



Nurses` knowledge and practice regarding patients` safety goals in intensive care units

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Abstract

Background: Patient safety is a key component of hospital performance and improving ICU staff nurses` performance remains an ideal that every organization strives to achieve this goal. Health care has become more efficient and also become more complex, with greater application of new technologies and therapies, which needs adopting with the international patient safety goals to improve the patient safety environment to simulate international competition and to increase the competitive advantages of the healthcare organizations at the national and international grades.

Aim: This study was aimed to assess Nurses` knowledge and practice regarding the patients` safety goals in intensive care units.

Design: A descriptive exploratory design was utilized to achieve the aim of this study.

Setting: The study was conducted in the ICUs at El Menofia university hospital.

Sample: A convenient sample consisted of 75 nurses from both sex working in the previous settings.

Tools: two tools were used for data collection.

1st Tool: Self-administered interview questionnaire, consisted of two parts.

Part I: Demographic Characteristics of nurses, such as: (age, sex, educational level... etc.).

Part II: Nurses` knowledge questionnaire of (patient identification, effective communication, medication safety... etc.).

2nd Tool: An observational check list to evaluate nurses` practice.

Results: There was highly significant positive correlation between nurses` knowledge and their total practice towards patient safety goals in the intensive care units at ($P = < 0.05$), there was highly statistically significant correlation between total nurses` practice towards patient safety goals in the intensive care units and their characteristics as qualification and attendance of training course at ($P = < 0.01$), also, there was statistically significant correlation with their age and years of experience at ($P = < 0.05$).

Conclusion: The current study shows that more than half of the nurses under study had poor level of total knowledge and about two thirds of nurses had incompetent level of practical skills regarding patient safety goals in the intensive care units.

Recommendations: Initial education and continuous learning programs should be planned to improve healthcare providers and integrate patient safety topics into the educational curricula.

Keywords: Patient safety, goals, intensive care units

Introduction

Nowadays patient safety is a healthcare issue in the healthcare organizations that includes the reducing and preventing medical fault that often leads to harmful health consequences. Health care has become more efficient and also become more complex, with greater application of new technologies and therapies, which needs adopting with the international patient safety goals to improve the patient safety environment to simulate international competition and to increase the competitive advantages of the healthcare organizations at the national and international grades (Abdullah, *et al.*, 2020) [1].

Patient safety did not garner national attention until the late 1990`s, upon the publication of the Institute of Medicine (IOM) report, "To Err is Human". This report estimated that nearly 44,000-98,000 patients die from preventable errors in American hospitals each year, a statistic that galvanized

patient safety into the public eye and sparked activity among various healthcare stakeholders at both national and institutional levels (Fracica, 2021) [10].

International patient safety goals is a set of requirements that are crucial for the foundation of a patient safety approach at hospital level (WHO, 2016). These goals highlight problematic areas in health care, describe evidence-bases, and expert-based consensus solutions. It is essential that everyone is familiar with and able to incorporate into daily practice (Larasati, Dhamanti, 2021) [16].

Critical care nurses or ICU nurses must be proficient in a wide variety of high-level nursing skills. ICU nurses need to be a specialist in evaluating intensive care patients, recognizing complications, administering care, and coordinating with other members of the critical care team. Successful critical care nurses also excel at interpersonal

communication, leadership, strategic planning, critical thinking and decision-making (Macey, Green & Jarden, 2021) [17].

The intensive care unit (ICU) has been described as an extremely stressful environment for nursing staff. It is a specialized section of a hospital that provides comprehensive and continuous care for critically ill patients. Moreover, it is highly technological area in which nurses are required to make rapid time sensitive decisions. For example, the patient's fight for life appears to be an endless battle for the nurses working in an ICU (Tobin, 2017) [31].

Significance of the study

Subjects and Methods

I. Technical Design

Design: A descriptive exploratory design will be used to achieve the aim of this study.

Subject: A convenient sample of all available nurses (75nurses) from both sex working at intensive care units (ICUs).

