Palestinian Medical and Pharmaceutical Journal

The Impact of Patient Safety Training on Undergraduate Nursing Students' Perceptions of Safety Competence: A quasi-experimental study

Fathieh Abu Moghli, RN, Ph.D [1], Hanan Dawod Al-Obieat [2], Mohammad R. Alosta [3], Sajeda Al Hamory [4], Ismael Alblishi [5], Eyad Abu Alhaijaa* [6], Mohammad M. Alnaeem [7].

Received 28 Sep. 2024, Accepted 4 Nov, 2024, Published: xxxxxxxxxx, DOI: https://doi.org/10.xxxx

Accepted Manuscript, In press

Abstract:

Background and Aim: The global movement toward patient safety calls for the engineering of the healthcare system, including undergraduate and graduate healthcare academic education and training. However, improving and maintaining patient safety in the healthcare system is a challenging task. The aim of the current study was to assess the impact of patient safety training program on 4th-year nursing students' perception of safety competencies.

Materials and Methods: A quasi-experimental, post-test-only nonequivalent group design, was conducted. The course was designed based on the World Health Organization patient-safety guide and was conducted over four hours. A total of 144 students were invited to participate in the study. One hundred and twenty-seven students were recruited and were divided between the intervention (n=63) and the control group (n=64).

Results: The study results showed a significant difference between the mean of students' safety perception scores of the intervention group (M=4.6, SD=0.41) and the control group (M=3.7, SD=0.69), t (118) =8.4, p <0. 001. All students attended the leadership and management courses (theoretical and practical) while none of them were received a patient safety training prior to this study. Furthermore, no significant differences in means of patients' safety competence scores and students' demographic factors (p< .05).

Conclusion: Patient safety education is a crucial ingredient in ensuring the safety of the healthcare system. Nurses are at the forefront of care delivery, and therefore they must be competent in patient safety.

Keywords: Patient Safety; Nursing Student; Curriculum; Education; Nursing; Competency; Safety Culture.

Introduction

The Institute of Medicine (IOM) found in its influential report "To Err is Human: Building a Safer Health System" (IOM, 1999) that there are an estimated 44,000 to 98,000 annual deaths caused by preventable medical errors in hospitals. This report had a significant impact on the healthcare community, prompting calls for changes across all levels of the healthcare field. Subsequent reports, including "Health Professions Education: A Bridge to Quality" (IOM, 2003), recommended that all health professionals receive education focused on providing patient-centered care as part of a multidisciplinary team, with an emphasis on evidence-based practice, quality improvement approaches, and informatics (p. 45). Patient safety is a fundamental and critical concern for the performance and improvement of healthcare systems (Al-Haijaa, Ayaad, & Al-Refaay,2018). The term refers to the prevention of actual or potential harm to patients (The Council of the European Union, 2009; WHO, 2011). Upholding patient safety in healthcare systems is particularly challenging given the constant evolution and complexity of these systems (Olds & Dolansky, 2017). Breaches in patient safety lead to negative consequences such as prolonged hospitalization, increased infection rates, injury, and in the worst cases, death (WHO, 2017). The enhancement of patient safety has been a strategic priority for the World Health Organization (WHO), focusing on implementing a multifaceted approach for improvement. This approach includes providing global leadership and promoting collaboration, developing guidelines and tools, building capacity, engaging patients and families in safer healthcare, and monitoring improvements in patient safety (WHO, 2017, p. 6).

The global shift towards patient safety has led to a restructuring of healthcare systems, including the integration of patient safety into undergraduate and graduate healthcare education (IOM, 2003). Patient safety is considered a crucial skill for nurses (Chenot & Daniel, 2010; Olds & Dolansky, 2017). The WHO introduced a patient safety curriculum guide for medical schools in 2010 (Walton et al., 2010) and a guide for the multidisciplinary team in 2011, providing a framework for patient safety competencies within healthcare academic institutions (WHO, 2011). Additionally, the Canadian Patient Safety Institute has established a set of competencies to enhance inter-professional patient safety knowledge, skills, and behaviors (Frank, 2008).

