Knowledge and Practice of Internship Students on the Emergency Crash Cart System in a Selected Tertiary Care Hospital, Mangaluru, Karnataka, India

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Abstract

Introduction   A crash cart is the trolley for storing lifesaving equipment and drugs in a hospital. During an emergency situation, nurses are left with confusion and hurry in getting the emergency medication and equipment. Typically, the crash cart system remains locked until a code blue triage is initiated by the hospital. This lack of exposure leads to poor competency and confident in performing essential tasks during a code blue. A well-organized crash cart system can save a lot of time and confusion during an emergency, which in turn can save a life.

Aim   The aim of this study was to identify the knowledge and practice of internship students on emergency crash cart system and to find the correlation between knowledge and practices of nursing internship students on maintenance of emergency crash cart system.

Materials and Methods   A descriptive correlative research study was conducted among 93 nursing internship students tertiary care hospital, Mangaluru, Karnataka, India. The samples were selected by using purposive sampling techniques. Demographic proforma, structured knowledge questionnaire on knowledge regarding emergency crash cart system with 32 items was used to determine the level of knowledge and observation practice checklist with 24 items was used to assess the practice of internship students on maintenances of emergency crash cart system. Descriptive and inferential statistics was used to analyze the collected data.

Results   Majority (89; 95.7%) of the internship students are in the age group of 20 to 25 years and most (59; 63.4%) of internship students are working in wards. Of that 79 (84.9%) internship students have average knowledge with mean 18.1, median 19, and standard deviation (SD) 3.2. Majority 90 (96.7%) of the internship students have satisfactory practice on emergency crash carts with mean 22.9, median 23, and SD 1. 11. There is a moderate positive linear relationship between knowledge and practice scores of the internship students on the emergency crash cart system ($r = 0.38$, df $= 92$, $p = 0.05$).

Keywords
► code blue
► crash cart system
► practices
► nursing internship students

Conclusions The study concludes nursing internship students have average knowledge about emergency crash cart system. And the practice of internship students on maintenance of crash cart was satisfactory. The study thus implies the need for frequent reinforcement and training programs, which may help the internship students to improve knowledge on emergency crash cart systems. There should be clear instructions about the arrangement and use of a crash cart in each and every unit.

Introduction

Nurses and doctors, the first in line to provide life support and resuscitation, should always be clearly aware of the placement of the emergency cart and their contents and their use.[1] Hospital nurses encounter many in-hospital cardiac arrests that require them to respond immediately and to provide efficient competent care.[2–4] An emergency is a situation that possesses an immediate risk to health, life, property, or environment. Most emergencies require an urgent intervention to prevent a worsening of the situation.[5] According to a new study, four times people die from preventable medical errors, as many as 4,40,000 a year. One in 10 patients is harmed while receiving hospital care.[3–6] As nurses play a major role in the provision of health care, it is the nurses who frequently discover patients with cardiac arrest and it is necessary for them to restock the crash cart after every shift, verifying the presence and expiry date of every item.[7–9] It is a well-known fact that crash cart systems are an integral part of emergency procedures in any hospital. But it is felt that this system is not used to its potential in most of the hospitals.[7–9] The researcher had come across many incidents in her experience in the nursing profession where many nurses and doctors are not having enough knowledge regarding crash carts. It is very important that emergency nurses should develop the skills regarding organization, uses, and care of crash carts in hospitals. Hence, from these instincts the investigator was motivated to check the level of knowledge and practices of nursing internship students who are the future nurse force.

Materials and Methods

A descriptive correlative research study was conducted among 93 nursing internship students at Yenepoya Medical College Hospital, Mangaluru. A pilot study was conducted on November 14, 2020 to December 20, 2020 and the final data was collected from 28/12/2020 to 28/3/2021. The samples were selected by using purposive sampling techniques. BSc nursing internship students who are doing their internship in a selected hospital and who are available during the period of data collection were included in the study and who are not willing to participate in the study was excluded. Sample size estimation was done with Slovin's formula. Formula $n = N / (1 + Ne2)$. $N = 187$ N Mean total population $e = 0.05$ Margin Error of confidence interval of 95% Solution: $n = 187/ (1 + 187(0.05)$ ^2) $n = 187/ (1 + 187(0.0025)$ Multiplying it with N$n = 187/ (1 + 1)$ Adding 1 and dividing N, $n = 187/2$ $n = 93$. A demographic proforma, structured knowledge

