



IMPACT OF CARE BUNDLE EDUCATION PROGRAMME ON NURSES KNOWLEDGE AND PRACTICE REGARDING "CENTRAL LINE- ASSOCIATED BLOOD STREAM INFECTION" IN INTENSIVE CARE UNITS

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ABSTRACT

Background: Central line-associated bloodstream infection is an important healthcare-associated infection in the critical care units. It causes substantial morbidity, mortality and incurs high costs. Objective of the study was to determine the impact of care bundle education program on Nurses' Knowledge and practices regarding central line associated blood stream infection in the intensive care units. **Materials and Methods:** A quasi experimental pre and post study design was used. The study was conducted in Intensive care units of Jinnah Hospital Lahore. A convenience simple of thirty six, 36 nurses was included in the study. Structured questionnaires were used as a tool for knowledge and practices regarding CVC to determine the effect of care bundle education program on nurses' knowledge and practices regarding central line associated blood stream infections in intensive care units. **Results:** There were statistically substantial changes between mean score of the pre and post- test of nurses' knowledge and practices regarding central line associated blood stream infections in ICUs. The pre knowledge means score was 10.86 ± 1.496 which was increase after implementation of intervention the post knowledge score was 20.83 ± 3.761 . The p value was = 0.000 which represents the significant changes in the pre and post-test knowledge and practices score. **Conclusions:** The study finding revealed an inadequate knowledge and practices among nurses regarding central line associated bloodstream infections in intensive care units before the care bundle education program while its improve in the post-test.

Keywords: CLABSIs, Knowledge, ICUs, practices.

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INTRODUCTION:

The reduction of Central Line-associated Bloodstream Infections (CLABSI) through knowledge and practice regarding in intensive care units remained the key factor that should be managed. Central Line-associated Bloodstream Infections (CLABSIs) are one of the most prevalent Health care-associated Infections (HAIs) among Neonate intensive care unit (NICU) high-risk infants. In Pakistan this is an important issue in all tertiary care institutions and other district level hospitals. These infections pose a safety threat to the patient by increasing risk of mortality and morbidity. It relates to a primary bloodstream infection that develops within the first two days after insertion of a central venous catheter (CVC) and occurs before infection in newborns. It is the most severe complication associated to CVC usage in critical care.(1)

Nosocomial infections are the actual cause of morbidity and mortality. It has been identified by the International Nosocomial Infection Control Consortium (INICC) observation from 2002 to 2006. It is also high rates infections in the intensive care units (ICUs) of third world countries. Rates of device-associated nosocomial infections and central line associated bloodstream infections (CLABSI) were 3 to 5 times that of ICUs in the United States.(2) This is the significant cause of morbidity and mortality and the severely ill patient. Central line-associated blood stream infection (CLABSI) is measure the most preventable class of nosocomial infections.(3)

In clinical settings, nurses must demonstrate understanding of the central venous catheter's indications, problems, and care.(4) In the future, a lack of education may have an impact on compliance. In order to avoid Central line associated blood stream infection, (CLABSI) it is critical to educate yourself. Education, it is said, lies at the foundation of the problem of nurses' lack of knowledge.(4)

CLABSI is identified with higher medical care costs, delayed emergency clinic stays, and expanded mortality.(5) Although 204,000 cases and 25,000 related mortalities were recorded in the United States in 2016, different western nations, particularly in the cutting-edge world, have seen an extensive drop in the pace of CLABSI.(6)

Shockingly, it is connected to various issues, including apoplexy, embolism, and central line-related circulation system contamination, which are all perilous for patients and costly to treat central line-associated bloodstream infection (CLABSI).(7) Healthcare professionals are very interested to decrease the frequency of these illnesses in order to enhance patient outcomes and save healthcare expenditures. This initiative must be collaborative, involving health care providers who order Central venous catheter (CVC) insertion and removal, intravascular catheter insertion and maintenance personnel, infection control staff, healthcare managers, including individuals who deal resources, and patients who are proficient of supplementary in the care of their catheters.(8) Using a daily objectives sheet, nurse-driven procedures, computerized reminders, or multidisciplinary catheter rounds, a systematic approach on a daily basis might be used.(6)

