



Assessment of Knowledge, Attitude and Practice of Nurses Concerning Patient Safety in Soran City: A Cross-Sectional Study

Fatema M. Azo ¹, Mryam Y. Yaseen ², Magroom E. Senior ³, Safya S. Piro ⁴, Tiran J. Piro⁵, Hamdia M. Ahmed ⁶.

^{1,3} Soran Technical Institute, Erbil Polytechnic University, Erbil, Iraq.

^{2,5} Erbil Medical Institute, Erbil Polytechnic University, Erbil, Iraq.

⁴ College of Nursing, University of Duhok, Erbil, Iraq.

⁶ College of Health Sciences, Hawler Medical University, Erbil, Iraq.

ABSTRACT

Background: Patient safety has been identified as a global importance health care challenges. There is a rising number of patients' mortality in hospitals each year because of gaps in patient safety. Knowledge, attitude, and practice of the nurses toward patient safety have a main impact on the delivery of safe patient care.

Objectives: To assess knowledge, attitude, and practice towards patient safety among nurses.

Methodology: A cross-sectional design was conducted on 205 nurses working in Soran City of Erbil governorate. A self-reported questionnaire toward patient safety was used between February and March 2025.

Results: The results revealed that the mean age of the nurses was 33.77 years. More than half (51.2%) of them were male. The majority (81.5%) of them were graduated from nursing institute. The majority (57.6%) of them had working experience of ≥ 6 years. The nurse's level of good knowledge, positive attitude, and good practice towards patient safety was 62.4%, 55.6%, and 48.3% respectively. The multi-variable logistic regression analysis showed that; age, years of experience, working hours per week were factors significantly associated with knowledge towards patient safety. The significant predictors of a positive attitude are age and years of experience. Marital status, years of experience, having information about patient safety during initial education, and receiving training about patient safety were factors significantly associated with practice towards patient safety.

Conclusion: In the present study, more than half of the nurses had good knowledge and positive attitude towards patient safety, yet only 48.3% engage in good practice. It is necessary to implement patient safety education curricula and focused training sessions.

Keywords: Patient safety, Knowledge, Attitudes, Practices, Nurse.

CORRESPONDING AUTHOR: Mryam Yaseen Yaseen, Soran Technical Institute, Erbil Polytechnic University, Erbil, Iraq.
Email: mryam.yaseen@epu.edu.iq

INTRODUCTION

Patient safety is an issue that has received increasing attention worldwide ⁽¹⁾. It can be defined as the avoidance and prevention of patient injuries or adverse events that could happen during healthcare delivery ⁽²⁾.

Sometimes during receiving health care, errors related with care may result in a serious damage such as death, disability or extra protracted treatment. In addition, it may also cause secondary health care charges and hurt; it also affects the customer insight, attitude and belief. On the other hand, it may also affect providers' confidence and honesty ⁽³⁾.

Patient safety is regarded as a global problem by which both developed and developing countries are affected ⁽⁴⁾. In the developed countries, studies state that in hospitals, rates of adverse events really, were much high, with a number of at least 8%; 50% of them were expected to be preventable ⁽⁵⁾. On the other hand, in developing countries, there is indication that the level of awareness among providers about the risk of unsafe healthcare is increasing slowly but progressively.

A study performed in the East Mediterranean Region (EMR) showed that adverse events occurred with 18% of inpatient admissions. This same study raised the attention to the increased rate of death and disability, despite high preventability of these adverse events ⁽⁴⁾.

WHO (2019) reported, the incidence of adverse events because of unsafe care is one of the 10 leading causes of mortality and disability globally. In low- and middle-income countries, about 134 million adverse events happen in hospitals because of unsafe care, which leads to 2.6 million deaths each year. Up to 4 in 10 patients are injured in primary and outpatient health care worldwide, of which about 80% of the injury is avoidable ⁽⁶⁾.

Patient safety and the provision of quality care are fundamental aspects of healthcare systems and practices, which significantly reliant on the contributions of nurses ⁽⁷⁾. As the largest group of

healthcare providers, nurses are in a prime position to enhance patient safety ⁽⁸⁾.

The evidence showed that patient safety programmers and the distribution of study outcomes in the area have specifically supported nurses to develop safer practices ⁽⁹⁾. Even though there are many strategies available to improve patient safety. Thus, also better application of the available methods, it is energetic to use new and potentially more actual methods. For example, health professionals' involvement in patient safety programmers is vital if improvements in patient safety are required ⁽¹⁰⁾.

The research of Seong-Soo Huh and Hee-Young Kang ⁽¹¹⁾ found that there was a positive association between the attitude of patient safety and patient safety managing actions.

The main trial in affecting toward a safer health care system is patient safety culture, which is the prevention of risk to the patients. Safe medical practices can avoid danger. For this, healthcare experts must have moral attitudes ⁽¹²⁾.

Knowledge concerning safety in complex systems is increasing and health care is a complex scheme that is both growing. Therefore, patient safety work also has to grow. Basic conditions for safe performance such as management that values safety, good working circumstances, safety culture, enough staffing and ability, and equipment that facilitates safe practice are important ⁽¹³⁾.

