ISSN: 2457-0400

Impact Factor: 7.675

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

www.wjahr.com

Volume: 10, Issue: 8

Page N. 60-68

Year: 2026

Original Article

Coden USA: WJAMA3

A STUDY TO ASSESS THE EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE REGARDING CRASH CART AMONG THE 4TH YEAR BSC NURSING STUDENTS AT SELECTED NURSING COLLEGE, MYSURU

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Article Received: 19 June 2026 **Article Revised:** 09 July 2026 **Article Published:** 01 August 2026

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DOI: https://doi.org/10.5281/zenodo.21702238

How to cite this Article: Mrs. Kavitha R.[1]*, Mrs. Rani S. C.[2]. (2026) A Study To Assess The Effectiveness Of Structured Teaching Programme On Knowledge Regarding Crash Cart Among The 4th Year Bsc Nursing Students At Selected Nursing College, Mysuru. World Journal of Advance Healthcare Research, 10(8), 60–68.

ABSTRACT

A pre-experimental one-group pre-test and post-test study was conducted to assess the effectiveness of a structured teaching programme on knowledge regarding crash cart among 4th year BSc Nursing students at a selected nursing college, Mysuru. The objectives of the study were to assess the pre-test knowledge, evaluate the effectiveness of the structured teaching programme, and determine the association between pre-test knowledge and selected demographic variables. A quantitative evaluative research approach with a one-group pre-test and post-test design was adopted. Sixty 4th year BSc Nursing students were selected using simple random sampling. Data were collected using a structured questionnaire consisting of demographic variables and 25 multiple-choice knowledge questions. Descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (paired t-test and chi-square test) were used for data analysis. The findings revealed that in the pre-test, 29 (48.3%) students had poor knowledge, 27 (45.0%) had average knowledge, and only 4 (6.7%) had good knowledge. Following the structured teaching programme, none of the students had poor knowledge, while 29 (48.3%) had average knowledge and 31 (51.7%) had good knowledge. The mean pre-test knowledge score was 14.43 ± 3.82, whereas the mean post-test knowledge score increased to 19.51 ± 2.36. The paired t-test value was 7.23, indicating a statistically significant improvement in knowledge following the structured teaching programme ($p < 0.05$). Chi-square analysis demonstrated no statistically significant association between pre-test knowledge and selected demographic variables, including age, gender, type of family, source of information, and religion ($p > 0.05$). The study concluded that the structured teaching programme was effective in improving the knowledge of 4th year BSc Nursing students regarding crash cart management. The findings support the incorporation of regular educational programmes and simulation-based training to enhance emergency preparedness among nursing students.

INTRODUCTION

An emergency is any medical problem that could cause death or permanent injury if not treated quickly. Emergency Nursing is a nursing specialty in which nurse's care for patients in the emergency or critical phase of their illness or injury. In contrast to practically every other specialty of nursing, in which a patient arrives with a diagnosis applied by a physician and the nurse, must manage the patient's care according to that diagnosis, emergency nurses work with patients in whom a diagnosis has not yet been made and the cause of the problem is not known. Emergency nurses frequently contact patients in the emergency department before the patient sees a physician. In this situation, the nurse must be skilled at rapid, accurate physical examination, early recognition of life-threatening illness or injury, the use of advanced monitoring and treatment equipment, and in some cases, the ordering of testing and medication according to "advance treatment guidelines" or "standing orders" set out by the hospital's emergency physician staff. Any facility that treats patients who have the potential to have a sudden deterioration in their condition should have a crash cart available.[2]