Differences in nursing students' perceptions of safety exist across countries. A study by Tella, Smith, Partanen & Turunen

1 Department of Nursing, Faculty of Nursing, The University of Jordan, Amman, Jordan. E-mail: fathieh@gmail.com
2 Department of Nursing, Faculty of Nursing, Al-Zaytoonah University of Jordan, Amman. E-mail: hanandaowd@yahoo.com
3 Department of Nursing, Faculty of Nursing, The University of Zarqa, Zarqa, Jordan. Email: mro1984@yahoo.com
4 Department of Nursing, Faculty of Nursing, The University of Jordan-Aqaba Campus, Aqaaba, Jordan. Email: sajeda.alhamory@hotmail.com

5 Critical Care Senior Registered Nurse Al-Istishari Hospital, Amman, Jordan. Email: ismaelapn@gmail.com
6 CPHQ. Director of Quality, Abdali Hospital, Amman, Jordan. *Corresponding author: eyadabualhijaa@gmail.com
7 Department of Nursing, Faculty of Nursing, Al-Zaytoonah University of Jordan, Amman, Jordan. Email: mmalnaeem33@gmail.com

(2015) surveyed 195 Finnish and 158 British nursing students and found that British students have more favorable perceptions of safety compared to their Finnish counterparts. The authors recommended integrating patient safety into nursing education curricula, involving nursing students in curriculum development, making effective use of simulations, and comparing nursing curricula against international best practices (Tella et al., 2015, Alnaeem et al., 2024). In Italy, a cross-sectional study measured the perception of patient safety among undergraduate nursing students and reported that students displayed high confidence in patient safety, with an overall mean exceeding four out of five. However, almost half of the students reported encountering unsafe clinical training settings, and approximately one-quarter witnessed adverse events and/or close call events during their clinical training (Stevanin et al., 2015).

Many studies have explored the competencies of patient safety among undergraduate healthcare students (Aboumatar et al., 2012; Hwang et al., 2016; Moskowitz et al., 2007; Roh et al., 2015; Kim, Yoon, Hong, & Min,2019)). Kim, Yoon, Hong, & Min (2019) conducted a patient safety training for undergraduate nursing students utilizing a quasi-experimental study design and a flipped learning strategy and reported a significant enhancement in the students' perceptions of patient safety competence. In a cross-sectional, pre- and post-study design, Hwang et al. (2016) conducted a one-day patient safety education program for final-year students in Korean medicine colleges, which included students from medical, nursing, and traditional science divisions. The researchers reported a significant and positive increase in students' confidence in patient safety after the training ($t=6.99$, $p<0.001$) (Hwang et al., 2016). Another study reported a significant improvement in safety knowledge by about 19% among second-year medical students after attending a three-day patient safety training (Aboumatar et al., 2012). Furthermore, a three-day patient safety course delivered to third-year medical students before their clinical training program reported a significant improvement in students' perceptions of patient safety competence (Roh et al., 2015). However, the research in the field of patient safety education is in need for more rigorous research designs and more reliable outcome measures (Lee, Morse& Kim,2022).

Early education and preparation regarding patient safety are crucial for ensuring the competence of graduate nurses in patient safety. Undergraduate nursing programs that incorporate patient safety principles into their educational curriculum are taking the initial step towards ensuring patient safety and quality competence in clinical practice. After the COVID-pandemic, the need for implementing safety measures were become more significantly and nurses who had good background with using these concept of safety measures were less stressed (Alnaeem et al., 2022). However, a recent review found that despite the integration of safety concepts into the nursing curriculum, perceptions regarding patient safety varied among students (Bedgood & Mellott, 2021).

Purpose of study

The purpose of this study was to assess the effect of patient safety training on undergraduate nursing students' perceptions of safety competence.

Materials and Methods

Design

A quasi-experimental, post-test-only nonequivalent group design was employed to investigate the impact of patient safety training on the perception of patient safety competencies among 4th-year nursing students. The intervention was administered to one of the two groups, conveniently recruited for the study.

