

Table 1: Summary of selected studies  
Summary of quantitative studies

Reference	Article Type/Methodology	Purpose	Key Findings/Results
[42] Ben Natan M, Sharon I, Mahajna M, Mahajna S. Factors affecting nursing students' intention to report medication errors: an application of the theory of planned behavior. Nurse Education Today [Internet]. 2017 Aug [cited 2019 Sept 30]; 58:38-42. doi:10.1016/j.nedt.2017.07.017	QN/ Descriptive cross-sectional design	"To examine factors related to nursing students' intention to report medication errors, using the Theory of Planned Behavior, and to examine whether the theory is useful in predicting students' intention to report errors."	"The findings indicate that students' intention to report medication errors was high. The Theory of Planned Behavior constructs explained 38% of variance in students' intention to report medication errors. The constructs of behavioral beliefs, subjective norms, and perceived behavioral control were found as affecting this intention, while the most significant factor was behavioral beliefs. The findings also reveal that students' fear of the reaction to disclosure of the error from superiors and colleagues may impede them from reporting the error."
[42] Ben Natan M, Sharon I, Mahajna M, Mahajna S. Factors affecting nursing students' intention to report medication errors: an application of the theory of planned behavior. Nurse Education Today [Internet]. 2017 Aug [cited 2019 Sept 30]; 58:38-42. doi:10.1016/j.nedt.2017.07.017	QN/Cross-sectional	"To identify the knowledge of nursing students at a public university in the interior of the State of São Paulo about patient safety."	"The results indicate that part of the students consider that nursing care is unsafe and can entail risks. The team's lack of preparation is considered a factor that hampers safe care delivery. In addition, a large part of the students is unfamiliar with the term adverse event."

<p>[38] Cebeci F, Karazeybek E, Sucu G, Kahveci R. Nursing students' medication errors and their opinions on the reasons of errors: A cross-sectional survey. Journal of the Pakistan Medical Association. 2015 May; 65(5):457-462</p>	<p>QN/Cross-sectional survey</p>	<p>"To determine number and type of medication administration errors made by nursing students, and to explore the rate of reportings, emotions after the errors and the causes of errors."</p>	<p>"The most common error reported was deviation from aseptic technique in 96(23.8%) cases. Most common emotions resulting from errors were fear in 45(28.8%) and anxiety in 37(23.5%). Most common cause was performance deficit in 141(43.4%) cases and the most common contributing factor was workload declared by 179(55.2%)."  "The findings of the current study suggests that undergraduate nursing students are at risk of making errors when administering medications to patients in a clinical setting. Adequate supervision is an essential component for safe medication administration Not only this is important for quality of learning experiences of students, but it has significant implications for the delivery of safe and effective healthcare." "The error rate among nursing students was high whereas reporting of errors was low."</p>
<p>[7] Cooper E. From the school of nursing quality and safety officer: Nursing students' use of safety reporting tools and their perception of safety issues in clinical settings. Journal of Professional Nursing [Internet]. 2013 Mar [cited 2019 Sept 29]; 53(4), 238-243.</p>	<p>QN/An exploratory survey</p>	<p>"Describes the innovative new role of quality and safety officer (QSO) developed by one university in response to the Quality and Safety Education for Nurses challenge to increase quality and safety</p>	<p>"Responses of 145 prelicensure nursing students suggest that it is difficult to get all errors and near-miss events reported. Barriers for nursing students are similar to the barriers nurses and physicians identify in reporting errors and near-miss events. The survey reveals that safety for the patient is the primary concern of the student nurse."</p>

		education for prelicensure nursing students. The article also describes the results of a study conducted by the QSO, obtaining information from prelicensure nursing students about the use of safety tools and identifying the students' perceptions of safety issues, communication, and safety reporting in the clinical setting."	
[58] Duhn L, Karp S, Oni O, Edge D, Ginsburg L, VanDenkerkhof E. Perspectives on patient safety among undergraduate nursing students. Journal of Nursing Education [Internet]. 2012 Jul [cited 2019 Sept 30]; 51(9), 526-531. doi:10.3928/01484834-20120706-04	QN/Cross-sectional study	"To examine the perspectives of undergraduate nursing students in one Canadian university regarding confidence in what they were learning about patient safety."	"Responses were favorable, with students reporting confidence in learning about a variety of patient safety competencies. Of note, there were decreasing levels of confidence in the third-year and fourth-year students and low-to-moderate correlation between classroom and clinical responses. These results support the importance of consistently engaging students in safety principles early in and throughout their health care programs."
Geller, N. F., Bakken, S., Currie, L. [40] Geller NF, Bakken S, Currie LM, Schnall R, Larson EL. Infection control hazards and near misses reported by nursing	QN	"To describe the frequency and types of hazard and near-miss comments about infection control issues over 3 years of data	"Five hundred nursing students submitted 3492 comments related to hazards and near misses. Of these, 886 responses (25.4%) were related to infection control practices. The most

<p>students. American Journal of Infection Control [Internet]. 2010 Dec [cited 2019 Sept 30]; 38(10):811-816. doi:10.1016/j.ajic.2010.06.001</p>		<p>collection"</p>	<p>common category was nonadherence to isolation precautions (27.6%), followed by contamination of the environment or equipment (18.5%), breaks in aseptic technique (17.2%), hand hygiene (15.9%) or gloving failures (11.5%), and occupational risks (8.2%)." "Infection control hazards and near misses were commonly reported across clinical settings by nursing students" Infection control - "isolation precautions, environmental or equipment contamination, aseptic technique, hand hygiene, gloving, occupational risk, and other" "The most common category of infection-related hazards and near misses was nonadherence to isolation precautions (27.6%), followed by contamination of the environment or equipment, breaks in aseptic technique, hand hygiene or gloving failures, and occupational risks"</p>
<p>[45] Gropelli T, Shanty JA. Nursing students' perceptions of safety and communication issues in the clinical setting. Journal of Nursing Education [Internet]. 2018 May [cited 2019 Sept 30]; 57(5):287-290. doi:10.3928/01484834-20180420-06</p>	<p>QN/Exploratory descriptive</p>	<p>"To describe nursing students' perceptions of safety issues and communication in clinical settings."</p>	<p>"One third of the students reported thinking that mistakes are held against them. In addition, they reported fear of communicating an error and fear of asking questions if something does not seem right. The majority reported they never encountered a near-miss event and would not report an error that and not harm the patient. Students also responded that actual errors and near</p>

