Nurses' Performance Regarding Rapid Response Code

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Abstract

Introduction: Cardiac arrest is one of the most serious events during hospitalization. The scoring system using the bedside assessment of five physiologic parameters, including heart rate, systolic blood pressure, respiratory rate, temperature, and response to stimulus. Early use of different EWS in United Kingdom led to detection of un well patients. *Aim:* The aim of the study was to assess Nurses' performance regarding rapid response code. *Methods:* A descriptive research design was used in this study. The study was conducted in inpatient Unit at Elaraby Hospital. *Sample:* A convenience sample was used (50 nurses'). *Tools:* three tools were used for collection of data. A self-administered questionnaire tool for nurse' consisted of demographic characteristics of nurse's and nurses' knowledge, observational checklist tool and nurses' attitude regarding rapid response code. **The study finding revealed that,** about 100 % of the studied nurses had unsatisfactory level of knowledge regarding rapid response code, while about 84% of the studied nurses had unsatisfactory level of practices regarding rapid response code, also 84% of the studied nurses had negative attitude regarding rapid response code. *Conclusion,* It can be concluded that inpatient nurses need special educational program regarding rapid response code to prevent cardiopulmonary arrest. *The study recommended that;* increase awareness of nurses regarding rapid response code to adhere to rapid response code guidance for prevent cardiopulmonary arrest.

Key words: Nurses' Performance, Rapid Response Code

Introduction:

Mitchell, & et al., (2019) Showed that Patient deterioration is a significant clinical and financial burden for patients, providers, and healthcare systems. As the volume of hospitalizations for critical patients continues to rise, providers are challenged to manage more acute, resource intensive populations in a resource constrained environment. Compounded with a scarcity of beds in higher acuity care areas, patient status may be underestimated, and transferred to lower acuity care areas. This may be attributable to a relative lack of resources and a significant decrease in nurse to patient ratios.

Nagarajah, & et al., (2022) showed that Early Warning Signs (EWS) was developed for the inpatient cases in England since 1997. The scoring system generated a simple weighted score using the bedside assessment of five physiologic parameters, including (HR) heart rate, (SBP) systolic blood pressure, (RR) respiratory rate, temperature, and response to stimulus. A total score of three points or more triggered immediate escalation of care.

Viana, & et al., (2021) Present the hospital has two different teams, the Rapid Response Team (RRT) which acts when a patient presents with clinical deterioration, and the code blue which is called when the patient has cardiac arrest. An Intensive Care Unit (ICU) senior physician leads the RRT, plus unit Incharge and Assigned Nurse. Any code is alerted by dialing a particular number well known throughout the hospital. Almost code team is composed of a senior ICU physician, a medical resident and ICU nurse, and they bring with them an emergency cart, anyone can activate the code and all hospital wards can be reached within 3 minutes / code blue and 5 minutes / RRT.

Difonzo, M., (2017) Revealed that RRS is based on 4 essential components; the afferent limb includes EWS, physicians and nurses of general hospital wards, which called triggering limb., the efferent limb is the RRT that can be nurse or physician-led and can include a respiratory therapist, which called response limb., the administrative limb oversees all system components, allows the working of the team nurd provides necessary resources., and the quality improvement limb analyzes events data, provides feedback on the team function, monitors quality indicators like the staff satisfaction, and collects data on outcome measures.

Significance of the study

Hogan, & et al., (2020) Illustrate that resuscitation teams are called to between one and five Inter Hospital Cardiac Arrest (IHCA) / 1000 hospital admissions amounting to around 20,000 arrests in NHS hospitals in England / year. Survival discharge is around 13–20%. 66% of IHCA patients show abnormal signs up to 6 hours prior to IHCA. Moreover, nursing staff may be unaware of abnormal vital signs in almost 50% of patients in the general ward as they struggle to manage time pressures and work interruptions throughout their shift. This led to the development of RRS which focus on detect EWS.

Dobuzinsky, A., (2017) Illustrate that historically, more recent literature is supportive of the positive effect of RRTs. Notably, decreases in mortality rates post implementation of an RRT within a hospital. Also, reported decreases in code blue calls and unplanned intubations as a result of the RRT model. Ultimately, the bedside nurse's role during these emergencies is to promote the best outcomes for the patient while promoting effective collaboration with RRT. Therefore the nurse play an important role regarding rapid response code to prevent cardiopulmonary arrest.

Aim of the study:

The aim of the study was to assess Nurses' performance regarding rapid response code. This aim will be achieved through:

1. Assess nurses' knowledge regarding rapid response code.
2. Assess nurses' practice regarding rapid response code.
3. Assess nurses' attitude regarding rapid response.