Settings and Sampling

The research was conducted at the University of Jordan School of Nursing, targeting 144 4th-year nursing students scheduled to join an intensive training program in the upcoming semester. Participants were conveniently selected based on the inclusion criterion of being a fourth-year nursing student joining the intensive training program in the next semester. The sample size was determined using a Cohen d table, indicating that a minimum of 128 participants was needed for the study results to be reliable at a medium effect size, 0.8 power estimation, and a significance level of 0.05 (Cohen, 1992).

The intervention "101 Patient Safety Course

A four-hour "101 Patient Safety Course" was conducted from 8 am to 12 pm, utilizing a curriculum based on the WHO guide on patient safety (WHO, 2011) and previous research on patient safety education. The course covered six main topics: introduction to patient safety, identification and management of close calls and adverse events, human factor engineering, culture of safety, national patient safety goals, and effective behaviors to improve patient safety, as well as effective communication and teamwork. At the end of this training, its was expected from the students to define patient safety, identify the frequency and incidences of medical errors in Jordan and worldwide, differentiate between error, harm and adverse events, understand the complexity of the healthcare system, list the national patient safety goals, understand the key characteristics of the culture of safety, list and practice the critical behaviors to improve patient safety, and understand the principles of JUST culture. The curriculum was reviewed and approved by two patient safety experts.

The training was conducted by the research team. It was structured to be an interactive, including case scenarios, a power point presentation and a video record explaining the main concept of every module. Students were allowed to clarify any ambiguous topics and to raise questions during the training. Also, every training topics was closed by the trainee by a summary of the key concepts and allow time for students to clarify or ask questions. At the end of training, students were asked to rate the overall training program, every training module and every trainee using a point Likert scale where five was highly satisfied and one is highly dissatisfied. Also, there was a question asking the student if they recommend the training course to other students. The students were highly satisfied from the training modules, the trainees and recommend the patient safety training module.

Data Collection Instrument

Data were collected using a data collection kit containing demographic information and the "Health Professional Education in Patient Safety Survey" (H-PEPSS) (Ginsburg et al., 2012). The H-PEPSS, developed by Ginsburg and colleagues, assesses self-perceived safety competencies in both classroom and clinical experiences. It consists of 27 items categorizing patient safety, addressing broader patient safety issues in health professional education, and speaking up about patient safety using a 5-point Likert scale. The questionnaire took an average

of 10 minutes for the students to complete. Each item was evaluated using a 5-points Likert scale ranging from one (strongly disagree) to five (strongly agree). The tool was reported to have good psychometric properties and was used by several researchers(Bressan et al., 2016; Colet & Cruz, 2015; Hwang et al., 2016; Stevanin et al., 2015; Usher et al., 2017). The authors used this questionnaire and distribute it in English language as the nursing students are already have received their education in English. Cronbach alpha coefficient of the entire scale in the present study was 0.89.

Ethical Consideration

The research obtained approval from the University of Jordan Institutional Review Board (IRB) and permission from the School of Nursing on 11/5/2022 (Ref no. 2/13/2021-2022). The current study followed the Declaration of Helsinki provisions, and all participants provided informed consent. The permission to use the measurement instruments has been received from the original author.

Results and Discussion

Characteristics of the students

In this study, 144 students were invited to participate, with 127 students recruited and divided between the intervention (n=63) and control (n=64) groups. All students were in their 4th year in nursing school. All students attended the leadership and management courses (theoretical and practical). None of the students had received a patient safety training prior to this study. Also, there were no significant difference (p>0.05) found between students' demographics data (age and gender) in both groups (intervention and control groups).