However, the responsibility for patient safety should not be restricted to the practice nurses. Somewhat, patient safety should be a responsibility of all in the healthcare system ⁽¹⁴⁾.

Nurses consequently prioritize and are interested to carry out responsibilities and risk assessments related to completing patient safety ⁽¹⁵⁾. Also, developing a culture of safety is a basis element of several efforts to progress patient safety and care value ⁽¹⁶⁾. Patient safety is extremely prioritized in the health care system. Since successful

interprofessional association is the crucial for patient safety, this issue should be included inter professionally in the program (17). Ensuring safety in healthcare situations is introducing enhancements both in education and clinical practice (18).

Furthermore, patient safety can be improved by standardized deliveries when encouraged by technological resolutions, face-to-face communication between nurses, and together with bedside reports. (19). Gaining evidence regarding the level of knowledge, attitude and practice towards patient safety among nurses are important and significant to assume the essential strategies to improve the burden of damage, expenses of its related issues and to improve the quality of health care. However, there is a lack of study that has talked knowledge, attitude and practice towards patient safety among nurses employed in the study area, even in our country. The Kurdistan Rejoin of Iraq has seen significant, fast-paced development in infrastructure, but clinical practices and safety protocols may not have matured at the same rate. This creates a potential gap between the quality of facilities and the quality-of-care processes. Conducting a study on the knowledge, attitude, and practice of nurses concerning patient safety in Soran, Iraq, is highly justified due to the critical role of nurses as frontline providers and the specific contextual challenges within the Kurdistan Region of Iraq. Therefore, the present study will be conducted to assess knowledge, attitude and practice of nurses about patient safety in Soran Maternity Teaching Hospital and Ashti Teaching Hospitals of Soran City.

AIMS OF THE STUDY

To assess the level of nurses' knowledge, attitude and practice for patient safety in Soran Maternity Teaching Hospital and Ashti Teaching Hospitals at Soran / Erbil / Iraq.

METHODOLOGY

Study Design

This is descriptive cross-sectional design research that was used to conduct aim of the study.

Study Setting and Period

The study is conducted at Soran Maternity Teaching Hospital and Ashti Teaching Hospital, involving nurses affiliated with the Ministry of Health (MOH) in the Erbil government from February 10, 2025 to March 10, 2025. Soran and Ashti Hospitals are referral and teaching hospital and provide inpatient and outpatient services for people that located in Soran City of Erbil government, Kurdistan Region of Iraq.

Sampling technic and sample Size:

Convenient purposive sampling technique used for selected study subject and a total of 205 nurses (105 from Soran Hospital and 100 from Ashti Hospital) who agreed to participate. All participants are qualified nurses who provided direct patient care in all hospital wards and units and must have at least one year of working experience in the hospital in different shifts to reduce the likelihood of significant sampling error. The sample size was calculated by using a single proportion formula a 95% confidence level with a 5% margin of error.

Inclusion Criteria:

- Nurses must hold at least a Diploma degree in nursing.
- Nurses must have at least one year of working experience in the hospital.

Exclusion Criteria:

The cases did not fulfill the inclusion criteria and refused to participate in the study were excluded.

Study Tool and Data Collection

The study employed by validated questionnaire that was developed from previous relevant studies and literatures on nurses' knowledge, attitudes, and practices related to patient safety (20, 21). In addition, it has been given for review by 10 experts.

The quality of the data was assured by pretesting of the questionnaire and providing training

on the data collection instruments and procedures. Also, the reliability of the questionnaire was checked by the reliability analysis and the value of Cronbach's alpha was suggested a reliable tool.

The questionnaire was included following parts:

Part one: Socio demographic data (age, gender, educational level, marital status)

Part two: Personal related characteristics of the nurses.

Part three: Knowledge about patient safety that there were two possible responses with score 1 for correct answer, which divided to:

Good knowledge: When nurses respond is above the mean score on knowledge questions about patient safety. relevant literatures

Poor knowledge: When nurses respond below the mean score on knowledge questions concerning to patient safety.

Part four: Practice about patient safety that there were two possible responses (yes, no) with score 1 for correct answer, which divided to:

Good practice. When nurses respond above the mean score on practice questions about patient safety.

Poor practice. When nurses respond below the mean score on practice questions about patient safety.

Part five: Attitude regarding patient safety that the questions followed a 4-point Likert scale ("strongly disagree", "disagree", "agree", "strongly agree") with four -point Likert scale (1 = strongly disagree, 2 = disagree, 3 =agree, 4 = strongly agree that categorized:

Positive attitude. When nurses respond the mean or above the mean score on attitude questions regarding to patient safety.

Negative attitude. When nurses respond below the mean score on the attitude questions regarding to patient safety.

Ethical considerations

The present study was approved by nursing department on behalf of the Institutional Ethical Review Board of Erbil Polytechnic University (code: 1650, 20/1/2025). The letter of permission was sent to Ashti and Soran maternity teaching hospitals and permission was obtained. The aims of the study were explained to the subjects who agree to participate in the study and brief information was offered concerning the significance of the study for the nurses. Verbal informed consent obtained from them. This was because of that this study didn't include any clinical investigational which could harm the nurses in any form. This procedure of gaining verbal consent was approved by Nursing department on behalf of the Institutional Ethical Review Board of Erbil Polytechnic University.

