Research Article

A Study to Assess the Effectiveness of E-Module on High-Alert Medications in Terms of Knowledge among Student Nurses in a Selected College of Nursing in Delhi

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Abstract

Introduction: Use of medications is central to modern healthcare, and nearly all patients visiting a hospital will receive one or more medicines during their hospital stay or upon discharge. Medication use is a complex process and includes intervention by several health personnel, for example, physicians, pharmacists, nurses and student nurses to ensure safety of the patient.[1] High-alert medicines have been proven to be safe and effective when taken properly. But they can cause injury if a mistake happens while taking them. This means that it is vitally important to know about these medicines and take them exactly as intended.[2]

Methodology: The research approach selected for the study was quantitative approach with pretest-posttest design. Convenient sampling was used for the selection of 60 student nurses from Rufaida College of Nursing to evaluate their knowledge on high-alert medications. The tool developed and used for data collection was a structured knowledge questionnaire on high-alert medications to assess the knowledge of student nurses on high-alert medications. E-module on high-alert medications was developed by the researcher and administered to student nurses.

Results: The present study revealed that the e-module was an effective method of teaching in nursing. The mean posttest knowledge score (44.03) was higher than the mean pretest knowledge score (30.23) with a mean difference of (13.8). It indicated gain in knowledge by the student nurses. The obtained mean difference was found to be statistically significant as evident from the 'z' value of 8.8193 at 0.05 level of significance. There was no significant association between knowledge of student nurses on high-alert medications with their selected demographic variables like age, educational qualification, percentage in class attendance, marks obtained in previous exam, and area of domicile.

Conclusion: E-module on high-alert medications was found to be effective in improving the knowledge of student nurses on high-alert medications. There was significant difference found in the pretest and posttest mean scores of student nurses. It shows that the e-module on high-alert medications was effective in enhancing the knowledge of student nurses on high-alert medications.

Keywords: Knowledge, High-alert medications, E-module, Effectiveness

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Introduction

Medication is the most common healthcare intervention, and medication use in the hospital settings requires that a series of actions be performed correctly by several members of healthcare team, such as the physician, the unit in charge, the hospital pharmacist, and the nurses. A recent study by Parihar in India revealed that medication error accounts for 68.8% of the medical error.[3] A meta-analysis study by Millar identified the relative percentages of pediatric error types in prescribing (3–37%), dispensing (5–58%), administering (72–75%) and documenting (17–21%).[4] In a study by Lesar, error in decimal point placement, mathematical calculation, or expression of dosage regimen accounted for 59.5% of dosage error. The dosage equation was reported to be wrong in 29.5% of dosage.[5]

There is a need for awareness to prevent patient harm due to high-alert medications. Reports show approximately 500 medication errors/incidents that caused patient harm and the top six drugs included in these incidents were Insulin, Morphine, Hydromorphone, Heparin, Warafarin and Potassium chloride.[5]

The high-alert medication classes included in the final list were: chemotherapeutic drugs, immunosuppressive medications, lipid/total parenteral nutrition and opioids.

An international group of experts defined 14 medications and 4 medication classes as high-alert for children. This list might be helpful as a starting point for individual hospitals to develop their own high-alert list tailored to their unique situation.[6]

The present study is to see the effectiveness of e-module in improving knowledge of student nurses on high-alert medications.

Materials and Methods

The research approach selected for the study was quantitative approach with pretest-posttest design. Convenient sampling was used for the selection of 60 student nurses from Rufaida College of Nursing to evaluate the knowledge on high-alert medications. The tool developed and used for data collection was a structured knowledge questionnaire on high-alert medications to assess the knowledge of student nurses on high-alert medications. E-module on high-alert medications was developed by the researcher and administered to student nurses.

Results

The data was coded and entered in a Microsoft Excel Sheet and was analyzed using descriptive and inferential statistics.