Table 1. Characteristics of participants (N=127)

Variable	Mean SD (range)	N	(%)
Age	21.4 (± 3.67)		
Groups			
Intervention group		63	49.6
Control group	-	64	50.4
Gender			
Female		30	23.6
Male	-	97	76.4

Students' Self-Perceived Patient Safety Knowledge and Competence

The study examined the students' self-perceived knowledge and competence in patient safety. An independent-samples t-test revealed a significant difference in the mean scores of students' safety perceptions between the intervention group (M=4.6, SD=0.41) and the control group (M=3.7, SD=0.69), t (118) =8.4, p <0.001, with a large effect size (η2=0.37). The mean difference between the two groups is detailed in Table 2. Further analysis of the relationship between patients safety competence and their demographic factors, the result revealed that age (r= 1.76, p< .05) and gender (X2= 5.65, p< .05) did not revealed a significant differences in means. (Table 2).

Table 2: Difference in safety perception among intervention and control groups

Group	Intervention		Control		df	ţ	P*
	M	SD	M	SD			
Total score	4.6	.41	3.7	0.69	118	8.4	.001
Patients safety culture	4.7	0.42	4.1	0.85	88.5	4.73	.001
Work in team	4.6	0.46	3.7	0.83	99.4	7.72	.001
Communicating effectively	4.6	0.60	3.7	1	98	6.05	.001
Managing safety risks	4.8	2.19	3.2	0.75	124	4.44	.001
Understand environment	4.54	0.59	3.65	0.84	124	6.88	.001
Recognizing adverse events	4.55	0.45	3.54	0.88	100.8	7.76	.001
Confidence in clinical skill	4.58	0.53	3.7	0.69	118	8.41	.001

*Significant at α =0.05 (2- tailed) , M: Mean, SD: Standard Deviation, df: degree of freedom

Students' Perspectives About Specific Patient Safety Content Areas

Furthermore, the study explored students' perspectives on specific patient safety content areas. The intervention group

exhibited higher confidence in learning about the broader principles of patient safety (M=4.3, SD=0.51) compared to the control group (M=3.7, SD=0.66). Additionally, the intervention group reported greater comfort in speaking up about safety issues (M=4.04, SD=0.8) compared to the control group (M=3.49, SD=0.51).

Discussion

A post-test quasi-experimental design with a nonequivalent control group was adopted to investigate the effect of patient safety training on nursing students' perceptions of safety competence. The results revealed that nursing patient safety competencies among the nursing students were enhanced after completing the training and were significantly higher in those who attended the patient safety training compared to those who did not. These findings are consistent with previous studies that provided a short training course on patient safety(Aboumatar et al., 2012; Hwang et al., 2016;Kim,Yoon,Hong,&Min, 2019; Moskowitz et al., 2007).

Also, this study finding was consistent with previous studies that adopted a different set of patient safety competency measures among the population of nursing students. Kim,Yoon,Hong,&Min, (2019) found that nursing students competence of patient safety were significantly higher in the experimental group who attended the patient safety training than who did not. Miller and LaFramboise (2009) reported that senior nursing students attended the intervention of patient safety demonstrated a higher overall perceptions of safety competence. Also, in another study that used the Quality and Safety in Nursing Education (QSEN) competencies framework reported a higher perceptions of QSEN competencies among senior nursing students who had the training on patient safety (Sullivan et al., 2009). A recent study analyzing the concept of "competency" emphasized its significance in nursing practice, highlighting that competency directly affects patient health and safety. The authors noted that a lack of competency can lead to adverse medical outcomes. They concluded that nurses can leverage the insights from this analysis to enhance their professional practice, particularly in clinical settings, thereby improving patient health outcomes (Mrayyan et al., 2023).

