Effectiveness of Educational Program on Nurses knowledge regarding Emergency Crash Cart medication management in Governmental Cardiac Centers Khartoum State Sudan 2019-2022

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Abstract

Background: According to the Joint Commission, crash cart-related patient safety issues are mixed-up medications, medication errors, damaged or expired medicines, improper checking of crash cart and non-competent staff. and enables health care providers to manage medical emergencies easily and confidently. **Aim:** To study effectiveness of the Educational Program on Nurses' knowledge regarding Emergency Crash Cart medication management. **Methods:** An interventional Hospital based study pre –post-test design carried out at Governmental Cardiac Centers Khartoum State Sudan. the total coverage sample (132) nurses were participate in the study. Data collected using a standardized questionnaire Pre and post Educational Program. **Results:** the percent of disagree and Strongly disagree are high in pre nurses knowledge 43.9 % strongly disagree, disagree 25.6 % ,while post Educational Program results strongly agree 44% , Agree33% .There were statistically significant differences between the nurse's knowledge, as the calculated (T) value reached, -13.33, in pre measurement ,-18.30 in post measurement which is a statistically significant value at the level of significance.01, where the Sig value is (.00). There is a statistically significant increase in the degree of nurses' knowledge in the post-measurement)

Keywords: Emergency; Crash Cart; Medication management; Educational program; Knowledge; Nurses

Introduction

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 . (1)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. (2)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.(3) The National Accreditation Board of Hospitals and Health Care Providers (NABH) sets standards and justifies obligatory regulations for effective access to emergency medication, including sufficient medication storage in a standardized manner across the institution. (4) Additionally, it suggests a daily check system guaranteeing proper stock levels, expiration date tracking, paperwork to establish employee accountability, and locking mechanisms to deter theft. (5)in cardiac arrest situations, every minute's delay in resuscitation can lead to a drop in successful outcomes by 7%–10%.(8)

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

2. Methodology

Study design :- An interventional Hospital based study with a pre intervention and post intervention assessment designed was conducted during the 2019- 2022.

Study area and setting : -Was carried out in Khartoum State Sudan Governmental Cardiac Centers at Ahmed Gasim and Shab Cardiac Centers in Coronary Care Unit (CCU1), Intensive Care Unit (ICU), 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.

Study population : All nurses work in (Ahmed Gasim Cardiac and Shab Cardiac Center) were chosen

Inclusion criteria: Nurses were included in the study by the following eligibility requirements Gender : Males and Females both, holders of a bachelor's degree in nursing, Job type: a permanent position and Working departments include the Intensive Care Unit, Coronary Care Unit (1)and Coronary Care Unit(2)Ahmed Gasim Cardiac Center.

Intensive Care Unit, Intermediate Coronary Care Units, and Coronary Care Unit were employed by the Shab Cardiac Center.

Exclusion criteria: Nurses who do not attend the educational program three nurses were on holyday and sec live .

Sampling : 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 135 Nurses Complete the survey

Data collection Toll : The researcher created a pre and post-educational program questionnaire that included two parts. socio-demographic characteristics including age, gender, educational background, and level of experience. work environment and have received prior training in crash cart management. The second part is to evaluate nurses' knowledge of crash cart medication management . The scoring system: a Likert scale scores were used five points Strongly agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly disagree (1). Before the educational program began the pre-data was collected, and three months later the post-program evaluation got started using the same questionnaire**.**

Data analysis: The researcher used several statistical treatments to process data, using the Statistical Package for Social Sciences (SPSS) program, 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 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 concentrate on frequencies and identify differences across groups

Ethical Approval The study was approved by The Institutional Review Board (IRB) Nursing Colleges at AlNeelain University provided their approval for this study. The second approval from the IRB for the research division of the Khartoum State Ministry of

Health (SMOH). additionally, the study was approved by governmental hospitals Ahmed Gasim and Shab heart centers.

3.Results

Table No. (1) Distribution Demographic data for the studied nurses (N=132).

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 nurses were female(70%) , hade aged between 23 to 40 years(54%) and about (89%) of them were Bachelor in nursing. regarding years of experience half of nurses (54%) were have experience 6-10 years .nurses disruption 55%were in coronary care units Most of Nurses (67%) hadn't received training before .

3.Results

Table No. (2) Distribution Demographic data for the studied nurses (N=132).