questionnaire on knowledge regarding emergency crash cart system was used to determine the level of knowledge and observation practice checklist was used to assess the practice of internship students on maintenance of emergency crash cart system. To ensure validity, the tool along with demographic proforma and a structured knowledge questionnaire on emergency crash cart systems and an observational practice checklist on the maintenance of emergency crash cart system was submitted to seven experts in the field of emergency crash cart system management. There was a 100% agreement on all items. A few suggestions were given to modify and simplify the wording of some items. The modifications were then made to the tool. Administrative permission was obtained from both hospital and college authorities and ethical clearance was obtained from the Institutional Ethical Committee-2 dated October 16, 2020. The informed consent was obtained from the internship students. All the participants in the study were informed regarding the details of the study in their own language.

Structured Knowledge Questionnaire on Knowledge Regarding Emergency Crash Cart System

A structured knowledge questionnaire on knowledge regarding emergency crash cart system was developed by the investigator with 32 items with maximum score of 32 to assess the knowledge of internship students regarding emergency crash cart system[9–13] Knowledge score was graded as good knowledge, average knowledge, and poor knowledge. The questionnaire was distributed by the investigator to internship students and the time taken by the subjects to complete the questionnaire was approximately 20 minutes. To assess the reliability, the English version of the tool was administered to 16 subjects. Reliability and internal consistency were obtained by using a split-half test and the reliability coefficient obtained was 0.80.

Observation Practice Checklist

An observation practice checklist was developed by the investigator with 24 items to identify the practice of internship students on maintenance of emergency crash cart systems with maximum score of 24.[14–17] Practice score was graded as satisfactory, moderately satisfactory, and unsatisfactory. The practice of internship students on maintenance of emergency crash carts was observed by the investigator during each shift. The interrater reliability method was used to assess the reliability. The rates of this study were two nursing faculties with mean 8.5 years of clinical and teaching experience. Observations were

recorded independently. Intraclass correlation coefficient was used to assess the interrater reliability and all the items on the observation checklist have acceptable values of percentage of agreement with reliability score of 0.83.

Statistical Analysis

The statistical calculations were performed using computer-based statistical software Statistical Package for the Social Sciences (SPSS) version 21.0 Both descriptive and inferential statistics was used to analyze the collected data.

Results

Section I

Description of Demographic Proforma of the Internship Students

►Table 1 shows the distribution of the internship students according to their age, gender, area of working, in service training, source of information. Majority 95.7% of the subjects were in the age group of 20 to 22 years, most (78.5%) of the subjects were females, more than half 63.4% of the internship students were working in wards, 100% of the nursing internship students undergone in service training program, and nearly half 47.3% of the subjects who had information about crash cart system were from theory classes and 35.5% from nursing supervisors/ward in-charge.

Table 1 Distribution internship students according to their demographic proforma, $n = 93$

Sl. no.	Variables	n, (%)
1.	**Age in years**	
	a. 20–22 years	89 (95.7)
	b. 23–2	4 (4.3)
2.	**Gender**	
	a. Male	20 (21)
	b. Female	73 (78.5)
3.	**Area of working**	
	a. ICU	11 (11.8)
	b. ICCU	10 (10.8)
	c. Emergency ward	13 (14)
	d. Ward	59 (63.4)
4.	**Inservice training**	
	a. Yes	93 (100)
	b. No	–
5.	**Source of information**	
	a. Theory classes	44 (47.3)
	b. Media/mass media	16 (17.2)
	c. Nursing supervisors/ ward in-charge	33 (35.5)

Abbreviations: ICU, intensive care unit; ICCU, intensive cardiac care unit. Demographic characteristics of study group ($n = 93$). The data presented is frequency (n) with percentage in parenthesis (%).

Section II

Knowledge Score of Subjects on Emergency Crash Cart System (►**Fig. 1** and ►**Table 2**).

Section III

Practice Score of Internship Students on the Emergency Crash Cart System. (►**Fig. 2**)

Section IV

Correlation of Knowledge and Practice Score of Internship Students on the Emergency Crash Cart System

The data presented in ►**Table 3** shows spearman's correlation "r" value is 0.38 at df 92 with $p = 0.05$, which indicates there is a weak positive linear relationship between knowledge and practice scores of internship students on the emergency crash cart system.