The main purpose of this project was to educate and give thorough insights to Nurses staff about evidence based Central Line Practices and the reduction of CLABSI through knowledge and practice regarding highly critical areas To educate the nurses' staff is pivotal and very much important to reduce morbidity, death rates, and high expenses regarding Catheter related infections. Many of the research have been carried out on CLABSI, but it remained untouched from the perspective of Nurses knowledge and practice regarding adults in critical areas. Even



the prominence on CLABSI prevention and reduction approaches in recent years, these infections linger to happen.(9)

MATERIAL AND METHODS

The current study design was Quasi-experimental study (pre/post-test design). The study was conduct in the intensive care units of Jinnah Hospital Lahore Punjab Pakistan with a sample size of 36. Convenience sample technique was used to recruit study participants matching the inclusion criteria and willing to participant voluntarily. Data was collected by 2 validated and adopted tools. One was Nurses Knowledge Questionnaires which consist of 25items, while Tool II: Nurses Practice Checklist which consists of 15 items. Data was entered and analyzed in SPSS version 20. For quantitative variables mean standard duration were computed. And for inferential statistic paired sample t-test was applied.

RESULTS:

Table 1 Demographic Characteristics of the study participants.

Demographics characteristics		
Name of variable	Categories	Frequency (%)
Gender	Male	0 (0%)
	Female	36 (100%)
Age	Less than or equal to 25 years	8 (22.2 %)
	26 to 30 years	20 (55.6%)
	31 to 35 years	7 (19.4 %)
	More than 35 years	1 (2.8%)
Education Level	Diploma in General Nursing	24 (66.7%)
	BSN/Post RN	12 (33.3%)
	MSN	0 (0%)
Experience	Less than or equal to 2 years	3 (8.3%)
	3 to 5 years	14 (38.9%)
	6 to 10 years	18 (50.0%)
	More than 10 years	1 (2.8%)
Posted Area	MICU	16 (44.4%)
	SICU	20 (55.6%)



The above table (1) shows the demographic characteristics of the study participants in terms of frequency and percentages. Total study participants were females. 55.6%, study participants belonged to the age group of 26 to 30 years, followed by 22.2% less than or equal to 25 years. 31 to 35 years were 19.4% and more than 35 years were 2.8%, as for as education level are concerned 24 (66.7%) general nursing diploma, BSN/Post RN were 12 (33.3%). In addition of experience level of study participants belong to 6 to 10 years were 50.0%, to 5 years were 38.9%, followed by less than or equal to 2 years' experience group they were 8.3% and more than 10 years of experience group participants they were 2.8%. Most of study participants worked in SICU they were 55.6%, while 44.4% study participants worked in MICU.

Table 2 Knowledge levels of the study participants.

	Pre Data	Post Data
	Frequency (%)	Frequency (%)
Poor Knowledge	25 (69.4%)	1 (2.8%)
Average Knowledge	11 (30.6%)	10 (27.8%)
Good Knowledge	0 (0%)	25 (69.4%)

The above table (Table 2) represents the information regarding knowledge of the study participants; In the pre-test data mostly the study participants falls in the poor and average knowledge while they are improved into good knowledge in the post-test data.

Table 3 Practice levels of the study participants.

	Pre Data	Post Data
	Frequency (%)	Frequency (%)
Non-compliant	32 (88.9%)	0 (0%)
Partially compliant	4 (11.1%)	15 (41.7%)
Compliant	0 (0%)	21 (58.3%)

The above table (Table3) gives information about the practice level of the study participants which were clinical staff of hospital. Their practice about CLABSI was assessed before and after intervention. If we look at the table, before intervention the practice of the study participants was not sufficient. The practice of the clinical staff was categorized into three main categories: Non-compliant, partially compliant and compliant. Those clinical staff having score between 22-30% was considered good clinical score. Subjects having less than 15% score of CLABSI are considered non-compliant. Whereas partially compliant of the study participants was considered from 15-21%. Before the intervention the percentage of patients having non-compliant practice were 88.9%, 32 out of 36. After the intervention it the numbers of study participants having non-



compliant practice were reduced to zero from 32, out of 36 which means that zero percent. Similarly those clinical staff who had compliant practice was only zero out of 36 which means that they were zero percent. But after intervention there number significantly increased to 21 out of 36 which mean 58.3%.

Table 4 Comparison of the Pre and Posttest Knowledge and Practice Scores of the Study Participants.