A crash cart is cart stocked with emergency medical equipment, supplies and drugs for use of health professionals especially during efforts to resuscitate a patient experiencing cardiac arrest. Adequate storage of medical equipment should be available in the crash cart as it functions to provide emergency management to the patient present with a wide variety of critical, urgent and semi-urgent conditions. 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. Staff must be familiar with the location of all resuscitation equipment within their working area A "Crash Cart" is a mobile, compact cart, equipped with various medical aid tools (used mainly for cardiac emergencies). The cart consists of items such as a defibrillator, medications, a suction pump, and other life-saving equipment. The function of crash carts is to provide a mobile station within the hospital that contains everything needed to treat a life-threatening situation. The advantage of mobility is that it allows the treatment to come to the patient when needed. It is often the nurse's role to undertake the routine checking of the resuscitation trolley and cardiopulmonary equipment. As nurses play a major role in the provision of health care, it is the nurses who frequently discover patient 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. Nurses play an integral role in the management of cardiopulmonary arrests. In inpatient facilities, nurses are at the patient's bedside 24 hours/day and are likely to be the first to respond and manage initial treatment during an emergency.[1]

Human life is very valuable. When any person is admitted to critical care unit, life is critical or dangerous situations. The nurses who face such complex should have expert skills, knowledge and judgment to manage such critical incidents. They need to be updated their knowledge according to modern nursing research and practices. They must be able to apply their knowledge in practice successfully. The nurse who monitors patient continuously in the critical care units acts as drugs administrator and is the coordinator and collaborator of services as well. But the prominent role in emergency situations is a drug administrator's role.[3]

The successful management of cardiopulmonary emergencies revolves around the optimum utilization of the golden hour, so that the patient gets the best possible advantage at survival.[2]

In past years, there have been various issues with efficiency and organization of the "Crash Carts". The two main issues prior to its reinvention and revamping, were that the materials on the cart were not easily found, and there were no clear instructions on how to use critical items on the crash cart. There were also issues with over-stuffing of items, and the excessive shifting of various items when the cart was on the move, or even when the drawers of the cart were opened and shut. Knowing that the most critical aspects of the "Crash Cart" organization were time and access to materials, the Detroit VA's Systems Redesign Team was asked to help. The team lives by what they call the "5 S's": Sort, Strengthen, Shine, Standardize, and Sustain. The Detroit VA's Systems Redesign Team will take an issue or problem, break it down to its core elements, and then sort those elements. Once that is done, they figure out where exactly these elements can be improved upon, and become the most effective. Once that is developed, they then figure out how to organize it in the neatest and cleanest way. They then make the things they sorted, strengthened and shined, the more effective way of doing things, in other words, it becomes the new standard. Finally, once the first "4 S's" are complete, it comes down to simply sustaining that standard, as well as always striving to better it, improve upon it and update it.[4]

NEED OF STUDY

It is well known that crash cart system is an integral part of system of emergency procedure in any hospital. but it is felt that this system is not used to its potential in most of the hospital. During emergency situation nurses are left with confusion and hurry in getting the emergency medications. A well organised crash cart can save more time and confusion during emergency which in turn can save the life. Some crash carts are organised into drawers with colour code for different type of situations. Defibrillator goal is giving shock to the heart and it will help for survival of person. In endotracheal intubation equipment the tube allows artificial respiration equipment to take over the job of breathing for the patient of life saving equipment.[5]

Cardiac arrest and other emergency conditions require immediate intervention within the first few minutes; hence properly maintained crash carts are essential for improving survival rates. Inadequate knowledge regarding crash cart contents may lead to delays in emergency procedures such as intubation, defibrillation, medication administration, and cardiopulmonary resuscitation (CPR). Research studies indicate that periodic training and mock drills improve nurses' confidence and competency in handling crash carts during emergencies.[15]

Missing, expired, or improperly arranged emergency drugs and equipment can negatively affect patient outcomes and increase medico-legal issues in hospitals. Studies have identified inconsistencies in crash cart checking practices among healthcare professionals, emphasizing the need for standardized protocols and regular auditing.[16]

Proper labeling and organization of crash cart drawers help healthcare workers quickly locate equipment during critical situations, thereby reducing response time. Newly recruited nurses and nursing students may lack

adequate exposure to emergency crash cart management, creating a need for educational assessment and training programs.[17]

