especially because it involved realistic videos and simulation exercises (Kyrkjebø et al., 2006). In simulation education, competency and critical thinking checklists and the reporting of errors were conducted to increase nursing students' critical thinking skills (Gantt & Webb-Corbett, 2010). Traditional teaching and learning methods, reading, clinical practices, and return demonstrations were still part of patient safety education (Luhanga, Yonge, & Myrick, 2008; Smith et al., 2007).

Nursing Students' Learning of Patient Safety

Nursing students' learning of patient safety was related to continuity, sensitivity, and a supportive environment, each of which is explored in depth. It was important that nursing students constantly improved their own patient safety competencies, were sensitive to their own role in securing patient safety, and had the potential to learn the identification of specific issues in a supportive learning environment (**Table A**).

Continuing Improvement of Patient Safety Competence. To learn patient safety, it was important for nursing students to continuously increase patient safety competence. Nursing students did not necessarily demonstrate adequate patient safety knowledge and skills after theoretical lectures (Henneman et al., 2010). Furthermore, nursing students could express dissatisfaction with the way patient safety issues were discussed in the classroom (Vaismoradi et al., 2011). However, opposite findings support classroom teaching; patient safety knowledge improved successfully when taught in a classroom, whereas patient safety skills, such as those regarding hazards and near-misses, improved most when taught in a health care environment (Sullivan et al., 2009). Academic and service partnership effectively promoted nursing students' learning of patient safety and quality knowledge (DeBourgh, 2012).

Certain clinical patient safety procedures emerged when nursing students performed clinical practice and simulation scenarios of patient care. Nursing students' performances of clinical procedures of patient safety varied. Poor infection control practices, mostly due to inadequate hand hygiene, verification of patient's allergies, and patient identification, were considered as common hazards, whereas medication administration was described as a common near-miss for nursing students (Currie et al., 2007; Gantt & Webb-Corbett, 2010; Henneman et al., 2010). Other clinical procedures included incomplete allergy verification and insufficient interaction with the doctor by nursing students. In contrast, Henneman et al. (2010) found that nursing students focused on coordinating information with patients and families. Clear communication required nursing students to be sensitive to their own role.

Sensitivity to Their Own Role. Nursing students were sensitive to their own roles in clinical practice and considered safety to be a significant issue (Chenot & Daniel, 2010; Mossey et al., 2012; Sullivan et al., 2009; Vaismoradi et al., 2011). Most of the nursing students reported making a hazard or a near-miss in simulation settings or during clinical placements (Gregory et al., 2009; Henneman et al., 2010). Just culture encourages the reporting of patient safety incidents without fear of punishment; this integrative literature review demonstrated that it was important for nursing students to feel safe when reporting errors in clinical practice (Attree et al., 2008; Koohestani & Baghchegi, 2009; Mulready-Shick et al., 2009). Web-based hazard and near-miss reporting systems promoted nursing students' mindfulness and sensitivity to their own role and responsibility regarding patient safety (Currie et al., 2007). On the other hand, nursing students' unsafe practice types were identified to increase understanding of the fact that nursing students need to be considered as individuals to encourage their learning of patient safety (Mossey et al., 2012).

By observing potential errors, nursing students learned to identify dangerous situations; they learned to stop errors from progressing and correct the situation. Nursing students' age, tolerance of ambiguity, and self-reported grade point average did not correlate with learning of patient safety competencies (Henneman et al., 2010; Ironside et al., 2009). In clinical practice placement, errors and near-misses could lead to nursing students' failing the clinical practice. Failing depended on the stage of nursing students' studies and the type of errors that occurred (Tanicala, Scheffer, & Roberts, 2011). In addition, nursing students learned about personal reactions and the limits of their own competence in interprofessional simulation education. While in clinical practice placement, nursing students did not necessarily consider themselves as being competent enough for safe practice (Kyrkjebø et al., 2006; Vaismoradi et al., 2011). The support of the learning environment had an influence on nursing students' learning of patient safety.

Supportive Learning Environment. A supportive learning environment had a crucial role in the teaching of patient safety. In dedicated learning units, nursing students could perform clinical practice in a safe environment and feel comfortable to practice what they had learned about patient safety. Students thought it was easier to learn about hospital systems such as bracelet scans and potential adverse event alerts with a smaller student-to-teacher ratio (DeBorough, 2012; Mulready-Shick et al., 2009). The potential for making errors decreased when nursing students were adequately supervised. The reverse was also true: when nursing students lacked sufficient supervision, the risk of errors increased (Reid-Searl et al., 2010; Reid-Searl, Moxham, Walker, & Happell, 2008). A defensive, blame culture was detrimental to learning and could affect how nursing students reported hazards and near-misses in clinical practice. Fear and administrative barriers, such as having no positive feedback from the preceptor and focusing on an individual's performance, negatively influenced nursing students' performance (Attree et al., 2008; Koohestani & Baghcheghi, 2009).