The researchers distributed the questionnaires to nurses and they followed them while filling the questionnaires.

Statistical analysis

The collected data were analyzed using version 20 of Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics were used to summarize the demographical and personal related characteristics of the participants, as well as their knowledge, attitudes, and practices regarding PS. Bivariable and multivariable logistic regression analyses were applied to identify variables associated with knowledge, attitude, and practice towards patient safety.

RESULTS

Table 1 outlines the findings of socio-demographic characteristics of the nurses in the study (n=205). The nurses' ages are categorized into three groups: 36.1% are under 30 years old, 43.4% fall within the 30-39 age range, and 20.5% are aged 40 and above. The mean age is 33.77 years (SD = 8.335).

In terms of gender distribution, the sample is almost evenly split, with males comprising 51.2% and females 48.8%.

Regarding educational qualifications, the majority of nurses (81.5%) have completed their education at the institute level, while 18.5% hold a bachelor's degree.

Marital status shows that slightly more than half of the nurses (53.7%) are married, while 46.3% are single.

This table highlights the diversity of the sample in terms of age, gender, education, and marital status, which may be relevant to understanding their perspectives and practices related to patient safety (table1).

Table 2 provides an overview of the personal characteristics of the nurses in the study (n=205). The years of experience among nurses are relatively evenly distributed, with 42.4% having 5 years or less of experience, and both the 6-10 years and over 10 years categories accounting for 28.8% each. The mean years of experience are 8.89 years (SD = 7.984).

In terms of work position, the vast majority of the nurses (92.2%) are staff nurses, with only 7.8% holding head nurse positions.

Regarding weekly working hours, nearly half of the nurses (48.3%) work less than 40 hours, while 25.4% work between 40-59 hours, and 26.3% work 60 or more hours per week. The average working hours per week are 39.69 hours (SD = 24.514).

When it comes to additional employment, 48.8% of the nurses have an extra job, while 51.2% do not.

A significant majority of the nurses received information about patient safety during their initial education (79.0%), and an even higher percentage (91.2%) received continuing education on patient safety. Furthermore, 94.1% of the nurses have undergone training specifically related to patient safety, leaving only 5.9% without such training.

Table 3 presents the distribution of knowledge, attitude, and practice among nurses regarding patient safety. The results indicate that 62.4% of the nurses have good knowledge about patient safety, while 37.6% have poor knowledge. In terms of attitude, a slightly larger proportion of nurses (55.6%) demonstrate a positive attitude towards patient safety, compared to 44.4% who have a negative attitude. Regarding practice, the nurses are almost evenly split, with 51.7% exhibiting poor practice and 48.3% showing good practice. This distribution suggests that while the majority of nurses possess good knowledge and a positive attitude, there is a significant portion that still exhibits poor practice in patient safety.

A binary logistic regression model was used to evaluate the impact of various demographic and personal-related variables on nurses' knowledge about patient safety. This model was statistically significant, $\chi^2(13) = 24.795$, $p = 0.025$. The model explained 15.5% (Nagelkerke R^2) of the variance in patient safety and the overall classification accuracy of the model was 69.8%, meaning it correctly classified about 70% of cases. The Hosmer and Lemeshow test were not significant, $\chi^2(8) = 5.019$, $p = 0.756$, suggesting that the model fits the data well.

Of the 11 predictor variables, four were statistically significant: age, years of experience, working hours per week, Having an information about patient safety during initial education. These variables were significant at 0.1 and 0.05, significant levels, respectively.

Table (4) shows that the age is a significant predictor of knowledge about patient safety. Nurses who are older have a higher likelihood of having good knowledge compared to younger nurses. Specifically, for each unit increase in the age, the odds of having good knowledge increase by approximately 2.08 times (OR = 2.076, 95% CI [1.096, 3.932]), and this is statistically significant at the 5% level ($p = 0.025$).

There is a positive relationship between years of experience and knowledge of patient safety, nurses with fewer years of experience are more likely to have better knowledge about patient safety compared to those with over 10 years of experience. Nurses with 5 years or less of experience and those with 6-10 years of experience are nearly 3 times more likely to have better knowledge compared to the reference group (OR = 2.967, 95% CI [1.031, 8.536]), (OR = 2.942, 95% CI [1.171, 7.388]).

There was a positive relationship between working hours per week (40-59 hours) and knowledge of patient safety. Nurses working 40-59 hours per week have significantly higher odds of better knowledge, nearly 3 times higher (OR = 2.951, 95% CI [1.212, 7.182]) compared to those working 60 hours or more. However, working less than 40 hours per week does not show a significant relationship with knowledge.

There was a negative relationship between having information about patient safety during initial education and knowledge of patient safety. Nurses who received information about patient safety during their initial education are significantly less likely to have good knowledge (OR = 0.439, 95% CI [0.197, 0.982]), about patient safety compared to those who did not receive such information. This suggests that the information provided during initial education might not be as effective or impactful in fostering long-term knowledge about patient safety as one might expect.