Setting: The study was conducted at the ICUs in El Menofia university Hospital, it located near the national institute of liver in shebin el kom.

Tools of data collection

Data were collected using the following tools

Tool I: Self-administered interview questionnaire

It was developed by the investigator after reviewing the related literature from (JCI, 2015) [14] and was written in simple Arabic to suite level of the nurses. To assess the nurse's demographic characteristics and knowledge regarding patient safety goals in intensive care units, it included the following parts.

Part 1: Demographic characteristics of nurses such as (Gender, age, level of education, years of experience. etc.). (Hassanein *et al.*, 2021) [20].

Part II: Nurses' knowledge regarding patient safety goals in ICU

This include (patient identification, effective communication, medication safety, safe surgery, prevention of infection, prevention of patient fall). It was classified into 3categories:

- **Good** knowledge if score more than 80%.
- **Average** knowledge if score from 60%-80%.
- **Poor** knowledge if score less than 60%.

Scoring system: A scoring system was followed to assess nurses' knowledge regarding patient safety goals in ICU. The tool contained of 29 questions, the total scores of the questionnaire were 29 grades, the correct answer was scored as one grade and the incorrect answer was scored as a zero grade. These scores were summed and were converted into a percent score.

Tool II: Observational checklist

It was adapted from (Simmons, 2015) [27], developed and filled by the investigator to assess level of nurse's practice.

Scoring system

A scoring system was followed to assess nurses' practice;

each competency skill was assigned a score according to sub-items. The total score of nurses' practices were 45 grades, each item was evaluated as "competent" was taken one grade and "incompetent" was taken zero grade. These scores were summed up and were converted into a percentage score. It was classified into 2 categories:

- **Competent** if score $\geq 80\%$.
- **Incompetent** if score $< 80\%$.

II. Operational item

The operational design included the preparatory phase, content validity of the developed tool, pilot study and field work.

The preparatory phase

This phase was conducted through reviewing literature related to nurses' knowledge and practice regarding patient safety goals in ICUs. A review of the current and past available literature in the various aspects of the problems using books, articles, internet, periodicals and magazines were done. This served to develop the study tools for data collection. During this phase, the investigator also visited the selected place to get acquainted with the personnel and the study settings. The development of the tools was under supervisors' guidance and experts' opinions were considered.

Validity

Content validity was conducted to decide whether the tools covered the aim, test its appropriateness, comprehensiveness, accuracy, correction, clearance and relevance, etc. through a jury of 5 experts (Assistant professors and lecturers) of Adult Health Nursing from the Faculty of Nursing-Helwan University. Their opinion was elicited regarding tools consistency, rephrasing for some statements and scoring system (Newton & Paul, 2017; Mohamed *et al.*, 2022) [21, 29].

Reliability

It was conducted for the developed tool, to achieve the criteria of trust worthiness of the tool reliability. Cronbach Alpha which is model of internal consistency was used in the analysis (value throughout the implementation phases are (0.78, 0.81) respectively. Statistical equation of Cronbach's Alpha reliability coefficient normally ranges between 0 and 1 higher value (more than 0.7) denotes acceptable reliability (Subcommittee, 2017) [28].

Pilot study

A pilot study was carried out on (10%) (n= 8 nurses) of the subjects under the study was included and chosen randomly from the previously mentioned settings then later included to the sample. To test the applicability, feasibility, practicability, clarity of the constructed tools. The pilot study had also served to estimate the time needed for each subject to fill in the study tools. According to the results of the pilot study, no modifications were done for the used tools (In, 2017) [13].

Field work will include the following

- Data collection of this study was started and completed within six months from the second week of march

(2020) to the second week of September (2020).

- First, the investigator introduced herself to the studied nurses and gave them a brief explanation about the study and its purpose prior to any data collection.
- An approval was obtained from a scientific, ethical committee of the faculty of nursing at Helwan University and the study subjects individually to give a verbal agreement to participate in the study.
- Data collection was being done three days/week, from Sunday to Tuesday by the investigator in the morning and afternoon shifts.
- The required time to collect data from each nurse for about 30-40 minutes.
- Self-administered questionnaire for assessing nurses' knowledge was being filled by the nurses who giving care for patient in ICUs.
- Observational checklist for assessment of nurses' practice regarding patient safety goals was filled by the investigator.
- The studied nurses were assured that the information collected would be treated confidentially and that it would be used only for the purpose of the study.

