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Self-Learning Package Related to Patient Safety Goals and its effect on Nurse Interns' Performance and Awareness of Patient Safety Culture

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Abstract

Background: The International Patient Safety Goals (IPSGs) are used to improve the quality of care. Nurse interns' proper understanding of patient safety is essential ingraining this concept. **Aim**: The aim of this study was to assess the effect of a self-learning package related to patient safety goals on nurse interns' performance and awareness of patient safety culture. **Subjects and Methods**: The study was conducted at Ain-Shams University Hospitals using a quasi-experimental design with pre-post assessment on 110 nurse interns. The data collection tools were Patient safety knowledge questionnaire, Patient safety culture awareness questionnaire, and an observation checklist for nurse interns' safety performance. A Self-Learning Package was prepared and distributed to nurse interns. Its impact was evaluated after one and three months. **Results**: The nurse interns' median age was 23.0 years, with a majority of females (67.3%). Before the intervention, 40.0% had satisfactory knowledge, which rose to 100.0% at the post-intervention phase, and declined to 94.5% at the follow-up phase ($p<0.001$). Their awareness increased from 40.9% to 88.2% in the post-intervention phase, and slightly declined to 80.0% at follow-up ($p<0.001$). Overall, 50.0% had total adequate performance of IPSGs, which increased to 96.4% in the post-intervention phase, and slightly declined to 93.6% at the follow-up phase ($p<0.001$). Significant positive correlations were revealed among knowledge, awareness, and performance scores. The study intervention was a statistically significant independent positive predictor of all three scores. **Conclusion and recommendations**: The application of the developed self-learning package is effective in improving nurse interns' knowledge of patient safety, awareness of patient safety culture, and performance of patient safety goals. The study recommends its use.

Key words: International Patient Safety Goals (IPSGs), Nurse interns, Self-Learning Package.

Introduction

Patient safety is a major challenge for quality improvement and enhancing providers' (nurse interns) performance. The World Health Organization (WHO) is committed to make patient safety a high priority on the policy agenda of countries. The increasing incidence of documented cases of adverse events in healthcare has le to a growing concern in a number of countries about patient safety, which remains a fundamental principle of patient care and a critical component of quality management ***(World Health Organization [WHO], 2016)***.

Patient safety is the prevention of errors associated with healthcare and the mitigation of their effects. It refers to both the processes used to reduce harm, and the state

that arises from the actions taken to secure patients from harm. Patient safety is a right, guaranteeing patients a state of freedom from accidental or preventable injuries in medical care. Protecting this freedom requires establishing systems that minimize the likelihood of errors while maximizing the likelihood of intercepting them. Although error is unlikely to be completely eliminated, harm and impact to patients can be minimized ***(World Health Organization [WHO], 2012)***.

Protecting patients and staff members from harm is fundamental responsibility of all hospitals, in addition to giving the patients quality care in a safe environment. Hospitals must devote their attention to manage the safety of patients ***(The Egyptian Ministry of Health and Population [MOHP], 2008)***. The IPSGs focus on problems in healthcare safety and on how to solve them. A Safety Solution is any system design or intervention that has demonstrated the ability to prevent or mitigate patient harm stemming from the processes of healthcare ***(Joint Commission International Accreditation Standards for Hospitals [JCAHO], 2016)***.

The International Patient Safety Goals (IPSGs) are used to improve the quality of care in the international community through the provision of accreditation and consultation services, and to promote specific improvements in patient safety. Those patient safety goals are discussed as the following: **Goal One:** Improve the Accuracy of Patient Identification, **Goal Two:** Improve the Effectiveness of Communication among Caregivers, **Goal Three:** Improve the Safety Using of Medications. **Goal Four:** Ensure correct-Site, correct-Patient, and correct - Procedure Surgery, **Goal five:** Reduce the Risk of Healthcare-Acquired Infections, and **Goal six:** Reduce the Risk of Patient Harm Resulting from fall ***(Joint Commission International Accreditation Standards for Hospitals [JCAHO], 2016)***.

Safety culture is commonly defined as "the product of individual and group values, attitudes, perceptions and patterns of behaviors that determine a team or organization's commitment to safety management". It is widely accepted that every organization and team has a culture. It permeates all parts of an organization and its impact can be observed as behaviors and as breads ***(Sexton et al., 2011)***.