Table 1.Frequency and Percentage Distribution of Student Nurses as per Their Demographic Characteristics

N=60

| S. No.	Sample Characteristics	Frequency	Percentage
1	**Age (in years)**		
	19–21	33	55
	22–24	24	40
	25–27	03	5
	>27	0	0
2	**Educational qualification**		
	GNM	20	33.3
	B.Sc (Nursing)	20	33.3
	Post-basic B.Sc (Nursing)	20	33.3
	M.Sc (Nursing)	0	0
3	**Percentage of class attendance**		
	<60	7	11.6
	61–70	20	33.3
	71–80	23	38.4
	>80	10	16.7
4	**Marks obtained in previous exam**		
	50–60%	4	6.6
	61–70%	31	51.7
	71–80%	25	41.7
	81–90%	0	0
5	**Area of domicile**		
	Village	20	33.3
	Town	15	25
	City	15	25
	Metropolitan city	10	16.7
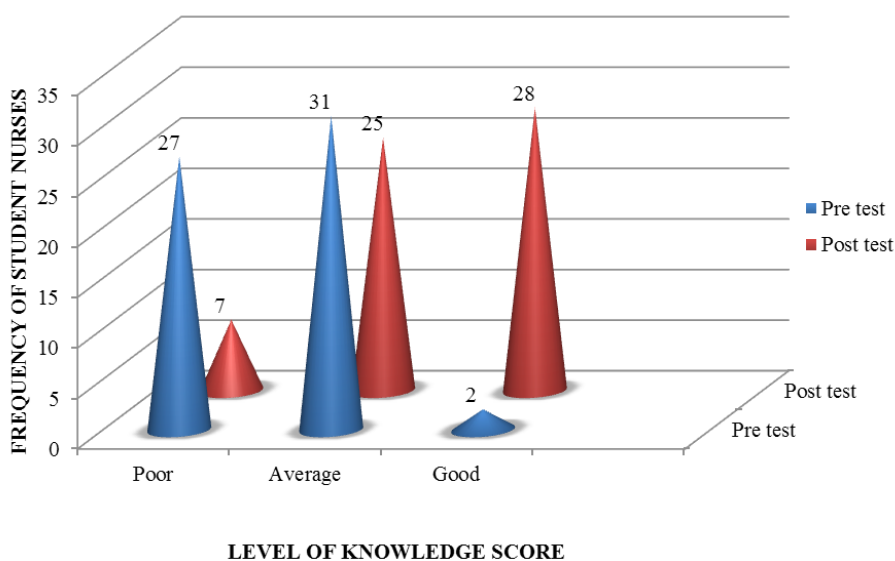
Figure 1.A 3D Cone Diagram Showing Frequency Distribution of Student Nurses according to Their Level of Knowledge

Table 2.Range, Mean, Mean Difference, Median and Standard Deviation of Knowledge Scores of Student Nurses on High-alert Medications

N=60

	Possible Range of Scores	Range of Obtained Scores	Mean	Mean. Difference	Median	SD
Pretest		9–47	30.23	13.8	31	9.71
Posttest	0–60	25–55	44.03		45	7.42

The data presented in Table 2 reveals that the mean knowledge score of student nurses on knowledge of high-alert medications in pretest was 30.23 and in posttest mean was 44.03. The standard deviation of scores of student nurses in pretest was 9.71 and 7.42 in posttest which means variability is more in the pretest.

Table 3.Determination of Significant Difference between Mean Pretest and Mean Posttest Knowledge Scores

Knowledge Score	Mean	Mean D	SD	'Z' value	P value
Pretest	30.20	13.8	9.71	8.8193*	0.0001*
Posttest	44.03		7.42		

'Z' (59)=1.96 P<0.05 *Significant at 0.05 Level; n=60

From the data represented in Table 3, it can be seen that the mean posttest knowledge score (44.03) was higher than the mean pretest knowledge score (30.20) with a mean difference 13.8. The obtained mean difference was found to be statistically significant as evident from the calculated 'z' value of 8.8193 which is greater than the table value of 1.96 at 0.05 level of significance.

This shows that obtained mean difference between the pretest and posttest knowledge scores was a true difference and not by chance.

Hence, the hypothesis H1 was accepted. This indicates that e-module on high-alert medications was effective in increasing the knowledge of student nurses.