			misses are not consistently reported."
[56] Halperin O, Bronshtein O, The attitudes of nursing students and clinical instructors towards reporting irregular incidents in the medical clinic. Nurse Education in Practice. 2019 Mar; 36:34-39	QN/Questionnaire	"The purpose of this study was to examine factors that contribute to the underreporting of incidents by nursing students during their clinical practicum, and by their clinical instructors. The study also aimed at examining the attitudes of the participants towards the possible improvement of reporting if certain policy and strategy changes were introduced within their academic or clinical institution."	"The results showed that about one-third of the instructors and one-half of the nursing students believed that circumstances and lack of awareness, and fear of consequences, lead to underreporting. Both nursing students and clinical instructors ranked "fear of consequences" as the main reason for not reporting, yet students ranked this higher than their instructors. Moreover, both groups believed that incident reporting could be increased following changes in the clinical field, mainly by increasing awareness and knowledge. A large percentage of participants also wrote that they do not report errors that are the result of circumstances and lack of awareness, mainly fear of consequences."
[49] Harding L, Petrick T. Nursing student medication errors; a retrospective review. Journal of Nursing Education [Internet]. 2008 Jan [cited 2019 Sept 30]; 47(1):43-47. doi:10.3928/01484834-20080101-05	QN/A Retrospective Review	"This article presents the findings of a retrospective review of medication errors made and reported by nursing students in a 4-year baccalaureate program."	"Data were examined in relation to the semester of the program, kind of error according to the rights of medication administration, and contributing factors. Three categories of contributing factors were identified: rights violations, system factors, and knowledge and understanding. It became apparent that system factors, or the context in which medication administration takes place,

			are not fully considered when students are taught about medication administration. Teaching strategies need to account for the dynamic complexity of this process and incorporate experiential knowledge. This review raised several important questions about how this information guides our practice as educators in the clinical and classroom settings and how we can work collaboratively with practice partners to influence change and increase patient safety."
[41] Koohestani HR, Baghcheghi N. Barriers to the reporting of medication administration errors among nursing students. Australian Journal of Advanced Nursing. 2009 Sept; 27(1):66-74.	QN/Cross-sectional, descriptive study	"To describe the perceived barriers to medication administration error (MAE) reporting among nursing students. In addition, a secondary objective of this study was to specifically compare the nursing student findings in relation to the semester of the program."	"Nursing students estimated 80.12% of all medication errors by nursing students are reported to their instructors. Administrative barrier (standardised mean=4.31) and fear (standardised mean=4.24) were the top two reasons for not reporting medication errors among nursing students."
[23] Langari MN, Tella S, Smith NJ, Turunen H. Self-assessment of patient safety competence: a questionnaire survey of final year British and Finnish pre-registration nursing student. International Journal of Caring Sciences. 2017	QN/Questionnaire survey	"To examine and compare the self-assessment of patient safety competence between British and Finnish nursing students."	"Majority of both British and Finnish participants reported that their curriculum did not include a separate module for patient safety. The overall patient safety competence of British and Finnish nursing students was high. However, the British nursing students

Sept 10; (30:1212-1223.			evaluated their overall patient safety competence significantly higher than Finnish nursing students. Both groups of students ranked their competence to prevent patient safety incidents (attitude) the highest and their competence to act after errors (skill) relatively low. The predictors for having a high level of patient safety competence for nursing students were being British and detecting separate patient safety module in the curriculum."
Lukewich J, Edge DS, TRanmer J, Raymond J, Miron J, Ginsburg L, VanDenKerkhof E. Undergraduate baccalaureate nursing students' self-reported confidence in learning about patient safety in the classroom and clinical settings: an annual cross-sectional study (2010-2013). International Journal of Nursing Studies [Internet]. 2015 Feb [cited 2019 Sept 30]; 52(5):930-938. doi:10.1016/j.ijnurstu.2015.01.010	QN/Cross-sectional study	"To explore undergraduate nursing students' self-reported confidence in learning about key patient safety competency areas outlined in the Safety Competencies Framework (Frank and Brien, 2008). Confidence in patient safety learning in both the classroom and clinical settings in an undergraduate nursing program in a Canadian university was assessed."	"In general, nursing students were relatively confident in what they were learning about the clinical dimensions of patient safety, but they were less confident about the sociocultural aspects of patient safety. Confidence in what they were learning in the clinical setting about working in teams, managing adverse events and responding to adverse events declined in upper years. The majority of students did not feel comfortable speaking up about patient safety issues. The nested cohort analysis confirmed these findings. In particular, confidence in acquiring basic clinical skills, learning about adverse."
[39] Ozturk H, Kariman I, Bahcecik AN, Sokmen S, Calbayram N, Altundag S, Kucuk	QN/Questionnaire	"The study was conducted to identify whether or not student nurses made the	"Overall 28% of the student nurses performed malpractice during clinical practice. Medical errors included failure

