A Study to Assess the Effectiveness of Critical Care Education on Knowledge of Students in Care of Patients with Mechanical Ventilator among Nursing Students in Srm College of Nursing, Kattankulathur, Tamil Nadu, India

C. Kanniammal[1], T. Suseelal[1], A. Akila Devi[2], K.Ambiga[2], A. Sheeba Jebakani[2]

Dr. C. Kanniammal[1] Dean, Dr. T. Suseelal[1] Associate professor, Mrs. A. Akila Devi[2] professor, Mrs. K.Ambiga[2] Associate professor, Mrs. A. Sheeba Jebakani[2] Associate professor, Medical surgical department, SRM College of Nursing, SRM Institute of Science and Technology, Kattankulathur, Chengalpattu District, Tamil Nadu, India

Abstract

Critical care education among nursing students is an emerging topic globally.Nurses lead a vital role in all hospital setting. Critical care nursing skills must be taught to the student nurses to provide optimum care during emergency situation.The present study assessed the impact of critical care education among students in SRM College of Nursing. A quantitative study with one group pre and posttest design was used.Totally hundred students between age group 18-20yrs participated in the study. After explaining and getting their consent by convenient sampling technique pretest was taken with 18 self structured objective type questions.Education on critical care was given by experts on current trends, technologies, evidenced based practice, pharmacological management, and role play, quality nursing care during ventilator support and legal responsibilities in critical care for 6 hrs. After the education post assessment was done with same questionnaire. Analysis was done with descriptive, MCNemar's test, and student paired t test. The post knowledge of students with care of patient in mechanical ventilator was significant with $p < 0.05$. This study high lights the need for educating the staff in critical care in the hospital setting.

Key words: *Critical care, Nursing students, Quality nursing care, Mechanical ventilator, Education*

Introduction

Critical care Nursing is one of the challenging area for nurses.In 18th century Florence Nightingale developed evidenced based care in Nursing.During 18th and 19th century general nursing staffs were trained to provide care to the patients in emergency situation.As technology advanced there was many changes evolved in nursing field.In 1923 Critical care facility first evolved. During 19th century it boostup and 20th century it was implemented with excellence in critical care.It enhances quality care as most important aspects in CCU. Undergraduate students need skills to care critically ill patients[1].

Current scenario is mainly focused to develop nurse practitioners to work in critical care unit. Nurses provide efficient care when the patients are brought in critical condition.

Nurses has to report to the doctor about any abnormal results,regarding their patients,so that it can be solved immediately[2]. Now a day the life expectancy of the people is more and there is increasing number of acutely ill patients are being admitted in hospital[3].

Delayingthe care may lead to severe complications and death.Students has to develop right attitude and Knowledge when they are posted in intensive care unit[4]. A nurse has a primary role in the health care of patients. Quality aspect of care should be strengthened with

Corresponding Author:
Dr. T. Suseelal,
Associate professor, SRM College of Nursing, SRM Institute of Science and Technology, Kattankulathur, Chengalpattu Dist – 603203, Tamil Nadu, India,
E-mail:suseelal.john@gmail.com

excellence of research study. Nurses are always near to the patients. They can understand abnormal rhythms, changes in vital signs and immediately report to doctors[5].

Evidenced based practice(EBP) is important to avoid the outdated practice.EBP it includes clinical expertise,patient value and preference. If the nurses in ICU are Knowledgeable they will not do harm to the patients[6]. Evidenced based practice in critical care reflect to improve quality patient care. It bridge the gap between theory and practice.[7]Critical care nurses are expected to provide standard nursing practices that requires expert guidance[8].Critical care nurses must be skilful, punctual, dedicated and they should cultivate attitude to care patients sincerely[9].Nurses must be intelligent to handle critical situation and should be emotionally prepared to work even the patients are very sick and at times of death and departure[10].The present study intended to evaluate the Knowledge of students and to educate them regarding the care of patient in mechanical ventilator.

Materials and Method

It was a descriptive study based on Knowledge assessment of critical care among nursing students in SRM College of Nursing, Kattankulathur. Formal approval was obtained from SRM Institute ethical committee. One group pre and post test design is used in this study. After explaining and getting the written consent from the participants with convenient sampling technique the data was collected from 100 samples on 22nd July 2019.After pilot study reliability of the tool was assessed by using Test retest method. The knowledge score reliability correlation co efficient value is 0.83. Pre test was taken by using standardized objective type interview questionnaire (18) in number on care of patient during ventilator. Continuing Nursing Education was given for 6 hours by various experts on current trend, evidenced based practice, and role of nursing team, pharmacotherapy, and quality care on patient during mechanical ventilator and legal aspects of critical care. A role play – mime programme on dealing with emergency situation was demonstrated by 10 students. Post test was taken with the same questionnaire .Each correct answer was given a score of (1) and the wrong answer was given a score of (0).The collected data was spread in Excell sheet SPSS Version 16.0 and analyzed. Confidentiality and anonymity was maintained throughout the study.

