

## Assessment of nurses' Knowledge and Practice Related to Caring of Central Venous Line at Aldamam hospital

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**Abstract:** Central venous catheters (CVC) are known to be associated with risks of complications such as infections and hemorrhages. Good practices of care and management are essential in limiting these risks. Therefore, the investigators felt a real need to assess the staff nurses' knowledge and practices regarding CVL Care. The objectives of the study were to assess the knowledge and practice of staff nurses regarding care of CVL. In Aldamam hospital, the research approach adopted for the study was quantitative approach and the research design was descriptive survey design. The tool for data collection was a structured questionnaire to assess the knowledge of nurses, an observation checklist for nurses related to CVL care technique pre, during and post procedure, and an observation checklist for nurses related to removal of CVL. 33 staff nurses working in Aldamam hospital. The findings of the study concluded that there was a significant statistical difference in nurses' knowledge and years of experience, and no significant statistical differences in nurse's practices before, during, after, and removal of central venous line in relation to years of experience.

**Keywords:** Central Venous Line, Knowledge, Nurses, and Practice.

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### I. Introduction

Central venous catheters (CVCs) are commonly used in critically ill patients for the administration of fluids, medications, blood products and parenteral nutrition, for the insertion of a transvenous pacing electrode and to monitor hemodynamic status.(1)

Central Venous Catheter (CVC) is a bigger, longer catheter that's put into a large vein. There are many different kinds of CVCs available, in clinical, according to illness situation, medical workers can choose short term or long-term CVC for patients to implement treatment. (2)

Some types of CVCs can stay in for many weeks, months, even years. In addition, the catheter can stay in as long as the patient getting treatment, so, patients do not need to be stuck with a needle each time, which can effectively relieve the pain of the patients. Every type of CVCs all have its own specific nursing care because they have different complications and possible problems.(2)

CLABSIs lead to prolonged hospital stays and increase health care costs and mortality. An estimated 250,000 bloodstream infections occur annually, and most are related to the presence of intravascular devices.(3) Central venous catheters usually remain in place for a longer period of time than other venous access devices, especially when the reason for their use is longstanding (such as total parenteral nutrition in a chronically ill patient). May be considered because of their smaller infection risk. Sterile technique is highly important here, as a line may serve as a ported'entrée (place of entry) for pathogenic organisms, and the line itself may become infected with organisms such as Staphylococcus aureus and coagulase-negative Staphylococci. (4)

Clinicians should think about how to care for various I.V. devices and when central venous access should be discontinued. They should understand some low-resistance lines, such as those used for dialysis; often need anticoagulant flushes, while other lines with valves, intended for long-term access, generally do not require heparin flushes. An emphasis on meticulous sterile technique, both during the placement of lines and during routine care, is essential. Removal of unused lines reduces infection risk. (5)

Central line-associated blood stream infections (CLABSIs) are common hospital acquired infections with reported mortality of 12-25%. The use of antibiotics and strict aseptic technique can significantly reduce the rate of infection. (6)

The best way nurses can help decrease the risk for a central venous catheter related bloodstream infection is by using meticulous hand hygiene. Proper hand hygiene before performing central venous catheter care can involve either the use of a waterless alcohol-based product, or using an antibacterial soap with water and adequate rinsing. (7)

The Institute for Healthcare Improvement (IHI) also recognizes the importance of decreasing central venous catheter related bloodstream infections. They have implemented a 5 Million Lives campaign that is

aimed at protecting patients from incidents of medical harm, including catheter infections. To help healthcare professionals accomplish this, the IHI has developed a care bundle aimed at preventing central venous catheter infections. A care bundle is a group of practices that together result in improved outcomes than if the practices were implemented separately. (8)

When caring for a patient with a central venous catheter, the nurse should be aware of how these factors can influence a patient's risk for developing a catheter related bloodstream infection.(9) Central venous catheters may be made out of either polyvinyl chloride or polyurethane material. Studies have indicated that catheters made out of polyurethane have a lower infection rate than catheters made out of polyvinyl chloride.(9)

When drawing blood from the catheter, include the following steps: remove the access cap before drawing blood, clean the catheter hub with alcohol, and attach the syringe directly to the catheter hub. When finished replace the access cap with a new sterile cap. Every time the access cap is removed, or if it becomes contaminated with blood or other fluid replace the cap with a new sterile cap. (10)

A study on CLABSI showed that lower CLABSI rates were achieved through educational measures without increasing costs to the hospital. In this approach, every health professional was approached individually regarding the insertion technique and maintenance of central venous catheters. (6)

Thus, knowledge and practice on central venous line care are important for nurses to prevent repercussion associated with improper central venous line approach.

## **II. Aim of the Study**

To evaluation of nurses knowledge and practice related to caring of central venous line at Aldamamhospital.

### **Hypotheses:**

1. All the participant nurses they know the indication and complication of central venous line.
2. All the mean knowledge and practice scores of nurses will be increase with increase years of experience.