<p>S. The malpractices of student nurses in clinical practice in turkey and their causes. The Journal of the Pakistan Medical Association. 2017 Aug; 67(8):1198-1205.</p>		<p>medical errors as well as the reasons for the errors.”</p>	<p>of complying with sterility and asepsis rules (32%), wrong identification of patient identity (19%), and administrating wrong dosage of medications (12%). They obtained a mean score of 4.19±0.62 from the overall scale and the lowest score was 3.9±0.78 for drug administrations.”</p>
<p>[43] Palese A, Gonella S, Grassetti L, Mansutti I, Brugnolli A, Saiani L, Sviat Team. Multi-level analysis of national nursing students’ disclosure of patient safety concerns. Medical Education. 2018 Nov; 52(11):1156-1166.</p>	<p>QN/Survey design</p>	<p>“The aims of the study were: (i) to describe nursing students’ opportunity to report errors, near misses or PS issues that emerged during their clinical learning experience; and (ii) to explore associated factors of the process of reporting itself.”</p>	<p>“In the multi-level analysis, factors increasing the likelihood of reporting events affecting PS have been mainly at the nursing programme level: specifically, higher learning opportunities, self-directed learning opportunities, safety and nursing care quality and quality of tutorial strategies. By contrast, being supervised by a nurse teacher prevented the disclosure of PS issues compared with being supervised by a clinical nurse.”</p>
<p>[55] Raymond J, Medves J, Godfrey C. Perspectives on patient safety among practical nursing students. Canadian Journal of Nursing Research [Internet]. 2016 Oct [cited 2019 Sept 30]; 48(2):41-47. doi:10.1177/0844562116664260</p>	<p>QN/Cross-sectional descriptive study</p>	<p>"To explore practical nursing students’ confidence in what they are learning about patient safety within their nursing education."</p>	<p>"Overall, students expressed the greatest confidence in their abilities to provide care in Clinical Safety topics. More than 75% of the students’ feared punishment when making an error and 88% have difficulty questioning other healthcare providers. Less than 30% of students stated that a system-level focus on errors was taught to them in their education</p>

			programs."
<p>[63] Reid-Searl K, Happell B, Burke KJ, Gaskin CJ. Nursing students and the supervision of medication administration. <i>Collegian</i> [Internet]. 2013 Jun [cited 2019 Sept 30; 20(2):109-114. doi:10.1016/j.colegn.2012.04.003</p>	QN	"To investigate student nurses' experiences of supervision while administering medications."	<p>"The findings revealed that 88% of students agreed that they had been directly supervised during the entirety of administration procedures. Although 7% of students reported not receiving supervision throughout medication administration, higher percentages of students indicated that they received lower levels of supervision when wards were busy (66%), when they felt under pressure to comply with the wishes of RNs (40%), when students had been in clinical settings for extended periods of time (51%), and when the RNs trusted the student nurses (37%).</p> <p>Approximately one third (29%) of student nurses disagreed that RNs followed the six rights when administering medications. These findings suggest that student nurses are not always adequately supervised and are at times administering medications outside the parameters of the law."</p>
<p>[20] Shanty JA, Gropelli T. Self-reported patient safety competence among nursing, respiratory care, and nuclear technology medicine students. <i>Journal of Allied Health</i>. 2018 Jul; 47(2):141-146.</p>	QN/Exploratory descriptive design	"To describe self-reported patient safety competence among nursing, respiratory care, and nuclear medicine technology students."	<p>"Significant differences were found among the groups. Nursing and nuclear medicine students reported higher safety competence. Females reported a higher level of competency than males. There were no significant differences between junior- and senior-level student self-</p>

			reported safety competencies. Findings will be used to make curricular changes to enhance safety education for healthcare professionals."
[30] Stevanin S, Causero G, Zanini A, Bulfone G, Bressan V, Palese A. Adverse events witnessed by nursing students during clinical learning experiences: findings from a longitudinal study. <i>Nursing &amp; Health Sciences</i> . 2018 May; 20(4):438-444.	QN/Longitudinal design	"To improve knowledge on PS incidents identified by nursing students during their clinical learning experiences."	"Ninety students were included and 94 incidents were reported: 17 (18.1%) by first year students, 27 (28.7%) by second year students, and 50 (53.2%) by third year students. One third of students did not report any PS incident at the end of each academic year, while only a few reported more than one. The incidence density was 3.8/1000 days of clinical training without statistical differences across academic years."
[28] Stomski N, Gluyas H, Andrus P, Williams A, Hopkins M, Walters J, Morrison P. The influence of situation awareness training of nurses' confidence about patient safety skills: a patient cohort study. <i>Nurse Education Today</i> [Internet]. 2018 Feb [cited 2019 Sept 30]; 63:24-28. doi:10.1016/j.nedt.2018.01.019	QN/Prospective cohort study	"To: 1) understand final year nursing students' confidence in their patient safety skills; and 2) examine the impact of situation awareness training on final year nursing students' confidence in their patient safety skills."	"No significant differences in confidence about patient safety skills were identified within settings (class/clinical). However, confidence in patient safety skills significantly decreased between settings i.e. nursing students lost confidence after clinical placements."
[34] Tabassum N, Allana S, Saeed T, Dias JM. Reported medication errors committed by undergraduate (four year bscn) students at akusonam, Karachi, Pakistan.	QN/Retrospective study	"This study was the first of its kind, which explored medication errors among nursing students in South Asia."	"Reviewing the advisory files indicated that out of the total 325 students, seven errors (2.3%) were reported." "Out of these seven errors, three students (42.9%) did near miss errors and four

