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THE EFFECT OF SELF-LEARNING PACKAGE RELATED TO PATIENT SAFETY GOALS ON NEW GRADUATE NURSES' PERFORMANCE

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ABSTRACT

Background: The International Patient Safety Goals (IPSGs) are used to improve the quality of care. New graduate Nurses' 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 for package related to patient safety goals on new graduate Nurses' performance.

Material and Methods: The study was conducted at Zagazig University Hospitals using a quasi-experimental design with pre-post assessment on 220 new graduate Nurses'. The data collection tools were patient safety knowledge questionnaire and an observation checklist for new graduate Nurses' safety performance. A self-learning package was prepared and distributed to new graduate Nurses'. Its impact was evaluated after three months.

Results: The new graduate Nurses' median age was 23.0 years, with mainly female nurses (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 ($p<0.001$). 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 and performance scores. The study intervention was a statistically significant independent positive predictor of all scores.

Conclusion and Recommendations: The application of the developed self-learning package is effective in improving new graduate nurse's knowledge and performance of patient safety goals.

Keywords: International Patient Safety Goals (IPSGs), New Graduate Nurses, Self-Learning Package

INTRODUCTION

Learning is the transformation of experience into knowledge, skills, and behaviors. Knowledge is also an integral part of life which results in changing of behavior (Bastable, 2012). Teaching is the international structure of content to enhance human interactions to facilitate learning through the teaching and learning methods used for patient safety education. The use of patient safety tools is an important element for graduating nursing students. Patient safety tools, such as checklists, were used in simulation of education (Steven *et al.*, 2014).

Newly graduated registered nurse transitioning from university to practice in acute settings remains challenging, stressful and emotionally exhausting (Creswell & Clark, 2010) as they strive to deliver safe nursing care amidst heavy workloads, increased accountability and responsibilityfor their patient care (Gleich *et al.*, 2016). To ensure a successful transition from a novice nurse to competent registered nurse (Glynn & Silva, 2013).

A Self-Learning package (SLP) is one of the most suitable teaching methods for adult learners. SLP is designed where the learner is free to choose what, how,

when and where to learn. 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 & Halstead, 2012). The International Patient Safety Goals (IPSGs) focus on problems in healthcare safety and how to solve them. A Safety solution is any design or intervention that has demonstrated the ability to prevent or mitigate patient harm stemming from the processes of health care (Arias *et al.*, 2016). The 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:

1. Improve the Accuracy of Patient Identification
2. Improve the Effectiveness of Communication among Caregivers
3. Improve the Safety Using of Medications
4. Ensure correct-site, correct-patient and correct-procedure surgery
5. Reduce the risk of Health Care-Acquired Infections and
6. Reduce the Risk of patient Harm Resulting from fall (The Joint Commission Accreditation Hospital, 2016).

To ensure such safe care, new graduate nursesoccupy an exceptional position in their transition phase from theory to practice. 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 (WHO, 2011).

Moreover, Fergusonand & Howell, (2015) and Mohamed, (2014) in Egypt studied new graduate nurses' knowledge about patient safety and recommended to incorporate patient safety issues into the educational curricula and training of health professionals across the spectrum of health care.

Aim of the study

The study aimed to assess the effect of a self-learning package related to patient safety goals, new graduate Nurses' performance through:

1. Assessing new graduate Nurses' knowledge related to patient safety goals before and after self-learning package.

2. Assessing new graduate Nurses 'safety performance before and after implementing self-learning package.

MATERIAL AND METHODS

Study design and setting: A quasi-experimental study design with pre-post assessment was used to conduct the study. The study was carried out at Zagazig University Hospitals. That consisted of two sectors the first is the Emergency sector and the second is the El-salam sector.

1. The emergency sector: This sector included four hospitals namely:

a) New surgical hospital

b) Medicine hospital

c) Emergency hospital

d) Gynecology and obstetrics hospital with a capacity of (1058) beds.

2. El-salam sector: This sector included three hospitals namely:

a) Cardio-chest hospital

b) El-salamhospital

c) Pediatrichospital consisted of (726) beds.

Materials: The study involved all available new baccalaureates, graduate nurses in their first year of practice, who accept to participate in the study,working in theabove-mentioned settings during the time of the study.The sample consisted of 220 new graduate nurses-72 males and 148 females. This sample size was large enough to estimate a prevalence rate of awareness of 50% among new graduate nurses with 5% standard error at 95% level of confidence and compensation for a non-response rate of about 10% using the finite population correction (Kish,1965).