It is well recognized that enhancing the students' safety competencies requires incorporating patient safety as an integral part of the nursing education curriculum. In a recent systematic review, nursing students were found to value the vital role of patient safety in their education and reported their incompetence in recognizing and raising their safety concerns and errors (Bedgood & Mellott, 2018). Also,incorporating patient safety training within the nursing education have become a key priority area (Mansour et al., 2018). Nowadays, incorporating online education is essential, particularly when managing large student groups, as it facilitates the exploration of key concepts related to safety competencies (Alnaeem et al., 2024; Mrayyan et al., 2023). A cross-sectional survey was conducted with 158 final-year nursing students, analyzed using confirmatory factor and descriptive statistics. The findings identified four components with Cronbach Alpha reliabilities: Comfort (0.778), Error Reporting (0.638), Denial (0.510), and Culture (0.739), resulting in an overall reliability of 0.845. While 62% of participants observed medical errors during clinical practice, only 25% reported these incidents. These results highlight the necessity of integrating Patient Safety into nursing education, as it can enhance clinical excellence, decrease medical errors, and improve health outcomes (AlNawafleh et al., 2022). Thus, it is recommending to involve more effort to integrate online education (Alnaeem, et al., 2024); especially if there are large number of stuents which facilitate exploring the main concepts related to safety competences. In our study, the findings revealed a moderate level of patient safety competence among the nursing students. However, these findings might reflect not incorporating patient safety in the nursing education curriculum, which is crucial to equip nursing students with the required patient safety competencies.

The effect size in this study was found to be large (η2, was 0.37).27 This large effect size can be explained by assessing students' perception of safety competence directly after conducting the course. This result concomitant the previous publication, which reported a moderate to large effect size. (Hwang et al., 2016) However, Hwang et al. conducted focused interviews two months after the training course with eight nursing student participants and found the students maintained their positive patient safety competence(Hwang et al., 2016).

Though of the short duration of the patient safety training module, students who attended the training were highly satisfied from the overall training modules, the trainees and will recommend the patient safety training module to other students. Based on the presented results of this paper, the control group was offered the patient safety training module by the research team and in coordination with the college of nursing faculty members.

Implications and recommendations

Our study, which contributes to the growing trend of using a post-test quasi-experimental design with a nonequivalent control group, underscores the need for further research. The meticulous effort we devoted to comparing the study outcomes with other research, particularly before and after the intervention in Jordan, highlights the potential for future investigations. We recommend that future research could employ a similar study design and evaluate the effectiveness of patient safety interventions based on their duration. It would be advantageous to integrate interventions from evidence-based sources such as the WHO patient safety curriculum guide and real patient safety case scenarios (Kim, Yoon, Hong, & Min, 2019).

Strengths and limitations

The findings of the current study may have limited generalizability due to its focus on a single nursing class within one university setting and the use of a convenience sample of students, which may introduce selection bias. It is important to note that the survey conducted as part of their training may have led to socially desirable response bias, potentially inflating the reported scores. Furthermore, the study did not explore the lasting impact of patient safety training on nursing students' perceptions of safety competence. As a result, it is recommended that future research consider assessing the long-term effects of patient safety education, including using behavioral measures to evaluate patient safety competencies.

Conclusion

Our study adopted a pre-and post-test quasi-experimental design with a nonequivalent control group to investigate the

effectiveness of patient safety training on nursing students' perception of patient safety competencies. Patient safety training and education is crucial in ensuring the healthcare system's safety. Nurses are at the forefront of care delivery and must be equipped with the necessary patient safety competencies.

Ethics approval and consent to participate

The Institutional Review Board at University of Jordan approved this study on 11/5/2022 (Ref no. 2/13/2021-2022). The current study followed the Declaration of Helsinki provisions, and all participants provided informed consent. The permission to use the measurement instruments has been received from the original author.

Consent for publication

The authors grant the Publisher permission to publish this work. All the data generated for this study are included within the article.

Availability of data and materials

All data generated during this study are included in this published article.

Author's contribution

study conception and design: Hanan Al-Obieat, Mohammad Al-Osta, Sajeda Al Hamory Ismael Alblishi, Eyad Abu Alhaijaa; data analysis and validation, Fathieh Abu Moghli, Hanan Al-Obieat, Mohammad Al-Osta, Sajeda Al Hamory Ismael Alblishi, Eyad Abu Alhaijaa, Mohammad Alnaeem; draft manuscript preparation: Fathieh Abu Moghli, Hanan Al-Obieat, Mohammad Al-Osta, Sajeda Al Hamory Ismael Alblishi, Eyad Abu Alhaijaa, Mohammad Alnaeem. All authors reviewed the results and approved the final version of the manuscript.