Evidence suggests that routine crash cart monitoring and documentation improve accountability and readiness of emergency equipment. Effective crash cart management contributes to patient safety, quality assurance, and better emergency care services in hospitals.[18]

The increasing incidence of cardiovascular diseases, trauma, respiratory emergencies, and critical illnesses has increased the importance of emergency preparedness in healthcare settings. Studies reveal that continuous nursing education programs significantly enhance knowledge and practical skills related to crash cart management.[19]

In emergency units and intensive care settings, nurses play a major role in maintaining crash carts; therefore, assessing their knowledge and practices is important. Lack of awareness regarding the location and functioning of emergency equipment such as defibrillators, suction apparatus, Ambu bags, and airway devices can compromise patient care.[20]

Research findings support the implementation of checklist-based crash cart monitoring systems to ensure completeness and functionality of emergency supplies. Evaluation of nurses' knowledge and practice regarding crash carts can help hospital administrators develop effective training policies and improve emergency preparedness.[21]

The study findings may help in developing guidelines, protocols, and educational modules related to crash cart management for nursing personnel. Proper crash cart management reduces stress and confusion among healthcare workers during emergency situations and promotes coordinated team response. There is limited local research available regarding crash cart preparedness among nursing professionals, which creates a need for further study in this area.[22]

Nurses and doctors are the first in line to provide life support and resuscitation. they should always be clearly aware of the placement of the emergency cart and their contents and their use. Staff must be familiar with the location of all resuscitation equipment within their working area A "Crash Cart" is a mobile, compact cart, equipped with various medical aid tool. The cart consists of items such as a defibrillator, medications, a suction pump, and other life-saving equipment. The function of crash carts is to provide a mobile station within the hospital that contains everything needed to treat a life-threatening situation.[4]

2 OBJECTIVES

STATEMENT OF THE PROBLEM

''A study to assess the effectiveness of structured teaching programme on knowledge regarding crash cart among the 4th year BSc nursing students at selected nursing college, Mysuru.

OBJECTIVES OF THE STUDY

1. To assess the pre-test knowledge regarding crash cart among the 4th year BSc nursing students at selected nursing college, Mysuru
2. To evaluate the effectiveness of structured teaching programme on knowledge regarding crash cart among 4th year nursing students at selected nursing college Mysuru
3. To determine the association between the pretest knowledge scores of the nursing students on knowledge regarding crash cart with their selected demographic variables.

HYPOTHESIS

H1: There is a significant difference between the pre-test and post-test knowledge score among the 4th BSc year nursing students.

H2: There will be a significant association between the level of knowledge of 4th year BSc nursing students' knowledge regarding crash cart and their personal selected variables.

ASSUMPTIONS

The study assumes that;

1. 4th year BSc Nursing students have basic knowledge regarding crash cart contents and emergency management.
2. Proper organization and availability of crash cart items help in effective emergency care.
3. Effective crash cart management contributes to improved quality of patient care and safety.
4. Training and experience influence the competency of nurses in handling crash carts.

MATERIALS AND METHODS

Research Approach: Evaluative research approach.

Research Design: The study adopted a Pre -experimental one group pretest post-test research design

Study Setting and Population: The study was conducted at JSS College of Nursing, Mysuru, the study population included 4th year BSc nursing students.

Sample Size: 60, 4th year BSc nursing students from JSS College of Nursing, Mysuru

Sampling Technique: Simple random sampling technique was used to select participants who met the eligibility criteria.

Data Collection

1. Section A: Demographic Proforma-includes age, gender, type of family, source of information, religion
2. Section B: Structured Knowledge Questionnaire to assess the knowledge of 4th year BSc nursing

students regarding crash cart ((25 items; content validated by experts; r = 0.58)

Tool selected in the research should be the vehicle as for as possible that would provide data for drawing conclusions pertinent to the study, and at the same time add to the body of knowledge in the discipline Based on the research problem and objectives of the study, the following steps were undertaken to select and develop the data collection tool.