Table (5) indicate a binary logistic regression analysis was performed to assess the influence of age, gender, educational qualification, marital status, years of experience, job position, weekly working hours, additional employment status, and knowledge and exposure to patient safety information during both initial and continuing education on the likelihood of nurses demonstrating a positive attitude toward patient safety.

The model was statistically significant, $\chi^2(15) = 25.694$, $p = .041$. It explained between 11.8% (Cox & Snell R^2) and 15.8% (Nagelkerke R^2) of the variance

in attitude and correctly classified 65.9% of cases, with better accuracy for positive attitudes (71.9%) than negative attitudes (58.2%). The Hosmer and Lemeshow test were not significant, $\chi^2(8) = 12.215$, $p = 0.142$, suggesting a good model fit.

Among the predictors, age and years of experience and knowledge were significant. Compared to nurses aged 40 and above (the reference group), nurses aged 30-39 have a lower likelihood of having a positive attitude towards patient safety, this finding is statistically significant (OR = 0.332, 95% CI [0.099, 1.116]). Nurses aged less than 30 also have a lower likelihood of a positive attitude (OR = 0.302, 95% CI [0.114, 0.802]), and this is statistically significant. The logistic regression analysis also suggests that nurses with 6-10 years of experience are more likely to have a positive attitude about patient safety compared to those with more than 10 years of experience (the reference group). Specifically, nurses with 6-10 years of experience have about 2.6 times higher odds of having a positive (OR=2.556, 95% CI [0.997, 6.559]). In contrast, nurses with 5 years or less experience do not show a significant association with attitude toward patient safety. Nurses with poor knowledge about patient safety are somewhat less likely (OR=0.570, 95% CI [0.296, 1.099]) to have a positive attitude towards patient safety compared to those with good knowledge.

The significant predictors of a positive attitude towards patient safety among nurses are age and years of experience. Specifically, older nurses (aged 40 and above) and those with more than 10 years of experience are more likely to have a positive attitude. Knowledge shows a marginal inverse relationship with attitude, which might require further investigation. Other factors like gender, education qualification, marital status, work position, working hours per week, having an extra job, and having information or training on patient safety were not significant predictors in this model.

Table 6 presents the association between nurses' practice regarding patient safety and their sociodemographic characteristics. The analysis reveals that most sociodemographic variables do not show a statistically significant association with practice. However, a few variables approach significance. Marital status shows a marginal association, with single nurses slightly more likely to engage in good practices (53.7%) compared to married nurses ($p = 0.098$). Years of experience also trends towards significance, where nurses with fewer than 5 years of experience are more likely to have good practices (57.5%) compared to those with more than 10 years ($p = 0.051$). Notably, having information about patient safety during initial education is significantly associated with better practice, as nurses who received this information were more likely to demonstrate good practice (51.9%) compared to those who did not ($p = 0.035$). Finally, receiving training about patient safety also shows a trend towards significance, where those who received training are more likely to have good practices ($p = 0.084$). Other factors, such as age, gender, education qualification, work position, working hours per week, and having an extra job, do not show significant associations with practice.

DISCUSSION:

Understanding the knowledge, behaviors and practice of nurses toward patient safety is crucial for improving healthcare quality and reducing adverse events. This study conducted a cross-sectional assessment of nurses in Soran City to evaluate their knowledge, attitudes, and practices related to patient safety.

The present study showed that the nurse's level of good knowledge towards patient safety was 62.4%. The result of this study is comparable with other studies conducted in different parts of the world. This finding was higher when compared with a study conducted in Urmia University of Medical Sciences, West Azerbaijan province, Iran, where the level of

good knowledge towards patient safety was 50% (22). The variation might be due to that the difference in the study population. The study that conducted in Urmia University of Medical Sciences was done among the students studying medicine, nursing, and midwifery. However, the present study was conducted among the staff nurses working in hospital. The present study finding was also higher when compared with a study conducted in University of Gondar specialized hospital where nurses' level of good knowledge towards patient safety was 48.4% (23). The present study finding was lower once compared with a study conducted in Public University of Parana', Brazil, which reported the knowledge of nurses towards patient safety as 89.8% (24). The difference might be due to that the differences in socio-economic features. The present study finding was consistent with the study conducted in Arsi University of Ethiopia which reported the knowledge of nurses towards patient safety as 58.7% (25).

In present study age is a significant predictor of knowledge about patient safety. Nurses who are older have a higher likelihood of having good knowledge compared to younger nurses. This finding was supported by a study conducted in multidisciplinary hospitals in Western Lithuania (26).

Finding of present study indicated nurses who received information about patient safety during their initial education are significantly less likely to have good knowledge about patient safety. This is contrast to result of those participants who had information regarding patient safety during initial education were more likely to have a good knowledge towards patient safety when compared to their contraries (26,27). The variation might be due to that the initial education often focuses on theoretical, inadequate practical application, resource-limited, or complex clinical environments found in the region, weak safety culture. A poor reporting culture, where safety issues are not discussed, can make initial, formal education seem irrelevant or disconnected from real-world practice, causing it to be forgotten. Conversely,

nurses who receive ongoing training or who work in environments with a strong, active safety culture—where errors are discussed openly—tend to have better knowledge and performance.