A positive and strong safety culture is essential to improve and assure patient safety. Building a safety culture is therefore strongly promoted as an important activity for all organizations. Healthcare teams with a positive safety culture are more likely to learn openly and effectively from errors and harms. The converse is true for a negative safety culture, which has been implicated as a causal factor in many major organizational failures worldwide, including high profile National Health System (NHS) incidents. The prevailing safety culture also influences the priorities of every healthcare worker and help to shape their discretionary safety-critical attitudes and behaviors ***(Tillerson, 2010)***.

The teaching and learning methods used for patient safety education show the importance of combining multiple teaching and learning methods to promote the continuity, logical order, and entirety of the patient safety competence. The use of patient safety tools is an important element for graduating nursing students. Patient safety tools, such as checklists, were used in simulation education; but it was not clear whether these tools were used systematically throughout the entire education ***(Steven et al., 2014)***.

Teaching is the intentional structuring of content to enhance human interactions to facilitate learning. Learning is a change in behavior. In most instances, the degree of permanency of the behavior change is directly related to the amount of practice reinforcement engaged in by the learner

(Bednarski, 2014). The concept of teaching is defined as "the process of guiding learners as they work with information" and "teachers help learners to find information, remember it, understand it, organize it, apply it, and evaluate it" ***(Sukhadia, 2012)***.

A Self-Learning Package (SLP) is one of the most suitable teaching methods for adult learners. It is essential in assisting student nurses to meet the challenges presented in today's healthcare environment. SLP is designed where the learner is free to choose what, how, when and where to learn. This flexibility is an importance characteristic in open learning process. Self-learning package method is an information on one concept presented according to few specific objectives in a format that allows student skipping of a section; typically includes self-checks (pre-post-tests) of student learning throughout the self-contained package ***(Billings and Halstead, 2012)***.

Internship is a part of an educational program in which nurse interns can earn academic credits from their colleges. It may be arranged independently from the curriculum in which nurse interns would gain work experience only. Internship also allows nurse interns the opportunity to apply their knowledge and skills in a professional setting while still in intern year. Internships offer carefully planned and monitored work experience with the goal being to gain additional knowledge from the job exposure ***(Sreedharan et al., 2011)***.

Significance of the study

Patient safety as a topic is largely absent from healthcare education. Safe care for patients can only be optimized if healthcare workers receive the right training, and are helped to keep up-to-date with knowledge. To ensure such safe care, nurse interns occupy an exceptional position in their transition phase from theory to practice, as future leaders. Their proper understanding of patient safety and of how to reduce the incidence of patient harm is essential ingraining this concept the settings they will be working in ***(World Alliance for Patient Safety, 2008)***.

Moreover, ***Fakhry et al. (2014); Mohamed (2014)*** in Egypt studied nurse interns' awareness of patient safety culture, recommended the importance of both incorporated patient safety issues into the educational curricula and training of health professionals across the spectrum of healthcare. Hence**,** this study will be carried out to assess the effect of self learning package related to patient safety goals on nurse interns' safety culture and performance. Hence**,** this study is carried out to assess the effect of a self-learning package related to patient safety goals on nurse interns' safety culture and performance.

Aim of the study

The aim of this study was to assess the effect of a self-learning package related to patient safety goals on nurse interns' performance and awareness of patient safety culture. This was achieved through the following objectives.

1. Assessing nurse interns' knowledge related to patient safety and patient safety goals before and after the self-learning package;
2. Assessing nurse interns' awareness of patient safety culture before and after the self-learning package;
3. Assessing nurse interns' safety performance before and after implementing self-learning package.

Research Hypothesis

1. The self-learning package related to patient safety goals will improve

nurse interns' knowledge about patient safety;
2. The self-learning package related to patient safety goals will improve nurse interns' awareness of patient safety culture;
3. The self-learning package related to patient safety goals will improve nurse interns' safety performance.

Subjects and Methods

1. Research design

A quasi-experimental study design with pre-post assessment was used in this study.

2. The study setting:

The study was conducted at Ain-Shams University Hospitals, where nurse interns are having their training. These included the following hospitals:

- Ain-Shams University Hospital : where nurse interns have their training in five settings, namely CCU, Neurological ICU, Stroke ICU, Endemic ICU, and Kidney dialysis unit;
- El-Demerdash Hospital: where nurse interns have their training in two settings, namely Operating rooms and ICUs;
- Cardiovascular Hospital: where nurse interns have their training in three settings, namely Adult ICU, Pediatric ICU, and CCU;
- Pediatrics University Hospital: where nurse interns have their training in four settings, namely Neonatal ICU, Medical ICU, Surgical ICU and emergency department.