Teaching methods

- Interactive lecture sessions
- Demonstration of usage of crash cart steps
- Group discussion and question–answer session
- Feedback and correction were given.

Content covered

- Definition of crash cart
- Function and purposes of crash cart
- Polices of crash cart
- Equipment's and drugs in crash cart
- Action and indication of drugs in crash cart
- Look alike and sound alike drugs
- High alert drugs and their protocols
- Concentrated electrolyte drugs and their administration
- Protocol to change near expiry drugs

Review of Literature

Good research does not exist in vacuum"

Review of literature refers to the activities involved in identifying and searching for information on a topic and developing a comprehensive picture of the state of knowledge on that topic. A review of related literature given an insight into various aspects of the problem under study. The review serves as an integrated function that facilitates the accumulation of knowledge. Hence review of literature is important to research in order to know what has been established and documented. The investigator carried out an extensive review of literature on the research topic in order to gain deeper insight into the problem and to collect maximum relevant information for building the foundation for the study**.**

Review of literature is an integral component of any study or research project.

This chapter deals with the selected studies, which is related to the objectives of the proposed study. It enhances the depth into the crux of the problem. Literature review troughs light on the studies and their findings reported about the problems of the study. Review of literature is a systematic identification, location, scrutiny and summary of written materials that contain information on research problem. Review of literature is an essential step in the research project. It provides basis for future investigation, justifies the need for the study, throws light on the need for the study, reveals constraints of data collection and relates the findings from in a professional discipline from which valid and pertinent theories may be developed.

- SECTIN 1: Studies and literature related to the standardization of crash cart
- SECTION 2: Studies and literature revealing the advantage of crash cart and its maintenance.

SECTION 1: Studies and literature related to the standardization of crash cart

This study is conducted by Adams B D, Shih H, Stuffel E, Robinson A. a video-based training programme improves defibrillator inspection compliance. A.M. Cordial in year 2006 FEB 15; 578 -579.The missed-inspection rate for defibrillators significantly improved from 8.9% to 6.9% (p= 0.037) after video training program implementation. The missed-inspection rate for crash carts, however, actually worsened from 2.7% before to 8.0% (p = 0.0001). Aim of the study to investigate whether a brief video of how to properly inspect crash carts and defibrillators would improve the quality and frequency of these inspections. The study was a before-after cohort design. The final RESULT was video-based training programme improved the frequency and quality of defibrillator inspections, but not crash cart inspections. It was felt that a short video training programme could be viewed on a ward computer at a convenient time.[5]

This study is conducted by Telesca K narrated., Hospital pharms in the year 1992 Dec; Data was collected through simple random sampling technique. 15 random observations per crash cart were made in the pre and post intervention phases each over a period of 3 months from (July 2015 to September, 2015), with a total of 180 observations made, covering all three duty shifts, as the emergency department should be ready24 x 7.The aim of the study was that an organized crash cart can bring a sense of structure to potentially chaotic situation. By standardizing every crash cart, time and confusion can be saved during an emergency situation.11 The result of this study was article describes one hospital's solution to the designed and restocking of crash carts. This approach streamlined the process of restocking the medication component of the crash carts by the pharmacy department. No matter what time of day or night code was called, pharmacy could have the medications replaced within minutes.[6]

This study is conducted by Laufman H, Badner B, ZeinerL.,In the year March-april 1978; The study was carried out in sarvodaya hospital and trinity hoapital.110-113.The Aim of study was every item of which is visible and available without opening drawers for it, and be kept on every nursing station and every special care department of a hospital.12 The RESULT of this study was system study was made of the performance criteria of such a cart under conditions which require its use.[7]