Variable	Socio-demographic data	Number	%
Experience	1 -5Y	42	%32
	6-10Y	71	%54
	15-11 Y	19	%14
Work place	Coronary Care Units	72	%55
	Intensive Care Unite	49	%37
	Inter media Intensive Care Unite	11	%8
have training before	Yes	44	%33
	No	88	%67

Table (1): Show that (54%) were have experience 6-10 years .nurses disruption 55%were in coronary care units Most of Nurses (67%) hadn't received training before .

Table No. (3) shows the pre educational program nurses knowledge regarding Crash Cart medication management (n=132).

NO	ITEMS	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
		Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	the emergency crash cart have a list of medication	10	7.6	20	15.2	8	6.1	35	26.5	59	44.7
2	The medication checked based on expiry date ?	20	15.2	17	12.9	6	4.5	32	24.2	57	43.2
3	the medication arranged according to their action	19	14.4	17	12.9	7	5.3	37	28.0	52	39.4
4	the medication arranged in sequence and in order	14	10.6	14	10.6	6	4.5	33	25.0	59	44.7
5	the crash cart contain emergency drugs according to stander amount	19	14.4	9	6.8	4	3.0	29	22.0	71	53.8
6	Organizing of the medication in crash carts reduce of medication error	11	8.3	21	15.9	7	5.3	45	34.1	48	36.4
7	the emergency crash cart drugs Labeled to their action policy?	24	18.0	21	15.9	5	3.8	23	17.4	59	44.7
	Total		12.8 %		12.9 %		4.8 %		25.6 %		43.9%

The above table show that , most of participant were Strongly disagree in pre educational program Nurses knowledge about Crash Cart medication management 43.9 % ,disagree 25.6 % ,while strongly agree 12.8% and agree 12.9% (the percent of disagree and Strongly disagree are high There

is low of nurses' knowledge about Crash Cart medication management pre educational program).

Table No. (4) shows the post educational program nurses knowledge regarding Crash Cart medication management (n=132).

NO	ITEMS	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
		Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	the emergency crash cart have a list of medication	43	32.6	47	35.6	10	7.6	16	13.6	14	10.6
2	The medication checked based on expiry	64	48.5	33	25.0	6	4.5	11	8.3	18	13.6
3	the medication arranged according to their action	46	35.1	52	39.7	11	8.4	9	6.9	13	9.9
4	the medication arranged in sequence and in order	64	48.5	40	30.3	9	6.8	10	7.6	9	6.8
5	the crash cart contain emergency drugs according to stander amount	67	50.8	44	33.3	5	3.8	8	6.1	8	6
6	Organizing of the medication in crash carts reduce of medication error	65	49.2	47	35.6	3	2.3	5	3.8	12	9
7	the emergency crash cart drugs Labeled to their action policy?	53	40.2	42	31.8	9	6.8	17	12.9	11	8.3
	Total		44%		33%		5.7%		8.5%		9%

The above table show that , most of participant total percent Strongly agree in post educational program Nurses knowledge about Crash Cart medication management were 44% ,33% agree ,while 8.5 % Disagree and9% Strongly disagree. (the percent of agree and Strongly agree are high There

is increased of nurses' knowledge about Crash Cart medication management post educational program measurements).

Table No. (5) shows the pre /post educational program nurses knowledge regarding Crash Cart medication management(n=132).

No		Pre		Post	
		Mean	Std. Deviation	Mean	Std. Deviation
1.	the emergency crash cart have a list of medication	2.1439	1.33434	3.9242	1.33727
2.	The medication checked periodically based on expiry	2.3258	1.44504	3.8636	1.50570
3.	the medication arranged according to their action	2.3485	1.25975	3.8321	1.46712
4.	the medication arranged in sequence and in order	2.2197	1.23136	4.0530	1.42129
5.	the crash cart contain emergency drugs according to stander amount	2.0606	1.14696	4.1667	1.46594
6.	Organizing of the medication in crash carts reduce of medication erro	2.2576	1.21712	4.1212	1.32285
7.	the emergency crash cart drugs Labeled to their action policy?	2.4545	1.31053	3.8258	1.60326
Total		15.71	4.00	28.13	4.5

The above table show , that the differences between the mean in pre/ post educational program nurses knowledge regarding Crash Cart medication management the total mean in pre 15.71 in post increased to 28.13 and the Std. Deviation pre 4.00 post 4.5 (There is a statistically significant increased in the degree of nurses' knowledge in the post measurements).