3. Subjects of the study:

The subjects of this study consisted of the nurse interns having their training in the aforementioned settings during the time of the study. Their total number was 190 nurse interns. The sample size was 110 nurse interns, 36 males and 74 females; this sample size was large enough to estimate a prevalence rate of awareness of 50% among nurse interns with 5% standard error at 95% level of confidence and compensating for a non-response rate of about 10% using the finite population correction ***(Kish and Leslie, 1965)***.

4. Tools of data collection:

Three tools were used in data collection, namely; Patient safety knowledge questionnaire, Patient safety culture awareness questionnaire, and an observation checklist for nurse interns' safety performance**.**

- **Patient safety knowledge questionnaire *(Appendix I)***: This tool consisted of two parts.

  - **Part I:** This was aimed at collecting data regarding the demographic characteristics of the nurse intern such as age, gender, pre-university education, training units and hours.

  - **Part II:** This was developed by the researcher based on pertinent literature review **(Joint Commission Resources [JCR] 2010; World Health Organization [WHO], 2012)** to assess nurse interns' knowledge regarding patient safety. International patient safety goals (IPSGs), and patient safety culture. It included 42 True/False and Multiple-Choice (MCQ) questions covering different aspects of patient safety such as concept of patient safety, the concept and content of international patient safety goals, and the factors affecting patient safety culture.

Scoring System

For each question, a correct response was scored 1 and the incorrect zero. For each area of knowledge, the scores of the items were summed-up and the total divided by the

number of the items, giving a mean score for the part. These scores were converted into percent scores. Knowledge was considered satisfactory if the percent score was 60% or more and unsatisfactory if less than 60%.

- **Patient safety culture awareness questionnaire (Appendix II):** This tool was based on the Hospital Survey on Patient Safety Culture (HSPSC) questionnaire developed by the Agency for Health Care Research and Quality ***(Agency for Healthcare Research and Quality [AHRQ], 2008)***. It was used to assess nurse interns' awareness regarding patient safety culture. It included 12 patient safety culture dimensions with 42 items with response on a 5-point Likert scale from "strongly disagree" to "strongly agree," in addition to a question about patient safety grade, a question about the number of events reported during the last 12 months, and question about comments regarding patient safety.

- **Observation checklist performance (Appendix III)**: This tool was developed by the researcher based on review or related literature ***(Mohamed, 2010; Salem, 2012; Joint Commission on Accreditation of Health Care Organizations [JCAHO], 2016)*** to assess the performance of international patient safety goals (IPSGs) by the nurse interns. It consisted of 83 items covering the steps of the IPSGs procedures to be performed by the nurse intern, in addition to a part for identification data such as code number, name of the unit, the time of observation and observation number.

Operational design

This design involves a description of the preparatory phase, pilot study, and fieldwork.

Preparatory phase:

This phase lasted for seven months from March to September 2016. In this phase, the researcher conducted a thorough review of the national and international literature related to International Patient Safety Goals (IPSGs). This was through searches in textbooks, journals, and periodicals concerning the topic of the study. This was helpful in designing the data collection tools.

Tools validation

Validity the preliminary form of the questionnaires were presented to a panel of experts for face and content validation, the jury panel consisted of five experts professors of nursing administration and medical-surgical department from the faculties- Ain Shams, Cairo, and Zagazig Universities. The process involved their general or overall opinion about the form. Then, they assessed each item for clarity, comprehensiveness, simplicity, understanding and applicability. Their suggestions were also sought in MCQ and true or false. Accordingly to their opinions recommended modifications were performed by the researcher.

Pilot study

A pilot study was done on eleven nurse interns representing approximately 10% of the main study sample. The pilot served to assess the clarity of the knowledge questionnaire as well as the feasibility of the observation checklist. Since no changes were done in the tools, the pilot sample was included in the main study sample.

Reliability: The reliability of the scales used in the tools was examined through assessing their internal consistency. The scales showed good as indicated by their Cronbach's Alpha below.

Field Work:

The actual fieldwork of the study lasted for seven months from the beginning of March to the end of September 2016. It

involved phases of assessment, planning, implementation, and evaluation.

Assessment phase: This phase involved pre-testing of the study nurse interns' knowledge, safety culture awareness, and performance using the relevant data collection tools. The researcher visited each of the four hospital included in the study to explain the purpose and nature of the study to the administration and obtain their permission to carry out the study. Then, the researcher met with the nurse interns, oriented them about the study aim and procedures, and invited them to participate.

