

A STUDY TO ASSESS THE KNOWLEDGE OF STAFF NURSE REGARDING CARE OF CENTRAL LINE

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ABSTRACT

Introduction: A central line-associated bloodstream infection (CLABSI) is quite common in an intensive care unit (ICU) and results in a prolonged stay with multiple complications. This study tried to reveal existing knowledge deficits among the newly recruited nursing staff about central venous line (CVL) care. This study also highlights the usefulness of "flipped classroom" and "interactive practical classes" techniques in re-educating nursing staff about CVL basics and management and their impact on nursing staff performance in managing CVL.

Methods: This is a cohort study conducted at a tertiary care centre from August 2021–January 2022. A total of 20 newly recruited nursing staff (with 1 to 3 years of nursing experience) underwent a pre-test comprising 25 questions about central venous line (CVL) basics and management. All the 20 newly recruited nursing staff had at least 6 months of prior experience of working in an ICU at different hospitals. This was followed by an intervention in the form of "flipped classroom" and "interactive practical classes" with individualized attention. A post-test was conducted following these classes to assess the knowledge gained. A total score of pre-test and post-test activities was calculated for each nurse.

Results: The mean age of the participants was 24.6 years. All the 20 participants had exposure to the CLABSI prevention guidelines during their initial days of training at their respective nursing colleges. 20 participants scored a mean of 21.4 ± 2.4 during the pre-test. A post-test mean score increased to 23.1 ± 1.0 in Section-A. Similarly, 20 participants scored a mean of 8.4 ± 0.94 during the pre-test. A post-test mean score increased to 9.4 ± 0.94 in Section-B.

Conclusion: Our study showed that with the help of newer learning techniques, the overall knowledge and management skills in managing CVL of newly recruited nurses increased significantly.

Key words: Cardiac critical care, Nursing care, central venous line, CLABSI

INTRODUCTION

A central line is a large-bore central venous catheter that is typically placed in large sized veins using sterile technique,

except when a patient is unstable, in which case sterility might only be a minor issue. The following are some indications for inserting a central venous line: fluid

resuscitation, blood transfusion, drug infusion, central venous pressure monitoring, pulmonary artery catheterization, emergency venous access for patients for whom peripheral access cannot be obtained, and transvenous pacing wire placement.

A bloodstream infection that occurs within 48 hours after the installation of a central line and is confirmed by a laboratory is referred to as a central line-associated bloodstream infection (CLABSI). It is a frequent complication that is linked to higher healthcare costs, longer hospital stays, and high mortality. The majority of instances can be avoided with the right aseptic procedures, oversight, and management practices [1].

The CLABSI rate varies considerably in the different studies reported from India. The overall rate of CLABSI was 17.04 per 1000 catheter-days and 14.21 per 1000 inpatient-days in the latest Indian study [2]. Mehta and Rosenthal reported the incidence of the CLABSI rate as 7.92/1000 device days in India in 2007. While the study conducted by Singh reported a CLABSI rate of 0.48 per 1000 central line days, other studies showed CLABSI rates of 27.0 and 16.0 per 1000 central line days. CLABSI is caused in various ways, such as contamination of intravenous fluids by tubing, while injection of drug additives to intravenous fluids, addition of connecting tubes or while adding stopcocks to the iv system, improper care of needle insertion site, contaminated needles or catheters, failure of change of iv access site when inflammation first occurs, improper technique during administration of multiple blood products, improper care of peritoneal or hemodialysis shunts, improper accessing of an IV port.

During CVP, the nurse monitors the patient for complications, which include local obstruction with distal ischemia, external hemorrhage, massive ecchymosis, dissection, air embolism, blood loss, pain, and infection. The prevention of catheter-related infection is key to the successful use of parenteral nutrition and medication. Most infections that do occur result from contamination of the exit site or catheter hub. A nurse must follow strict guidelines or protocols for the care of the vascular access device before, during, and after its insertion. This study shows the knowledge deficit among the nursing staff about the CVL. This study also highlights the usefulness of the "flipped classroom" and "interactive practical classes" techniques in re-educating nursing staff about CVL basics and management.

METHODOLOGY

This is a cohort study that will take place at a tertiary care centre from August 2021 to January 2022. A total of 20 newly recruited nursing staff (with 1 to 3 years of nursing experience) underwent a pre-test comprising 25 questions about central venous line (CVL) basics and management. All 20 newly recruited nurses had at least 6 months of prior experience working in an ICU at different hospitals. This was followed by an intervention in the form of "flipped classroom" and "interactive practical classes" with individualised attention. These classes included two theoretical classes and two practical classes in ICU. Each of these classes lasted for 1 to 2 hours. These classes were taught by an experienced nurse with at least 20 years of experience along with a critical care specialist doctor with 10 years of experience. Each of these classes was interactive, with no restriction on queries raised by nurses. One week before the

class, the instructor recorded short videos (less than 10 min each using PowerPoint Office) covering the different objectives of the CVL lecture. These videos were uploaded to the social media app ‘WhatsApp’s group’ where all the participants and instructors are members and made available to the participants. Participants were instructed to watch the videos prior to the class. Along with the videos, captions were included to enhance the participants' understanding.

