# EFFECTIVENESS OF EDUCATIONAL PROGRAM ON NURSES PERFORMANCE REGARDING EMERGENCY CRASH CART MATERIAL MANAGEMENT IN GOVERNMENTAL CARDIAC CENTERS KHARTOUM STATE SUDAN

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**Abstract**

The emergency crash cart is a portable trolley containing all equipment and drugs needed to treat a life threatening situation. Aim: study knowledge of nurses regarding Emergency Crash Cart material management. Design: An interventional Hospital based study pre –posttest design was conducted at Ahmed Gasim Cardiac Center and Shab Cardiac Center. 132 nurses participated in the study by responding to the questionnaire which tested their knowledge, pre and post educational Results: Most of participant were female (70%), half of participant (54%) Experience from 6 to 10 years. Strongly disagree in pre educational program Nurses knowledge was 40.3%, disagree 28.76% strongly agree 11.82 %and agree 13.92%. While in post education strongly agree 48.53 agree 32.4, strongly disagree 7.39 and disagree 7.6. mean in pre 13.91 in post increased to 24.09 and the Std. Deviation pre 3.72 post 3.81 (There is a statistically significant increase in the degree of nurses' knowledge in the post measurements).Conclusions Educational program was improvement of nurse's performance regarding emergency Crash Cart management . Recommendations: All nurses must be will trained regarding emergency Crash Cart management. Keywords: Performance, Crash Cart, Nurses, Educational Program

## 1. INTRODUCTION

The emergency crash cart is a portable trolley containing all equipment and drugs for emergency cardiopulmonary resuscitation (CPR).[1] The function of crash carts is to provide a mobile station within the hospital that contains everything needed to treat a life-threatening situation. [2]The availability and proper operation of the resuscitation equipment are necessary for successful cardiopulmonary resuscitation. [3] Defects with missing or malfunctioning resuscitation equipment in resuscitation trolleys have been identified by the National Patient Safety Agency (NPSA) as threats to patient safety and causes of death among in-patients needing CPR. [4] Basic protocols must be followed when setting up the trolley, including the locations and monitoring schedules that must be followed throughout the institution on a regular basis. [6] Although studies have emphasized how important it is to have the right tools,

supplies, and medications on hand to successfully manage emergencies, along with staff members who are aware of where to find them and what they contain, it is discovered that the availability of essential tools varies from hospital to hospital. [7] There is a focus on standardization since it improves the staff's familiarity with operating crash carts and lowers the likelihood of mistakes and misunderstandings during an emergency. [8] Poor familiarity with the equipment and a failure to recognize component failure or damaged devices result from operators' lack of daily checks and insufficient training.[9] Numerous studies from around the world have documented the occurrence of missing or outdated supplies or equipment as a result of the absence of the supply list.[10] The fact that nurses frequently "float" between various patient care units can have an impact on their performance and confidence during a code since they are unfamiliar with the layout of the code cart.[11] Janda and others Standardization is stressed since it improves staff familiarity with the crash carts and lowers the likelihood of mistakes and misunderstanding in an emergency[12] . Poor familiarity with the equipment and an inability to recognize component failure or broken devices are the results of insufficient training and operators' failure to undertake daily checks.[13] For patients with such life-threatening conditions presenting to the emergency department (ED), crash carts have become essential tools for resuscitation.[14] For instance, in cardiac arrest situations, every minute's delay in resuscitation can lead to a drop in successful outcomes by 7%−10%. [15]Thus, timely access to a defibrillator, resuscitation medications, supplies, and equipment should be fast and easy, and crash carts need to be carefully equipped, organized, and maintained. [16] As a result, immediate access to a defibrillator, resuscitation drugs, supplies, and equipment should be simple and quick, and crash carts need to be meticulously outfitted, maintained, and organized. [17]To decrease the possibility of medication errors, shorten the time it takes to retrieve medications, and ensure that the medications are properly labeled by The Joint Commission's (TJC) medication management standard. [18]

## 1.1 Hypothesis

1. No Significant difference in the nurse's performance after the educational program.

2. Significant difference Nurse's performance enhanced after the educational program

## 1.2 General objective

1. To study Effectiveness of an Educational Program on Nurses Performance regarding Emergency Crash Cart management Pre and Post educational program

## 1.3 Specific objectives

To assess nurse's knowledge regarding Emergency Crash Cart management Pre and Post educational program.

## 2. MATERIALS AND METHODS

## 2.1 Study design

An interventional Hospital based study with a pre intervention and post intervention assessment.

## 2.2. Study area/study setting

The research was carried out in cardiac hospitals in Khartoum state. There are two Cardiac Hospitals in the government: Shab and Ahmed Gasim hospitals.