This study is conducted by Adams B D, Shih H, Stuffel E, Robinson A. a video based training programme improves defibrillator inspection compliance. A.M. Cardiol in year 2006 FEB 15 ; 578 -579.The missed-inspection rate for defibrillators significantly improved from 8.9% to 6.9% (p= 0.037) after video training program implementation. The missed-inspection rate for crash carts, however, actually worsened from 2.7% before to 8.0% (p = 0.0001). Aim of the study to investigate whether a brief video of how to properly inspect crash carts and defibrillators would improve the quality and frequency of this inspections. The study was a before-after cohort design. The final RESULT was video-based training programme improved the frequency and quality of defibrillator inspections, but not crash cart inspections. It was felt that a short video training programme could be viewed on a ward computer at a convenient time.[8]

This study is conducted by Agarwal S, Swanson S, Murphy A, Yaeger K, Sharek P, Halamek L. in year 2005 sept;116(3):326-33., Aim of study was comparing the utility of a standard pediatric resuscitation cart based on a Broselow tape. It was found that despite less prior experience with the Broselow cart, subjects in the study found it easier to use and preferred it to the standard cart, they located intubation equipment, and Naso-gastric tubes significantly faster.14 The result of the study was 21 subjects, 62% found the broselow cart 'easy' or "very easy" to use versus 33% for the standard cart. Of the 21 subjects, 67% preferred the broselowcrt, 10% preferred the standard cart, and 23% indicated no performance. Intubation supplies and nasogastric tubes were found significantly faster when using the Broselow cart (mean time: 29.1 and 20 seconds, respectively) versus the standard cart (mean time: 38.7 and 38.2 seconds, respectively). Correct equipment was provided a statistically significant 99% of the time with the Broselow cart versus 83% of the time with the standard cart. Ten percent of the subjects had prior experience with the Broselow cart versus 62% having experience with the standard cart.[9]

SECTION 2: Studies and literature revealing the advantage of crash cart and its maintenance

This study is conducted by Manouchehr Saljoughian Aim: -To study on medical emergencies. He states that in addition to supportive measures, quick therapeutic interventions are essential in most cases. Therefore, access to the right medication to resolve the problem is critical. A selection of drug that is most effective and appropriate in these situations are kept in a special cart known as "crash cart" in all hospital departments responsible for patient care. RESULT of the research was the pharmacy departments are responsible for providing these medications and regularly checking them for stability, replacement and expiration dates. The most important indications, contraindications, dosage, and administration of these drugs are reviewed as a reminder for the physicians, nurses and pharmacists who serve on cardiac arrest (code) teams or who are involved in other emergencies.[10]

This study is conducted by Stewart Taylor conducted a study on crash cart exchange procedure. Anytime the Emergency cart is entered, the integrity seal must be broken. A broken seal signals the need to exchange the cart. Immediately after the cart is used, the staff on the Unit must put a patient label on a Charge Ticket. The unit then returns the used cart to Central Supply and exchanges it for a checked sealed cart. At the time of exchange, the representative from the unit rechecks the cart with a representative from Central Supply to confirm that all supplies are present. A crash cart receipt slip is signed by both checkers. One copy stays with the cart and one stays in CSS.[11]

A study is conducted by Troels Thim,1,2 Niels Henrik Vinther Krarup,1,4 Erik Lerkevang Grove,1 Claus Valter Rohde,3 and Bo Løfgren1 with the aim to use the (A) Airway, (B) Breathing and, (C) Circulation structured approach to the assessment of a sick child to provide an overview of the equipment used in resuscitation attempts involving children. It emphasizes that a working knowledge of the resuscitation equipment used in emergency situations is fundamental to the process of checking and preparing it. The article is aimed at students and newly qualified nurses, but may be also useful as revision for more experienced nurses. The result of study was The ABCDE approach is a strong clinical tool for the initial assessment and treatment of patients in acute medical and surgical emergencies, including both prehospital first-aid and in-hospital treatment. It aids in determining the seriousness of a condition and to prioritize initial clinical interventions. Widespread knowledge of and skills in the ABCDE approach are likely to enhance team efforts and thereby improve patient outcome.[12]