Field work will include two phases as follow:

First phase: This includes:

- 1) Interview with available nurses individually before collection of data to explain the aim and objective of the study and take their approval to participate in the study prior to any data collection then basic assessment was be done and data was be collected from all nurses.
- 2) Assess nurse's knowledge regarding patient safety goals in ICU.

Second Phase: This includes:

- 1) Direct & indirect observation for each nurse during care of patient in ICUs while applying safety goals, each nurse take time about (10-15) minutes.

III. Administrative design

Official permission for this study was obtained by submission of the formal letter issued to the Dean of the Faculty of Nursing, Helwan University, and Director of the previously mentioned study settings. The investigator then met the hospital director before starting data collection to obtain their approval and assistance in conducting the study and explained the aim of the study and the methods of data collection.

Ethical considerations

An approval was obtained from scientific ethical committee of faculty of nursing at Helwan University and the study subjects' prior data collection. The investigator clarified the objective and aim of the study to the subjects included. The investigator assured maintain anonymity and confidentiality of the subjects' data and the subjects have the right to withdraw from the study at any time. Ethics, Values, culture, beliefs were respected.

IV. Statistical design

Data collected from the study subjects was revised, coded, and entered into computer percentages. It was analyzed with the program (SPSS) statistical package for social science

under windows version 23. The collected data were organized, revised, analyzed, tabulated using the number, and percent distribution. Data were presented using the descriptive statistic in the form of frequencies and percentages. Chi-square test (χ^2) was used for comparisons between qualitative variables, and correlation sufficiency (Spearman's rank test) was used to test the correlation between variables. Statistical significant was considered at $p\text{-value} \leq 0.05$ significant.

Result

Table 1: Frequency and percentage distribution of the studied nurses according to their demographic characteristics (n=75)

Items	N	%
Age (year)		
20 - < 30	34	45.3
30 - < 40	28	37.3
≥ 40	13	17.3
Mean SD	32.2 ± 2.30	
Gender		
Male	30	40
Female	45	60
Qualification		
Nursing Diploma	8	10.7
Technical nursing degree	43	57.3
Bachelor nursing degree	20	26.7
Post graduate degree	4	5.3
Years of Experience		
< 5	15	20
5-10	42	56
≥ 10	18	24
Mean SD	7.81±1.29	
Training Course on patient safety standards		
Yes	12	16
No	63	84

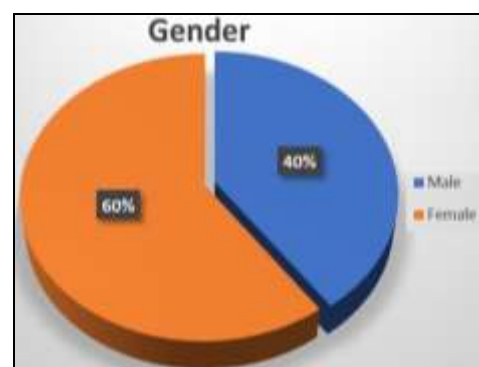


Fig 1: Percentage distribution of the studied nurses according to their gender (n=75)

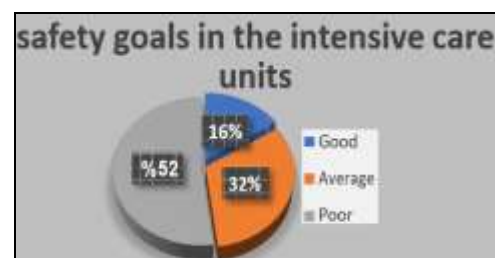


Fig 2: Percentage distribution of the studied nurses according to their total knowledge about patient safety goals in the intensive care units n=75