Section V

Association between Knowledge Scores of Internship Students with Selected Demographic Variables

There is no significant association found between knowledge score of subjects with selected demographic variables

Section VI

Association between Practice Scores of Internship Students with Selected Demographic Variables

►**Table 4** shows that there is a significant association with area of working with practice scores of internship students at 0.05 level of significance.

►**Table 4** shows chi-squared test (x^2) showing the association between practice score and selected demographic variables.

Discussion

The results showed that the majority (84.9%) of the internship students have only average knowledge, 11.8% of internship students have good knowledge, and only 3.2% of them have poor knowledge regarding emergency crash cart. Supporting the findings of the present study, a study conducted
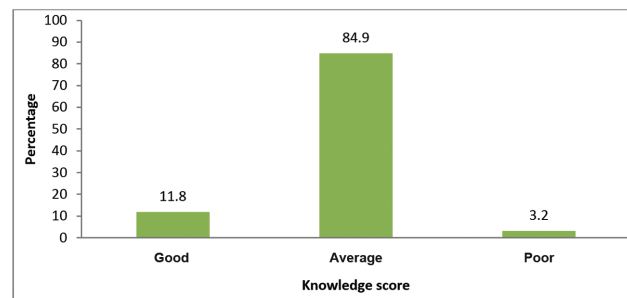

Fig. 1 Percentage of distribution of knowledge score of internship students on emergency crash cart.

Table 2 Area-wise mean and SD of knowledge score of internship students on emergency crash cart system, $n = 93$

Sl. no	Areas	Maximum score	Mean ± SD
1.	General information	5	1.01 ± .70
2.	Equipment and materials	13	4.13 ± .99
3.	Injections/medicines uses and actions	14	8.95 ± 1.90

Abbreviation: SD, standard deviation.

Max score = 32. The data in ►**Table 2** depicts area-wise knowledge score of internship students on emergency crash cart system. The data presented is the mean ± SD of the knowledge scores on emergency crash cart system.
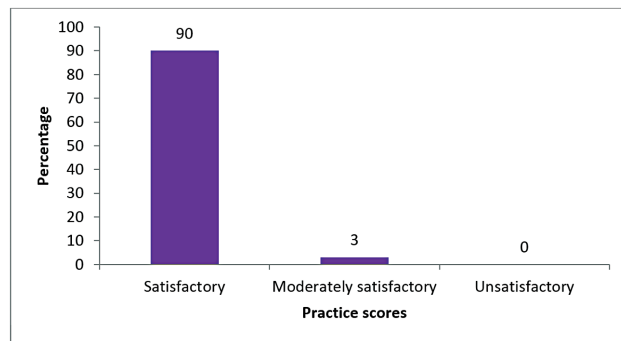

Fig. 2 Bar diagram showing the distribution of practice scores of internship students on the emergency crash cart system.

by Sreelakshmy and Haseena, the result shows that majority of students (51; 56.7%) had above average knowledge, whereas 24 (26.6%) has good knowledge and only 15 (16.7%) had poor knowledge regarding management of selected medical emergencies.[11] Another supporting study conducted by Khemnar et al, the results showed that only 2% of subjects had good knowledge.[1] Similar study was conducted by Kumar and Murthy, in which the pretest revealed that 4th year BSc nursing students were having low levels of knowledge on utilization of emergency crash cart system with a mean score of 18.35.[4] Similar study conducted by Thampi showed that in pretest knowledge assessment 43.3% of study subjects had good knowledge on crash cart system, 20% had average knowledge, and 36.7% of staff nurses had poor knowledge about crash cart system.[2] This study findings were consistent with a study that was conducted by Bhirange et al which revealed that the majority of staff nurses were found having average knowledge. Before intervention, they had mean knowledge score of 15.78 ± 3.25 which is average, and after intervention, they had mean knowledge score of 26.35 ± 1.53, which is excellent and very good.[12]