Table 4.Fisher Exact Test of Significance Showing the Relationship between Posttest Knowledge of Student Nurses on High-Alert Medications with Selected Demographic Variables

Selected Variables	Knowledge Scores			Test	P Value
Age (in years)					
19–21	5	2	26	Fisher Test	0.678
22–24	1	1	22		
25–27	0	0	3		
Educational qualification					
GNM	1	2	17	Fisher Test	0.302
B.Sc (Nursing)	4	1	15		
Post-basic B.Sc (Nursing)	1	0	19		
Percentage of class attendance					
<60	0	1	6	Fisher Test	0.615
61–70	3	0	17		
71–80	2	1	20		
>80	1	1	8		
Marks obtained in previous exam					
50–60	0	0	4	Fisher Test	0.930
61–70	4	2	25		
71–80	2	1	22		
Area of domicile students belong to					
Village	2	1	16	Fisher Test	0.891
Town	2	0	10		
City	2	2	25		

p≥0.05 level of significance, n=60

Data in Table 4 depicts that there was no significant relationship between knowledge of student nurses on high-alert medications with selected demographic variables, viz., age (p=0.678), education (p=0.302), percentage in class attendance (p=0.615), percentage in previous exam (p=0.930), area of domicile (p=0.891) at 0.05 level of significance.

Hence the H_2 was rejected. There is no significant association between knowledge of high-alert medications with selected demographic variables at 0.05 level of significant. (Table 5 End of the article)

Discussion

Findings of the study have been discussed in terms of objectives. In this section, major findings of the present study have been discussed with reference to the results obtained by other investigators. The present study was aimed to evaluate the effectiveness of e-module on high-alert medications in terms of knowledge among student nurses in a selected college of nursing in Delhi.

The findings of the present study are consistent with the study done by Karakus,[7] on impact of e-learning on medication administration of nursing students and it was found that e-learning is an effective, innovative, viable, valid and reliable teaching strategy for nursing students on medication administration. It strengthens medication administration competencies of nursing students, improves the students' self-confidence and patient safety. On the other hand, it decreases medication errors. Because of the complexity of medication administration, it is necessary to maximize medication administration skills of students.

In the present study, it was found that there was statistically significant improvement in knowledge on high-alert medications after administration of e-module on high-alert medications. Laustsen et al.,[8] promoted alcohol-based hand rubbing by e-learning among university hospital staff. Participants had a significantly higher adherence to correct hand rubbing before and after clinical procedures than non-participants. E-learning programs may help to prevent healthcare-related infections and meet the demands of lifelong education and training of hospital staff.

Conclusion

E-module on high-alert medications was effective in improving knowledge of high-alert medications among student nurses. There was significant difference found in the pretest posttest mean scores of student nurses. It shows that the e-module on high-alert medications was effective in enhancing the knowledge of student nurses on high-alert medications. There was no significant relationship found between knowledge of student nurses on high-alert medication and selected demographic variables, viz., age, education qualification, percentage in class attendance, marks obtained in previous exam and area of domicile.

Conflict of Interest: None

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Table 5.Findings related to Area-Wise Modified Mean, Modified Mean Percentage, Modified Mean Percentage Gain on Comparison of the Pretest and Posttest Knowledge Score of Student Nurses on High-Alert Medications

n=60

Area-Wise Distribution	Items		Pretest			Posttest		Modified Mean Percentage gain	Rank Order of Modified Mean Gain
		Mean	Modified Mean	Modified Mean	Mean	Modified Mean	Modified Mean		
Safe administration of high-alert medication	16	31.69	1.98	198.06	45.69	2.86	285.56	87.50	I
High-alert medication actions	24	27.83	1.16	115.96	42.29	1.76	176.21	60.25	II
calculation of high-alert medications	4	42.75	10.69	1068.75	46.25	11.56	1156.25	87.50	I
Nursing responsibility during high-alert medication administrations	6	42.50	7.08	708.33	44.33	7.39	738.83	30.50	III
Commonly used abbreviations during high-alert medication administrations	10	49.50	4.95	495.00	52.00	5.20	520.00	25.00	IV