DISCUSSION

The results of this integrative literature review reveal that the content of patient safety education varies within the nursing education field. Many different teaching and learning methods are used to educate nursing students about patient safety. Further-

more, nursing students' knowledge of patient safety does not necessarily improve after their formal education. Nursing curricula play a prominent role in ensuring that nursing students can demonstrate suitable patient safety competencies. The content of patient safety education must be clear and explicit in nursing curricula, and effective teaching and learning methods need to be properly described and used in both academic settings and clinical practice placements. Nursing students must learn the fundamentals of patient safety, learn from errors, and report hazards and near-misses from the very beginning of their nursing studies (EUNetPaS, 2010; Vaismoradi et al., 2011; WHO, 2011). In addition, nurse educators should respond to the errors that nursing students make in their clinical practice placements and thus develop better educational methods and curricula to improve patient safety competencies. Understanding the importance of the interactive connection between academic and clinical education is essential (Benner et al., 2010).

This integrative review identified the content of patient safety in nursing education to be learning from errors, responsible individual and interprofessional team working, anticipatory action in complex environments, and patient safety–centered nursing. It is important for nursing students to develop good attitudes to work with the patient's best interests at heart. Christiansen, Robson, and Griffith-Evans (2010) wrote that nursing students perceive service improvement learning as important to patient safety and their future career development. The patient is at the center of safe care, and nursing students can make a positive difference through their behavior by having a questioning approach and the confidence to work differently. In this literature review, the national and international patient safety standards or legislation was not identified as being obviously relevant to patient safety education. Thus, it is important to highlight the existing official patient safety standards, strategies, and legislation when devising the patient safety content of nursing education.

In this integrative review, the teaching and learning methods used for patient safety education show the importance of combining multiple teaching and learning methods to promote the continuity, logical order, and entirety of the patient safety competence. The use of patient safety tools is an important element for graduating nursing students. Patient safety tools, such as checklists, SBAR, CRM, and BEST, were used, for example, in simulation education, but it was not clear in this integrative literature review whether these tools were used systematically throughout the entire education, applying different teaching and learning methods. In addition, Vaismoradi et al. (2011) described how nursing students feel insecure in clinical practice. Nursing students indicated that they needed help with internalizing patient safety principles and values; in this regard, they viewed themselves as not being competent enough. Interprofessional patient safety education can provide a deeper view for nursing students to learn patient safety and realize their own role in multiprofessional teams. The systematic practicing of patient safety principles using comprehensive tools with a variety of well-established teaching and learning methods is essential in nursing education.

Nursing students' learning of patient safety was composed of continuing improvement in patient safety competence, sensi-

tivity to their own role in securing patient safety, and a supportive learning environment. Together, studies at the university and clinical practice placements should lead to the desired level of education about patient safety. Understanding systematic failures, acting transparently, and learning from errors are essential for safe patient care (Sherwood & Drenkard, 2007; Wakefield et al., 2005). Thus, a just culture is needed in nursing education, as it holds every individual accountable for their own actions. It focuses on behavioral choices and distinguishes between human error, unintentional risk-taking behavior, and intentional risk-taking behavior. A just culture supports nursing students' reporting of errors and near-misses without fear of retribution by providing appropriate, fair, and consistent resolution of adverse student practice events (Barnsteiner & Disch, 2012; North Carolina Board of Nursing, 2012).

Most of the studies in this integrative review originated from the United States, where the QSEN initiative has led to many improvements of patient safety in nursing education (Sherwood, 2011). Only two of the studies were from Europe. For example, the EUNetPaS (2010) provides guidelines for nursing education to promote similar patient safety competencies among nursing students in Europe. Thus, further studies are needed to compare the patient safety competencies of nursing students across Europe.

