

Impact of educational interventions on nurses' knowledge regarding care of patient with central venous line

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Abstract

Background: Central Venous Line is widely used in critically ill patients for continuous assessment of the cardiovascular system. Adequate knowledge of nurses in taking care of central venous pressure line plays vital role to minimize complications and to accurately recognize catheter-related problems, thus securing safer and improved outcome for the patient. This study was performed to find out the effectiveness of educational intervention in increasing nurses' knowledge regarding care of patients with Central Venous Line among nurses.

Methods: This is a pre-experimental study design (pre-intervention---intervention---post-intervention). After institutional approval, 40 nurses were taken from Kathmandu Medical College Teaching Hospital for study adopted with Simple Random Sampling (Lottery) method. A structured, self-administered questionnaire was used for pre- intervention data collection After two weeks of educational intervention, post- intervention test was taken. The data was analysed and calculated by using descriptive Statistics and Paired "t" test was applied to assess the differences between pre-intervention and post- intervention results.

Results: Overall, mean knowledge score was 14.75 with SD 2.37 in the pre intervention. After educational intervention the score was changed to 16.80 with SD 5.51. There was significant difference between the pre -intervention and post-intervention knowledge score (p value =0.039).

While assessing the overall existing knowledge level of the participants, most of the participants had moderate knowledge level (50% to 75%). After intervention knowledge level significantly increased (p value=0.001).

Conclusion: The study showed that educational intervention programme considerably improved the nurses' level of knowledge about care of patient with central line. Overall mean knowledge score between pre-intervention and post-intervention was found to be significant.

Key words: Central Venous Pressure (C V P), Central Venous Catheter (CVC), Educational Intervention

INTRODUCTION

Central Venous Line is an important determinant of hemodynamic monitoring. Central Venous Line was first performed in experimental animals at the turn of the 20th century. In humans it did not become a standard practice in critically ill patients until after World War II. Insertion of a central venous catheter (CVC) in human was first reported by Werner Forssman, a surgical intern, who described canalizing his own right atrium via the cephalic vein in 1929. In 1970s Central Venous Pressure Line was introduced into standard practice. Further advances coincided with technical refinements in the needles, catheter and monitoring system available; its

use has been increased in clinical utilization as a Central Venous Pressure Line¹.

Central Venous Pressure monitoring is common form of direct monitoring of the pressure of right atrium. It represents the filling pressure of the right ventricle and indicates the ability of the right side of heart to manage a fluid load. In Central Venous Pressure Catheterization procedure nurses' responsibility begins from preparation of the procedure, till the removal of Central Venous Catheter. Actually the resolution of patient condition depends on meticulous care provided by the nursing personnel².

A Central Venous Line is a potential source of infection. This complication may result in significant morbidity or mortality. Incidence of catheter related infection is estimated 200,000 cases worldwide each year³.

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When Central Venous Catheter care team or nurse provides standardized, meticulous care, infection rate is significantly reduced on average from about 25% to 30%³. Other studies show that education on catheter insertion and care reduces infection rates by 41 to 66% in adult intensive care Units (ICU)⁴.

The nurse who has a thorough understanding of the benefits and risk of Central Venous access devices should be able to minimize and accurately recognize catheter related problem ensuring safer and improved outcome for the patient⁵.

It is important to consider potential complications such as catheter related bacteraemia. Nurses are the first line of defense to prevent infection. Therefore nurses taking care of these central line devices must be up to date regarding appropriate infection control measures⁶. Therefore, the aims of this study to find out the effectiveness of educational intervention in increasing knowledge regarding care of patients with Central Venous Line among nurses.

METHODS

This is pre-experimental study design. After institutional approval, 40 nurses were taken from Kathmandu Medical College Teaching Hospital, (KMCTH) for study adopted with Simple Random Sampling (Lottery) method. After obtaining informed consent, a structured, self-administered questionnaire was used for data collection. After obtaining the pre-intervention, the planned educational intervention was implemented. Structured teaching programmed contents, definition of CVP line its benefits and risks of the CVP line as well as how to minimize the catheter related complications and its management and care of patients with central venous pressure line etc. After two weeks of educational intervention post-intervention was test taken by same research instruments that was used in pre-intervention.