Table (6) showing the result of (T) test- Statistics Pre- post educational program Nurses knowledge about Crash Cart Medications (n=132).

	N	Items	criterion Value	Mean	Std. Deviation	Df	(T)	Sig. (2-tailed)	Inference
Pre	132	(7)	21	15.71	4.5		-13.33	.000	Sig
Post	132	(7)	21	28.13	4.47		18.30	.000	Sig

The above table show, the differences between the mean and the criterion value are statistically significant, as the calculated (T) value reached, -13.33, in pre measurement, -18.30 in post measurement which is a statistically significant value at the level of significance.01, where the Sig value is (.00). That mean differences are statistically significant, In favor of the criterion value versus the mean, then the result is: There is a statistically significant increase in the degree of nurses' knowledge in the post-measurement)

4.Discussion

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. Percentage distribution participant nurses before Nurses knowledge about Crash Cart medication management 43.9 % of participant were Strongly disagree and 25.6 % disagree . Adverse events reporting study in gynecology and obstetrics area of an urban teaching hospital revealed total 82 events in 6 weeks period out of which 56% events were reported from obstetrics while remaining 44% were from gynecology [(12).] Total 1976 medication errors were reported in an observational study conducted upon 10000 women in obstetric emergency ward of a hospital in Egypt in 2010 [(13)] . have a list of medication 44.7 % , The medication checked periodically based on expiry 43.2 ,the medication arranged according to their action 39.4% , the crash cart contain emergency drugs according to stander amount 53.8 % , Organizing of the medication in crash carts reduce of medication error 36.4% and the emergency crash cart drugs Labeled to their

action policy 44.7. Crash Cart medication management the total mean in pre 15.71 in post increased to 28.13 and the Std. Deviation pre 4.00 post 4.5 (There is a statistically significant increased in the degree of nurses' knowledge in the post measurements). According to the Joint Commission, some of the factors leading to most of the crash cart-related patient safety issues are mixed-up medications, medication errors, damaged or expired medicines, improper checking of crash cart as per policies and procedures and non competent staff .[14] There must be strengthened system for medicines management and expiry monitoring to prevent any health hazard in a healthcare system .[15] Once a medicine is expired, its safety and efficacy becomes uncertain as per U.S. Food and Drug Administration. [16.]Healthcare professionals must play their role in the monitoring of expired or deteriorated medicines in healthcare areas by following the approved international guidelines of treatment and rationalized usage of medications .[17] 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 medications Thakur Sudarshan K.,TakAnjna, Bajaj Nisha (2018). similar study to assess the effectiveness of structured teaching programme on knowledge regarding utilization of crash cart trolley among III -B.Sc Nursing students Concluded the knowledge regarding crash cart trolley in pre-test. After providing structured teaching programme on utilization of crash cart trolley there is a significant improvement on knowledge of students regarding crash cart trolley. {S. Aruna and Kalaimathy K. and G.Sivasakthi Raman},

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 to manage situations efficiently. 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.

6.Recommendations

Following are some recommendations that are offered based on the findings of the present study: Ongoing training initiatives to keep nurses working in emergency rooms up to speed on their knowledge and abilities. To generalize the findings, the study may be replicated with larger sample size and in a different hospital context. An intermittent assessment of critical care nurses' knowledge and skills regarding various nursing practices at the intensive care units. The system of inspecting, changing, and repairing the emergency trolleys' equipment might be made better by developing the Standard Operating Procedures in-service training.