LIMITATIONS

This integrative literature review has several limitations. First, the studies selected in this review included participants from different levels and phases of nursing education. Second, the implementation of primary studies varies and can influence the reliability of this integrative review. Some studies shared the same data, which could have biased the results of this integrative review. Third, the integrative review method itself has some limitations, such as the combination of diverse methodologies, which can lead to inaccuracy and bias (Whittemore & Knafl, 2005). However, the authors tried to mitigate these issues by using a second academician to validate the literature selection process and the evaluation of the quality of selected research articles.

REFERENCES

Attree, M., Cooke, H., & Wakefield, A. (2008). Patient safety in an English pre-registration nursing curriculum. *Nurse Education in Practice, 8,* 239-248.

Barnsteiner, J., & Disch, J. (2012). A just culture for nurses and nursing students. *Nursing Clinics of North America, 47,* 407-416.

Benner, P., Sutphen, M., Leonard, V., & Day, L. (2010). *Educating nurses: A call for radical transformation.* San Francisco, CA: Jossey-Bass.

Brady, D.S. (2011). Using quality and safety education for nurses (QSEN) as a pedagogical structure for course redesign and content. *International Journal of Nursing Education Scholarship, 8,* 1-18. doi:10.2202/1548-923X.2147

Burns, N., & Grove, S.K. (2009). *The practice of nursing research: Appraisal, synthesis, and generation of evidence* (6th ed.). St. Louis, MO: Elsevier Saunders.

Chenot, T.M., & Daniel, L.G. (2010). Frameworks for patient safety in the nursing curriculum. *Journal of Nursing Education, 49,* 559-668.

Christiansen, A., Robson, L., & Griffith-Evans, C. (2010). Creating an improvement culture for enhanced patient safety: Service improvement learning in pre-registration education. *Journal of Nursing Management, 18,* 782-788.

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

Currie, L.M., Desjardins, K.S., Stone, P.W., Lai, T.Y., Schwartz, E., Schnall, R., & Bakken, S. (2007). Near-miss and hazard reporting: Promoting mindfulness in patient safety education. *Studies in Health Technology and Informatics, 129* (Pt. 1), 285-290.

DeBorough, G.A. (2012). Synergy for patient safety and quality: Academic and service partnerships to promote effective nurse education and clinical practice. *Journal of Professional Nursing, 28,* 48-61.

Department of Health. (2006). *Safety first: A report for patients, clinicians and health managers.* Retrieved from http://www.dh.gov.uk/

de Vries, E.N., Ramrattan, M.A., Smorenburg, S.M., Gouma, D.J., & Boermeester, M.A. (2008). The incidence and nature of in-hospital adverse events: A systematic review. *Quality and Safety in Health Care, 17,* 216-223.

European Network for Patient Safety. (2010). *A general guide for education and training in patient safety.* Retrieved from http://www.eupatient.eu/Documents/Projects/EUnetPaS/Guidelines_final_22%2006%202010.pdf

Gantt, L.T., & Webb-Corbett, R. (2010). Using simulation to teach patient safety behaviors in undergraduate nursing education. *Journal of Nursing Education, 49,* 48-51.

Girdley, D., Johnsen, C., & Kwekkeboom, K. (2009). Facilitating a culture of safety and patient-centered care through use of a clinical assessment tool in undergraduate nursing education. *Journal of Nursing Education, 48,* 702-705.

Gregory, D., Guse, L., Dick, D.D., Davis, P., & Russell, C.K. (2009). What clinical contracts reveal about nursing education and patient safety. *Canadian Nurse, 105,* 20-25.

Hawker, S., Payne, S., Kerr, C., Hardey, M., & Powell, J. (2002). Appraising the evidence: Reviewing disparate data systematically. *Qualitative Health Research, 12,* 1284-1299.

Henneman, E.A., Roche, J.P., Fisher, D.L., Cunningham, H., Reilly, C.A., Nathanson, B.H., & Henneman, P.L. (2010). Error identification and recovery by student nurses using human patient simulation: Opportunity to improve patient safety. *Applied Nursing Research, 23,* 11-21.

Ironside, P.M., Jeffries, P.R., & Martin, A. (2009). Fostering patient safety competencies using multiple-patient simulation experiences. *Nursing Outlook, 57,* 332-337.

James, K.M. (2010). Incorporating complexity science theory into nursing curricula. *Creative Nursing, 16,* 137-142.

Jokelainen, M., Turunen, H., Tossavainen, K., Jamookeeah, D., & Coco, K. (2011). A systematic review of mentoring nursing students in clinical placements. *Journal of Clinical Nursing, 20,* 2854-2867.