A post-test was conducted following these classes to assess the knowledge gained. A total score of pre-test and post-test activities was calculated for each nurse.

Two such sessions of pretest and post-test were performed, which included sections-A and B. Section-A covered the fundamentals of the patient's central venous line. Section-B included performing central venous line care.

Participants were asked to respond anonymously to questions about their degree of satisfaction with the flipped classroom method and the effect this strategy had on their learning at the conclusion of the most recent flipped classroom. This anonymous survey was created with Google Forms and made available to all students after the final lesson.

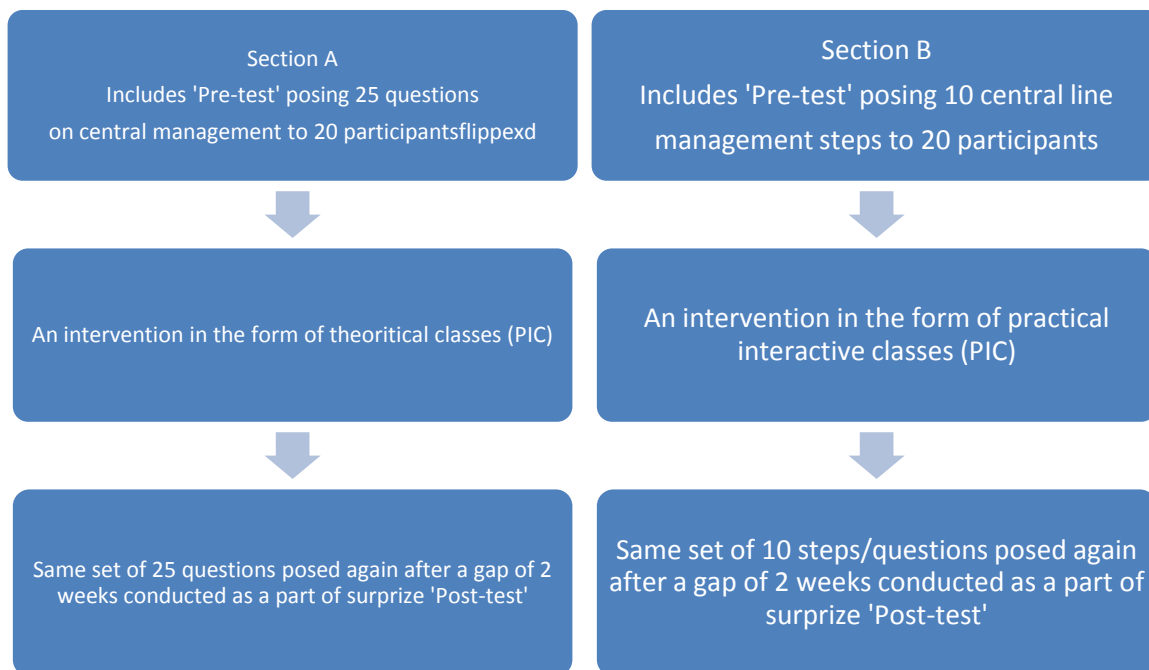


Fig 1: The chart showing the design of the study

This data is analysed using statistical methods such as the paired sample T-test, mean, standard deviation, and descriptive plots. The software used to analyse statistics is JASP (open-source software by the University of Amsterdam). This study was approved by the internal ethical

committee at our tertiary care centre according to the WMA Declaration of Helsinki—Ethical principles for medical studies involving human subjects.

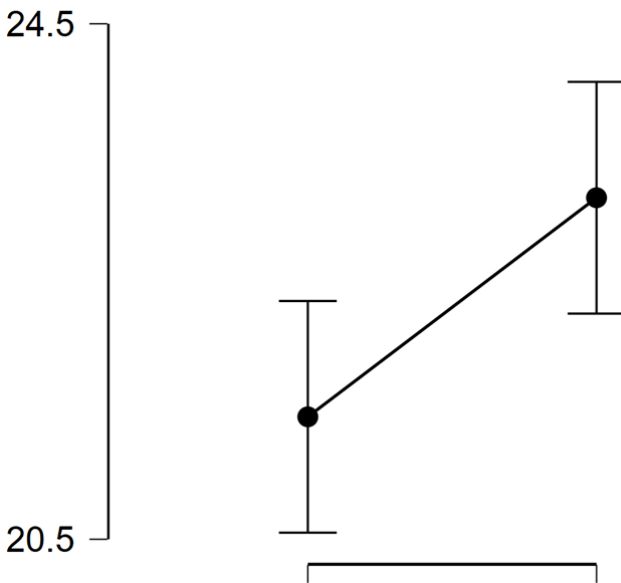
RESULTS

The mean age of the participants was 24.6 years. All 20 participants had exposure to the CLABSI prevention guidelines during their initial days of training at their respective nursing colleges.