Results

The demographic table revealed among 100 participants majority of them were between the age group of 19-20 years (40%), between 18-19 and 20-21 years were (30%). Regarding education majority of them were BSC nursing fourth year (30%), second year (30%), third year ((26%), Diploma nursing second year (14%). Regarding their residential background urban and rural region were (50%). In relation to religion Hindus were (80%) and Christians were (20%).

Table 1: pre Knowledge score of students in critical care education programme N= 100

s.no	Statements	Knowledge on			
		Correct		Not correct	
		n	%	n	%
1	Improper securing of ET Tube might cause	37	37.00	63	63.00
2	The complication that occurs due to endotracheal tube obstruction	35	35.00	65	65.00
3	The nurse should understand that a ventilator alarm could be due to	67	67.00	33	33.00
4	How often do you change the humidifiers?	73	73.00	27	27.00
5	Which position do you recommend to prevent ventilator associated pneumonia?	53	53.00	47	47.00
6	How often do you give eye care when patient is on ventilator?	41	41.00	59	59.00
7	How often the position of the patient is changed ?	51	51.00	49	49.00
8	Tidal volume can be termed as	39	39.00	61	61.00
9	Which of the following is selected when the patient is not able to continue any spontaneous breath during ventilator?	15	15.00	85	85.00
10	How often chest physio should be given when the patient is in ventilator?	19	19.00	81	81.00
11	Which of the ventilator parameter is adjusted in order to reduce paCo2 ?	22	22.00	78	78.00

Cont... **Table 1: pre Knowledge score of students in critical care education programme N= 100**

12	What are the key indicators to evaluate the adequacy of oxygenation in ventilated patient?	40	40.00	60	60.00
13	When the intubation is required for a short period, which of the following is recommended?	42	42.00	58	58.00
14	The dosage of Inj. Morphine is	35	35.00	65	65.00
15	Which is the most common sedative used when the patient is on ventilator?	41	41.00	59	59.00
16	What is the action of dopamine?	32	32.00	68	68.00
17	Which of the following is an indication for weaning?	33	33.00	67	67.00
18	Ventilator associated pneumonia can be prevented	31	31.00	69	69.00

The above table shows each question wise pre-test percentage of knowledge score.

They are having maximum knowledge in how often do you change the humidifiers (73.0%) and minimum knowledge score in Which of the following is selected when the patient is not able to continue any spontaneous breath during ventilator(15.0%).

Table 2: Post Knowledge score among students in critical care education programme.

N= 100

sno	**Statements**	**Knowledge on**			
		Correct		**Not correct**	
		n	**%**	**N**	**%**
1	Improper securing of ET Tube might cause	57	57.00	43	43.00
2	The complication that occurs due to endotracheal tube obstruction	55	55.00	45	45.00
3	The nurse should understand that a ventilator alarm could be due to	87	87.00	13	13.00
4	How often do you change the humidifiers?	88	88.00	12	12.00
5	Which position do you recommend to prevent ventilator associated pneumonia?	73	73.00	27	27.00
6	How often do you give eye care when patient is on ventilator?	65	65.00	35	35.00
7	How often the position of the patient is changed ?	73	73.00	27	27.00
8	Tidal volume can be termed as	63	63.00	37	37.00
9	Which of the following is selected when the patient is not able to continue any spontaneous breath during ventilator?	46	46.00	54	54.00
10	How often chest physio should be given when the patient is in ventilator?	47	47.00	53	53.00
11	Which of the ventilator parameter is adjusted in order to reduce paCo2 ?	42	42.00	58	58.00
12	What are the key indicators to evaluate the adequacy of oxygenation in ventilated patient?	60	60.00	40	40.00
13	When the intubation is required for a short period, which of the following is recommended?	62	62.00	38	38.00
14	The dosage of Inj. Morphine is	62	62.00	38	38.00
15	Which is the most common sedative used when the patient is on ventilator?	61	61.00	39	39.00
16	What is the action of dopamine?	60	60.00	40	40.00
17	Which of the following is an indication for weaning?	64	64.00	36	36.00
18	Ventilator associated pneumonia can be prevented	59	59.00	41	41.00

The above table shows each question wise post-test percentage of knowledge .They are having maximum knowledge in How often do you change the humidifiers (88.0%) and minimum knowledge score in Which of the ventilator parameter is adjusted in order to reduce $paCo_2$ (42.0%).

Table 3: Comparison of pre and post knowledge mean score of students in critical care education programme

N=100

	No. of students	Mean score	SD	Mean Difference	Student paired t-test
Pretest	100	7.06	2.31	4.18	t=10.29 P=0.001***
Posttest	100	11.24	3.43		

Significant at p<0.05 level

The above table shows in the pretest the students are having 7.06 knowledge score and after intervention they were having 11.24 knowledge score, so the difference is 4.18 knowledge score, this difference is large and it is statistically significant. It was calculated using student paired t-test.