Kohn, L.T., Corrigan, J.M., & Donaldson, M.S. (2000). *To err is human: Building a safer health system.* Washington, DC: National Academies Press.

Koohestani, H.R., & Baghchegi, N. (2009). Barriers to the reporting of medication administration errors among nursing students. *Australian Journal of Advanced Nursing, 27,* 66-74.

Kyrkjebø, J.M., Brattebø, G., & Smith-Strøm, H. (2006). Improving patient safety by using interprofessional simulation training in health professional education. *Journal of Interprofessional Care, 20,* 507-516.

Lenburg, C.B., Klein, C., Abdur-Rahman, V., Spencer, T., & Boyer, S. (2009). A comprehensive framework designed to promote quality care and competency for patient safety. *Nursing Education Perspectives, 30,* 312-317.

Leonard, M., Graham, S., & Bonacum, D. (2004). The human factor: The critical importance of effective teamwork and communication in providing safe care. *Quality & Safety in Health Care, 13*(Suppl. 1), i85-i90.

Luhanga, F., Yonge, O., & Myrick, F. (2008). Strategies for precepting the unsafe student. *Journal for Nurses in Staff Development, 24,* 214-219.

Miller, C.L., & LaFramboise, L. (2009). Student learning outcomes after integration of quality and safety education competencies into a senior-level critical care course. *Journal of Nursing Education, 48,* 678-685.

Ministry of Social Affairs and Health. (2009). *Promoting patient safety together. Finnish patient safety strategy 2009–2013. Publications of the Ministry of Social Affairs and Health 2009:5.* Retrieved from http://www.stm.fi/c/document_library/get_file?folderId=39503&name=DLFE-8037.pdf

Mossey, S., Montgomery, P., Raymond, J.M., & Killiam, L.A. (2012). Typology of undergraduate nursing students' unsafe clinical practices: Q-methodology. *Journal of Nursing Education, 51,* 245-253.

Mulready-Shick, J., Kafel, K., Banister, G., & Mylott, L. (2009). Enhancing quality and safety competency development at the unit level: An initial evaluation on students learning and clinical teaching on dedicated education units. *Journal of Nursing Education, 48,* 716-719.

North Carolina Board of Nursing. (2012). *Just culture in nursing education programs.* Retrieved from http://www.ncbon.com/myfiles/downloads/just-culture.pdf

Nursing and Midwifery Council. (2008). *The code: Standards of conduct, performance and ethics for nurses and midwives.* Retrieved from http://www.nmc-uk.org/documents/standards/the-code-A4-20100406.pdf

Rabøl, L.I., Andersen, M.L., Østergaard, D., Bjørn, B., Lilja, B., & Mogensen, T.. (2011). Descriptions of verbal communication errors between staff. An analysis of 84 root cause analysis-reports from Danish hospitals. *BMJ Quality & Safety, 20,* 268-274.

Reid-Searl, K., Moxham, L., & Happell, B. (2010). Enhancing patient safety: The importance of direct supervision for avoiding medication errors and near misses by undergraduate nursing students. *International Journal of Nursing Practice, 16,* 225-232.

Reid-Searl, K., Moxham, L., Walker, S., & Happell, B. (2008). Shifting supervision: Implications for safe administration by nursing students. *Journal of Clinical Nursing, 17,* 2750-2757.

Sherwood, G. (2011). Integrating quality and safety science in nursing education and practice. *Journal of Research in Nursing, 16,* 226-240.

Sherwood, G., & Drenkard, K. (2007). Quality and safety curricula in nursing education: Matching practice realities. *Nursing Outlook, 55,* 151-155.

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

Soop, M., Frysmark, U., Köster, M., & Haglund, B. (2008). Adverse events in hospitals are common. The majority can be avoided according to a study of medical records. *Läkartidningen, 105,* 1748-1752.

Sullivan, D.T., Hirst, D., & Cronenwett, L. (2009). Assessing quality and safety competencies of graduating prelicensure nursing students. *Nursing Outlook, 57,* 323-331.

Tanicala, M.L., Scheffer, B.K., & Roberts, M.S. (2011). Defining pass/fail nursing student clinical behaviors phase I: Moving toward a culture of safety. *Nursing Education Perspectives, 32,* 155-161.

Vaismoradi, M., Salsali, M., & Marck, P. (2011). Patient safety: Nursing students' perspectives and the role of nursing education to provide safe care. *International Nursing Review, 58,* 434-442.