In the current study, 55.6% of the participants demonstrated a positive attitude towards patient safety. This percentage was higher than a study conducted in Jimma Zone Public Hospitals where the overall perception of patient safety was found to be 36.77% ⁽²⁸⁾. The variation might be due to that the duration meanwhile the study conducted in which the study of Jimma Zone Public Hospitals was conducted from March 15 to April 9, 2017. But result lower than a study conducted in Jordan ⁽²⁹⁾. The present study finding was also lower than the study conducted in University of Gondar where the level of positive attitude of patient safety was (84.33%) ⁽³⁰⁾. The possible defense might be due to that the differences in sample size, the study population, different settings and the implementation of positive initiatives and educational programs in certain healthcare settings more than our study health setting. The current study finding was consistent with another study conducted in University of Gondar specialized hospital where nurses' level of positive attitude towards patient safety was 56.1% ⁽³¹⁾. In present study nurses aged less than 30 have a lower likelihood of a positive attitude. This finding is supported by a study conducted in Gondar town of Ethiopia ⁽³²⁾.

Result of present study demonstrate the nurses with poor knowledge about patient safety are somewhat less likely to have a positive attitude towards patient safety compared to those with good knowledge. This finding is in line with a study conducted in Gondar town of Ethiopia ⁽³²⁾. The likely description might be that participants with good knowledge may try to develop positive safety attitudes.

The study result shows that the nurse's level of good practice towards patient safety was 48.3%. In comparison, a study in Ethiopia reported a lower percentage of nurses with good practice 19.9% ⁽³³⁾,

maybe due to the nonattendance of prior advance creativities. This study shows having information about patient safety during initial education is significantly associated with better practice, as nurses who received this information were more likely to demonstrate good practice (51.9%) compared to those who did not. This finding is supported by a study conducted in Gondar town of Ethiopia ⁽³²⁾.

Also, result shows those nurses who received training are more likely to have good practices regarding patient safety when equated to their converses. This finding is in line with a study conducted in Asella of Ethiopia ⁽³⁴⁾. The probable explanation could be that meanwhile having information could improve the knowledge level and affect the practice.

Limitations of the present study:

This study had some limitations including being a cross-sectional study that relied on self-reported knowledge, attitude, and practice; this is subject to reporting bias. Moreover, purposive sampling technique might hinder generalizability of results. Despite this is a critical topic, the level of knowledge, attitude, practice, and associated factors towards patient safety among nurses were not adequately assessed in Kurdistan of Iraq. This has affected the discussion section of the present study.

CONCLUSIONS:

This cross-sectional study provides valuable insights into the current state of nurses' knowledge, attitude and practice regarding patient safety in Soran City. More than half of the nurses had good knowledge and positive attitude towards patient safety, yet only 48.3% engage in good practice. The present study offers significant evidence to support of public health and to avoid errors and harm-related morbidity and mortality during medical service.

We propose strengthening each component through education programs and training on patient safety, cultural change, and systemic support can significantly improve patient outcomes and overall

healthcare quality in the region. Hospital managers need to prepare training for staff, prepare brochures and reading materials about patient safety. Future research could explore longitudinal effects of interventions or expand to other regions for broader applicability.

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Ethical statement

This study is not an experimental study, and the data were collected through interviews with a sample of nurses who participated in the study. The proposal of the study was approved by the Scientific and Ethics Committee of Erbil Medical Technical Institute (number 1650), Erbil Polytechnic University, on 20 January 2025. Informed verbal consent was taken from all study participants as this approach is generally preferred by people in our community, and written consent is not common, which was approved by the Scientific and Ethics Committee of Erbil Medical Technical Institute, Erbil Polytechnic University. All methods that were used in this study are in accordance with the guidelines of Erbil Polytechnic University, Kurdistan Region, Iraq.

Conflict of interest

The authors declare that they have no competing interests

Author contributions

MYY prepared the proposal, wrote the manuscript. FMA analyzed and interpreted the data. MES collected the data and entered the data into SPSS software. SSP writing. HMA & TJP participated in designing the questionnaire and reviewing the final draft of the manuscript.

Consent for publication

Not applicable.

Data availability

The datasets used and/or analyzed throughout the current study available from the corresponding author on rational request.