	Pre Data	Post Data		
	Mean ± SD	Mean ± SD	Mean difference	Paired Sample t-test
Knowledge Score	10.86 ± 1.496	20.83± 3.761	-9.972	P value= 0.000
Practice Score	10.67 ± 3.757	22.19± 1.837	-11.528	P value= 0.000

The above table (Table 4) represents the statistical summary of the pre and post- test intervention of knowledge and practices scores of subjects related to 2 domains. Moreover, the mean score of knowledge of study participants in the post intervention test is 20.83± 3.761 which is much higher than the mean score at the baseline (pre-test) is 10.86± 1.496. While the mean score of the subjects in the pre-test intervention of practices scores is 10.67 ± 3.757 which is increased after post-test intervention with a level of 22.19± 1.837.

Table-5: Mean and standard deviation and comparison of study participants' knowledge score

Knowledge Score	Pre-intervention	Post-intervention	Mean Difference	Paired simple t-test
	mean±sd	mean±sd	mean±sd	p-value
	10.86±1.496	20.83±3.761	-9.972	0.000

The above table (Table 5) shows improvement in knowledge level of the caregivers after post intervention which is improved from 10.86±1.496 to 20.83±3.761.

Table-6: Mean and standard deviation and comparison of study participants' practice score

Practice Score	Pre-intervention	Post-intervention	Mean Difference	Paired simple t-test
	mean±sd	mean±sd	mean±sd	p-value
	10.67±3.757	22.19±1.837	-9.972	0.000

The above table (Table 6) revealed a noticeable improvement in the total nurses practices post care bundle education regarding assisting in CVC insertion, care, maintenance and CLABSI in intensive care units.



DISUSSION:

This chapter stated the discussion of major findings of the study, and its correlation with other research study. The study design is Quasi-Experimental single group pre and post study. The objectives of the current study were to evaluate the nurses' knowledge and practice regarding "Central Line-associated Bloodstream Infections" in intensive care units. To evaluate the effect of care bundle education on nurses knowledge regarding central line associated blood stream infection in intensive care units and to evaluate the effect of care bundle education program on nurses practice regarding central line associated blood stream infection in intensive care unit was assessed before and after (6 months) the implementation of nursing education interventions, and were tested through paired sample t-tests.

The result of the current study shows that, there is a significant difference between the pre and post intervention of knowledge and practices scores of study participant. The same study done by (Manzo et al., 2022) in Brazil.(10) They revealed that Nursing professionals had moderate knowledge regarding CLABSI prevention practices. But the knowledge of the nurses and medical professionals can be increased by interventions. Moreover, the mean score of knowledge of study participants post intervention is 20.83 ± 3.761 which is much higher than the mean score at the baseline is 10.86 ± 1.496 . The mean score of the patients with a pre intervention of practices scores is 10.67 ± 3.757 which is increased after intervention with a level of 22.19 ± 1.837 . The findings of the current study are similar to a study conducted in Egypt in 2019. The study findings revealed that, there were highly statistical significant difference in total mean scores of nurse's knowledge and practice about bundle of care related to

CLABSI between pre- post and follow up of implementation of bundle.(11) In congruent a study was conducted in Jordan in 2018, the study results shows that, in there were poor knowledge of study participants in the pre-test, with 8.2 mean scores and SD $\frac{1}{4}$ 3.6. While the Post-test was conducted after 6 months, after completion of the course, in the experimental group knowledge score was drastically and significantly improved, however the control group presented no change ($t(106,3) \frac{1}{4}$ 25.1, $p \frac{1}{4}$ 0.00) (12). Educating intensive care unit nurses to use central venous catheter infection prevention guidelines: effectiveness of an educational course. Another study conducted in Oman in 2022, there were statistically significant differences between mean scores of the pre and post-test as regards nurses' knowledge and practices regarding central line-associated bloodstream infection in high-risk neonates. (13)