Funding

This study was not received any financial support from any organization or agencies.

Conflicts of interest

The authors report no conflict of interest.

Acknowledgements

The authors would like to thank all students who participate in the study and faculty members who facilitate the data collection process.

References

Aboumatar HJ, Thompson D, Wu A, et al. Development and evaluation of a 3-day patient safety curriculum to advance knowledge, self-efficacy and system thinking among medical students. BMJ Qual Saf. 2012;21(5):416-422. doi:10.1136/bmjqs-2011-000463

Abualrub RF, Abu Alhijaa EH. The impact of educational interventions on enhancing perceptions of patient safety culture among Jordanian senior nurses. Nurs Forum. 2014;49(2):139-150. doi:10.1111/nuf.12067

Al-Haijaa, E. A., Ayaad, O., Al-Refaay, M., & Al-Refaay, T. (2018). Malpractice an Updated Concept Analysis and Nursing ImplicationinDeveloping Countries. IOSR Journal of Nursing and Health Science, 7(1), 81-5.

Alnaeem, M. M., Atallah, A. A., Alhadidi, M., Salameh, I., Al-Mugheed, K., Alzoubi, M. M., ... & Abdelaliem, S. M. F. (2024). Relationship between perceived value, attitudes, and academic motivation in distance learning among nursing students in rural areas. BMC nursing, 23(1), 710

Alnaeem, M. M., Hamdan-Mansour, A. M., Nashwan, A. J., Abuatallah, A., & Al-Hussami, M. (2022). Healthcare providers' intention to leave their jobs during COVID-19 pandemic: A cross-sectional study. Health Science Reports, 5(6), e859

AlNawafleh, A. H., Muwafaq, A. M., & Alhalaiqa, F. (2022). Patient safety education: a perspective of Southern Jordan Nursing Students'. Natural and Applied Sciences Series, 37(2)

Bedgood AL, Mellott S. The Role of Education in Developing a Culture of Safety Through the Perceptions of Undergraduate Nursing Students. J Patient Saf. 2018;00(00):1. doi:10.1097/pts.0000000000000548

Bedgood, A. L., & Mellott, S. (2021). The role of education in developing a culture of safety through the perceptions of undergraduate nursing students: An integrative literature review. Journal of Patient Safety, 17(8), e1530-e1536

Chenot TM, Daniel LG. Frameworks for patient safety in the nursing curriculum. J Nurs Educ. 2010;49(10):559-568. doi:10.3928/01484834-20100730-02

Cohen J. A power primer. Psychol Bull. 1992;112(1):155-159. doi:10.1037/0033-2909.112.1.155

Colet PC, Cruz JP. Patient Safety Competence of Nursing Students in Saudi Arabia : A Self-Reported Survey. Int J Health Sci (Qassim). 2015;9(4):411-419. doi:10.12816/0031231

Duhn L, Karp S, Oni O, Edge D, Ginsburg L, Van Den Kerkhof E. Perspectives on patient safety among undergraduate nursing students. J Nurs Educ. 2012;51(9):526-531. doi:10.3928/01484834-20120706-04

Frank j. Safety Competencies.; 2008.

George D, Mallery P. SPSS for Windows step by step: A simple guide and reference. 11.0 update. 2010.

Ginsburg L, Castel E, Tregunno D, Norton PG. The H-PEPSS: An instrument to measure health professionals' perceptions of patient safety competence at entry into practice. BMJ Qual Saf. 2012;21(8):676-684. doi:10.1136/bmjqs-2011-000601

Hwang JI, Yoon TY, Jin HJ, Park Y, Park JY, Lee BJ. Patient safety competence for final-year health professional students: Perceptions of effectiveness of an interprofessional education course. J Interprof Care. 2016;30(6):732-738. doi:10.1080/13561820.2016.1218446

IOM. Health Professions Education.; 2003. doi:10.17226/10681

IOM. To Err Is Human. Building a Safer Health System, Volume 6. Vol 2.; 1999. doi:10.17226/9728

Kim, Y. M., Yoon, Y. S., Hong, H. C., & Min, A. (2019). Effects of a patient safety course using a flipped classroom approach among undergraduate nursing students: A quasi-experimental study. Nurse Education Today, 79, 180-187.