Sample and Methods:

Design:

A descriptive research design was utilized to conduct the study. A type of research design that aims to systematically obtain information to describe a situation or population.

Participants:

A convenience sample of all inpatient nurses. They were all included (50) in inpatient unit at Elaraby Hospital.

Research tools:

Three tools were utilized for data collection, designed in Arabic form, they were:

Tool I: Self-administered Questionnaire:

Consisted of two parts:

Part I: Demographic characteristics: Concerned with assessment of socio-demographic characteristics of nurses. Including: age, gender, marital status, education level and job; years of experience, ICU experience, Training Courses and No of arrested cases.

Part II: Nurses' knowledge related rapid response code: Concerned with assessment of Nurses' knowledge related rapid response code parameter, early warning signs and rapid response team. It developed by the researcher guided by **(Rashid, et al., 2014)** and **(Peter, et al., 2015)**. It consisted of 33 questions. as MCQ and yes or no questions. It covered the following items:

1. Rapid response code parameters: It consists of Seven questions: pulse, O2 saturation, pain, blood pressure, RR, Temperature and GCS .

2. Early warning signs: It consists of Six questions: respiration, O2 saturation, heart rate, systolic blood pressure, temperature and level of consciousness.

3. Rapid response team: It consists of four questions covered the following: what is it, roles of team members, Team decision and who responsible to activate the code.

The scoring system

The score one was given to the right answer, whereas score zero was given to the incorrect answer. The total score was calculated for each nurse by adding the score of items. Then the sum of scores for each dimension and total score (33) grade was calculated by summing the scores given for its responses. The scores of total knowledge were transformed into percent score. Unsatisfactory level of Knowledge: for those who had score < 70%. Satisfactory level of Knowledge: for those who had score ≥ 70%.

Tool II: Observational Check List:

It was used by the investigator during observing nurses conducting the parameters of rapid response code. It consisted of eight observation as pre procedure/preparation, temperature, pulse, respiration, blood pressure, oxygen saturation, glasgow coma scale and post procedure/discarding, which including 36 items, as: done and not done for each item. It adopted from **Lynn, & LeBon, (2017)**.

The scoring system

Each observational item scored as one for done, or zero for not done. The total score 36 grades were calculated for each nurse by adding the items score of observational check list. Then the sum of scores for each item and total score was calculated by summing the scores given for its responses. The scores of total Practices were transformed into percent score. Unsatisfactory practices: for those who had score < 85%. Satisfactory practices: for those who had score ≥ 85%.

Tool III: Nurses' Attitude related rapid response code:

It was developed by the researcher based on literature review, under supervision and guided by **(Ibrahim, et al., 2017).** It was used to assess nursing attitude in terms of their satisfaction with nursing care regarding rapid response code. It is psychometric scale consisted of 15 MCQ.

The scoring system

It was used to assess nursing attitude in terms of their satisfaction with nursing care regarding rapid response code; each item scored one for never, two for not agree, three for sometimes, four for agree and five for strong agree. Negative attitude: for those who had score < 60%. Positive attitude: for those who had score ≥ 60%.

Note: Some questions were formulated in a negative format and the scoring was coded in the reversed order.

Content validity and reliability:

Content validity was used for the modified tools to determine whether the tools covered the aim or not. It was evaluated by a jury of five experts, two professors of medical surgical nursing, one professors of critical nursing, one professor of nursing administration from Faculty of nursing-Zagazig and Helwan University and one professor of critical medicine from Faculty of Medicine Beni Suef University. Modifications were done according to their recommendations. In the present study the overall reliability of tools (cronbach's alpha (0.86), acceptable).

Pilot study:

A pilot study for tools of data collection was carried out on (Five Nurses) 10% within selected criteria in order to test for clarity, relevance, comprehensiveness, understandable, feasible, applicability and ease for implementation. Nurses who shared in the pilot study were included in the main study sample because no modification done in the tools.

Field work:

The actual process of data collection for this study was carried out in the period from the beginning of February 2020 to beginning of December 2020. The researcher interviewed nurses in groups; one group/day/two days/week (10 Nurses) at day shift at inpatient unit/ training room, the researcher explained the aim and objectives of study to the participant. The researcher assured that the data collected and information will be confidential and would be used only to improve their performance.

Ethical considerations:

All ethical issues were taken into consideration during all phases of the study. The ethical research considerations in this study included the following: The research approval was obtained before conducting the study, the objectives and the aims of the study were explained to the participants. The researcher confirmed the anonymity and confidentiality of subjects. Subjects were allowed to choose to participate or not and the right to withdraw from the study at any time without penalty. Researcher confirmed that the data collected would be confidential and used only to improve the nurses' performance and patient condition.