<p>International Journal of Nursing Education [Internet]. 2015 Jan [cited 2019 Sept 30]; 7(3):94-98. doi:10.5958/0974-9357.2015.00142.7</p>			<p>nursing students (57.1%) did actual medication errors. (Table 1). All errors were reported on morning shifts on supervised clinical by the faculty. There was no repetition of any medication error by the same student. Errors in the preparation phase were committed by five students (71%). Out of these five preparation errors, four students (57%) did unsupervised preparation of medication, while one student (14.3%) did not read the medical record number of the patient and committed the error (Table 2). In administration phase, one error (14.3%) occurred due to use of wrong route, one error due to wrong dose, three errors (42.9%) occurred because of unsupervised administration. One error (14.3%) was identified when the student was about to administer without supervision, one error (14.3%) occurred because of lack of manual dexterity for intra venous administration."</p>
<p>[51] Tabassum N, Saeed T, Dias JM, Allana S. Strategies to eliminate medication error among undergraduate nursing students. International Journal of Nursing Education [Internet]. 2016 Jan [cited 2019 Sept 30]; 8(1):167-171. doi:10.5958/0974-</p>	<p>QN/Retrospective study</p>	<p>"To discuss about the possible factors which might have contributed towards the reported errors, even after moving with the vigilant process."</p>	<p>"There were total 325 BScN students from 3 admission cohorts between 2010 and 2013. Reviewing the advisory files indicated that out of the total 325 students, seven errors (2.3%) were reported. There are some strategies that can decrease the rate of error in the undergraduate program." ""some</p>

9357.2016.00030.1			<p>strategies could be carried out to decrease the medication error, first is to practice for drug dosage calculations, the students are already doing in classroom set up but its reinforcement and integration can be practiced in real ward setting. The second strategy is to inform the demerits of not performing the medication error without the policy. They must understand and informed in the beginning that they are not licensed and practice with their faculties only. The skill lab must hold the stock of different drug types so that students can gain acquaintance with changes in drug appearance and learn to improve the manual dexterity. In the ward set up the staff should be informed prior that they cannot influence the students or pressures them to do or handle medication. The faculty can arrange a calm or little non noisy place at ward site to provide a conducive environment for medication process."</p>
<p>[29] Tella S, Smith N, Partanen P, Jamookeah D, Lamidi M, Turunen H. Learning to ensure patient safety in clinical settings: comparing Finnish and British nursing students' perceptions. Journal of Clinical Nursing [Internet]. 2015 Jul [cited Sept 30,</p>	<p>QN/Cross-sectional comparative study</p>	<p>"To explore and compare Finnish and British nursing students' perceptions of their learning about patient safety in clinical settings."</p>	<p>"Finnish nursing students had significantly more critical perceptions on their learning about patient safety in clinical settings than their British peers. A strong predictor for differences was supportive and systems-based approaches in learning to ensure patient safety. Notably, fewer Finnish students</p>

<p>2019]; 24(19-20):2954-2964. doi:10.1111/jocn.12914</p>			<p>had practiced reporting of incidents in clinical settings compared to British students. In both countries, the students held learning about patient safety in higher esteem compared to their learning experiences in clinical settings."</p>
<p>[44] Usher K, Woods C, parmenter G, Hutchison M, mannix J, power T, Jackson D. Self-reported confidence in patient safety knowledge among Australian undergraduate nursing students: a multi-site cross-sectional survey study. International Journal of Nursing Studies [Internet]. 2017 Mar [cited 2019 Sept 30]; 71, 89-96. doi:10.1016/j.ijnurstu.2017.03.006</p>	<p>QN/Cross-sectional survey</p>	<p>"To describe first, second and third year Australian undergraduate nursing students' confidence in patient safety knowledge acquired in the classroom and clinical settings across the three years of the undergraduate nursing program."</p>	<p>"Participants were most confident in their learning of clinical safety skills and least confident in learning about the sociocultural dimensions of working in teams with other health professionals, managing safety risks and understanding human and environmental factors. Only 59% of students felt confident they could approach someone engaging in unsafe practice, 75% of students agreed it was difficult to question the decisions or actions of those with more authority, and 78% were concerned they would face disciplinary action if they made a serious error. One patient safety subscale, Recognising and responding to remove immediate safety risks, was rated significantly higher by third year nursing students than by first and second year students. Two broader aspects of patient safety scales, Consistency in how patient safety issues are dealt with by different preceptors, and System aspects of patient safety are well covered in our program, were rated significantly higher</p>

			by first year nursing students than by second and third year students. One scale, Understanding that reporting adverse events and close calls can lead to change and can reduce recurrence of events, was rated significantly higher by third year students than first and second year students."
[50] Valdez LP, de Guzman A, Escolar-Chua R. A structural equation modeling of the factors affecting student nurses' medication errors. Nurse Education Today [Internet]. 2012 Feb [cited 2019 Sept 30]; 33(3):222-228. doi:10.1016/j.nedt.2012.01.001	QN/Factor analysis and structural equation modeling	"To explore the factors affecting medication errors by student nurses."	"This study attempted to explore the factors affecting student nurses' medication errors. Apparently, medication errors by student nurses develop from the interaction between several factors, namely: In-violation, In-writing, In-excess, In-experience, In-tension and poor adherence to the "five rights". Among these variables, only poor adherence to the "five rights" was found to have a direct effect on student nurses' medication error. Similarly, in-violation had the highest impact on poor adherence. Moreover, In-violation is influenced by In-tension and In-excess. In-excess for its part, was found to be a better predictor of In-tension than In-experience. Finally, In-experience was also found to be a determinant of In-excess."
[32] Walsh LJ Antsey AJ, Tracey AM. Student perceptions of faculty feedback following medication	QN/Descriptive design	"The objectives of this study are to determine factors which increase the	"The factors identified as increasing the likelihood of reporting medication errors for students who made a medication