REFERENCES:

1. Al-Ahmadi TA. Measuring patient safety culture in Riyadh's hospitals: a comparison between Public and Private Hospitals. *J Egypt Public Health Assoc.* 2009;84(5-6):479–500. <https://pubmed.ncbi.nlm.nih.gov/20673566/>.
2. Asem N, Sabry HA, Elfar E. Patient safety: knowledge, influence and attitude among physicians: an exploratory study. *J Egypt Public Health Assoc.* 2019 Sep 4;94(1):22. <https://doi.org/10.1186/s42506-019-0022-9> PMID: 32813209.
3. El-Hosany W., Habashy A., Abd Elwahab E., Ali H., (2019): Developing a proposed Plan for Patients' Safety Management system in Cardiac Catheterization Units at Suez Canal University Hospitals, International Scientific Conference of Faculty of Nursing, Suez Canal University, In collaboration with Edith Cowen university Australia, 21-22. <https://www.researchgate.net>. 33131153
4. Siddiqi S, Elasady R, Khorshid I, Fortune T, Leotsakos A, Letaief M, et al. Patient safety friendly hospital initiative: from evidence to action in seven developing country hospitals. *Qual Assur Health Care.* 2012; 24(2): 144–51. <https://doi.org/10.1093/intqhc/mzr090>. Epub 2012 Feb 2.
5. De Vries E, Ramrattan M, Smorenburg S, Gouma D, Boermeester M. The incidence and nature of in-hospital adverse events: a systematic review. *Qual Saf Health Care.* 2008; 17:216–23.
6. WHO. World-patient-safety-day <https://www.who.int/campaigns/world-patient-safety-day/2019>.
7. Hughes RG, editor. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. *Rockville (MD): Agency for Healthcare Research and Quality (US);* 2008. <http://www.ncbi.nlm.nih.gov/books/NBK2651/>.

8. Vaismoradi M, Salsali M, Marck P. Patient safety: nursing students' perspectives and the role of nursing education to provide safe care. *Int Nurs Rev.* 2011; 58:434–42. <https://doi.org/10.1111/j.1466-7657.2011.00882.x> PMID: 22092321
9. Siman AG, Brito MJM. Changes in nursing practice to improve patient safety. *Rev Gau'cha Enferm.* 2016; 37 (spe): e68271: 1–9. https://www.scielo.br/pdf/rgenf/v37nspe/en_0102-6933.
10. Verstappen W, Gaal S, Esmail A, Wensing M. Patient safety improvement programmes for primary care. Review of a Delphi procedure and pilot studies by the LINNEAUS collaboration on patient safety in primary care. *Eur J Gen Pract.* 2015; 21:50 <https://doi.org/10.3109/13814788.2015.1043725>. PMID: 26339837 Huh S-S, Kang H-Y
11. Huh S-S, Kang H-Y. The Attitude of Patient Safety and Patient Safety Management Activity in Nursing Students. *J Korea Acad-Ind Coop Soc.* 2015; 16:5458–67 <https://doi.org/10.5762/KAIS.2015.16.8.5458>.
12. Nadarajan SP, Karuthan SR, Rajasingam J, Chinna K. Attitudes Toward Patient Safety among Medical Students in Malaysia. *Int J Environ Res Public Health.* 2020; 17. <https://doi.org/10.3390/ijerph.17217721> PMID: 33105745
13. Ros A. [Patient safety work has to develop and intensify]. *Lakartidningen.* 2020;117. *Patient Safety: Reducing Harm Due to Medical Care.*
14. Murray M, Sundin D, Cope V. New graduate registered nurses' knowledge of patient safety and practice: A literature review. *J Clin Nurs.* 2018; 27:31–47. <https://doi.org/10.1111/jocn.13785> PMID: 28252838.
15. Groves PS, Bunch JL. Priming patient safety: A middle-range theory of safety goal priming via safety culture communication. *Nurs Inq.* 2018; 25:e12246. <https://doi.org/10.1111/nin.12246> PMID: 29774970
16. Weaver SJ, Lubomksi LH, Wilson RF, Pfoh ER, Martinez KA, Dy SM. Promoting a Culture of Safety as a Patient Safety Strategy: A Systematic Review. *Ann Intern Med.* 2013; 1585_Part_2:369. <https://doi.org/10.7326/0003-4819-158-5-201303051-00002>. PMID: 23460092
17. Wipfler K, Hoffmann JE, Mitzkat A, Mahler C, Frankenhauser S. Patient safety—Development, implementation and evaluation of an interprofessional teaching concept. *GMS J Med Educ.* 2019; 36. <https://doi.org/10.3205/zma001221>. PMID: 30993171
18. 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; 35:926–34. <https://doi.org/10.1016/j.nedt.2015.04.002> PMID: 25959704
19. Bressan V, Mio M, Palese A. Nursing handovers and patient safety: Findings from an umbrella review. *J Adv Nurs.* 2020; 76:927–38. <https://doi.org/10.1111/jan.14288>. PMID: 31815307
20. Ahmad Ayyad1, Nesrin Abu Baker, Islam Oweidat, Khalid Al-Mugheed, Samira Ahmed Alsenany and Sally Mohammed Farghaly Abdelaliam. Knowledge, attitudes, and practices toward Patient Safety among nurses in health centers. *BMC Nurse.* 2024 Mar 14;23(1):171. <https://doi:10.1186/s12912-024-01831-1>.
21. Wake AD, Tuji TS, Gonfa BK, Waldekidan ET, Beshaw E, Mohamed MA, Geressu ST. Knowledge, attitude, practice and associated factors towards patient safety among nurses working at Asella Referral and Teaching Hospital, Ethiopia: a cross-sectional study. *PLONE.* 2021;16(7):1–19.
22. Nabilou B, Feizi A, Seyedin H. Patient Safety in Medical Education: Students' Perceptions, Knowledge and Attitudes. *PLOS ONE.* 2015; 10:e0135610. <https://doi.org/10.1371/j.pone.0135610>. PMID: 26322897
23. Biresaw H, Asfaw N, Zewdu F. Knowledge and attitude of nurses towards patient safety and its associated factors. *Int J Afr Nurs Sci.* 2020; 13:100229. <https://doi.org/10.1016/j.ijans.2020.100229>.