Lee, S. E., Morse, B. L., & Kim, N. W. (2022). Patient safety educational interventions: A systematic review with recommendations for nurse educators. Nursing Open, 9(4), 1967-1979.

Mansour, M. J., Al Shadafan, S. F., Abu-Sneineh, F. T., & AlAmer, M. M. (2018). Integrating patient safety education in the undergraduate nursing curriculum: a discussion paper. The open nursing journal, 12, 125.

Miller CL, LaFramboise L. Student learning outcomes after integration of quality and safety education competencies into a senior-level critical care course. J Nurs Educ. 2009;48(12):678-685. doi:10.3928/01484834-20091113-07

Moskowitz E, Veloski JJ, Fields SK, Nash DB. Development and evaluation of a 1-day interclerkship program for medical students on medical errors and patient safety. Am J Med Qual. 2007;22(1):13-17. doi:10.1177/1062860606296669

Mrayyan, M. T., Abunab, H. Y., Khait, A. A., Rababa, M. J., Al-Rawashdeh, S., Algunmeeyn, A., & Saraya, A. A. (2023).

Competency in nursing practice: a concept analysis. BMJ open, 13(6), e067352.

Olds D, Dolansky MA. Quality and Safety Research: Recommendations From the Quality and Safety Education for Nursing (QSEN) Institute. Appl Nurs Res. 2017;35:126-127. doi:10.1016/j.apnr.2017.04.001

Roh H, Park SJ, Kim T. Patient safety education to change medical students' attitudes and sense of responsibility. Med Teach. 2015;37(10):908-914. doi:10.3109/0142159X.2014.970988

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. Nurse Educ Today. 2015;35(8):926-934. doi:10.1016/j.nedt.2015.04.002

Sullivan DT, Hirst D, Cronenwett L. Assessing quality and safety competencies of graduating prelicensure nursing students. Nurs Outlook. 2009;57(6):323-331. doi:10.1016/j.outlook.2009.08.00

Tella S, Smith NJ, Partanen P, Turunen H. Learning Patient Safety in Academic Settings: A Comparative Study of Finnish and British Nursing Students' Perceptions. Worldviews Evidence-Based Nurs. 2015;12(3):154-164. doi:10.1111/wvn.12088

The Council of the European Union. Council Recommendation of 9 June 2009 on patient safety, including the prevention and control of healthcare associated infections. Off J Eur Union. 2009;(1982):1-6. doi:10.1097/HCR.0b013e31823be0bc

Torkaman, M., Sabzi, A., & Farokhzadian, J. (2022). The effect of patient safety education on undergraduate nursing students' patient safety competencies. Community Health Equity Research & Policy, 42(2), 219-224.

Usher K, Woods C, Parmenter G, et al. Self-reported confidence in patient safety knowledge among Australian undergraduate nursing students: A multi-site cross-sectional survey study. Int J Nurs Stud. 2017;71:89-96. doi:10.1016/j.ijnurstu.2017.03.006

Walton M, Woodward H, Van Staalduinen S, et al. The WHO patient safety curriculum guide for medical schools. Qual Saf Heal Care. 2010;19(6):542-546. doi:10.1136/qshc.2009.036970

Warner, Rebecca. (2008). Applied statistics from bivariate through multivariate techniques. Sage publications. Los Angeles

WHO. Patient Safety Curriculum Guide Multi-Professional Edition.; 2011. https://apps.who.int/iris/bitstream/handle/10665/44641/9789241501958_eng.pdf;jsessionid=A3B2EC6DCD8E9364DA3A157B22FE750D?sequence=1.

World Health Organization. Patient safety: making health care safer. World Health Organization; 2017. https://apps.who.int/iris/handle/10665/255507. License: CC BY-NC-SA 3.0 IGO