<p>errors- a descriptive study. Nurse Education in Practice. 2018 Nov; 33:10-16.</p>		<p>likelihood of nursing students reporting medication errors; to elicit nursing student perception of faculty feedback following a medication error, and determine how this faculty feedback impacts reporting of subsequent medication errors; and to develop recommendations regarding the most effective faculty approaches when providing feedback to nursing students following medication errors.”</p>	<p>error were the same as for those who did not make an error. Students in both groups indicated intention to report errors based upon professional attitudes, behaviors and/or values. The researchers concluded that professional socialization, in combination with supportive learning environments, may increase student comfort in reporting medication errors.”</p>
<p>[21] Warholak TL, Queiruga C, ROush R, Phan H. Medication error identification rates by pharmacy, medical, and nursing students. American Journal of Pharmaceutical Education [Internet]. 2011 Mar [cited 2019 Sept 30]; 75(2):24. doi:10.5688/ajpe75224</p>	<p>QN/Prospective, observational study</p>	<p>"To assess and compare prescribing error-identification rates by health professional students."</p>	<p>"One hundred seventy-five questionnaires were returned (87% response rate). Pharmacy students had a significantly higher error-identification rate than medical and nursing students (<math>p &lt; 0.001</math>). No significant differences were found between medical and nursing students (<math>p = 0.88</math>). Compared to medical students, pharmacy students more often were able to identify correctly the error type for each prescription (<math>p &lt; 0.001</math>; <math>p = 0.023</math>; <math>p = 0.001</math>)."</p>

<p>[36] Wolf ZR, Hicks R, Serembus JF. Characteristics of medication errors made by students during the administration phase: a descriptive study. <i>Journal of Professional Nursing</i> [Internet]. 2006 Jan [cited 2019 Sept 30]; 22(1):39-51. doi:10.1016/j.profnurs.2005.12.008</p>	<p>QN/Descriptive, retrospective, secondary analysis study</p>	<p>"To identify characteristics of medication errors made by nursing students during the administration phase and as reported in the USP (United States Pharmacopeia) MEDMARX program." Note - "The MEDMARX is a national, voluntary, internet-accessible medication error database that has been used by more than 700 hospitals and health systems since September 1998."</p>	<p>"Fewer than 3% of 1,305 student-made medication errors occurring in the administration process resulted in patient harm. Most were omission errors, followed by errors of giving the wrong dose (amount) of a drug. The most prevalent cause of the errors was students' performance deficits, whereas inexperience and distractions were leading contributing factors. The antimicrobial therapeutic class of drugs and the 10 subcategories within this class were the most commonly reported medications involved. Insulin was the highest-frequency single medication reported."</p>
<p>[53] Yoshikawa J, Catin de Sousa BE, Sorgini Peterlini MA, Miyuki Kushara D, da Luz Gonçalves Pedreira M, Machado Avelar AF. Comprehension of undergraduate students in nursing and medicine on patient safety. <i>Acta Paulista de Enfermagem</i>. 2013 Jan; 26(1): 21-29.</p>	<p>QN/Prospective and exploratory study</p>	<p>"To identify the comprehension of undergraduate students in nursing and medicine at a public university of São Paulo on human error and patient safety."</p>	<p>"Most students received formal training on the subject and had attitudes that demonstrated uncertainty in what would be correct for some practices."</p>

Summary of qualitative studies

Reference	Article	Purpose	Key Findings/Results
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	Type/Methodology		
[54] Bickhoff L, Levett-Jones T, Sinclair PM. Rocking the boat — nursing students' stories of moral courage: a qualitative descriptive study. <i>Nurse Education Today</i> [Internet]. 2016 Apr [cited 2019 Sept 30]; 42:35-40. doi:10.1016/j.nedt.2016.03.030	QL/Descriptive	"To explore how nursing students demonstrate moral courage when confronted with clinical situations that negatively impact the quality of patient care; and the factors, both extrinsic and intrinsic, which allowed them to do so."	"Four key themes emerged: (1) patient advocate identity, which had two sub-themes of knowing one's own moral code and previous life experiences; (2) consequences to the patient and to the participant; (3) the impact of key individuals; and (4) picking your battles."
[62] Dolansky MA, Druschel K, Helba M, Courtney K. Nursing student medication errors: A case study using root cause analysis. <i>Journal of Professional Nursing</i> [Internet]. 2013 Mar [cited 2019 Sept 30]; 29(2):102-108. doi:10.1016/j.profnurs.2012.12.010	QL/Case study	"To present a case study that highlights an undergraduate nursing student medication error and the application of an RCA (Root cause analysis)."	"Factors identified were environmental, personal, unit communication and culture, and education. The process of using the RCA provided an opportunity to identify improvement strategies to prevent future errors. The use of the RCA promotes a fair and just culture in nursing education and helps nursing students and faculty identify problems and solutions both in their performance and the systems in which they work."
[37] Gregory D, Guse L, Dick DD, Davis P, Russell CK. What clinical learning contracts reveal about nursing education and patient safety. <i>Canadian Nurse</i> . 2009 Oct; 105(8):20-25.	QL/Content analysis	"To explore unsafe patient care events recorded in clinical learning contracts initiated for baccalaureate students in the faculty of nursing, University of Manitoba."	"Thirty-seven students precipitated these events. Most events were related to medication administration (56%) and skill application (20%). A breakdown of medication administration events showed that the highest number were errors related to time (33%) and dosage (24%). International students and male