The nurse interns who gave their verbal consent to participate were handed the self-administered questionnaire form to assess their knowledge and awareness of patient safety culture, along with filling instructions. This was done during the morning shift at their training units. The researcher was present during this process to clarify any queries and to prevent any knowledge contamination. Every nurse intern took approximately 25-30 minutes to answer the knowledge part and another 25-30 minutes for the patient safety culture awareness part. The filled forms were handed back to the researcher who checked them for completeness.

The nurse interns were then observed individually by the researcher using the observation checklist of international patient safety goals (IPSGs) performance. Each nurse intern was observed three times. The period between successive observations was at least two days. The observation lasted 40 to 45 minutes for each nurse intern. The average of the three observations was used in the statistical analysis.

Planning phase: After completing the data collection in the assessment phase, analysis was done in order to identify all strengths and weaknesses of nurse interns' knowledge, awareness, and performance. It also involved all comments reported and recorded by the researcher. This process took approximately one month.

Based on the information obtained from analysis of the assessment phase data, the researcher developed the Self-Learning Package booklet. The researcher also used pertinent literature ***(Mohamed, 2010 Joint Commission on Accreditation of Health Care Organizations [JCAHO], 2016)*** in this process. The package was aimed at improving nurse interns' knowledge, awareness, and performance of basic patient safety, international patient safety goals (IPSGs), and their awareness of patient safety culture. It consisted of three sections, along with instructions in how to use a self-learning package booklet. The three sections were as follows:

- *Section I*: It was concerned with knowledge of patient safety definition, purpose, and difference from quality. It included pre- and post-tests with 3 Essay questions and 3 MCQ questions.

- *Section II:* It was covered the international patient safety goals (IPSGs), how to achieve each goal, in addition to Checklist for (IPSGs). It had pre-post-tests sections consisting of 9 Essay questions and 12 MCQ questions.

- *Section III:* It was concerned with knowledge of patient safety culture definition, elements, characteristics, and factors influencing it. It had pre-post-tests sections with 4 Essay questions and 3 MCQ questions.

Implementation phase: The self-learning package was distributed by the researcher to the nurse interns, immediately after observing their safety performance. The researcher discussed with them the strong and weak aspects regarding their safety performance of (IPSGs). Each nurse interns was notified with the content of the self-learning package booklet to discuss certain issues related to their performance. The

researcher was making a group meeting with all nurse interns to discuss the content and to answer her/his questions. The group meeting started every day from at 11:00 am. This phase took one month.

Evaluation phase: One month after completion of implementing the self-learning package booklet, the researcher evaluated the effect of the intervention on nurse interns' knowledge, awareness, and performance. This was done using the same data collection tools and checklist as in the assessment phase. The observations were done three times for each participant, and the average was used in analysis. This phase took one month. For follow-up, the same process was repeated three months after the post-assessment evaluation, using the same data collection tools and checklist. This phase took one month. The researcher collected the data four days/week; some days lasted from 10:00 am to 1:00 pm, while other days lasted from 3:00 pm to 7:00 pm.

nurse interns knowledge of patient safety and their age ($p=0.04$). It is evident that the percentages of nurse interns with satisfactory knowledge were higher among those <23 years old.

Results:

Table (1): Demographic characteristics of nurse interns in the study sample (n=110).

item	Frequency	Percent
Age:		
<23	22	20.0
23+	88	80.0
Range	22.0-25.0	
Mean±SD	23.0±0.7	
Median	23.0	
Gender:		
Male	36	32.7
Female	74	67.3
Pre-university education:		
Secondary	94	85.5
Technical institute of nursing	16	14.5
Unit:		
Hemodialysis	12	10.9
ICU	44	40.0
CCU	20	18.2
Operations room	18	16.4
NICU	11	10.0
Emergency	5	4.5
Duration of training in hospital (months):		
1	24	21.8
2	81	73.6
3	5	4.5

Table (1): The study sample included 110 nurse interns whose age ranged between 22 and 25 years, with median 23.0 years, with a majority of females (67.3%) as illustrated in Table 1. The great majority had secondary pre-university education (85.5%). The highest percentage had their training in ICUs (40.0%), and their duration of training in the hospital was 2 months (73.6%).