Tools of data collection:

Two tools were used to collect data for this study.

1. Patient safety knowledge questionnaire:

This tool consisted of two parts:

Part 1: To collect data regarding the personal characteristics of the new graduate nurses such as age, gender, pre-university education.

Part 2: Knowledge questionnaire on patent's safety developed by the researcher based on pertinent literature review (Joint Commission International, 2010 and World Health Organization, 2011) to assess new graduate nurse's knowledge regardingInternational patient safety goals. It included 34 true/false and multiple-choice (MCQ) questions covering different aspects of the content of international patient safety goals.

The Scoring System: For each question, a correct response was scored (1) and the incorrect response scored was (zero). 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%.

II. Observation Checklist:

This tool was developed by the researcher based on literature review(Mohamed, 2014; Hare *et al.*, 2008; Joint Commission International, 2010; The Joint Commission Accreditation Hospital, 2016) to assess the performance of international patient safety goals (IPSGs) by the new graduate nurses. It consisted of 83 items covering the steps of the IPSGs procedures to be performed by the new graduate nurses. The IPSGs are:

i. Improve accuracy of patient identification and use at least two patient identifiers while:
   - giving medication.
   - giving blood or blood products.
   - aking blood/other specimens.

ii. Improve the effectiveness of communication among caregivers:
   - report critical results of tests on timely basis.

iii. Improve the Safety Using of Medications:
   - Safety usage of high alert medications
   - Reduce likelihood of patient harm associated with the use of anticoagulant therapy
   - Maintain and communicate accurate patient medication information (Medication reconciliation).

iv. Reduce Risk of Health-care-Acquired Infections-
   - Comply with hand hygiene guidelines
   - Implement evidence-based performance to prevent central line blood stream infections Implement evidence-based performance to prevent urinary tract infection, in addition to a part of personal data such as code number, the time of observation and observation number.

Scoring System: The items observed scored not done as '0'anddone as '1'. The items 'not applicable' were not scored and were discounted from the total. For each dimension, 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. The performance was considered adequate if the percent score was 85% or more and inadequate if less than 85% given that patient safety is a critical issue in quality.

(a) Preparatory phase

This phase occurred from March 2016 to September 2016. In this phase, the researcher conducted a thorough review of literature related to International Patient Safety Goals (IPSGs). Searches concerning the topic of the study were helpful in designing the data collection tools.

Tools validity: The preliminary form of the questionnaires was presented to a panel of experts for face and content validation, the jury panel consisted of five expert professors of nursing administration and medical-surgical department from the faculties of Zagazig, Cairo. And Ain-Shams Universities the process involved their general or overall opinion about the form. Then, they assessed each item for clarity, comprehensiveness, understanding and applicability. Accordingly, to their opinions recommended modifications were performed by the researcher.

Pilot study: This was done on twenty-twonew graduate nurses 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. The pilot sample was not included in the 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 0.956, for Patient safety knowledge questionnaire and 0.972 for Observation checklist.

Fieldwork

The actual field-work of the study from the beginning of March 2016 to the end of September 2017. It involved phrases of assessment, planning, implementation and evaluation.

(b) Assessment phase: This phase involved pre-testing of the study of new graduate nurses' knowledge and performance using the relevant data collection tools. The researcher visited the hospitals 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 new graduate nurses, oriented them about the study aim and procedures, and invited them to participate.

The new graduate nurses who gave their verbal consent to participate were handed the self-administered questionnaire form to assess their knowledge, along with filling instructions. This was done during the morning shift at their workunit's break. Every new graduate nurses took approximately 25-30 minutes to answer the knowledge part.

The researcher using the observation checklist of international patient safety goals performance to observe the new graduate nurses three times individually. The period between successive observations was at least two days. The observation lasted 40 to 45 minutes for each new graduate nurses. The average of the three observations was used in the statistical analysis.

(c) Planning phase: After completing the data collection in the assessment phase, analysis was done to identify all strengths and weaknesses of new graduate nurses' knowledge and performance. It also involved all comments reported and recorded by the researcher.

Based on the information obtained from analysis of the assessment phase data, the researcher developed the self-learning package bookletand used pertinent literature in this process. The package was aimed at improving new graduate nurse's knowledge and performance of basic patient safety goals. It consisted of instructions in how to use a self-learning package booklet.

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 16 true/false questions and 18 MCQ question.