Statistical analysis:

Data collected throughout questionnaire and outcome measures coded, entered and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) software for analysis. According to the type of data, qualitative data was presented as number and percentage, quantitative continues group presented by mean ± SD, the following tests were used to test differences for significance; Differences between frequencies (qualitative variables) and percentages by Chi-square test. P value was set at <0.05 for significant results & <0.001 for high significant result.

Results:

Table (1) showed the demographic characteristics of the studied nurses which consist 50 nurses. Regarding to age of nurses ranged from 18 to 44 years, as 18-34 and 35-44 years old of nurses (74% and 26% respectively). Additionally 52% of the nurses were female and 70% of the nurses were married. Also, 84% of the nurses were not worked before in ICU. Finally 86% of the nurses were trained on first aid and CPR.

Table (2) revealed that; there were inpatient arrested cases in last month/critical cases were 7.6%.

Table (3) showed that; there were 58% of studied nurses' didn't know the pulse definition. Meanwhile, 46% of studied nurses' didn't know that oxygen saturation is component of the vital signs. While, 42% of studied nurses' didn't know measurements methods of the temperature.

Table (4) showed that; there were 78% of studied nurses' weren't performing hold the patients' wrist as if taking the pulse without explains to patient. Meanwhile, 66% of studied nurses' weren't performing Inflates cuffs until pulse is no longer felt. Finally, 92% of studied nurses' weren't Calculate the final score of Glasgow Coma Scale.

Table (5) showed that; there were 14% of studied nurses had responded very strong regarding following the vital signs are important, 6% of them had responded very strong regarding early detection of the warning signs is essential. While, 70% of studied nurses had responded very strong regarding inpatient nurses have a great role in avoiding cardiopulmonary arrest.

Table (6) revealed that; regarding level of knowledge about 100 % of the studied nurses had unsatisfactory level of knowledge regarding rapid response code, while about 84 % of the studied nurses had unsatisfactory level of practice regarding rapid response code and about 84 % of the studied nurses had negative attitude regarding rapid response code.

Table (7) revealed that; there was a strong positive relation between the total knowledge score and the total practice score with p value (0.000).

Table 1: Frequency and percentage distribution of demographic characteristics for the nurses (n=50).

Demographic Characteristics	Study Sample (n= 50)	
	No	**%**
Age in years:		
18 - 34	37	74.0
35 - 44	13	26.0
Gender:		
Male	24	48.0
Female	26	52.0
Marital Status:		
Single	9	18.0
Married	35	70.0
Widow	2	4.0
Divorced	4	8.0
Education Level:		
Institute	19	38.0
Bachelor	27	54.0
Master	4	8.0
Years of Experience:		
1-4	15	30.0
5-9	33	66.0
10-14	2	4.0
ICU Experience:		
Yes	8	16.0
No	42	84.0
Training Courses (First Aid or CPR):		
Yes	43	86.0
No	7	14.0

Table 2: Frequency and percentage distribution of total inpatient arrested cases / critical cases.

Total Inpatient Arrested Cases / Critical Cases	No (65)	%
	5	7.6

Table 3: Frequency and percentage distribution of the studied nurses' level of knowledge regarding rapid response code (n=50).

Items	Correct		In Correct	
	No	**%**	**No**	**%**
Rapid Response Code Parameters				
Pulse				
Def	21	42.0	29	58.0
Normal rate	17	34.0	33	66.0
Finger to be avoid when check the pulse	8	16.0	42	84.0
Measurements' location	19	38.0	31	62.0
Oxygen saturation				
Is it component of vital signs?	27	54.0	23	46.0
Normal range	25	50.0	25	50.0
Is the pain component of vital signs?	22	44.0	28	56.0
Blood pressure				
Def	18	36.0	32	64.0
Common used artery to check it	24	48.0	26	52.0
What create blood pressure?	25	50.0	25	50.0
Breathing				
Normal rate	13	26.0	37	74.0
Scientific name of expelled air	17	34.0	33	66.0
Can a human control it?	13	26.0	37	74.0
Temperature				
Measurements methods	29	58.0	21	42.0
Avoided method in heart disease	12	24.0	38	76.0
Avoided method in children	13	26.0	37	74.0
Glasgow Coma Scale				
What is it?	17	34.0	33	66.0
From it consist of	27	54.0	23	46.0
Its features	15	30.0	35	70.0
Mini and Maximum sum	20	40.0	30	60.0
Early Warning Signs				
Breathing rate	0	0.0	50	100.0
Oxygen saturation	4	8.0	46	92.0
Heart rate	6	12.0	44	88.0
Systolic blood pressure	6	12.0	44	88.0
Temperature	2	4.0	48	96.0
Level of consciousness	7	14.0	43	86.0
Rapid Response Team				
What is it?	0	0.0	50	100.0
Roles of the Team Members				
ICU doctor	3	6.0	47	94.0
Primary physician	0	0.0	50	100.0
Unit Incharge nurse	3	6.0	47	94.0
Assigned nurse	0	0.0	50	100.0
Who responsible for activation	3	10.0	47	90.0
Team decision	3	6.0	47	94.0