Table 4:Comparison of pre and post Knowledge score among students in critical care education programme

N=100

Level of knowledge	Pretest		Posttest		Extended McNemar's test
	n	%	N	%	
Inadequate knowledge	85	85.00	20	20.0	$\chi 2$=65.89 P=0.001***
Moderate knowledge	15	15.00	54	54.0	
Adequate knowledge	0	0.0	26	26.0	
Total	100	100	100	100	

Significant at p<0.05 level

The above table reveals before Critical care education, 85.0% of the students are having inadequate level of knowledge score, 15.0% of them having moderate level of knowledge score and none of them are having adequate level of knowledge score.

After Critical care education, 20 %of the students are having inadequate level of knowledge score , 54.0% of them having moderate level of knowledge score and 26.0% of them are having adequate level of knowledge score.

Level of knowledge gain of between pretest and posttest was calculated using Extended McNemar's chisquare test is significant with p<0.05.

The association with demographic variables revealed elder students and urban area students are having more knowledge score than others. Statistical significance was confirmed using chi square test (P<0.05) all the other variables are not significant P>0.05. So there's no association between the post level Knowledge score and the demographic variables.

Discussion

This continuing nursing education programme dealt on various aspects of critical care nursing to improve

students Knowledge and skills to work in critical care unit. Most of the students are willing to work in ICU after their graduation. Critical care area is a place where serious patients are admitted at time they are in a stage of fight or flight. At this junction the expertise Nursing assessment and care is needed without any delay. The nurses must understand their responsibility and they work deligently in saving the life of patients. Many adult patients were admitted in critical care unit and most of them died within 6 hrs after all expert treatment loosing the patient's life is a horrible situation for the family and it reduces the economical status of our country. ICU nurse must be vigilant in observing the signs and symptoms, nursing care in critical situation and documentation. After the death of patients all documents are saved for legal concern. Nurses must keep it in mind and they should provide optimum care to their patients to save their lives. The present study post test revealed out of 100 students 28% of them having adequate Knowledge 54% of them having moderately adequate Knowledge and 20% having inadequate knowledge with x^2=65.84,P<0.01. Also the mean score is difference 4.18 (P<0.01). This study result was consistent with the study done by Jaber. A etal., (2016) revealed positive students experience after critical care course. This study can be done in hospital among staff nurses working in critical care unit.

Conclusion: The present study concluded that the student's knowledge is improved after the critical care education programme.

Conflict of Interest: The authors have no conflict of interest.

Funding/Support: None declared.

References

1. Jafar A. Alasad, Muayyad M. Ahmad, Nazih Abu Tabar Huthaifa Ahmad.Nursing student's Experiences in Critical Care Course: A Qualitative StudyJournal of Intensive and Critical Care. 2016.
2. Williams E[1], Palmer C. Student nurses in critical care: benefits and challenges of critical care as a learning environment for student nurses. NursCrit Care. 2014 Nov;19(6):310-5. doi: 10.1111/nicc.12053.
3. Elizabeth Williams R Student nurses in critical care: benefits and challenges of critical care asa learning environment for studentnurses.2013.,https://doi.org/10.1111/nicc.12053.
4. NurselVatansever, NerimanAkansel, Experience of Nursing Students during their Clinical Placements, International Journal of Caring Sciences, September. 2016., 9 (3) : 1040.
5. Patrick Gallagher, Billiejoan Rice, Paul Tierney, Karen Page and Aidin McKinney Evaluating a critical care course .A study looked at how final-year student nurses felt they benefited from taking part in a critical care course . 2011
6. Sevinc Tastan, Emine Iyigun, Hatice Ayhan, Sevgi Hatipoglu, Experiences of Turkish undergraduate nursing students in the intensive care unit. Australian journal of nursing practices.DOI: https://doi.org/10.1016/j.colegn.2013.12.003
7. Lena Stevens, Janet Yvonne Mattsson. Development of an individual assessment instrument for critical care nursing students Journal of Nursing Education and Practice. 2017, Vol. 7, No. 2 http://dx.doi.org/10.5430/jnep.v7n2p54
8. Sigrid Wangensteen Inger, S. Johansson ,Monica E Björkström , Gun Nordström Critical thinking dispositions among newly graduated nurses, Journal of leading global Nursing Research .2010
9. Bartlett, Doreen .J.; Cox, Peter D. Measuring Change in Students' Critical Thinking Ability: Implications for Health Care Education Journal of Allied Health. 2002.,31 (2):64-69
10. PanelN M, Beauvais[a], Brady1E. R.O,' Sheac2M T. Qunin G[3].Emotional intelligence and nursing performance among nursing students. Nurse Education Today 2011;1(4)2: 396-401 https://doi.org/10.1016/j.nedt.2010.07.013