(d) Implementation phase: The self-learning package was distributed by the researcher to the new graduate nurses, immediately after observing their safety performance. The researcher discussed with them the strong and weak aspects regarding the safety performance of IPSGs. Each new graduate nurseswere notified with the content of theself-learning package booklet to discuss certain issues related to their performance. The researcher was making a group meeting with all new graduate nurses to discuss the content and to answer her/his questions. The group meeting started every day at 11:00 am. This phase took three months.

(e) Evaluation phase: Three month safter completion of implementing the self-learning package booklet, the researcher evaluated the effect of the intervention on new graduate nurses' knowledge 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 three months. 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.

III. Administrative design

Official permissions to conduct the study were obtained from hospital directors through letters from the Dean of the Faculty of Nursing, Zagazig University. The researcher met with the directors of the hospitals and explained to them the study purposes to obtain their cooperation during the study.

Ethical considerations

The study protocol was approved by the Faculty of Nursing. The aim of the study and its procedures were explained to all study participants and their verbal informed consent was obtained. They were reassured that any obtained information would be confidential

and used only for research.

IV. Statistical Design:

Data entry and statistical analysis were done using SPSS20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and means and standard deviations and medians for quantitative variables. Cronbach Alpha coefficient was calculated to assess the reliability of the developed tool through its internal consistency. Quantitative continuous data were compared using the non-parametric Kruskal-Wallis test.

Qualitative categorical variables were compared using chi-square test. Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables and ranked ones. To identify the independent predictors of the scores of knowledge and performance and multiple linear regression analysis was used. Statistical significance was considered at *p*-value <0.05.

RESULTS

Table 1: Personal Characteristics of New Graduate Nurses in the Study Sample (N = 220)

Personal Characteristics	No	%
Age in year		
<23	44	20
23+	176	80
Range	**22.0-25.0**	
Mean +SD	**23. 82±0.7**	
Median	**23.0**	
Gender		
Male	72	32.7
Female	148	67.3
Pre- university education		
Secondary school	188	85.5
Technical Institute of Nursing	32	14.5
Duration of training in hospital:		
1**(month)**	48	21.8
2**(months)**	162	73.6
3**(months)**	10	4.5

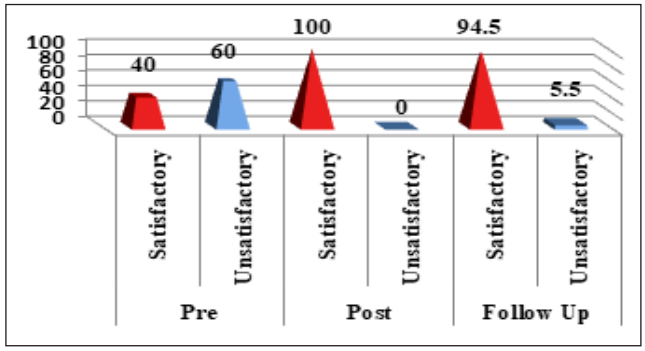
Table 1 show that the study sample included 220 new graduate Nurses whose age ranged between 21 and 25 years, with median 23 years, with most females (67.3%) as illustrated in Table 1. The great majority had secondary school, Pre- university education (85.5%), and their duration of training in hospital was 2 months (73.6 %).

Table 2: New Graduate Nurse 'Knowledge Related to International Patient Safety Goals (IPSGs) throughout the Study Phases

Satisfactory (60%+) Knowledge of Patient safety	Time						X^2 (pre-post)	X^2 (pre-FU)
	Pre (n=220)		Post (n=220)		FU (n=220)			
	No.	%	No.	%	No.	%		
International patient Safety goals: I.Improve accuracy of patient identification.	116	52.7	208	94.5	186	84.5	49.54 (<0.001*)	25.87 (<0.001*)
II. Improve the effectiveness of communication among caregivers.	158	71.8	220	100.0	208	94.5	36.08 (<0.001*)	20.31 (<0.001*)
III. Improve the safety of using medications.	132	60.0	208	95.5	216	98.2	39.94 (<0.001*)	48.49 (<0.001*)
IV. Ensure correct site, patient, surgery.	164	74.5	214	97.3	214	97.3	23.47 (<0.001*)	23.47 (<0.001*)
V. Reduce risk of health-care-acquired infections.	158	71.8	214	97.3	212	96.4	27.27 (<0.001*)	24.77 (<0.001*)
VI.Reduce risk of patient harm resulting from fal l.	140	63.6	216	98.2	208	94.5	42.49 (<0.001*)	31.77 (<0.001*)