24. De Oliveira JLC, da Silva SV, dos Santos PR, Matsuda LM, Tonini NS, Nicola AL. Patient safety: knowledge between multi-professional residents. *Einstein*. 2017; 15:50–7. <https://doi.org/10.1590/S1679-45082017AO3871>. PMID: 28444089
25. Wake AD, Tuji TS, Gonfa BK, Waldekidan ET, Beshaw ED, Mohamed MA, et al. Knowledge, attitude, practice and associated factors towards patient safety among nurses working at Asella Referral and Teaching Hospital, Ethiopia. *PLOS ONE*. 2021; 16(7): e0254122. <https://doi.org/10.1371/journal.pone.0254122>.
26. Brasaite I., Kaunonen, M., Martinkenas, A., & Suominen, T. (2017). Health care professionals' knowledge regarding patient safety clinical nursing research. *SAGE Journals*, 26(3), 285–300. <https://doi.org/10.1177/1054773816628796>.
27. Addisu DW, Techane ST, Berhanu KG, Eskeder TW, Etalem DB, Mohamed AM, Shawlem TG. Knowledge, attitude, practice and associated factors towards patient safety among nurses working at Asella Hospital, Ethiopia. *PLOS ONE* 2021 Jul 1;16(7):e0254122. <https://doi.org/10.1371/journal.pone.0254122>.
28. Belay Gizaw A, Balcha Hailu F, Tamiru Negese D. Perception Towards Patient Safety Practice and Associated Factors among Health Care Providers of Jimma Zone Public Hospitals. *Adv Tech Biol Med*. 2018; 06. <https://doi.org/10.4172/2379-1764.1000261>.
29. Ahmad Ayyad, Nesrin A B, Islam O, Khalid AM, Samira AA, Sally MF. Knowledge, attitudes, and practices toward Patient Safety among nurses in health centers. *BMC Nurse*. 2024 Mar 14;23:171. <https://doi.org/10.1186/s12912-024-01831-1>.
30. Tegegn HG, Abebe TB, Ayalew MB, Bhagavathula AS. Patient safety attitudes of pharmacy students in an Ethiopian university: a cross-sectional study. *Drug Health Patient Saf*. 2017; 9:19–24. <https://doi.org/10.2147/DHPS.S128137>. PMID: 28507450
31. Biresaw H, Asfaw N, Zewdu F. Knowledge and attitude of nurses towards patient safety and its associated factors. *Int J Afr Nurs Sci*. 2020; 13:100229. <https://doi.org/10.1016/j.ijans.2020.100229>.
32. Henok Biresawa, Nini Asfawb, Fisseha Zewduc. Knowledge and attitude of nurses towards patient safety and its associated factors. *International Journal of Africa Nursing Sciences* 13 (2020) 100229. <https://doi.org/10.1016/j.ijans.2020.100229>.
33. Mohammed T, Woldearegay E, Kedir S, Ahmed K, Getnet M and Gudina EK(2023). Patient safety knowledge, attitude and practice among undergraduate health science students in South West Ethiopia. *Front. Public Health* 10:1064896. <https://doi.org/10.3389/fpubh.2022.1064896>.
34. Wake AD, Tuji TS, Gonfa BK, Waldekidan ET, Beshaw ED, Mohamed MA, et al. Knowledge, attitude, practice and associated factors towards patient safety among nurses working at Asella Referral and Teaching Hospital, Ethiopia: A cross-sectional study. *PLoS ONE* 16(7): e0254122. July 1, 2021. <https://doi.org/10.1371/journal.pone.0254122>.

TABLES:

Table (1): Socio-demographic Characteristics of Nurses (n=205)

Variables		No (%)
Age groups	less than 30	74 (36.1)
	30-39	89 (43.4)
	40 and above	42 (20.5)
($\bar{X} \pm SD : 33.77 \pm 8.335$)		
Gender	Male	105 (51.2)
	Female	100 (48.8)
Education Qualification	Institute	167 (81.5)
	Bachelor	38 (18.5)
Marital status	Single	95 (46.3)
	Married	110 (53.7)

Table (2): Personal Related Characteristics of Nurses (n=205)

Variables		No (%)
Years of experience	≤ 5 years	87 (42.4)
	6-10 years	59 (28.8)
	> 10 years	59 (28.8)
($\bar{X} \pm SD : 8.89 \pm 7.984$)		
Work position	head nurse	16 (7.8)
	staff nurse	189 (92.2)
Working hours per weeks	< 40	99 (48.3)
	40-59	52 (25.4)
	≥ 60	54 (26.3)
($\bar{X} \pm SD : 39.69 \pm 24.514$)		
Having extra job	Yes	100 (48.8)
	No	105 (51.2)
Having an information about patient safety during initial education	Yes	162 (79.0)
	No	43 (21.0)
Having an information about patient safety during continuing education	Yes	187 (91.2)
	No	18 (8.8)
Having a training about patient safety	Yes	193 (94.1)
	No	12 (5.9)