Vlayen, A., Verelst, S., Bekkering, G.E., Schrooten, W., Hellings, J., & Claes, N. (2012). Incidence and preventability of adverse events requiring intensive care admission: A systematic review. *Journal of Evaluation in Clinical Practice, 18,* 485-497.

Wakefield, A., Attree, M., Braidman, I., Carlisle, C., Johnson, M., & Cooke, H. (2005). Patient safety: Do nursing and medical curricula address this theme? *Nurse Education Today, 25,* 333-340.

Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing, 52,* 546-553.

World Health Organization. (2004). *World Alliance for Patient Safety: Forward programme*. Retrieved from http://www.who.int/patientsafety/en/brochure_final.pdf

World Health Organization. (2009). *Conceptual framework for the international classification for patient safety (v.1.1). Final technical report 2009*. Retrieved from http://www.who.int/patientsafety/taxonomy/icps_full_report.pdf

World Health Organization. (2011). *Patient safety curriculum guide: Multi-professional edition*. Retrieved from http://whqlibdoc.who.int/publications/2011/9789241501958_eng.pdf

Table A
Studies Investigating Patient Safety in Nursing Education

Author(s) (Year), Country	Purpose and Aims of the Study	Research Methods or Instrument	Sample (*n*)	Validity / Reliability	Patient Safety Content in Nursing Education	Learning and Teaching Methods of Patient Safety	Nursing Students' Learning Outcomes of Patient Safety
Attree et al. (2008), United Kingdom (UK)	To explore the perceptions of nursing students, educators, and key stakeholders about patient safety in an English pre-registration curriculum	Content analysis of curriculum Focus group interviews and semi-structured individual interviews Thematic analysis	One pre-registration nursing degree curriculum Pre-registration nursing students (*n* = 15), Educators (*n* = 10), Key education stakeholders (*n* = 6)	A case study, small sample	No explicit patient safety learning content and objectives found in curriculum; No patient safety module exists; Included theory and ideals, but no practice	Patient safety integrated into lectures; Theory and principles in lecturers' problem-based scenarios; Individual rather than systematic approach to learning both in university and practical settings; Defensive, blame culture in both education and clinical practice, especially in practice; Lack of opportunity to discuss and learn from patient safety incidents	Nursing students gained most knowledge and experience from clinical practice; Nursing students' perceptions of patient safety and risk: keeping patients safe and protected from harm; safe medication and environment, falls, infection, communication, observation, risk assessment and management; Gap between what is taught and practice; Nursing students perceive learning defensive practice.
Chenot & Daniel (2010), United States (US)	To gain a better understanding of the current status of patient safety awareness among prelicensure nursing students	Phases I and II: A survey research, the HPPSACS, a 34 item instrument, exploratory factor analysis and alpha reliability Phase III: A content analysis	Phase I: academic professional nurses (*n* = 150) Phase II: associate degree and baccalaureate nursing students (n= 318) Phase III: Nursing program and curricula from academic institutions (*n* = 7)	Question-naire Phase I: alpha near 0.70 or above Phase II: alpha 0.64-0.82 Statistical significance used (*p* = 0.05)	At least three of the six QSEN competencies: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics were included in nursing curricula of participating academic institutions	Current patient safety curriculum (QSEN)	Nursing students' learning about patient safety: sensitivity to their own role, responsibility for patient safety; Themes identified: comfort, error reporting, denial and culture: Evidence was found of characteristics related to demographic variables: race and ethnicity; relationship between type of collegiate and nursing students' perceptions of their patient safety competence; Younger female students were not as comfortable with patient safety issues.