Results of this study revealed that out of 93 internship students, 96.7% had satisfactory practice scores on emergency crash cart systems. Findings of this study were contradictory with a study conducted Alexander to assess the practice of organized crash cart system among nurses in selected hospital of Bangalore. The results showed that out of the 50 subjects, 21 (42%) had unsatisfactory level of practice.[9] Similar study conducted by Akber et al, the main results found that 58.8% ($n = 94$) participants were respondent of medication checked periodically and exchanged based on expiry date, and 41.3% ($n = 66$) participants were respondent of medication not checked periodically and exchanged based on date expiry.[10]

The findings of this study showed that there is no significant association between knowledge score with demographic variables. The findings of the study contradictory with a study conducted by Thampi in Kerala, India, to assess the effect of structured teaching program on knowledge regarding crash cart system among staff nurses of medical wards revealed that age of the subjects and total years of experience had significant association with the knowledge levels of staff nurses regarding crash cart system.[2]

There is a significant association found with selected demographic variables like area of working, whereas there is no association between other demographic variables like age, gender, in service training, and source of information. The above findings can be compared with the study conducted by Alexander, to assess the practice of organized crash cart systems among nurses in selected hospitals in Bangalore. Results revealed that there was significant association with the practice score of subjects as well as area of working.[9] The findings of this study show that there is an increasing need to conduct frequent reinforcement and training programs by teachers to the internship students to improve knowledge and practice on emergency crash cart systems.

Conclusion

This study was able to show that nursing internship students had only average knowledge regarding emergency crash cart

Table 3 Correlation between knowledge and practice scores of internship students on the emergency crash cart system, $n = 93$

Variables	Max score	Min score	Mean ± SD	r-Value	df	p-Value
Knowledge	32	16	18.1 ± 3.2	0.38	92	0.05
Practice	24	12	22.9 ± 1.1			

Abbreviation: SD, standard deviation.

$r = 0.38$ at df = 92, $p = 0.05$.

Table 4 Association between practice scores of internship students with selected demographic variables, $n = 93$

Practice score					
Sl. no.	Variables	< Median (23)	≥ Median (23)	x^2	p-Value
1	Age (years) a. 20–22	77	12	1.132	0.287
	b. 23–25	4	0		
2	Gender a. Male	19	1	1.696	0.193
	b. Female	62	11		
3	Area of working			7.714	0.048*
	a. ICU	11	0		
	b. ICCU	10	0		
	c. Emergency ward	12	1		
	d. Ward	48	11		
4	Source of information			0.925	0.630
	a. Theory classes	38	6		
	b. Media/mass media	13	3		
	c. Nursing supervisors/ward in-charge	30	3		

Abbreviations: ICU, intensive care unit; ICCU, Intensive cardiac care unit.
*Significant $p < 0.05$

systems. However, practice on management of the crash cart system was satisfactory. The factors behind the adequate practice may be as observed by the investigators were every shift the ward in-charge was assigned internship students to organize crash cart according to the hospital crash cart checklist. Emergency situations can occur at any time. As internship students are the future human resource to represent the nurse population, they must be adequately trained and competent enough to manage emergency conditions. So, nursing education institutions and standard hospital policy can ensure the student nurses are well trained to face future challenges.

Limitation
This study results were limited to only small sample size with one hospital settings.
Nursing Implication(s)

Nursing Services
A nursing superintend, nurse educator, senior nurse, or ward in-charge can conduct individual teaching, group discussion and organize hands-on training that will improve the quality of nursing practice. The finding of the study can be incorporated in nursing services especially in causality and in intensive care unit.

Nursing Education
The findings of the study can be incorporated with the existing nursing education curriculum and must include imparting knowledge about the importance of emergency crash cart system among students and staff. The nursing teachers can use the result of the study as an informative illustration for the students. The in-service education program for internship students can be organized before starting of the internship

Nursing Administration
The nurse administrator can take part in developing hospital policy and standing orders related to crash cart for staff nurses and internship students. Administrators can ensure the opportunity for future nurses to study about the utilization and maintenance of emergency crash cart system.

Nursing Research
This study has given an insight to the necessity of doing research in the nursing practice side. The study will serve as a valuable reference material for the future investigators. Nurse can use the finding for further research studies to plan and implement strategies to impart knowledge on emergency crash cart system.

Financial Support and Sponsorship
Nil.

Ethics Approval
This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the institutional Ethics Committee-2 dated 16/10/2020

Conflict of Interest
None declared.

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