(*) Statistically significant at p<0.05

Table 2 shows that at the pre-intervention phase, new graduate Nurse's knowledge of patient safety was low, with only 34.5% of them having satisfactory knowledge. On the other hand, the highest percentage of adequate knowledge was for the fourth patient safety goal of eliminating wrong-site, wrong-patient, and wrong-surgery (74.5%). Statistically significant improvements were revealed at the post-intervention phase in all areas (p<0.001), reaching 100.0% adequacy for the second goals. The follow-up phase had some declines in new graduate Nurse 'knowledge in most areas, but the levels remained significantly higher compared with the pre-intervention levels (p<0.001%).



(*) Statistically significant at p<0

Figure 1: Total New Graduate Nurses' Knowledge of Patient Safety throughout Study Phases

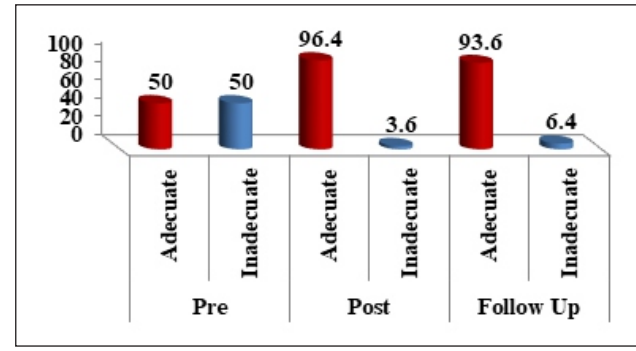
Figure 1 demonstrates that only two-fifth of the new graduate nurses (40.0%) had satisfactory knowledge at the pre-intervention phase and declined to 94.5% at the follow-up phase. These differences were statistically significant (p<0.001).

Table 3: Total New Graduate Nurses 'Performance of IPSGs throughout Study Phases

Adequate (85% +) performance	Time						X^2 (pre-post)	X^2 (pre-FU)
	Pre (n=110)		Post (n=110)		FU (n=110)			
	No.	%	No.	%	No.	%		
I. Improve accuracy of patient identification: use at least two patient identifiers when								
- giving medication	86	78.2	108	98.2	101	91.8	21.11 (<0.001*)	8.02 (0.005*)
- giving blood or blood products.	48	43.6	101	91.8	92	83.6	58.42 (<0.001*)	38.03 (<0.001*)
- taking blood/other specimens.	20	18.2	107	97.3	75	68.2	140.99 (0.001*)	56.04 (<0.001*)
II. Improve the effectiveness of communication among caregivers: report critical results of tests on timely basis								
	85	77.3	108	98.2	100	90.9	22.33 (<0.001*)	7.64 (0.006*)
III. Improve the Safety Using of Medications								
- Safe us age of high alert medications.	71	64.5	109	99.1	91	82.7	44.12 (<0.001*)	9.37 (0.002*)
- Reduce likelihood of patient harm associated with the use of anticoagulant therapy.	60	54.5	95	86.4	76	69.1	26.75 (<0.001*)	4.93 (0.03*)
- Maintain and communicate accurate patient medication information (Medic-ation reconciliation).	45	40.9	103	93.6	74	67.3	69.45 (<0.001*)	15.39 (<0.001*)
IIV. Reduce Risk of Health - care - Acquired Infections								
- Comply with hand hygiene guidelines.	58	52.7	102	92.7	86	78.2	44.37 (<0.001*)	15.76 (<0.001*)
- Implement evidence-based performance to prevent central line blood stream infections.	35	31.8	105	95.5	84	76.4	96.25 (<0.001*)	43.95 (<0.001*)
- Implement evidence - based performance to prevent urinary tract infection.	102	92.7	109	99.1	109	99.1	Fisher (0.04*)	Fisher (0.04*)
V. Reduce Risk of Patient Harm Resulting from fall								
	56	50.9	102	92.7	100	90.9	47.52 (<0.001*)	42.66 (<0.001*)

(*) Statistically significant at p<0.05

In total, table 3 demonstrates generally low new graduate Nurses' performance of the totals of patient safety goals at the pre-intervention phase. The lowest percentages of adequate performance were related to goal I concerning improving accuracy of patient identification using at least two patient identifiers when giving blood or blood products (43.6%) and taking blood/other specimens (18.2%), in addition to goal III concerning medication reconciliation (40.9%) and goal V concerning implementation of evidence-based performance to prevent central line blood stream infections (31.8%). However, all goals demonstrated statistically significant improvements at the post-intervention phase, with slight declines at the follow-up phase but still higher compared with the pre-intervention levels.