Currie et al. (2007), US	To describe a curricular innovation project: Promoting mindfulness of patient safety with web-based reporting system	Descriptive statistics, frequency and percentage distributions	Baccalaureate nursing students ($n = 156$) 2 to 5 weeks clinical practice during 10 weeks, 1,487 reports submitted	No statistical significance reported	Promoting mindfulness and enhancing patient safety; Observing and reporting hazards and near-misses during clinical practice	Web-based hazards and near-misses reporting system and documentation; Students having wireless handheld device to submit a report every day	Reports: Dangerous situations ($n = 933$) and near-misses ($n = 554$); Poor infection control practice was the most frequently reported dangerous situation and medication errors most often reported as a near-miss; Insufficient patient identification and documentation relating to hazards
DeBorough (2012), US	To describe nursing students' safety and quality knowledge and the students' perceptions of team behaviors and communication effectiveness	A descriptive pilot study in two phases I Phase: students' knowledge about safety and quality matters II Phase: students' perceptions of team communica-tion	Prelicensure nursing students ($n = 24$), third semester	Effect sizes calculated (Cohen's d) small 0.0-0.2 moderate 0.3-0.5 large when greater than 0.8	The Synergy Partnership Model aligning agency safety and quality initiatives with school's student outcome competencies; Students' safety and quality knowledge and perceptions of team behaviors and communication effectiveness	Clinical nursing course	Students' awareness of national safety goals increased (effect size = 0.94 and 2.11); Knowledge gain for concept of nursing care sensitivity increased (0.67 and 0.95); Perception of being better prepared to began each shift increased (0.85); Perception of availability of communication opportunities among health care team members increased (0.66); Perception of impact on patient care outcomes increased (0.70)
Gantt & Webb-Corbett (2010), US	To describe integration of patient safety instruction into simulation experiences for undergraduate nursing students	Descriptive statistics, frequency and percentage distributions	Undergraduate nursing students Pretest ($n = 84$) Posttest ($n = 110$)	No statistical significance reported	Checklists; Patient safety practices including hand washing, patient identification and patient allergy verification; Critical thinking abilities including students reactions, problem solving and reasoning skills	Evaluative nursing clinical simulations using SimMan® 30-minute clinical scenarios evaluating students' use of competency checklist and care delivery critical thinking checklist; Completed checklists were used to debrief students about their strengths and errors	Inadequate hand washing in pretest 61% and in posttest 38%; Inadequate patient identification in pretest 61% and in posttest 22%

Gregory et al. (2009), Canada	To explore unsafe patient care events recorded in clinical learning contracts	Qualitative content analysis and descriptive statistical analysis	Archived individual nursing student files from 1999 to 2005 ($n = 60$)	The authors categorized data together	Concerns about unsafe patient care	In nursing student files, 154 unsafe patient care events documented	37 students of 60 concerned about unsafe patient care; Errors 12.34%, near-misses 30.52%, potential adverse events 54.55% and adverse events 2.60%
Henneman et al. (2010), US	To describe the types and frequency of errors that happened to nursing students during human patient simulation exercises and describe types of errors identified, stopped and corrected	Retrospect-ive study	Senior nursing students ($n = 50$) participating in a simulation exercise which was videotaped	Two independent researchers reviewed videotapes, which were not included in the final analysis Statistical significance (p) calculated using Fisher's Exact Test	Error identification, stoppage and correction; Rule-based error categories: skill-based, rule-based and knowledge-based; Rule-based category subdivided: coordination, verification, monitoring and intervention; Independent assessing and managing of an acutely ill patient; Scenarios: congestive heart failure (CHF) and a motor vehicle accident (MVA)	Two simulation exercises lasting 15 and 30 minutes mimicking a real-life patient care situation; Prior to this simulation education, theoretical lectures about managing patients using the medical diagnoses; nursing students had two prior experiences of simulation	Error frequencies in scenarios CHF 60% and MVA 51% ($p = 0.07$); Errors: Patient identification 84%/88%, allergy verification 76%/68%, physician interactions 80%/ 56%, coordinating information with the patient and family 28%/8%, respectively; Identifying of embedded medication errors 14%, in CHF more often than MVA ($p < 0.001$); All nursing students made errors
Ironside et al. (2009), US	To explore the extent to which student experiences with multiple-patient simulation improved students' patient safety competencies and the student factors that were related to the outcome	Descriptive statistics; Instrument MSTAT-I and Patient safety competency scale One-way analysis of variance, Fisher's exact tests	Baccalaureate and associate degree nursing students ($n = 67$) Female 91%	Instruments: Cronbach's alpha = 0.86 to 0.89 Statistical significance conducted using ($p = 0.05$)	Nursing students' patient safety competencies in scenarios closely mimicking the complexity of patient care in acute care settings; Scenarios included minor and major disruptions	Multiple-patient simulation 20 minutes debriefing after scenario: what went nicely and what did not, what was learned; Self-reported grade point average (GPA)	Safety competencies improved from first to second simulation ($p < 0.0002$); No significant correlations were found between achievement of patient safety competencies and students factors (tolerance of ambiguity, age and GPA)
Koohestani & Baghchegi	To describe barriers that nursing students	A cross-sectional, descriptive	Nursing students ($n = 240$), response	Instrument: MAEs Face validity	Nursing students perceived barriers to medication error	Clinical practice, reporting medication errors	Nursing students' views of all medication errors reported (80.12%) to their instructors