References

1. Agarwal, S., Swanson, S., Murphy, A., Yaeger, K., Sharek, P., & Halamek, L. P. (2005). Comparing the utility of a standard pediatric resuscitation cart with a pediatric resuscitation cart based on the Broselow tape: A randomized, controlled, crossover trial involving simulated resuscitation scenarios. *Pediatrics*, *116*(3). https://doi.org/10.1542/peds.2005-0320
2. Aggou, M., Fyntanidou, B., Papapostolou, K., Nikopoulou, A., Lalopoulou, M., Fortounis, K., & Grosomanidis, V. (2015). Training in BLS/AED: Is it enough to perform resuscitation? *Resuscitation*, *96*. https://doi.org/10.1016/j.resuscitation.2015.09.209
3. Benner, P. (2004). Using the dreyfus model of skill acquisition to describe and interpret skill acquisition and clinical judgment in nursing practice and education. *Bulletin of Science, Technology and Society*, *24*(3). https://doi.org/10.1177/0270467604265061
4. Berg, R. A., Hemphill, R., Abella, B. S., Aufderheide, T. P., Cave, D. M., Hazinski, M. F., ... & Swor, R. A. (2010). Part 5: adult basic life support: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation, 122(18_suppl_3), S685-S705.
5. Bhatia, M. B., Mohan, S. C., Blair, K. J., Boeck, M. A., Bhalla, A., Sharma, S., Helenowski, I., Tatebe, L. C., Nwomeh, B. C., & Swaroop, M. (2021). Surgical and trauma capacity assessment in Rural Haryana, India. *Annals of Global Health*, *87*(1). https://doi.org/10.5334/aogh.3173
6. Blair, K. J., Boeck, M. A., Gallardo Barrientos, J. L., Hidalgo López, J. L., Helenowski, I. B., Nwomeh, B. C., Shapiro, M. B., & Swaroop, M. (2017). Assessment of Surgical and Trauma Capacity in Potosí, Bolivia. *Annals of Global Health*, *83*(2). https://doi.org/10.1016/j.aogh.2017.04.002
7. Carvalho REFL, Arruda LP, Nascimento NKP, Sampaio RL, Cavalcante MLSN, Costa ACP.

Assessment of the culture of safety in public hospitals in Brazil. Rev Latino Am Enfermagem. 2017;25:e2849. doi: https://doi.org/10.1590/1518-8345.1600.2849

8. Chacko, S. (2015). A Descriptive Study To Assess The Knowledge Of Organized Emergency Crash Cart And Medications Among Student Nurses Working In Selected Hospital At Belagavi.
9. Colquhoun M., & Gabbot D., & Mitchell S., (2012): Cardiopulmonary resuscitation guidance for clinical practice and training in primary care', Resuscitation Council (UK) viewed 21 February 2012, available at http://www.resus.org.uk
10. D'cunha, R. J., Fernandes, S. F., & Sherif, L. (2021). Utility of simulation as a teaching tool for nursing staff involved with code blue management. *Indian Journal of Critical Care Medicine*, *25*(8). https://doi.org/10.5005/jp-journals-10071-23912
11. da Silva, V. F., Lazzari, D. D., Reisdorfer, N., Michaelsen, S. C., & Kuhnen, A. E. (2021). Analyzing the operational conditions of crash carts in clinical and surgical hospitalization units. *Revista Da Escola de Enfermagem*, *55*. https://doi.org/10.1590/S1980-220X2019040003693
12. November M, Chie L and Weingart S N. PhysicianReported Adverse Events and Medical Errors in Obstetrics and Gynecology, Advances in Patient Safety: New Directions and Alternative Approaches, Aug 2008; 1
13. Kandil M, Sayyed T, Emarh H, Ellakwa H and Masood A. Medication errors in the obstetrics emergency ward in a low resource setting, J Matern Fetal Neonatal Med, Aug 2012; 25 (8): 1379-82
14. Dyson, E., & Smith, G. B. (2002). Common faults in resuscitation equipment - Guidelines for checking equipment and drugs used in adult cardiopulmonary resuscitation. *Resuscitation*, *55*(2). https://doi.org/10.1016/S0300-9572(02)00169-7
15. Kamba P F, Ireeta M E, Balikuna S and Kaggwa B. Threats posed by stockpiles of expired pharmaceuticals in low- and middle –income countries: a Ugandan perspective, Bull World Health Organ, Aug 2017; 95 (8):594-598
16. Jacquet G A, Hamade B, Diab K A, Sawaya R, Dagher G A, Hitti E and Bayram J D. The Emergency Department Crash Cart: A systematic review and suggested contents, World J Emerg Med, 2018; 9 (2):93-988. The Joint Commission. Crash-cart preparedness, Quick Safety, April 2017; 32:2
17. Jesso, M. N., Peng, Y., & Anderson, A. (2021). Crash Cart Usability: A Method in Simulation & Iterative Design. Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care, 10(1). https://doi.org/10.1177/2327857921101101