A study is conducted by JB Rousek with the Aim to assess the usability testing and human factors engineering (HFE) principles to create efficient code cart medication drawer modifications to improve code blue medical emergency medication management. A total of 26 health care professionals (13 pharmacists and 13 nurses) were asked to locate items within a code cart medication drawer during two independent simulated code scenarios alternately using either a baseline medication drawer (control; Drawer 1) or a prototype medication drawer (prototype; Drawer 2), which was developed using HFE principles and usability testing. Overall medication retrieval time, wasteful actions, and survey responses were recorded. The results showed that the Drawer 2 had significantly faster trial completion times ($p = .005$) and fewer wasteful actions ($p < .001$) compared to Drawer 1. Participant survey results rated Drawer 2 (prototype) significantly higher (more favourable) for medication drawer visibility ($p < .001$), usability ($p = .011$), and organization ($p < .001$) compared to Drawer I (baseline). The findings

demonstrate that HFE and usability applied to code cart design are effective,14 is customizable, and can affect patient safety by saving valuable time and reducing wasted motions (including errors) during code situations.[13]

This study is conducted by JM Lavelle, K N shaw, at 1993 with the aim of is emergency department cardiopulmonary resuscitation or intensive care unit cerebral resuscitation indicated, To report the neurologic outcome of a series of near-drowning victims treated with supportive management without aggressive cerebral resuscitation. to identify patient characteristics that indicate prognosis and guide therapy at the scene, the Emergency Department, and in the intensive care unit (ICU). Result: warm-water near-drowning patients, 56% survived neurologically intact, 32% survived in a persistent vegetative state, and the remaining 32% died. Unreactive pupils in the Emergency Department and a Glasgow Coma Score of < or = 5 on arrival to the ICU were the best independent predictors of poor neurologic outcome (odds ratio and 95% confidence intervals 374 [17 to 16,000] and 51 [5 to 2,200], respectively). However, no predictor was absolute and two no hypothermic patients who arrived to the Emergency Department without vital signs, requiring cardiopulmonary resuscitation and cardiotonic medications, had full neurologic recovery. Conclusion: the cast further doubt on the utility of aggressive forms of cerebral monitoring and resuscitation and emphasize the need for initial full resuscitation in the Emergency Department.[14]

RESULT

SECTION I: EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE REGARDING CRASH CART AMONG THE 4TH YEAR BSC NURSING STUDENTS AT SELECTED NURSING COLLEGE, MYSURU

Knowledge of 4th year nursing students was assessed using structured knowledge questionnaire. Knowledge scores were ranged from 0-25. The knowledge scores were further arbitrarily divided as poor knowledge (0-9), average 10-19) and good knowledge (20-25). The findings are presented in table 2.

Table 2: Frequency and percentage distribution of level of knowledge of 4th year BSc nursing students according to their pretest and post-test knowledge scores.
N=60

Knowledge Level	Pre- test f (%)	Post- test f (%)
Poor knowledge (0-9)	29(48.3%)	0(0.0%)
Average knowledge (10-19)	27(45%)	29(48.3%)
Good knowledge (20-25)	4(6.7%)	31(51.7%)

Table 3: Mean, Median, Standard deviation and Range of pre-test and post-test knowledge score of 4th year BSc nursing students
n=60

Test	Mean	Median	Range	SD
Pre-test	14.3	16	19	±3.82
Post-test	19.51	20	10	±2.36

Table 4: Mean, mean difference, standard deviation difference, standard error and paired 't' value of pre-test and post-test knowledge scores of 4th year BSc nursing students.
n=60

Knowledge Scores	Mean	Mean Difference	SD Difference	Standard Error	Paired 'T' Test Value
Pre-test	14.43	5.08	5.26	0.679	7.23*
Post-test	19.51				

t (99) =2.015; p<0.05* Significant

SECTION III: Association between level of practice of 4th year BSc nursing students and their selected personal variables

There was no statistically significant association between the level of knowledge of 4th year BSc nursing students and their selected personal variables.
N=60