			students were responsible for a higher number of events than their numbers in the sample would lead one to expect. The findings support further study related to patient safety and nursing education."
[48] Ion R, Smith K, Moir J, Nimmo S. Accounting for actions and omissions: a discourse analysis of student nurse accounts of responding to instances of poor care. <i>Journal of Advanced Nursing</i> [Internet]. 2016 Nov [cited 2019 Sept 30]; 72(5):1054-1064. doi:10.1111/jan.12893	QL/Discourse analysis	"To explore how nursing students account for decisions to report or not report poor care witnessed on placement and to examine the implications of findings for educators."	"Participants took care to present themselves in a positive light regardless of whether or not they had reported an episode of concern. Those who had reported tended to attribute their actions to internal factors such as moral strength and a commitment to a professional code. Those who had not or would not report concerns provided accounts which referred to external influences that prevented them from doing so or made reporting pointless."
[19] Monrouxe LV, Rees CE, Endacott R, Ternan E. 'Even now it makes me angry': health care students' professionalism dilemma narratives. <i>Medical Education</i> [Internet]. 2014 May [cited 2019 Sept 29]. 48(5):502-517. doi:10.1111/medu.12377	QL/ Narrative	"To examine dental, nursing, pharmacy and physiotherapy students' narratives of professionalism dilemmas: the types of events they encounter ('whats') and the ways in which they narrate those events ('hows')."	"In total, 226 personal incident narratives (104 dental, 34 nursing, 39 pharmacy and 49 physiotherapy) were coded. Framework analysis identified nine themes, including 'Theme 2: professionalism dilemmas', comprising five subthemes: 'student abuse', 'patient safety and dignity breaches by health care professionals', 'patient safety and dignity breaches by students', 'whistleblowing and challenging' and 'consent'. Using Linguistic Inquiry and Word Count (LIWC) software,

			significant differences in negative emotion talk were found across student groups and dilemma types (e.g. more anger talk when narrating patient safety and dignity breaches by health care professionals than similar breaches by students). The narrative analysis illustrates how events are constructed and the emotional implications of assigning blame (an ethical dimension) resulting in emotional residue."
[33] Noland CM. Baccalaureate nursing students' accounts of medical mistakes occurring in the clinical setting: implications for curricula. <i>Journal of Nursing Education</i> [Internet]. 2014 Feb [cited 2019 Sept 30]; 53(3):S34-37. doi:10.3928/01484834-20140211-04	QL/Content analysis	"This research study asked nursing students the following questions: What kinds of mistakes do nursing students make during their baccalaureate nursing degree (BSN) educational experience, and how do nursing students communicate about the mistakes? What do nursing students think of their training regarding medical mistakes? How do nursing students feel about medical mistakes?"	"Although all of the participants reported a sentinel event that occurred in an institution during their training, 10 students (26%) said that they had never made a mistake or could not recall making a mistake." "When asked how they handled the mistake, 48.2% of the participants were able to correct the error and 51.8% were unable to fix the mistake; the majority (72.4%) of participants reported their mistake to the patient or their supervisor, depending on the severity of the mistake." "...When asked if they had any formal training on how to handle mistakes, 19 students said they had received formal training and 19 said they had received no training." "The third research question asked participants, "How do nursing students feel about medical mistakes?" Most of the participants believed that mistakes

			happen to everyone (92%), that they are inevitable (92%), and that they were important learning opportunities (100%)."
[47] Noland CM, Carmack HJ. "You never forget your first mistake": nursing socialization, memorable messages, and communication about medical errors. <i>Health Communication</i> [Internet]. 2014 Nov [cited 2019 Sept 30]; 30(12):1234-1244. doi:10.1080/10410236.2014.930397	QL/Phenomenology	"To explore how nursing students narrativize their medical errors experiences during clinicals."	"We found that nursing students told three different narratives: (a) the "save the day" narrative, (b) the "silence" narrative, and (c) the "not always right" narrative. Finally, we discuss the implications of these narratives and their impact on nursing education."
[64] Noland CM, Carmack HJ. Narrativizing nursing students' experiences with medical errors during clinicals. <i>Qualitative Health Research</i> [Internet]. 2014 Dec [cited 2019 Sept 30]; 25(10):1423-1434. doi:10.1177/1049732314562892	QL/Thematic constant comparative method	"To identify memorable messages about communicating about mistakes that nursing students receive during their training and how they make sense of these messages."	"While open and honest communication about medical errors was the overarching message participants formally and informally learned, for nursing students, communicating about medical errors is a much more complex process than using open and honest communication. When dealing with medical errors, nursing students relied on three major memorable messages to guide their communication: (a) Not everyone hears about errors, (b) hierarchy matters, and (c) passive communication is the best way to interrupt or report an error."
[25] Reid-Searl K, Moxham L,	QL/Grounded theory	"To explore the factors	"Almost a third of the participants

<p>Happell B. Enhancing patient safety: the importance of direct supervision for avoiding medication errors and near misses by undergraduate nursing students. <i>International Journal of Nursing Practice</i> [Internet]. 2010 Jun 2016 [cited 2019 Sept 30]; 16(3):225-232. doi:10.1111/j.1440-172X.2010.01820.x</p>		<p>that influence the practice of medication administration for nursing students when in the off campus clinical setting."</p>	<p>reported making an actual medication error or a near miss. Where medication errors occurred, participants described not receiving direct and appropriate supervision by a registered nurse. Medication errors by nursing students have the potential to impact significantly on patient safety, quality of health care, and on nursing students' perceptions of their professional competence. Ensuring direct supervision is provided at all times must become an urgent priority for undergraduate nursing education."</p>
<p>[26] Reid-Searl K, Moxham L, Walker S, Happell B. Shifting supervision: implications for safe administration of medication by nursing students. <i>Journal of Clinical Nursing</i> [Internet]. 2008 Oct [cited 2019 Sept 30]; 17(20):2750-2757. doi:10.1111/j.1365-2702.2008.02486.x</p>	<p>QL/Grounded theory</p>	<p>"To explore the process of medication administration for nursing students when in the off-campus clinical setting."</p>	<p>"The central category was identified as 'shifting levels of supervision'. This describes the process of supervision students received when administering medication. Four levels were identified: 'being with', 'being over', 'being near' and 'being absent'. The findings suggest that nursing students do not always receive the level of supervision that is legally required. Less than satisfactory levels of supervision were identified by participants as leading to medication errors or near misses."</p>
<p>[27] Reid-Searl K, Moxham L, Walker S, Happell B. Internal conflict: undergraduate nursing students' response to inadequate</p>	<p>QL/Grounded theory</p>	<p>"This paper presents an overview of this internal conflict and its consequences for nursing</p>	<p>"The focus of this paper is to examine the emergent theme of internal conflict, which is experienced by the participants as a consequence of the theory—</p>