The data was analysed and calculated by using descriptive Statistics and Paired "t" test was applied at 0.05% level to assess the differences between pre-intervention and post-intervention results

The level of knowledge was determined by scoring the participants' responses about knowledge on CVP line care. There were 26 questions. Each correct answer carried 1 score, total score was 26.

The level of knowledge score was converted into percentage and overall adequacy of knowledge was graded according to the following criteria:

- If score > 75%: high level of knowledge
- If score 50% to 75%: moderate level of knowledge
- If score < 50%: inadequate level of knowledge⁷

RESULTS

Demographic characteristic of the participants are summarized in Table 1. Out of the 40 participants, 72.5% participants were less than 25 years old and 27.5% participants were more than 25 years old. Mean age of the participants was 23.5 Years.

On the basis of working experience 85.5% participants had 0-5 year of experience and 12.5% participants had 5-10 year of experience. There was no statically difference in the total mean knowledge score between 0-5 year experienced and 5-10 year experienced participants in pre-intervention (p=0.646) and post-intervention (p=0.521) respectively.

Regarding hands washing, the respondents had good knowledge. The score ranged from 95 % to 100% in the pre-intervention and post-intervention respectively. Regarding catheter related complication, mean knowledge score between pre intervention and post intervention was found to be significant at (p=0.001).

Overall mean knowledge score in pre-intervention and post-intervention was 14.75 with standard deviation of 2.37. After educational intervention the score was changed with 16.80 with standard deviation of 5.51. Statistical differences between pre-intervention and post-intervention was found to be significant (P=0.039).

Regarding classification of knowledge level as participant's pre-intervention and post-test Knowledge score, 87.5% respondents gained moderate and 15.5% had gained inadequate knowledge on pre-intervention. Whereas 45% had gained adequate knowledge, 35% had gained moderate and 20% had gained inadequate knowledge on post-intervention. Paired sign test was applied for statistical differences between pre-intervention and post-intervention in classifications of knowledge level. It was found to be significant (p=0.001).

Table 1: Demographic characteristic of the participants

Age Group	Number	Percentage
≤ 25 years	29	72.5%
> 25 years	11	27.5%

Table 2: Participants overall knowledge score of Pre-intervention and Post- intervention

Total mean knowledge score	Mean score	SD	'P' value
Pre-test	14.75	2.37	0.039
Post test	16.80	5.51	

DISCUSSION

Most of the respondents (72.5%) were below 25 years as well as they had less than 5 year of working experience, so these age groups need to be properly trained and oriented on CVP line care. This finding is consistent with the findings of earlier studies which showed young nurses with less experience, working in surgical and I.C.U should be accepted as risk group and targeted for training program⁶.

Regarding hands washing, the respondents had good knowledge. The score ranged from 95 % to 100% in the pre-intervention and post- intervention respectively. This result supports the study done by (Creedon A)⁹ which stated that the hospital acquired infections are serious problems and pathogens are readily transmitted to health workers' hands. Hand washing substantially reduce the transmission. Regarding catheter related complication, mean knowledge score between pre intervention and post intervention was found to be

significant at (p=0.001). Similar findings were seen in the study by Mrcmel LA³ in which staff education program have shown that catheter infection rates can be reduced between 23 to 37%.

Overall, mean knowledge score was 14.75 with SD 2.37 in pre-intervention. After educational intervention the score was changed to 16.80 with SD 5.51. There was significant difference between the pre- intervention and post- intervention knowledge score(p=0.039). Therefore, it could be concluded that educational intervention had significant role in increasing the knowledge. This result is supported by Davidson HC⁶ which stated that an educational program directed at nurses and physicians working in the medical ICU setting may significantly reduce the incidence of catheter-associated bloodstream infection by 57.1%. This finding was also supported by study done by Sharma M which concluded that educational intervention considerably improved the level of knowledge (P=0.001).

CONCLUSION

Study findings revealed that there was significant increase in knowledge in the post- intervention. Therefore, it can be concluded educational intervention plays an important role in increasing nurse's level of knowledge.

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