Table 2: Frequency and percentage distribution of the studied nurses according to their practical skills towards patient safety goals in the intensive care units

Items	Competent		Incompetent	
	N	%	N	%
Patient identification	24	32	51	68
Effective communications	38	50.7	37	49.3
Medications administration	32	42.7	43	57.3
Safe surgery (time out)	26	34.7	49	65.3
Prevention of infection	28	37.3	47	62.7
Fall prevention	25	33.3	50	66.7

(n=75)

Table 3: Number and percentage distribution of the studied nurses according to total practical skills towards patient safety goals in the intensive care units

Level of total practice	N	%
Competent	28	37.3
Incompetent	47	62.7

(n=75)

Table 4: Correlation between demographic characteristics of the studied nurses` and their total knowledge about patient safety goals in the intensive care units

Items	The studied sample (n=75)							X2	P-Value
	Good (n=12)		Average (n=24)		Poor (n=39)				
	N	%	N	%	N	%			
Age (year)	20 - < 30	8	66.7	15	62.5	11	28.2	15.97	.019*
	30 - < 40	4	33.3	8	33.3	16	41		
	≥ 40	0	0	1	4.2	12	30.8		
Gender	Male	5	41.7	10	41.7	15	38.5	3.252	.131
	Female	7	58.3	14	58.3	14	61.5		
Qualification	Nursing Diploma	0	0	0	0	8	20.5	20.98	.001**
	Technical nursing degree	3	25	9	37.5	31	79.5		
	Bachelor nursing degree	5	41.7	15	62.5	0	0		
	Post graduate degree	4	33.3	0	0	0	0		
Years of experience	< 5	3	25	10	41.7	2	5.2	13.02	.028*
	5 - <10	7	58.3	8	33.3	27	69.2		
	≥ 10	2	16.7	6	25	10	25.6		
Training Course	Yes	12	100	0	0	0	0	25.67	.000**
	No	0	0	24	100	39	100		

Table 5: Correlation between demographic characteristics of the studied nurses and their total practice towards patient safety goals in the intensive care units

Items	The studied sample (n=75)				X2	P-Value	
	Competent (n=28)		Incompetent (n=47)				
	N	%	N	%			
Age (year)	20 - < 30	18	64.3	16	34	16.02	.014*
	30 - < 40	10	35.7	18	38.3		
	40	0	0	13	27.3		
Gender	Male	15	53.6	15	31.9	5.301	.146
	Female	13	46.4	32	68.1		
Qualification	Nursing Diploma	0	0.0	8	17	19.02	.000**
	Technical nursing degree	6	21.4	37	78.7		
	Bachelor nursing degree	18	64.3	2	4.3		
	Post graduate degree	4	14.3	0	0		
Years of experience	< 5	6	21.4	9	19.1	17.85	.025*
	5 - <10	14	50	28	59.6		
	10	8	28.6	10	21.3		
Training Course	Yes	12	42.9	0	0	28.30	.000**
	No	16	57.1	47	47		

*significant at $p < 0.05$. **highly significant at $p < 0.01$.

Table 6: Correlation between total knowledge of the studied nurses and their total practice towards patient safety goals in the intensive care units

Item	Practice	Total
	R	P-value
Total knowledge	0.371	.000**

(**) Statistically significant at $p < 0.05$.

Discussion

Regarding characteristics of the studied nurses, the results of the present study revealed that less than half of the studied nurses were in the age group 20-<30 years, with a mean age of 32.2 ± 2.30 . This result was contradicted with that of Mamdouh, Mohamed, Abdelatief, (2020) [18], and Salem, *et al.*, (2019) [23], who revealed that, most of the studied nurses in the Intensive Care Units at Damanhur university hospital and Kasralainy hospital, Cairo University were in the age group 20-30 years, with a mean age of 30.4 ± 5.3 .

This result disagreed with that of Tahoun, Safan and Ahmed, (2021) [30], who conducted a study entitled "Nurses' Application of International Patient Safety Goals at Accredited and Non-accredited Hospitals" and illustrated that, more than half of the studied nurses' were aged from 20 to less than 25 years old at Benha University and Elaraby International Hospitals respectively.