Sl. No.	Sample Characteristics	Inadequate Knowledge	Moderate Knowledge	Chi-square
1. Age in years				
	20	2	3	0.025#
2. Gender				
	Male	3	8	0.0144#
	Female	17	32	
3.Type of family				

	Nuclear family	19	34	0.507#
	Joint family	1	6	
4. Source of information				
	Academics	16	9	1.169
	Mass medi	13	11	
	Health personal	5	6	
5. Religion				
	Christian	18	10	4.219
	Hindu	13	11	
	Muslim	6	2	

$\chi^2(1) = 3.84$; $\chi^2(2) = 5.99$; $p > 0.05$ = Not significant (NS); $p < 0.05$ = Significant (*); # = Yates' correction.

The study revealed that association between selected demographic variables and the pre-test level of knowledge was assessed using the chi-square test. The findings revealed that there was **no statistically significant association** between **age** ($\chi^2 = 0.028$#), **gender** ($\chi^2 = 0.0144$#), **type of family** ($\chi^2 = 0.507$#), **source of information** ($\chi^2 = 1.169$), and **religion** ($\chi^2 = 4.219$) with the pre-test knowledge level of the participants, as the calculated chi-square values were not statistically significant at the 5% level ($p > 0.05$). Therefore, the **null hypothesis (H_0) was accepted**, indicating that the pre-test knowledge level was independent of the selected demographic variables.

DISCUSSION

The present study assessed the effectiveness of a structured teaching programme on knowledge regarding crash cart among 4th year BSc Nursing students. The pre-test findings indicated that nearly half of the participants had poor knowledge, while only a small proportion demonstrated good knowledge regarding crash cart management. These findings suggest that although nursing students receive theoretical instruction, additional focused education is necessary to strengthen their understanding of emergency equipment and procedures.

Following the implementation of the structured teaching programme, a marked improvement in knowledge was observed. More than half of the students achieved good knowledge, and no participant remained in the poor knowledge category. The increase in the mean knowledge score from 14.43 to 19.51 further confirms the effectiveness of the educational intervention. The statistically significant paired t-test value ($t = 7.23$, $p < 0.05$) supports the first hypothesis, indicating that the structured teaching programme significantly improved students' knowledge regarding crash cart management.

These findings are consistent with previous studies conducted by Revathy et al. (2023), Kaushik (2019), and Archala Khemnar et al. (2017), which reported significant improvement in nursing students' knowledge after structured teaching programmes related to crash cart utilization and emergency preparedness. Previous literature has also emphasized that continuous education, regular training sessions, and simulation exercises improve nurses' competency and confidence in managing emergency situations.

The association between pre-test knowledge and selected demographic variables was analysed using the chi-square test. The findings showed no statistically significant association between age, gender, type of family, source of information, or religion and the pre-test knowledge level ($p > 0.05$). These findings indicate that baseline knowledge regarding crash cart was not influenced by the demographic characteristics of the participants. Therefore, educational interventions should be provided equally to all nursing students irrespective of their demographic background.

Overall, the study demonstrates that structured teaching programmes are an effective educational strategy for improving nursing students' knowledge regarding crash cart management and can contribute to better emergency preparedness and patient safety.

CONCLUSION

The present study concludes that the structured teaching programme was effective in improving the knowledge of 4th year BSc Nursing students regarding crash cart management. There was a statistically significant increase in the post-test knowledge scores compared to the pre-test scores, indicating the effectiveness of the educational intervention. Although most students possessed only poor to average knowledge before the intervention, the majority attained good knowledge following the structured teaching programme.

No statistically significant association was found between pre-test knowledge and selected demographic variables such as age, gender, type of family, source of information, and religion. Therefore, knowledge regarding crash cart management appears to be independent of these demographic characteristics.

The findings emphasize the importance of incorporating structured teaching programmes, regular workshops, simulation-based learning, and periodic refresher training into the nursing curriculum to improve emergency preparedness. Strengthening nursing students' knowledge and competency in crash cart management can contribute to timely emergency response, enhanced patient safety, and improved quality of nursing care.

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