Table (2): Relations between nurse interns' knowledge of patient safety before the intervention and their demographic characteristics

	Knowledge				X^2 test	p-value
	Satisfactory		Unsatisfactory			
	No.	%	No.	%		
Hospital:						
Ain-Shams University	17	42.5	23	57.5		
Cardiovascular	8	40.0	12	60.0	0.30	0.96
El-Demerdash	12	36.4	21	63.6		
Pediatrics	7	41.2	10	58.8		
Age:						
<23	13	59.1	9	40.9		
23+	31	35.2	57	64.8	4.18	0.04*
Gender:						
Male	15	41.7	21	58.3		
Female	29	39.2	45	60.8	0.06	0.80
Pre-university education:						
Secondary	37	39.4	57	60.6		
Technical institute of nursing	7	43.8	9	56.3	0.11	0.74
Unit:						
Hemodialysis	5	41.7	7	58.3		
ICU	19	43.2	25	56.8		
CCU	8	40.0	12	60.0	--	--
Operations room	7	38.9	11	61.1		
NICU	3	27.3	8	72.7		
Emergency	2	40.0	3	60.0		
Months of training:						
1	7	29.2	17	70.8		
2	34	42.0	47	58.0	--	--
3	3	60.0	2	40.0		

Statistically significant at $p<0.05$ (--) Test result not valid

Table (2): points to a statistically significant relation between nurse interns knowledge of patient safety and their age (p=0.04). It is evident that the percentages of nurse interns with satisfactory knowledge were higher among those <23 years old.

Figure (1):

Figure (1) : As Figure 1 displays, more than one-third of the nurse interns (36.4%) were from Ain-Shams University Hospital, while only 15.5% of them were from the Pediatrics Hospital.

Figure (2): Total nurse interns' knowledge of patient safety throughout the study phases.

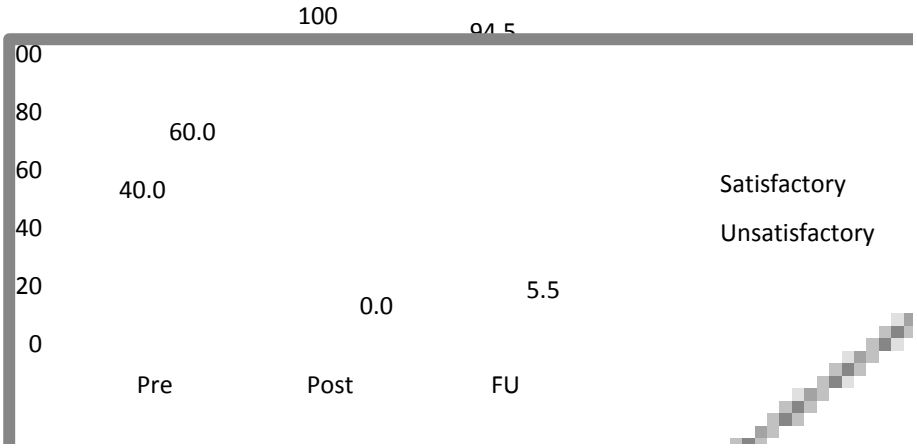
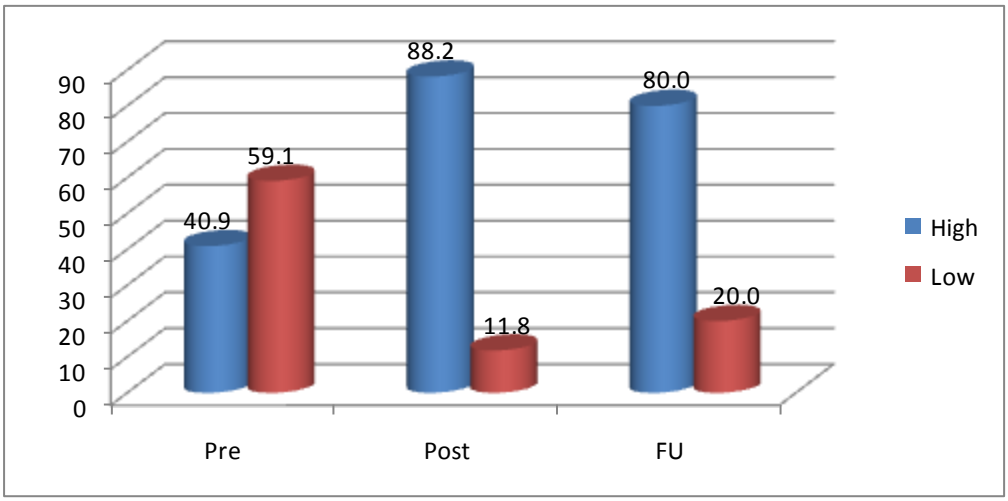


Figure (2) : Figure 2 demonstrates that only two-fifth of the nurse interns (40.0%) had satisfactory knowledge at the pre-intervention phase. This rose to 100.0% at the post-intervention phase, and declined to 94.5% at the follow-up phase. The differences were statistically significant ($p<0.001$).