Table 4: Frequency and percentage distribution of the studied nurses' practices regarding rapid response code (n=50).

Items	Correct		In Correct	
	No	**%**	**No**	**%**
Pre Procedure				
Check doctor order	22	44.0	28	56.0
Wash hands.	13	26.0	37	74.0
Assemble equipment's.	24	48.0	26	52.0
Introduces yourself to the patient.	22	44.0	28	56.0
Identifies patient by two Identifiers.	36	72.0	14	28.0
Explain the procedure to the patient.	17	34.0	33	66.0
Wear gloves	22	44.0	28	56.0
Keep patient privacy	22	44.0	28	56.0
Temperature				
Disinfect the thermometer.	21	42.0	29	58.0
Places thermometer on selected area.	16	32.0	34	68.0
Count Times accurately.	27	54.0	23	46.0
Remove Thermometer.	20	40.0	30	60.0
Reads thermometer accurately.	38	76.0	12	24.0
Disinfect by alcohol swap	33	66.0	17	34.0
Pulse				
Places limb in comfortable position.	20	40.0	30	60.0
Locate pulse.	50	100.0	0	0.0
Evaluate pulse for 1 minute.	15	30.0	35	70.0
Respiration				
Hold the patients' wrist as if taking the pulse without explains to patient you are recording respirations.	11	22.0	39	78.0
Put the patient in a comfortable position.	47	94.0	3	6.0
Observe movement of the chest.	27	54.0	23	46.0
Count the chest movements for 60 seconds.	41	82.0	9	18.0
Blood Pressure				
Select correct cuff size and placement.	15	30.0	35	70.0
Palpates brachial artery then Places stethoscope over brachial pulse.	17	34.0	33	66.0
Feels radial pulse with fingertips.	12	24.0	38	76.0
Inflates cuffs until pulse is no longer felt.	17	34.0	33	66.0
Release valve slowly and readings.	38	76.0	12	24.0
Deflates cuff fully and removes it.	39	78.0	11	22.0
Oxygen Saturation				
Put the saturation probe at suitable finger.	21	42.0	29	58.0
Read the oxygen saturation level	21	42.0	29	58.0
Glasgow Come Scale				
Assess the Eyes responses.	12	24.0	38	76.0
Assess the Verbal responses.	18	36.0	32	64.0
Assess the Motor responses.	5	10.0	45	90.0
Calculate the final score.	4	8.0	46	92.0
Post Procedure				
Wash hands.	25	50.0	25	50.0
Document in observational chart correctly.	19	38.0	31	52.0
Follow the instruction regarding Rapid Response Code correctly.	8	16.0	42	84.0

Table 5: Frequency and percentage distribution of the studied nurses' attitudes regarding rapid response code (n=50).

Items	%				
	1	2	3	4	5
Consider Patient's complaint.	2.0	56.0	2.0	22.0	18.0
Don't disturb patient sleeping.	10.0	58.0	14.0	2.0	16.0
Vital signs following are important.	10.0	18.0	2.0	56.0	14.0
Not leave patient during vital signs disturbance.	56.0	0.0	22.0	2.0	20.0
Early detection of the warning signs is essential.	34.0	0.0	58.0	2.0	6.0
Explaining to patient to reduce his anxiety.	2.0	16.0	64.0	8.0	10.0
Training courses effective in patient's outcome.	2.0	0.0	70.0	20.0	8.0
Help patient trust the nurse.	20.0	62.0	4.0	2.0	12.0
Following prescribed procedures.	2.0	2.0	80.0	6.0	10.0
Nurse patient relation affected by socio-economic status.	60.0	4.0	6.0	2.0	28.0
Inpatient cases are easy.	58.0	2.0	6.0	24.0	10.0
Team spirit ensure nursing care efficiency.	16.0	62.0	4.0	12.0	6.0
nurses a great role in avoiding cardiopulmonary arrest.	0.0	22.0	6.0	2.0	70.0
Ignore patient complaint if repeated.	14.0	6.0	18.0	62.0	0.0
Inpatient nurses must be qualified.	12.0	2.0	78.0	2.0	6.0

1= Never   2= Not agree   3= Some times   4= Agree   5= Strong agree. 159

Table 6: Frequency and percentage distribution of the total scores of knowledge, practices and attitudes among studied nurses' regarding rapid response code (n=50).