Concerning other characteristics of the studied nurses, the results of the present study showed that about two thirds of the studied nurses were female. This may be due to the greater fraction of the nurses in Egypt was female and may also related to the studying of nursing in Egyptian universities and institutions were exclusive for females only till few years ago.

This result was consistent with Khamaiseh, Al-Twalbeh, Al-Ajlouni, (2020), who conducted a study entitled " Patient safety culture in Jordanian primary health-care centers as perceived by nurses" and found that, almost two fifths of nurses working in intensive care units were females. This result was consistent with Hassanin, (2016) [12], who conducted a study entitled " nurses' performance regarding the neurological assessment in neurological unit" who stated that three quarter of the study subject were female.

These results were in partial agreement with that of Tahoun, Safan and Ahmed, (2021) [30], who found that at Benha University Hospital more than three quarters (76.7%) of studied staff nurses' were females, while at Elaraby International Hospital about three fifth of them were males.

Regarding qualification, results of the current study indicated that, almost more than half of the studied nurses had technical nursing degree. These results were in line with those of Eldeeb, (2016) [9] and Ahmed, Mehany & Abd El-Hafez, (2018) [4], who indicated that almost three fifths of nurses working in intensive care units at Jazan General Hospital, Sabia General Hospital and Abu Arish General Hospital had technical nursing degree.

Concerning years of experience and training course on patient safety standards, results of the current study indicates that more than halves of the studied nurses their years of experience ranged between 5-<10 years, with Mean $SD 7.81 \pm 1.29$ year and the majority of them didn't attend any training course on patient safety standards respectively.

This result was argued with Abo-Elmaged, (2019) [2] and Mamdouh, Mohamed, Abdelatief, (2020) [18], who cleared

that, the highest percentage of nurses working in ICUs at Assiut University hospital and Damanhur university hospital had more than ten years of experience in nursing and the majority had previously attended training courses. A possible explanation for this discrepancy of results is the lack of patient safety culture awareness where a majority of the enrolled nurses in the present study did not attend any training course on patient safety standards.

With total nurses knowledge about patient safety goals in the intensive care units, the present study showed that, more than half of the studied nurses had poor level of total knowledge about patient safety goals in the intensive care units and nearly one third of them had average level. While, minority of them had good level. This might be due to the majority of the studied nurses didn't receive educational courses about international patient safety goals and there was no policies about IPSGs at units ICU.

Based on the investigator's point of view, critical care nurses' knowledge levels of the IPGS were generally low, possibly due to a lack of continuing education programs and associated continuous quality improvement processes.

According to Omer, *et al.*, (2018) [22], who conducted a study entitled "Residents' Awareness about International Patient Safety Goals" and pointed out to that the sufficient knowledge regarding safety issues among the nursing staff constitutes one of the strongest points for the promotion of patient safety in healthcare facilities.

This result was in the same line with Shahin, Alshammari and Alabed, (2020) [25], who indicated that critical care nurses have a high knowledge level regarding IPSGs as the mean of knowledge mean-scores for IPSGs scale was generally high ($M = 0.930$).

This result was congruent with that of Yilmaz & Goris, (2015) [34], who stated in the context entitled for " Determination of the patient safety culture among nurses working at intensive care units" and reported that, 64.61% of nurses working at intensive care units had unsatisfactory knowledge about patient safety rules and regulation.

Considering total nurses, practical skills towards patient safety goals in the intensive care units, in the current study, less than two thirds of the studied nurses had incompetent level of practical skills towards patient safety goals in the intensive care units. While, a round one third of them had incompetent level. This might be due to the majority of the studied nurses hadn't received training about patient safety practices, that may have affect negatively on their application of international patient safety goals, there aren't any written policies of IPSGs in the unit and there was lack of consumables and resourced related to the application of international patient safety goals.