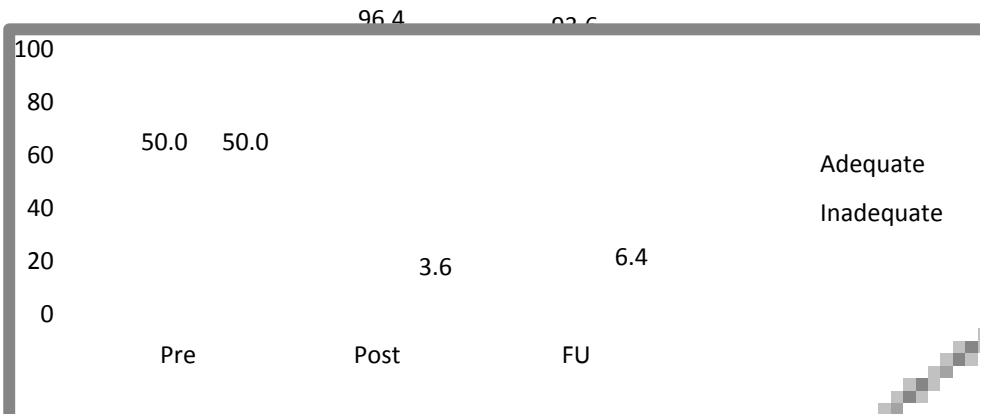
Figure (3): Total nurse interns' awareness of patient safety culture throughout the study phases.



Statistically significant at p<0.05

Figure (3) : As Figure 3 displays, 40.9% of the nurse interns in the study sample had high awareness of patient safety at the pre-intervention phase. This increased to 88.2% in the post-intervention phase, and slightly declined to 80.0% at the follow-up phase. These differences were statistically significant (p<0.001).

Figure (4): Total nurse interns' performance of patient safety throughout study phases.



Statistically significant at p<0.05

Figure (4): illustrates that 50.0% of the nurse interns in the study sample had total adequate performance of patient safety goals at the pre-intervention phase. This increased to 96.4% in the

post-intervention phase, and slightly declined to 93.6% at the follow-up phase. These differences were statistically significant ($p<0.001$).

Discussion

Internship programs allow nursing students to apply their knowledge and skills in a professional setting while still in school. This helps facilitating the transition from student to graduate nurse role, and alleviates the anxiety resulting from inability of the recent graduate to translate nursing theory into practice ***(Edgecombe et al., 2013)***. Nurse interns' safety performance are critical to the surveillance and coordination that reduce negative outcomes of care. Patient safety education can be implemented by providing a comprehensive curriculum to prepare nurse interns for safe practice ***(Skutil, 2014)***. Understanding how safety culture affects nursing behavior and patient outcomes is essential in hospital safety ***(Groves et al., 2016)***.

The present study was carried out to assess the effect of self-learning package related to international patient safety goals (IPSGs) on nurse interns' performance and awareness of patient safety culture. The study findings indicate that the use of the developed self-learning package was successful in improving nurse interns' knowledge, awareness, and performance, leading to acceptance of the study research hypothesis.

According to the current study findings, most of the nurse interns had unsatisfactory knowledge of patient safety, International Patient Safety Goals (IPSGs), and of patient safety culture before implementation of the intervention. Such knowledge deficiency might be explained by the lack of sufficient information about patient safety in the curricula of the faculty of nursing. It could be taught only as a theoretical topic with no practical training or application. In this respect, the ***World Alliance for Patient Safety (2011)*** emphasized that any patient safety curriculum should address the knowledge and performance elements of patient safety; it should use various learning approaches such as lectures, ward round-based teaching, small group learning, case-based discussions, patient tracking, role-play, simulation, and improvement projects.