## 2.3. Study population

Study participants were nurses who work in Coronary Care Unit (CCU1), Intensive Care Unit (ICU), and Coronary Care Unit (CCU2) in Cardiac Center in Ahmed Gasim hospital. and Coronary Care Unit(CCU), Intensive Care Units(ICU), Intermediate Intensive Care Units (IICU) at the Shab Cardiac Center.

## 2.4. Tools, scoring, and interpretation

The structured questionnaire was prepared to assess, information needed to achieve the goal of the study. (Pre and post-educational program questionnaire for nurses) It is composed of two Part (I) Data on the socio-demographic characteristics, including age, gender, educational background, and level of experience. Work environment and have received prior training in crash cart management. Part II: to evaluate Nurses' knowledge of managing Crash Cart material and articles consists of eight elements that can be arranged differently depending on the standard, with a checklist for each drawer's contents. Daily equipment testing is recommended, and documentation for crash carts is updated whenever modifications are made. Having experience using Crash Cart equipment, nurses can certify that everything is in working order, drawers are Labeled with content, and restocked of the crash cart. The scoring system: a Likert scale scores were used five points strongly agree (5), Agree (4), Neutral (3), Disagree (2), and strongly disagree (1)

## 2.5. Data Collection Procedure

Governmental Cardiac Centers in Khartoum State (Ahmed Gasim Cardiac and Shab Cardiac Center) were chosen as the sampling frame, along with a total coverage sample. Sample size 132 Nurses Complete the study. Before and after the educational session, the researcher provided a pre- and post-educational program questionnaire. Ethical approval was obtained from Al Neelain University by The Institutional Review Board (IRB) and Nursing Colleges. Khartoum State Ministry of Health innovation, Development and scientific research department received its second IRB certification (MOH). Additionally, Ahmed Gasim and Shab Heart Centers, two government institutions, authorized the study. The researcher explained the objectives of the study to the participant.

The voluntary consent of the participants was obtained in writing and they were able to withdraw at any time without penalty. They were told about the study and its anticipated benefits, which included enhancing their understanding of emergency crash carts and changing their attitudes about them. Additionally, there were no known risks related to the trial. Instead of names, the participants were given code numbers to ensure confidentiality. They stated that no one had accessed the data they had gathered.

## 2.6 Data analysis

The researcher used several statistical treatments to process data, using the Statistical Package for Social Sciences (SPSS) program, and select the following :Means: to find out the direction of differences between groups'-test one-tailed to reveal the general characteristic of the study variables. T-test two-tailed: to reveal the significance of the differences between the two groups .was used to code and enter the data. When the P value is 0.05 percent or higher and the analysis plan is present, the results are considered valid. With regard to demographic data, the descriptive analysis will concentrate on frequencies and identify differences across groups.

## 3. RESULTS

### Table 1: Distribution demographic data

| Variable | Socio-demographic data | Number | % |
|---|---|---|---|
| Gender | Male | 40 | 30% |
| | Female | 92 | %70 |
| Age | 20 - 30 | 46 | 35% |
| | 31 - 40 | 72 | 54% |
| | 41-50 | 14 | 11% |
| Qualification | Bachelor | 117 | %89 |
| | Master | 15 | %11 |

Table (1): Show that Most of participant were female (70%) , hade aged between 31 to 40 years(54%) and about (89%) of them were Bachelor in nursing.



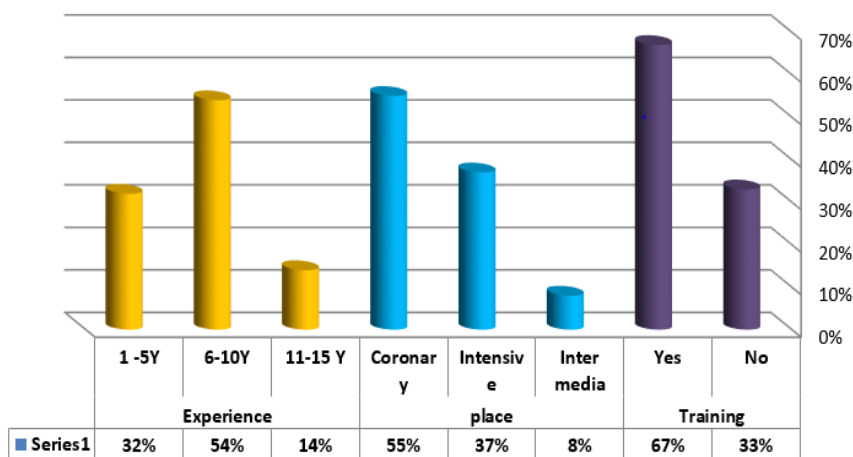| | 1 -5Y | 6-10Y | 11-15 Y | Coronary | Intensive | Inter media | Yes | No |
|---|---|---|---|---|---|---|---|---|
| | Experience | | | place | | | Training | |
| Series1 | 32% | 54% | 14% | 55% | 37% | 8% | 67% | 33% |