This result was similar with the study carried out by (Shaheen, *et al.*, 2016) [24], at El-Ebor family health centers which were not-accredited from JCI to assess healthcare providers practice toward Patient Safety" and illustrated that the majority of the participants had unaccepted practice regarding IPSGs.

This result comes in the same line with that of Ahmed, Mehany and Abd El-Hafez, (2018) [4], who conducted a study entitled "Assessment of Critical Care Nurses Knowledge and Practice Regarding Patient Safety in Intensive Care Units" and found that, about 64.0% of nurses had inadequate practice about all items of patient safety.

This result was agree with that of Alahmadi, (2020) ^[5], who conducted a study in Saudi Arabia and revealed that, 33% of the nurses had acceptable level of practical skills towards patient safety goals in the intensive care units. This might be explained by the point that these institutions were variable in terms of size, complexity, and focus on patient safety.

As regards the correlation between nurse's characteristics and their total knowledge about patient safety goals in the intensive care units, the present study noticed that there were highly statistically significant relation between nurse's characteristics namely Qualification & attendance of training course and their total knowledge regarding patient safety goals in the intensive care units. Also, there were statistically significant relation between nurses characteristics namely age & years of experience and their total knowledge regarding patient safety goals in the intensive care units.

These results were in partial agreement with those of Shahin, Alshammari and Alabed, (2020) ^[25], who showed there were no significant differences between nurse's characteristics namely qualifications & experience and their total knowledge regarding patient safety goals in the intensive care units.

As regards the relation between nurse's characteristics and their total practice about patient safety goals in the intensive care units, the present study noticed that there were highly statistically significant relation between nurse's characteristics namely qualification & attendance of training course and their total praactice regarding patient safety goals in the intensive care units. Also, there were statistically significant relation between nurses characteristics namely age & years of experience and their total practice regarding patient safety goals in the intensive care units.

These results were in partial agreement with those of Mamdouh, Mohamed and Abdelatief, (2020) ^[18], who showed that there were highly statistically significant relation between nurse's characteristics namely qualification and their total practice regarding patient safety goals in the intensive care units. The previous result was supported by those of (John, *et al.*, 2015) ^[15], who found similar results.

As regards the relation between nurse's total knowledge and their total practice, results noticed that there were positive correlation between nurses' knowledge and their total practice towards patient safety goals in the intensive care units. From the investigator point of view, this might be due to when technical skills increased, cognitive skills increased spontaneously. This result was supported with the study carried out by Al-Rafay, Shafik and Fahem, (2018) ^[6], who conducted a study, entitled "Assessment of nurses' performance regarding international patient safety goals at Primary Health Care Settings" and illustrated that there was statistically significant difference between nurses' knowledge and practice regarding to international patient safety goals.

This result was in agreement with Hassan & Ahmed, (2015) ^[11], who conducted a study entitled "Patient safety: Assessing Nurses Compliance" and demonstrated that, there were positive correlation between total knowledge and total practice. This finding reflects that nurse's performance is based on their knowledge.

This result was consistent with those of Mamdouh,

Mohamed and Abdelatief, (2020) ^[18], who showed that positive significant correlation between total knowledge and total performance of the nurses under the study regarding implementation of patient safety measures in intensive care units.

Conclusion

According to the findings of the present study. More than half of the nurses under study had poor level of total knowledge and about two thirds of nurses had incompetent level of practical skills regarding patient safety goals in the intensive care units. Furthermore, there was a positive correlation ($P < 0.05$) between total nurses knowledge and their total practice regarding patient safety goals in the intensive care units. The poor nurses' knowledge and practice related to patient safety measures may be a reason of ineffective patient health care, long patient staying in ICU and increase mortality.

Recommendation

Based on the study results, the following recommendations can be given

- Continues education and continuous learning programs should be planned to improve healthcare provider's knowledge and integrate patient safety topics into the educational curricula.
- Continuous in-service training program should be held for critical care nurses about patient safety.
- Further research studies are needed for ongoing assessment of critical nurses, including large samples about nursing practice for patient safety for generalized of the result.

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