The findings of the present study revealed significant improvement in nurse interns' knowledge regarding patient safety after implementation of the study intervention. The effect of the study intervention was confirmed through multivariate analysis, which identified the intervention as the main independent positive predictor of the nurse interns' score of knowledge. Such improvement in nurse interns' knowledge is critical to patient safety and quality of care. It is certainly due to the application of self-learning package, where nurse interns were provided them with a booklet about IPSGs including checklists for practical application in their units of training at Ain-Shams University Hospitals. Similar successes of self-learning interventions in improving nurses' knowledge of safety were reported in studies in Portugal ***(Tronchin et al., 2015)*** and in Scandinavia ***(Sauter et al., 2016)***.

The current study has also addressed nurse interns' awareness of patient safety culture. The study findings revealed that their awareness of patient safety was widely variable at the pre-intervention phase. The lowest level of awareness was about the frequency of events reported. This could be due to that their areas of training have events, but these events are not potentially harmful to patients, and are thus considered not reportable. The findings indicate the need for nurse interns to more aware with reportable events, and this adds to the strength of the rationale for carrying out the current study and implementing the intervention. The finding is in agreement with ***Mohamed (2014)*** whose study in Egypt identified that the dimension of frequency of events

reported was very low in nurses' level of awareness.

An important dimension of patient safety culture is that of Organizational Learning and Continuous Improvement. This dimension is important because it involves actively doing things to improve patient safety, learning from mistakes, and evaluating effectiveness of improvement interventions. The present study results demonstrated that slightly more than an half of the nurse interns were aware of this dimension. This result is lower compared with the study of ***Mohamed (2014)*** in Egypt where the dimension of Organizational Learning and Continuous Improvement had the highest agreement, and was an area of strength and improvement. The difference could be related to differences in the organization and administration of the two study settings. Nonetheless, the need for continued protocol and policy changes to keep patients safe has been outlined in a study in the United States ***(Carrizales and Clark, 2015)***.

Concerning the patient safety dimensions of "Management Support for Patient Safety" and "Feedback and Communication about Error," the present study revealed that only a half or less of the nurse interns' had related high awareness. This is of concern since it implies that a half or more them do not realize the importance of these two dimensions in patient safety culture. The importance of these two dimensions comes from their reflection of how errors are disclosed with the aim of correction and prevention rather than punishment and taking disciplinary actions. In congruence with this, ***Verbeek-Van Noord et al. (2014)*** stressed that "Hospital Management Support for Patient Safety" was one of the important dimensions of culture that explained the level of patient safety. Meanwhile, ***Brborović et al. (2014)*** in a study in Croatia reported higher nurse interns' awareness of the dimension of "Feedback and Communication about Error."

The implementation of the present study intervention led to significant improvements in nurse interns' awareness of patient safety culture. This was shown in most dimensions and in the total score at both the post-intervention and follow-up phases. This was confirmed in multivariate analysis, which identified the study intervention as the only positive predictor of the awareness score. The success of the self-learning package in improving nurse interns' awareness of patient safety culture could be attributed to the content of the package, which emphasized the importance of the various dimensions of patient safety culture in a format that is easy to assimilate. In support of this, a significant positive correlation was revealed between nurse interns' scores of knowledge and awareness. In agreement with this, a study in Poland demonstrated the effectiveness of a patient safety campaign in improving safety culture in frontline staff ***(Ozieranski et al., 2014)***.

The present study has also targeted nurse interns' performance of IPSGs. The results demonstrated variable levels of performance of the first IPSG of improving the accuracy of patient identification through the use at least two patient identifiers. The best performance of patient identification was while giving medication whereas the worse was while taking blood or other specimens. The areas of deficiency were mostly related to identifying patient with wristband or bar code, asking patient for his/ her complete name, checking for medical number. The better performance of patient identification while giving medication could be attributed to that this task is performed several times a day so that the nurse intern gets used with it. On the other hand, giving or taking blood is less frequent. It could reflect a lack of compliance with IPSGs in some of the areas of training. In agreement with this, a study in South Africa found that medication errors

were mainly related to improper use of patient identification guidelines ***(Blignaut et al., 2017)***.

Another important explanation of the deficient performance of nurse interns in accurate identification of patients when giving medications or blood or taking specimens is that they may know the patient in person and by name. In agreement with this, ***Mohamed (2010)*** in a study in Egypt mentioned that staff nurses sometimes mistakenly bypassed patient identification because they already know the patient. On the same line, ***Hassan and Ahmed (2012)*** reported deficient performance of accurate patient identification among nurses in a study in Egypt. This was attributed to that nurses were assigned for a small number of patients, and they knew their patients very well due to his/her long stay in ICU or ward.