### Figure 1: shows the level of experience work place and training before

The above figure show half of participant (54%) Experience from 6 to 10 years , Work place were Coronary Care Units 55% of them , most of participant were not have training for crash cart management before 67 % of them

**Table 2: shows the pre educational program Nurses knowledge about Crash Cart content and articles management (n=132)**

| No | Items | Strongly agree | | Agree | | Neutral | | Disagree | | Strongly disagree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Frequency | Percent | Frequency | Percent | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| 1 | Crash cart drawers arrangement depend of standard? | 11 | 8.3 | 21 | 15.9 | 7 | 5.3 | 45 | 34.1 | 48 | 36.4 |
| 2 | Crash cart drawers have chick list for each drawer content? | 16 | 12 | 13 | 9.8 | 9 | 6.7 | 48 | 36 | 47 | 35.6 |
| 3 | Nurses Check functioning of the equipment daily | 13 | 9.8 | 20 | 15.2 | 3 | 2.3 | 48 | 36.4 | 48 | 36.4 |
| 4 | Crash cart documentation and updated when changes are made to the crash cart | 15 | 11.4 | 26 | 19.7 | 6 | 4.5 | 33 | 25.0 | 52 | 39.4 |
| 5 | Nurses can operate all Crash Cart equipment | 20 | 15.2 | 19 | 14.4 | 7 | 5.3 | 34 | 25.8 | 52 | 39.4 |
| 6 | Nurses confirm all equipment are in good working condition each shift | 16 | 12.1 | 15 | 11.4 | 10 | 7.6 | 38 | 28.8 | 53 | 40.2 |
| 7 | drawers Labeling with content | 15 | 11.4 | 24 | 18.2 | 9 | 6.8 | 29 | 22.0 | 55 | 41.7 |
| 8 | Crash cart must be restocked after used | 19 | 14.4 | 9 | 6.8 | 4 | 3.0 | 29 | 22.0 | 71 | 53.8 |
| | Total | | 11.82% | | 13.92% | | 5.2% | | 28.76 | % | 40.3% |

The above table show that , most of participant were Strongly disagree in pre educational program Nurses knowledge about Crash Cart content and articles management total of Strongly disagree 40.3%, disagree 28.76% while total of strongly agree 11.82 %and agree 13.92% (the percent of disagree and Strongly disagree are high There is low of nurses' knowledge in pre measurements).

**Table 3: Shows the post educational program Nurses knowledge about Crash Cart content and articles management (n=132).**

| No | Items | Strongly agree | | Agree | | Neutral | | Disagree | | Strongly disagree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Frequency | Percent | Frequency | Percent | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| 1 | Crash cart drawers arrangement depend of standard? | 59 | 44.7 | 46 | 34.8 | 5 | 3.8 | 12 | 9.1 | 10 | 7.6 |
| 2 | Crash cart drawers have chick list for each drawer content? | 66 | 50.0 | 39 | 29.5 | 7 | 5.3 | 12 | 9.1 | 8 | 6.1 |
| 3 | Nurses Check functioning of the equipment daily | 64 | 48.5 | 43 | 32.6 | 4 | 3.0 | 8 | 6.1 | 13 | 9.8 |
| 4 | Crash cart documentation and updated when changes are made to the crash cart | 54 | 40.9 | 49 | 37.1 | 5 | 3.8 | 10 | 7.6 | 14 | 10.6 |
| 5 | Nurses can operate all Crash Cart equipment | 65 | 49.2 | 42 | 31.8 | 6 | 4.5 | 8 | 6.1 | 11 | 8.3 |
| 6 | Nurses confirm all equipment are in good working condition each shift | 70 | 53.0 | 38 | 28.8 | 8 | 6.1 | 9 | 6.8 | 7 | 5.3 |
| 7 | drawers Labeling with content | 66 | 50.4 | 40 | 30.5 | 3 | 2.3 | 12 | 9.2 | 10 | 7.6 |
| 8 | Crash cart must be restocked after used | 68 | 51.5 | 45 | 34.1 | 5 | 3.8 | 9 | 6.8 | 5 | 3.8 |
| | Total | | 48.53 | | 32.4 | | 4.08 | | 7.6 | | 7.39 |

The above table show that , most of participant  were Strongly agree in post  educational program Nurses knowledge about Crash Cart  content and articles management  Strongly agree 48.53 agree 32.4 while strongly disagree 7.39 and disagree 7.6 (the percent of agree and Strongly agree  are high There is increased of nurses' knowledge post  educational program measurements  )