(*) Statistically significant at p<0.05

Figure 2: Total New Graduate Nurses' Performance of Patient Safety throughout Study Phases

Figure 2 illustrates that 50.0% of the new graduate nurses in the study sample had total adequate performance of patient safety goals at the pre-intervention phase, and slightly declined to 93.6% at the follow-up phase. These differences were statistically significant (p<0.001).

Table 4: Correlation between New Graduate Nurses' Scores of Knowledge and Performance and their Demographic Characteristics

Items	Spearman's rank correlation coefficient	
	knowledge	Performance
Age	-0.10	-0.09
Month of training	0.03	-0.02
Patient safety grade	0.07	0.07
No. of events reported	-0.03	-0.12*

(*) Statistically significant at p<0.05

As table 4 displays, new graduate Nurses' scores of performances had statistically significant weak negative correlation with the number of events reported (r= 0.12).

Table 5: Correlation Matrix of New Graduate Nurse 'Scores of Knowledge and Performance

Items	Spearman's rank correlation coefficient knowledge
Performance	0.523**

(**) Statistically significant at p<0.01

Table 5 demonstrated that a statistically significant moderate positive correlation was revealed between their scores of knowledge and performance (r= 0 .523).

Table 6: Best Fitting Multiple Linear Regression Model for the Performance Score

Items	Unstandardized coefficients		Standardized Coefficients	*t*-test	*P*-Value	95% confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	85.86	0.45		192.705	<0.001	84.98	86.73
Intervention	9.00	0.55	0.67	16.486	<0.001	7.92	10.07

r-square=0.45, Model ANOVA: F= 271.79, p<0.001

Variables entered and excluded: age, gender, secondary education, months and hours of training, knowledge scores.

Similarly, table 6 indicates that the study intervention was the only statistically significant independent positive predictor of new graduate Nurse' performance score. The model explains 45%of the variation in this score. None of the other new graduate Nurse' characteristics had a significant influence on it.

DISCUSSION

New graduate nurse programs extent nursing students to apply their knowledge and skills in a professional setting. This helps and facilitate the transition from student to the new graduate nurse's role, and alleviates the anxiety resulting from inability of the recent graduate to translate nursing theory into practice (Edgecombe *et al*., 2013). New graduate nurses safety performance are critical to the surveillance and coordination that reduce negative outcomes of care. Patient safety goals education can be implemented by providing a comprehensive curriculum to prepare new graduate nurse for safe practice (Skutil, 2014).

On the same line, the Quality and Safety Education for Nurses initiative was developed to integrate quality and safety competencies into nursing education. Hence, the quality and safety of care can only be realized when new graduate nurses apply these at both the individual and system levels of care (Clark & Donaldson, 2008). The knowledge is more likely to be unsatisfactory compared to their younger age colleagues. However, other studies demonstrated a positive association between nurses' age and their knowledge (Modic *et al.*, 2014; Basauhra *et al.*, 2016). 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. 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 inadequate performance of new graduate nurses in accurate identification of patients when giving medications is that they may know the patient in person and by name in agreement with this, Mohamed (2014) 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 & Ahmed (2012) reported deficient performance of accurate patient identification among nurses in a study in Egypt.

The errors of patient identification led to delays in blood transfusion and its consequences as reported by olton-Maggs, (2016) in the United Kingdom. Famalaro *et al.*, (2016) stated that medication errors are one of the most common causes of death worldwide. A similar

success of a non-experimental study demonstrated improvement in medication safety after implementation of the IPSG (Beadles *et al.*, 2014).

CONCLUSION

In the light of the study findings, it can be concluded that the new graduate nurses in the study settings have deficient knowledge of patient safety and inadequate performance of international patient safety goals (IPSGs). These are influenced by their age. The use of the developed self-learning package is effective in improving their knowledge and performance. Thus, the set research hypothesis can be accepted, and the self-learning package can be used for this purpose.

RECOMMENDATIONS

- The hospital administration should encourage the application of the international patient safety goals (IPSGs) procedures to improve nurse's safety performance.
- Close and continuing supervision of the application of (IPSGs) is recommended in all setting, to enhance the development of patient safety among nurses.
- 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.

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