SECTION-A

20 participants scored a mean of 21.4 ± 2.4 during the pre-test. The post-test mean

score increased to 23.1 ± 1.0 . This increase in the average score was statistically confirmed with a paired sample T-test (Vovk-Sellke method). The numerical increase in the new score is statistically significant, with a p-value of 0.011 and a 95% confidence interval lying between 0.42 and 2.97.



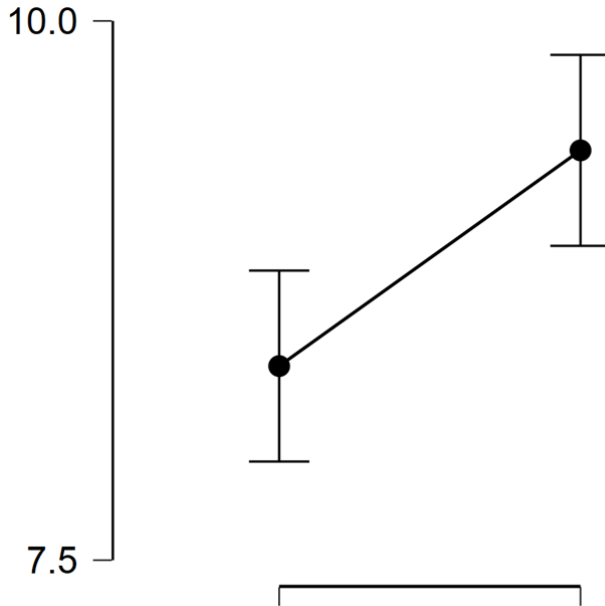
	Pre-test	Post-test
SECTION-A	Pre-test scores	Post-test scores
N=number of questions	20	20
Mean	21.45	23.15
Standard deviation (SD)	2.43	1.08
Standard Error (SE)	0.54	0.24
p-value	0.011	
Mean Difference	1.7	
CI (95%)	0.429-2.971	

Fig 2: The descriptive plot (figure) shows definitive improvement in the average score of individual participants after ‘interactive ‘classes under section A.

SECTION-B

20 participants scored a mean of 8.4 0.94 during the pre-test. The mean post-test score increased to 9.4 0.94. This increase in the average score was statistically confirmed with a paired sample T-test

(Vovk-Sellke method). The numerical increase in the new score is statistically significant with a p-value of 0.003 and a 95% confidence interval lying between 0.37 and 1.62.



	Pre-test	Post-test
SECTION-B	Pre-test scores	Post-test scores
N= number of questions	20	20
Mean	8.4	9.4
Standard deviation (SD)	0.94	0.94
Standard Error (SE)	0.21	0.21
p-value	0.003	
Mean Difference	1.0	
CI (95%)	0.374-1.626	

Fig 3: The descriptive plot (figure) shows definitive improvement in the average score of individual participants after ‘practical interactive’ classes under section B.

DISCUSSION

This study was conducted to determine the effectiveness of the "flipped classroom"

and "interactive practical classes" interactive strategies in increasing the knowledge and skills of managing patients'

CVL in an ICU setup. The results show a significant improvement in the basic knowledge about the CVL, such as the indications, the material of the CVL, the duration of upkeep, and complications. It also showed good improvement in the skills of managing patients' CVL.

The feedback from the newly recruited nursing staff also showed an increased level of confidence (40% versus 90%) and satisfaction (50% versus 96%) in knowing and performing proper CVL care. The flipped classroom educational model was noted by participants in the questionnaire's open-ended section. Participants reported that the flipped classroom method is very time-consuming but that it helped them to "be more attentive in class," "access the explanation at their convenience," "better recall the knowledge," and "understand clearly the respiratory system." According to the participants, the method's other difficulty was primarily technical (weak Internet connection).

This study expanded the body of knowledge about the status of newly recruited nurses' compliance with CLABSI prevention guidelines. Nurses' compliance was sufficient; however, more improvement was achieved by introducing "flipped classroom" and "interactive practical classes," two interactive learning strategies.

CONCLUSION

Our study showed that with the help of newer learning techniques, the overall knowledge and management skills in managing CVL of newly recruited nurses increased significantly.

Implications for Future Research

Future research prospects are presented by this work. First, multidisciplinary observational research would give a more thorough picture of how different healthcare providers' compliance affects the frequency of CLABSI. Second, the findings of this study could be more broadly applied if they were replicated with a larger sample size and nurses from different nations. Third, future research will add more to the discussion of how to prevent CLABSI by looking at other factors that may affect the rate of CLABSI, such as the side effects of medicines and the severity of the illness.

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