**Table 4: Shows the Descriptive Statistics about pre /post  educational program Nurses knowledge about Crash Cart content and articles management  (n=132).**

| | | Pre | | Post | |
|---|---|---|---|---|---|
| | | **Mean** | **Std. Deviation** | **Mean** | **Std. Deviation** |
| 1 | crash cart drawers arrangement depend of  standard | 2.2576 | 1.32285 | 4.0000 | 1.24177 |
| 2 | crash cart  drawers have chick list for each  drawer content | 2.2727 | 1.35968 | 4.0833 | 1.21090 |
| 3 | Nurses Check functioning of the equipment  daily | 2.2576 | 1.35140 | 4.0379 | 1.28648 |
| 4 | Crash cart documentation and updated when changes are made to the crash cart | 2.3864 | 1.45491 | 3.9015 | 1.30682 |
| 5 | Nurses can operate all Crash Cart equipment | 2.4015 | 1.49738 | 4.0758 | 1.23944 |
| 6 | Nurses confirm all equipment  are in good working condition each shift | 2.2652 | 1.40261 | 4.1742 | 1.14915 |
| 7 | drawers Labeling with  content | 2.3561 | 1.45745 | 4.0687 | 1.25998 |
| 8 | Crash cart must be restocked after used | 2.0606 | 1.46594 | 4.2273 | 1.05996 |
| | Total | 13.91 | 3.72 | 24.09 | 3.81 |

The above table show , that the differences between the mean in pre/ post  educational program nurses knowledge regarding  Crash Cart content and articles management  the total mean in pre 13.91  in post  increased to 24.09  and the Std. Deviation pre 3.72 post 3.81 (There is a statistically significant increase  in the degree of nurses' knowledge in the post measurements).

## 4. DISCUSSION

The importance of these findings might be linked to the organization of a training course on emergency crash cart management, which aimed to raise the bar for patient care and establish safe practices for maintaining crash carts and levels of standardization. [19]Knowledge of crash carts, equipment familiarity, equipment handling skills, defibrillator safety, and adequate documentation are among the important duties of nurses in intensive care.[20] According to the current study , the majority of nurses were female, the majority of them had bachelor's degrees in nursing, and half of them had experience ranging from six to ten years.) Nurses knowledge about Crash Cart content and articles management most of participant pre educational program strongly disagree 40.3%, disagree 28.76% while total of strongly agree 11.82 %and agree 13.92% (the percent of disagree and strongly disagree are high There is low of nurses' knowledge in pre measurements). A similar study was conducted (2016) to assess the

knowledge of critical care nurses related to essential crash cart trolley with basic emergency medications concluded that there is lack of knowledge related to essential crash cart trolley with basic emergency crash cart . [22] Post educational program result Strongly agree 48.53 agree 32.4 while strongly disagree 7.39 and disagree 7.6 (the percent of agree and Strongly agree are high There is increased of nurses' knowledge post educational program measurements The findings of the study, which are similar to study carried out by Madhya Madhusudan Singh. [23] Mentioned three facts why nurse's knowledge was low first fact that the majority of participants with Bachelor's degrees in nursing and crash cart management did not have these topics covered as sparingly in their level. Second fact that nurses don't use self-learning resources or keep up with new information. Another fact is that nurses' workloads don't allow them to read and keep their knowledge currentin the current study 67% of the participants had never trained about crash cart management before. Majority of participants 89% with Bachelor's degrees in nursing and halve of them 54%withe Experience from 6 to 10. It support also by Rawiaa Ibrahim study (2017), who found that such teaching programs generally improved knowledge by 33%. [24]Additionally, this outcome is consistent with (Paramesha& kumar, et al., 2016) who evaluates the impact of a self-instructional knowledge module on hospital emergency crash cart usage between 4th year B. Sc. nursing Students at specific Mysore nursing schools Pretest results showed that fourth-year B. Sc. nursing students had a low level of understanding. [25] The results of this study supported hypothesis (II), significant difference, with regard to nurses' performance. Following educational program.

## 5. CONCLUSION

According to the completed study, standardization in the crash carts may be fully adopted in terms of labeling and documentation protocols to promote visibility and staff accountability in order to manage situations in an efficient manner. Additionally, it demonstrated how difficult it was to bring about change in clinical practice when it came to the management of emergency equipment so that new procedures for checking and maintaining emergency equipment might be established. The medications management were not adequately available, however could lead to medication error during emergencies. The equipment checking procedures were not carried out correctly, the nursing staff should be well-versed in the equipment's functionality, nevertheless. It is impossible to dispute the significance of signs and staff awareness of the role of end users through frequent training.

**Ethical Approvals**

Ethical clearance certificate from Khartoum state ministry of health innovation, Development and scientific research department REC -07-2021

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