<p>supervision during the administration of medication. Collegian [Internet]. 2009 [cited 2019 Sept 30]; 16(2):71-77. doi:10.1016/j.colegn.2008.11.002</p>		<p>students."</p>	<p>practice gap. This conflict is reflected by the divergent requirements and expectations between the university and the registered nurses providing supervision in light of the role both play in student assessment. In addition, the participants voiced concerns about patient safety due to the potential for medication error. Internal conflict was identified by participants as the cause of considerable fear and anxiety about passing the course, getting a job and avoiding harm to patients. These findings raise serious concerns about the adequacy of the supervision for nursing students and highlighted the need for a more concerted approach to the theoretical and clinical education of students in relation to medication administration."</p>
<p>[57] Vaismoradi M, Jordan S, Turunen H, Bondas T. Nursing students' perspectives of the cause of medication errors. Nurse Education Today [Internet]. 2011 May [cited 2019 Sept 30]; 34(3):434-440. doi:10.1016/j.nedt.20d13.04.015</p>	<p>QL/Qualitative descriptive design</p>	<p>"To describe nursing students' perspectives of the causes of medication errors."</p>	<p>"Two main themes emerged from the data: "under-developed caring skills in medication management" and "unfinished learning of safe medication management", which was subdivided into "drifting between being worried and being careful", and "contextualising pharmacology education". All respondents felt that their education programmes were leaving them vulnerable to "drug errors" and cited incidents where patient safety had been</p>

			jeopardised."
[35] Zieber MP, Williams B. The experience of nursing students who make mistakes in clinical. <i>International Journal of Nursing Education Scholarship</i> [Internet]. 2015 May [cited 2019 Sept 30]; 12(1):65-73. doi:10.1515/ijnes-2014-007	QL/Grounded theory	"To explore the experience of undergraduate nursing students who had made at least one mistake in their clinical practice."	"What emerged is a theory that illuminates the process of how students move through the positive and negative elements of the mistake experience the core variable that emerged from the study was "living through the mistake experience." The mistake experience was clearly a traumatic process for nursing students and students reported feeling unprepared and lacking the capability to manage the mistake experience."

Summary of mixed methods (MM)

Reference	Article Type/Methodology	Purpose	Key Findings/Results
[60] Montgomery P, Killam L, Mossey S, Heerschap C. Third year nursing students' viewpoints about circumstances which threaten safety in the clinical setting. <i>Nurse Education Today</i> [Internet]. 2013 Oct [cited 2019 Sept 30]; 34(2):271-276. doi:10.1016/j.nedt.2013.09.019	MM/Q methodology	"To describe third year nursing students' viewpoints of the circumstances which threaten safety in the clinical setting."	"Three discrete viewpoints and one consensus perspective constituted students' description of threatened safety. The discrete viewpoints were labeled lack of readiness, misdirected practices, and negation of professional boundaries. There was consensus that it is most unsafe in the clinical setting when novices fail to consolidate an integrated cognitive, behavioral, and ethical identity. This unifying perspective was labeled nonintegration."

<p>[24] Mossey S, Montgomery P, Raymond JM, Killam LA. Typology of undergraduate nursing students' unsafe clinical practices: Q-methodology. <i>Journal of Nursing Education</i> [Internet]. 2012 Mar [cited Sept 30, 2019]; 51(5):245-253. doi:10.3928/01484834-20120309-01</p>	<p>MM/Q-methodology</p>	<p>"Describes undergraduate nursing students' subjective understanding of unsafe clinical practices, and results revealed a typology of five groups of unsafe students."</p>	<p>"The results showed four discrete groups of students at risk for unsafe clinical practices—vulnerable, unprepared, unknowing, and distanced students. Overall, a consensus viewpoint described the presence of the displaced student as the greatest safety risk."</p>
<p>[31] Santos APS. Nursing students' errors in clinical learning. <i>Qualitative outcomes in mixed methods research. Revista Brasileira de Enfermagem</i>. 2019 Jan; 72(1):170-176.</p>	<p>Convergent MM design</p>	<p>"To analyze factors associated with nursing students' errors during clinical learning, and their perceptions regarding these events and the opportunity for learning and development."</p>	<p>"Nursing student's errors were revealed according to their perceptions. They occurred in all phases of the nursing process and in transversal skills. Errors were acknowledged as learning and developmental opportunities."</p>
<p>[61] Stevanin S, Bressan V, Bulfone G, Zanini A, Dante A, Palese A. Knowledge and competence with patient safety as perceived by nursing students: the findings of a cross-sectional study. <i>Nurse Education Today</i> [Internet]. 2015 Apr [cited 2019 Sept 30]; 35(8):926-934.</p>	<p>MM/Cross-sectional design</p>	<p>"To describe a) the perceptions of nursing students regarding their own PS (Patient Safety) knowledge and competence, b) the differences, if any, in the PS perceptions of nursing students attending the first, the second and third academic year; c) the</p>	<p>"A total of 573 students (response rate 92.4%) participated. Around a quarter (28.8%) of students reported having experienced an adverse event or close call during their clinical experience. The settings where they learn were perceived as unsafe by 46.9% of students. PS (Patient Safety) knowledge and competence as perceived by students, was high (Median = 4) in all factors and</p>

doi:10.1016/j.nedt.2015.04.002		adverse events or close calls that students have experienced/witnessed during the clinical placements, and d) the perception of safety in the clinical environments attended."	dimensions of the H-PEPSSIta tool. High PS knowledge and competence was reported by first-year students, moderate by second-year students and higher at the end of the third-year."
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Summary of review papers