Additionally, a study conducted by {El-Sol, 2017 #115} (14) during a similar study about "The effect of a designed teaching module regarding prevention of central-line associated bloodstream infection on ICU nurses' knowledge and practice," who founded that the majority of the studied nurses who attended in- service training courses about infection control, their knowledge and practice increased. Nurse attendance of instructing courses and training programs, keeping them up-to-date, and enhancing their practices principally in applying the procedures that require strict aseptic techniques. Furthermore a study conducted in Egypt in 2020, the study results presented significant improvement in nurses' knowledge regarding the central venous access device (CVAD) after implementing the care bundle education program with a highly statistically significant difference ($P=0.000$). Also, a noticed improvement in nurses' knowledge



regarding all components of CAVD, including CVC catheter insertion site, types, duration of use, indications, and mechanical complications post compared to the pre-care bundle education program that reflected a significant effect of the bundle of care education.(1) In relation to this study's finding, it had been in agreement with {Bayoumi, 2017 #116} ,(15) who concluded that the bulk of the nurses within the pediatric hemodialysis unit have a lack of knowledge about evidence-based practice guidelines. There was a highly statistically significant improvement in total nurses' knowledge level immediately post and after six months of teaching guidelines implementation.

The current study shows table the demographic characteristics of the study participants in terms of percentages and frequency. Accordingly, 100 percent of the participants were females. In addition, most of participants belonged to the age group of 26 to 30 years, i.e. 55.6%, followed by less than or equal to 25 years, i.e. 22.2%, 31 to 35 years, i.e. 19.4% and more than 35 years, i.e. 2.8%. Similarly a study was conducted in Egypt in 2020. (16) The study participants' age was 54.7% between 20 and 25. In contrast a study was conducted in Cairo Egypt in 2017; the study findings revealed that three-quarters of the nurses in their study were less than 25 years old with a mean age of 21.69 ± 4.24 years old.

The highest level of study participants were general nursing Diploma holders such as 24 (66.7%). Followed by BSN/Post RN group participants they were 12, i.e 33.3% and MSN they were 0%. Similarly a study was conducted in Egypt in 2020, the study participants education level was General Nursing Diploma with a percentage of 66%. (1) . in addition of experience level most of participants belong to 6 to 10 years of group they were 50.0%, 3 to 5 years of experience

group they were 38.9%, followed by less than or equal to 2 years' experience group they were 8.3% and more than 10 years of experience group participants they were 2.8%. The result of the current study is congruent with a study Mansoura in 2016, the study revealed that, approximately two-thirds of studied nurses having 10 years of experience. (17) In contrast a study conducted in in Egypt 2020, the findings of the study shows that the majority of studied nurses had one to less than five years of experience with mean years of experience 2.73 ± 1.88 years.

The posted area of study participants they worked in Medical and Surgical intensive care units most of study participants worked in SICU they were 55.6% and 44.4% study participants worked in MICU. The similar study was conducted in USA 2013 the study communicated the result such as 53 % patient was male and 47% patients were female, while a contrast study was conducted by (S. M. Aloush & Alsarairh, 2018) .(18) There were many discipline ICUs were involved in the study. It was a very huge sample size study around 621 study participants was involved in the study. Moreover, a study conducted in Brazil by {Yoshida, 2019 #118}.(19) The study findings was contrast to our study, finding revealed that no significant reduction occurred in the incidence ratio of CVC-BSIs after bundle implementation in ICUs. The researcher suggested the need to review process of implementation, and continuing nursing education for health care in acquiescence and proper application of the educational bundle.

CONCLUSION

The based on current study findings, it established that there was inadequate knowledge as well as unskilled practice among nurses regarding central line



associated blood streams infection in intensive care units earlier the care of bundle education program. The enhancement of nurse's knowledge and practice develop after CLABSIs package of care fulfillment with highly statically important difference. Knowledge and practice of staff nurses in the critical unit regarding the maintenance are one of the most important determinants of quality nursing practice for better outcome among patient in intensive care units. The study theory is supported, and the care bundle education program achieved significant advancements in nurse's knowledge and performance regarding CLABSIs in intensive care unit.

RECOMMENDATIONS

Based on the results and completion of the present study, the following suggestions were recommended:

1: Establishing the educational centers in all tertiary care institutions manage for new nursing staff working in Intensive Care Units being responsible for upcoming and refreshing the nurses knowledge and practice.

2: Organizing the workshop that highlights the evidence based practices about package of care regarding prevention of CLABSIs and infection control events in critical care setting within the hospitals. These facilities must be delivered by nursing staff.

LIMITATIONS:

The current research study has few limitations mentioned below:

- One limitation includes the fact that the study was conducted at only one hospital setting, limiting the generalizability of the findings.
- One other main limitation found was that it was difficult for the patients in the given setting to attend regular lecture sessions in group, and then they were provided with face to face individual teaching in the OPD setting.

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