(2009), Iran	perceived to exist with medication administration error (MAE) reporting	study MAEs; 6-point Likert scale; Descriptive and correlation analysis	rate 100%		reporting in clinical practice		in clinical practice; 30% of nursing students reported making at least one error during clinical practices; Administrative barriers (including no positive feedback, focus on individual factors) and fear (recognized as incompetent, reprimands of doctor, instructor and nursing staff) were the major barriers to reporting medication errors
Luhanga et al. (2008), Canada	To describe strategies used by preceptors to teach students who act unsafely	Grounded theory, semi-structured interviews; Constant comparative analysis	Preceptors (n = 22); Female (n = 20); Male (n = 2)	Not clearly described	Prevention of nursing students' unsafe practice	Strategies used by preceptors teaching nursing students to prevent unsafe practice: Communication with learner and faculty instructor, developing a plan of action, constant observation and gradual clinical independence, stopping mistakes and explaining correct way, encouraging student to practice skills, questioning and giving reading assignments, creating a supportive environment, giving positive and honest feedback in private, students self-evaluation, retaining high standard of practice, seek external help and after remedial interventions make decisions to prevent failure of clinical practice	Passing/failing clinical practice: Unsafe action in clinical practice
Kyrkjebø et al. (2006), Norway	To test a simulation training program (BEST-principles) in inter-	Focus group method; A structured interview	Health professional students (n = 12): Nursing	The moderator and co-moderator checked the	Inter-professional education with BEST-principles (Better & Systematic Trauma Care) from patient care	Interprofessional simulation scenarios having one MS, one NS and one PINS in each team: Introduction to crew	Students views: generally satisfied with inter-professional education and wanted more team training; Learning about own team

			students (NS) (*n* = 4), Postgraduate intensive nursing students (PINS) (*n* = 4), Medical students (MS) (*n* = 4)	categoriz-ations	scenarios related to adverse events experienced by students: Blood transfusion, basic resuscitation skills, administration of drugs and management of central venous catheters	resource management (CRM) and having discussions, simulation scenario 1, reflection 1, simulation scenario 2 and reflection 2	performance, personal reactions and lack of competencies; Simulation scenarios ought to be realistic
Miller et al. (2009), US	To test the effects of structured classroom and clinical content related to safety and quality of health care systems on a group of senior-level nursing students	A mixed-method quasi-experimental study; Repeated-measures analysis of variance (ANOVA); Content analysis from qualitative data	Senior-level baccalaureate nursing students (*N* = 65) Intervention group 1 (*n* = 24) and Intervention group 2 (*n* = 8)	Instrument: The Student Perceptions of Safety and Quality Knowledge, Skills and Attitudes Question-naire Cronbach's alpha pretest = 0.398, posttest = 0.596	QSEN competencies: Patient-centered care, teamwork and collaboration, quality improvement, safety	A combination of classroom and clinical learning activities; First, classroom lectures: A case study, research and discuss; Second, (intervention group): Discussions and structured clinical projects (related to quality and safety in health care systems) related to clinical experiences	Having classroom and clinical learning activities improved nursing students' knowledge, skills and attitudes about quality and safety; Intervention group: Greater increase in perceptions reflected to teamwork and collaboration, safety and medication errors; Similar perceptions in intervention and control groups related to patient-centered care
Mossey et al. (2012), Canada	To extend nursing knowledge of safety from perspective of students	Q-methodolo-gy, five types of specified five types of contexts and students at risk for unsafe clinical practices	Baccalaureate nursing students (*n* = 59), final year	Q-methodology well described in nursing literature	Nursing students' unsafe practice in clinical practice	Clinical practice placements	Five perspectives identified about nursing students' unsafe practice types: 1) displaced 2) vulnerable 3) unprepared 4) unknowing 5) distanced
Mulready-Shick et al. (2009), US	To assess whether the DEU clinical education model	Focus groups interviews;	Nursing students (*n* = 18)	Question from earlier dedicated	Clinical practice placement in DEU;	Clinical practice in DEU: Students concentrated on medication safety;	Clinical practice in DEU: improved nursing students' quality and safety