Nonetheless, the implementation of the first IPSG concerning accurate patient identification may be more critical when giving blood or blood products given the associated potentially fatal risks. In the present study, more than three-fifth of the nurse interns had deficient performance in this area, which is quite alarming. This was mostly due to failure to check for the wristband or the patient medical number by neglect or forgetfulness.

In this respect, ***Stephen and Peter (2008)*** emphasized that the correct wristband identification was essential to prevent wrong blood transfusion and prevent blood sampling errors. Moreover, the ***National Blood Authority Australia (2009)*** required at least three approved patient identifiers on registration or admission to be used in blood transfusion. Thus, the incorporation of these safety principles will ensure that the correct patients receive the correct treatment, and the health care organizations should facilitate the process to increase health care quality and safety ***(Sexton et al., 2011)***. Moreover, errors of patient identification led to delays in blood transfusion and its consequences as reported by ***Bolton-Maggs (2016)*** in the United Kingdom.

As regards the second IPSG concerning improving the effectiveness of communication among caregivers by reporting critical results of tests and diagnostic procedure on a timely basis at the three study phases, the present study revealed generally high performance at the pre-intervention phase. Only the step of reporting the critical results of tests and diagnostic procedures on a timely basis, i.e. within 30 minutes, was mostly deficient at the pre-intervention phase. This could be due to lack of time leading to postponement of this step. A similar delay was reported in a study of notification of neuroradiology results in the United States, and it was attributed to inaccurate contact information, physician unavailability, patient transfer to a different service, or lack of responsiveness from caregivers ***(Honig et al., 2014)***. Nevertheless, the Joint Commission on Accreditation emphasized the importance of effective communication among caregivers ***(Joint Commission on Accreditation of Health Care Organizations [JCAHO], 2016)***.

The implementation of the present study led to significant improvements in all IPSGs at the post-intervention phase, with slight declines at the follow-up phase. Moreover, the regression analysis identified the study intervention as the only positive predictor of the performance score. This is certainly due to the positive effect of the intervention on nurse interns' knowledge and awareness of patient safety culture. In fact, the results demonstrated significant positive correlations between nurse interns' scores of knowledge and awareness and their performance scores. Therefore, the findings confirm the success of the self-learning package in improving nurse interns' performance. A similar success of a non-experimental study demonstrated improvement in medication safety after implementation of the IPSG ***(Beadles et al., 2014)***.

Furthermore, the current study findings demonstrated that the adequacy of nurse interns' performance of IPSGs was sustained through the follow-up phase. This indicates that it became deeply rooted in their practice, which reflects a high awareness of patient safety culture. In congruence with this, ***Suhonen et al. (2014)*** clarified that a culture of patient safety arises from attitudes, activities and enduring ethical values that are conducive to the safe delivery of patient care. Hence, there is commitment of nurse interns and organizations to minimize patient harm, promote the wellbeing of patients and healthcare providers that reduce the likelihood of adverse events, and communicate safety concerns, while at the same time learning from other events occur without punishment.

Conclusion

The study findings lead to the conclusion that the nurse interns in the study settings have deficient knowledge of patient safety, low awareness of patient safety culture, and inadequate performance of international patient safety goals (IPSGs) at the pre intervention phase. These are influenced by their age and the training hospital. The use of the developed self-learning package is effective in improving their knowledge, awareness, and performance. Thus, the set research hypothesis can be accepted, and the self-learning package can be used for this purpose.

Recommendation:

In view of the study findings, the following recommendations are proposed.

On Educational Level:

- The self-learning package (SLP) that developed and implemented in this study can be utilized by the nurse interns in the Faculty of Nursing, Ain-Shams university hospitals, as well as in similar settings.
- SLP as a method of teaching should be used continually for improving the performance of nurse interns in various areas and setting of training in internship year.

On Research Level :

- Further studies are needed for assessing safety performance and its effect on the quality of patient care and on nurses' job satisfaction.
- A strategic plan for patient safety should be applied in the study settings.

On Policy Makers Level :

- The hospital administration should encourage the application of International Patient safety goals (IPSGs) procedures to improve nurse's safety performance.
- The hospital administration should make available all the equipment and supplies needed by the nurses to implement the (IPSGs).
- IPSGs must be an integral part of the orientation and ongoing on-job educational activities to all nursing staff in hospitals.
- Close and continuing supervision of the application of (IPSGs) is recommended in all settings, to enhance the development of patient safety culture among nurses.

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