Reference	Article Type/Methodology	Purpose	Key Findings/Results
[46] Asensi-Vincente J, Jiménez-Ruiz I, Vizcaya-Moreno MF. Medication errors involving nursing students: a systematic review. <i>Nurse Educator</i> . 2018 Sept; 43(5):E1-E5.	Systematic Review	"The purpose of this study was to synthesize the available empirical evidence on prelicensure nursing students' medication errors."	"After the selection process, only 19 articles complied with all the requirements for inclusion in this review. The findings showed that few studies to date have analyzed errors and near misses involving nursing students, and the current evidence suggests that the incidence of them is high."
[17] Bianchi M, Bressan V, Cadorin L, Pagnucci N, Tolotti A, Valcarengi D. Patient Safety Competencies in undergraduate nursing students: a rapid evidence assessment. <i>Journal of Advanced Nursing</i> [Internet]. 2016 Dec [cited 2019 Sept 30]; 72(12):2966.	Rapid Evidence Assessment (REA)	"To identify patient safety competencies, and determine the clinical learning environments that facilitate the development of patient safety competencies in nursing students."	"Undergraduate nursing students need to develop competencies to ensure patient safety. The quality of the pedagogical atmosphere in the clinical setting has an important impact on the students' overall level of competence. Active student engagement in clinical processes stimulates their critical reasoning, improves interpersonal communication and facilitates adequate supervision and feedback." "There

doi:10.1111/jan.13033			is a lack of knowledge and research that describes what characteristics clinical learning environments should have to facilitate the development of patient safety competencies in nursing students. When clinical environments actively engage students in clinical processes, students develop better critical reasoning, decision-making skills and their overall level of competence. Mentors and tutors have an important role to support and supervise nursing students during their learning activities."
[65] Fagan A, Parker V, Jackson D. A concept analysis of undergraduate nursing students speaking up for patient safety in the patient care environment. <i>Journal of Advanced Nursing</i> [Internet]. 2016 Jun [cited 2019 Sept 30]; 72(10):2346-2357. doi:10.1111/jan.13028	Concept analysis	"An analysis of the concept of nursing students speaking up for patient safety in the workplace."	"Nursing student's role and position in the workplace differs from other health professionals in relation to speaking up and disclosing errors. Antecedents for nursing students to speak up and report errors include individual factors; students' clinical knowledge and safety knowledge; cultural and generational background; attitude, confidence and contextual factors; organisational structure; and supervision and support. There is evidence to suggest that nurses do not always speak up; for students to speak up they require sound clinical knowledge, commitment to patient safety, speaking up skills and confidence along with good supervision and support in the clinical environment."
Ion R, Smith K, Dickens G.	Systematic Review	"To systematically review	"N = 14 papers met inclusion criteria; study

<p>Nursing and midwifery students' encounters with poor clinical practice: A systematic review. Nurse Education in Practice [Internet]. 2017 Feb [cited 2019 Sept 30]; 23:67-75. doi:10.1016/j.nepr.2017.02.01</p>		<p>evidence about nursing and midwifery students' encounters with poor clinical care."</p>	<p>quality was moderate to good. Study synthesis revealed four themes: i) encounters with poor practice: students encounter poor practice that is likely to be worthy of professional sanction; ii) while intention to report is high in hypothetical scenarios, this appears not always to translate to actual practice; iii) a range of influencing factors impact the likelihood of reporting; iv) the consequences of encountering and subsequently reporting poor practice appeared to have a lasting effect on students."</p>
<p>[22] Killam LA, Luhanga F, Bakker D. Characteristics of unsafe undergraduate nursing students in clinical practice: an integrative literature review. Journal of Nursing Education. 2011 Aug; 50(8):437-446.</p>	<p>Integrative literature review/Q methodology</p>	<p>"To conceptualize students' perspective of safety in clinical learning. Appreciating variability in viewpoints across and between years of study, this paper specifically describes fourth year nursing students' views about when it is most unsafe in the clinical setting."</p>	<p>"A total of six discrete viewpoints and two consensus perspectives were identified. The discrete viewpoints at one site were Endorsement of Uncritical Knowledge Transfer, Non-student Centered Program and Overt Patterns of Unsatisfactory Clinical Performance. In addition, a consensus perspective, labelled Contravening Practices was identified as responsible for compromised clinical safety at this site. At the other site, the discrete viewpoints were Premature and Inappropriate Clinical Progression, Non-patient Centered Practice and Negating Purposeful Interactions for Experiential Learning. There was consensus that Eroding Conventions compromised clinical safety from the perspective of students at this second site."</p>

<p>[18] Milligan F, Wareing M, Preston-Shoot M, Pappas Y, Randhawa G, Bhandol J. Supporting nursing, midwifery, and allied health professional students to raise concerns with quality of care: a review of the research literature. Nurse Education Today [Internet]. 2017 Oct [cited 2019 Sept 30]; 57:29-39. doi:10.1016/j.nedt.2017.06.006</p>	<p>Systematic review</p>	<p>"To review research on healthcare students raising concerns with regard to the quality of practice published from 2009 to the present."</p>	<p>"Twenty three research studies were analysed. Most of the research relates to nursing students with physiotherapy being the next most studied group. Students often express a desire to report concerns, but factors such as the potential negative impact on assessment of their practice hinders reporting. There was a lack of evidence on how, when and to whom students should report. The most commonly used research approach found utilised vignettes asking students to anticipate how they would report." "Through the findings of the broader review completed for the Council the team was able to reach a consensus with regard to four key themes emerging from the literature. Those four themes are repeated here to present the research literature: • Empowerment and student voice • Patient safety and speaking-up • Reporting poor practice • Bullying and harassment"</p>
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