	facilitates students' learning of six QSEN competencies and to investigate additional outcome measures	Summary analysis report	Participation rate, 89%; Staff nurses (*n* = 9), Participation rate, 100%	education unit (DEU) studies	The QSEN competencies: patient-centered care, teamwork and collaboration, evidence based practice, quality improvement, safety and informatics	Practicing with smaller student-to-teacher ratio; Education and practice collaboration improved	competencies; Practicing with smaller student-to-teacher ratio decreased the potential for errors and increased medication knowledge; Students found it easy to learn hospital systems including bracelet scans, potential adverse event alerts and medication administration; Supported quality improvements in nursing care delivery
Reid-Searl et al. (2010), Australia	To investigate the factors influencing the practice of medication administration for nursing students in clinical settings	Grounded theory Demograph-ic question-naire In-depth semistruc-tured interviews	Bachelor of nursing students (*n* = 28) Female (*n* = 24) Male (*n* = 4)	Systematic approach described	Medication administration in clinical practice placement	Clinical practice placement, grade of direct supervision	One third of participants reported making a medication error or a near-miss; There was a lack of direct supervision when errors occurred
Reid-Searl et al. (2008), Australia	To explore the process of medication administration for nursing students when in clinical practice	A grounded theory; In-depth interviews Constant comparative data analysis	Undergraduate nursing students (*n* = 28); Female (*n* = 24); Male (*n* = 4)	Systematic approach described	Safe administration of medication in clinical practice placement	Four categories of supervision: Being with: nurse conducting the necessary checks, positive, emphatic and caring supervision Being over: nurse in close contact but considered non-supportive and rushed approach Being near: nurse in visual range but not beside student, usually when student had already been in placement some time Being absent: nurse provides no supervision, usually at the end of students placement	Learning safe administration of medication in clinical practice; Nursing students did not necessarily receive the appropriate level of supervision

Smith et al. (2007), US	To evaluate current levels of integration of quality and safety content in prelicensure curricula	Descriptive study; Online survey instrument	Nursing program leaders (*n* = 195) from 629 schools; Response rate, 31%	Face validity, pilot-tested	Safety spread throughout several courses (89%); dedicated safety-course (3%); Would like more of safety content in curricula (11%) and no safety in curricula (1%)	Pedagogical strategies of safety (79%-89%): readings, lecture, clinical practices, simulation and return demonstrations	Satisfaction of students beginning safety competencies (4.3 to 4.7) on Likert 5-point scale
Sullivan et al. (2009), US	To assess nursing students' perspectives of quality and safety content in their nursing programs with self-reported levels of preparedness and perceived importance of the QSEN competencies	Descriptive study; The QSEN Student Evaluation Survey (SES) consists of 3 different scales: Knowledge, skills and attitudes on 4-point Likert scale	Prelicensure nursing students (*n* = 575) from 1,665; Response rate, 35%	Pilot test of the QSEN SES	The six QSEN competencies: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics	Learning of the QSEN competencies	Knowledge objectives: mostly in classroom; Skills objectives: concerned with hazard and errors mostly in care environments; Attitudes objectives: safety viewed as second most important competency; Students' self-reported levels of preparedness including: Communicate observations and concerns about hazards or errors in the care environment; Demonstrate awareness of own strengths and limitations as a care team member
Tanicala et al. (2011), US	To identify faculty perspectives regarding nursing student behaviors resulting in failure of a clinical practice	Qualitative data analysis, four focus groups	Nurse educators from public and private schools of nursing, varied clinical specialties and degrees	Systematic approach described	Nursing student's behavior resulting in failure of a clinical practice placement	Clinical practice placement	Patient safety was considered a prominent issue when assessing whether nursing students pass or fail the clinical course; Whether errors and near misses contributed to failure of the clinical course, depended on the level of nursing students' studies and the type of errors that occurred
Vaismoradi et al. (2011), Iran	To study Iranian nursing students' perspectives and the role of nursing	Qualitative, semi-structured interviews,	Junior and senior nursing students (*n* = 17)	Peer-reviewing; independent, compared	Nursing curriculum having insufficient nursing care and patient safety issues	No separate section for patient safety issues; Nursing students expect to be helped to internalize the	Nursing students view patient safety as patients' physical and psychological comfort; Nursing students find they are

	education regarding patient safety	content analysis		and discussions, final consensus between all co-authors	compared to medical section	principles and values of patient safety	not knowledgeable or experienced enough; Gap between education and practice

Note. HPPSACS = Healthcare Professionals Patient Safety Assessment Curriculum Survey; QSEN = Quality and Safety Education for Nurses; MSTAT-I = Multiple Stimulus Types Ambiguity Tolerance Scale-1; BEST =Better & Systematic Trauma Care.