Table (3): Knowledge, Attitude and Practice among Nurses (n=205)

Variables		No	%
Knowledge	Poor knowledge	77	37.6
	Good knowledge	128	62.4
Attitude	Negative Attitude	91	44.4
	Positive Attitude	114	55.6
practice	Poor Practice	106	51.7
	Good Practice	99	48.3

Table (4): Logistic Regression Predicting the Likelihood of Knowledge of Nurses about Patient Safety Based on Demographic and Personal Related Characteristics of Nurses

Variables	β	P-value	OR	95% CI
Age	0.730	0.025	2.076	[1.096, 3.932]
Gender	-0.310	0.352	0.733	[0.381, 1.409]
Education qualification	0.265	0.528	1.304	[0.572, 2.969]
Marital status	0.018	0.962	1.018	[0.478, 2.171]
Years of experience		0.054		
≤ 5 years	1.088	.044	2.967	[1.031, 8.536]
6-10 years	1.079	.022	2.942	[1.171, 7.388]
Work position	-0.014	0.983	0.986	[0.275, 3.534]
Working hours per weeks		0.050		
< 40	0.307	0.425	1.359	[0.640, 2.889]
40-59	1.082	0.017	2.951	[1.212, 7.182]
Having extra job	0.345	0.297	1.412	[0.738, 2.703]
Having an information about patient safety during initial education	-0.823	0.045	0.439	[0.197, 0.982]
Having an information about patient safety during continuing education	-0.229	0.711	0.795	[0.237, 2.665]
Having a training about patient safety	-1.128	0.111	0.324	[0.081, 1.295]

Table (5): Logistic Regression Predicting the Likelihood of Attitude of Nurses about Patient Safety Based on Demographic and Personal Related Characteristics of Nurses

Variables	β	P-value	OR	95% CI
Age		0.053		
less than 30	-1.103	0.075	0.332	[0.099, 1.116]
30-39	-1.196	0.016	0.302	[0.114, 0.802]
Gender	-0.012	0.970	0.988	[0.521, 1.873]
Education qualification	0.335	0.421	1.398	[0.618, 3.162]
Marital status	0.515	0.157	1.674	[0.821, 3.413]
Years of experience		0.050		
≤ 5 years	-0.137	0.801	0.872	[0.302, 2.523]
6-10 years	0.939	0.051	2.556	[0.997, 6.559]
Work position	0.190	0.751	1.210	[0.374, 3.918]
Working hours per weeks		0.794		
< 40	0.256	0.511	1.292	[0.602, 2.775]
40-59	0.105	0.807	1.111	[0.477, 2.590]
Having extra job	-0.092	0.776	0.912	[0.483, 1.722]
Having an information about patient safety during initial education	-0.003	0.994	0.997	[0.442, 2.248]
Having an information about patient safety during continuing education	-0.407	0.499	0.665	[0.204, 2.167]
Having a training about patient safety	-0.154	0.829	0.857	[0.211, 3.480]
Knowledge	-0.561	0.094	0.570	[0.296, 1.099]

Table (6): Association between Practice and Sociodemographic Characteristics among Nurses Regarding Patient Safety

Variables	Practice		(p-value)	
	Poor practice No. (%)	Good practice No. (%)		
Age	less than 30	31(41.9)	43(58.1)	0.107
	30-39	51(57.3)	38(42.7)	
	40 and above	24(57.1)	18(42.9)	
Gender	Male	57(54.3)	48(45.7)	0.269
	Female	49(49.0)	51(51.0)	
Education Qualification	Institute	88(52.7)	79(47.3)	0.340
	Bachelor	18(47.4)	20(52.6)	
Marital status	Single	44(46.3)	51(53.7)	0.098
	Married	62(56.4)	48(43.6)	
Years of experience	≤ 5 years	37(42.5)	50(57.5)	0.051
	6-10 years	32(54.2)	27(45.8)	
	> 10 years	37(62.7)	22(37.3)	
Work position	Head nurse	9(56.3)	7(43.8)	0.454
	Staff nurse	97(51.3)	92(48.7)	
Working hours per weeks	< 40	56(56.6)	43(43.4)	0.396
	40-59	24(46.2)	28(53.8)	
	≥ 60	26(48.1)	28(51.9)	
Having extra job	Yes	49(49.0)	51(51.0)	0.269
	No	57(54.3)	48(45.7)	
Having an information about patient safety during initial education	Yes	78(48.1)	84(51.9)	0.035
	No	28(65.1)	15(34.9)	
Having an information about patient safety during continuing education	Yes	96(51.3)	91(48.7)	0.463
	No	10(55.6)	8(44.4)	
Having a training about patient safety	Yes	97(50.3)	96(49.7)	0.084
	No	9(75.0)	3(25.0)	