Items	No.	%
Knowledge		
Satisfactory	0	0.0
Un Satisfactory	50	100.0
Practices		
Satisfactory	8	16.0
Un Satisfactory	42	84
Attitude		
Satisfactory	8	16.0
Un Satisfactory	42	84

Table 7: Correlation between Knowledge, Practices and Attitudes (n= 50).

Items	Knowledge	
	r	Sig.
Practices	0.871	0.000**
Attitudes	0.249	0.081

r Pearson Correlation test   ** Highly statistically significant at p≤0.01

Discussion:

Concerning the study sample, it constitutes of 50 inpatient nurses included as study sample; More than two third of study sample aged 18-34 years old. More than half of study sample were female. Whereas more than two third of study sample were married. While more than half of study sample had Bachelor degree. Two third of study sample had 5-9 years experience. The majority of study sample hadn't previous ICU work and trained on CPR.

Concerning the cardiac arrest, the results of this study clarified that a minority ratio - total arrested cases in last month to total inpatient critical cases. A high mortality ratio might be due to lack of application rapid response code. This finding agreed with **(Custo, and Trapani, 2020)** in his study the impact of rapid response systems on mortality and cardiac arrests in Malta, who found that rapid response systems significantly decrease mortality and cardiac arrests.

As well, **Lee et al., (2019)** in a study effect of a rapid response system on code rates and in-hospital mortality in medical wards in South Korea, found that Implementation of an RRS was associated with significant reductions in code rates during RRS operating times and in-hospital mortality in medical wards. Also, **(Rose et al., 2016)** in his study Effectiveness of rapid response teams on rates of in-hospital cardiopulmonary arrest and mortality in US, found that Implementation of an RRT/MET is associated with a reduction in both hospital mortality and non-ICU cardiopulmonary arrests.

Concerning nurses' knowledge about rapid response code, the present study clarified that all of nurses hadn't knowledge regarding rapid response code. This might be due to lack of Nurses' knowledge as result of lack of training/ education regarding rapid response code. Agreed with **Warren, & et al., (2021)** in his study Impact of a modified early warning score on nurses' recognition and response to clinical deterioration in US, who found the simulation based intervention significantly improved nurses' knowledge.

As well, **Azimirad et al., (2020)** in a study nurses' ability to timely activate rapid response systems for deteriorating patients: a comparative case scenario study between Finnish and British nurses in Finland, who found that identified gaps in nurses' knowledge in management of deteriorating patients and case scenarios was suboptimal.

Concerning nurses' practices about rapid response code parameters, the present study clarified that less than quarter of nurses hadn't practice regarding rapid response code in study sample. this might be due to lack of education and training regarding rapid response code. This agreed with **(Tilley, & Spencer, 2021)** in study titled perceived barriers to rapid response team activation among nurses in Canada, who present that eight barriers were identified as having an impact on RRT activation; Suggestions for overcoming these barriers include RRT education for nurses and physicians.

Concerning the nurses' attitude about rapid response code, present study clarified that majority of nurses of the study sample had negative attitude regarding rapid response code. This might be a result that nurses unaware with the importance of rapid response code. this approach is unsupported by **(Loisa et al., 2021)** who conducted study about rapid response team nurses' attitudes and barriers to the rapid response system in Finland, found that RRT nurses consider their RRT work meaningful and think that RRT nurse duties have improved their critical care skills.

Concerning the correlation between the nurses' knowledge and attitude regarding rapid response code there are no significant relation in study sample. This might be a result that nurses unknowledgeable and careless regarding rapid response code. disagreed with **(Danis, 2019)** who conducted study about the role of rapid response nurses in improving patient safety in us, that hospital RRT implementation is now a joint commission requirement, that enabled nurses achieve clinical and leadership competency when transitioning into the RRT role.

Conclusion:

According to the results of the present study, it can be concluded, nurses' performance regarding rapid response code was unsatisfactory and there are needs for special educational program for inpatient nurses regarding rapid response code.

Recommendations:

Based on the results of the present study the following recommendations are suggested;

1. Adequate education and training to increasing awareness of nurses regarding rapid response code to prevent cardiopulmonary arrest.
2. Empower and motivate nurses to adhere to rapid response code guidance.
3. Further studies are necessary to identify effects of rapid response code application via electronic system.

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