## **III. Subjects and Methods**

### **Researchdesign:**

We approached this evaluation as descriptive study to assess 33 nurses working inAldamamhospitalin the following units emergency room, intensive care unit, and other different units on hospital

### **Setting:**

The study carried out at Aldamam hospital on Aldamam.

### **Sampling:**

A convenience sample and a descriptive study were used to collect data, (33sample) was selected from staff nurse who met the following criteria:

### **Inclusion criteria:**

- 1- Being a nursing professional, either with technical and supervisor level.
- 2-having agreed to participate in the research by signing the Informed Consent Form.
- 3- Female nurses.
- 4-Nurses with at least one year experience.
- 5- Who performed central venouscathetercare.

### **Exclusion criteria:**

- 1-The nursing assistant category
- 2- Staff nurses who had attended in-service education or conference regarding care of patient with central venous catheter.

### **EthicalConsideration:**

The study was approved by the appropriate ethics committee and hospital director. Staff nurses were informed about the purpose of the study and about their rights to refuse or withdrawal at any time.

### **Data collection:**

Administrative permission was obtained from the Principal of selected areas. Written consent was obtained from the study participants. Questionnaire was self-administrative and observational checklist to them inAldamamhospital,The time taken to respond to the questionnaire was one hours, The study was conducted between June 2018 and August.

**Tools of data collection:**

Data were obtained through the fallowing tools:

**Questionnaire sheet:**

Data was collected by using structured and validated questionnaire.

This questionnaire and observation was developed and constructed by researcher to assess nurses’ knowledge, practice and skills toward central venous line it was constructed base on review of nurses’ literature.

**The tools consisting of the following:**

**Tool (1):**

Nurse’s assessment sheet consisting of two parts:

**Part I:**

Demographic data consisted of insertion side (type of vein),Names of unit,andnumbers of years of experience

**Part II:**

A structured questionnaire consisted of multiple true and false Questionswere developed to assess the knowledge of nurses related to care of central venous line.

**Tool (2):**

**PartI:**

An observation checklist for nurses related to central venous linecaretechnique, pre,duringand post procedure.

**Part II:**

An observation checklist for nurses related to removal of central venous line.

**Statistical analysis:**

SPSS version (16) software was used in the statistical package to build a database and present data analyses.

Data were presented using descriptive statistics in the form of frequencies and percentages while a value of  $p < 0.005$  was considered significant. )

**IV. Results**

**Figure 1.** Distribution of nurses according to year of experience



In Figure1. show that the distribution of nurses according to years of experience , The findings showed that nurses have years of experience (1-4 ) years constituted (24.2%) ,nurses have years of experience (5-9) years constituted (54.5%)and nurses have years of experience (10+) years constituted (21.2%) .

**Table 1.** Distribution of hospital’s unites related to insertion of central venous line.

Name of unite	Frequency	Percent	Valid Percent	Cumulative Percent
ER	3	9.1	9.1	9.1
ICU	27	81.8	81.8	90.9
Others	3	9.1	9.1	100.0
total	33	100.0	100.0	

Table 1.revealed that (9.1%) of central venous line inserted in emergency room,(81.8%) of it inserted in intensive care unit, and(9.1%)of it inserted in different units on hospital.

**Table 2.**Level of Knowledge for Staff Nurses regarding CVL care

Years of experience	Poor		Satisfactory		Good		P value
	Count	Percent	Count	Percent	Count	Percent	
1-4 years	4	50%	2	25.0%	2	25.0%	P< 0.001*
5-9 years	0	0%	9	50.0%	9	50.0%	
10+ years	0	0%	0	0%	7	100.0%	

\*significant differences

--[poor]=level of knowledge was 50%

--[satisfactory]=level of knowledge from 50% to 70

--[good]=level of knowledge 70%+

**Table 2.**shows thatthe mean scores of knowledge increase with increase years of experience, The highest percent of knowledge on good level was(100%) for nurses have years of experience (10+)years, while the lowest percent on good level was(25.0%) for nurses have years of experience (1-4)years.

- There was a significant statistical difference in nurses’ knowledge and years of experience.

**Table 3.**Percentage Distribution of nurses’ practice means scores before, during, and after procedure.

Nurses’ practice (before)	Years of Experience			Total
	1-4	5-9	10+	
0	0 (0% )	1 (5.6% )	1 (14.3% )	2 (6.1% )
1	6 (75.0% )	9 (50.0% )	2 (28.6% )	17 (51.5% )
2	2 (25.0% )	8 (44.4% )	4 (57.1% )	14 (42.4% )
Nurses’ practices (during)				
3	1(12.5% )	3 (16.7% )	0 (.0% )	4 (12.1% )
4	3(37.5% )	10 (55.6% )	5 (71.4% )	18 (54.5% )
5	4 (50.0% )	5 (27.8% )	2 (28.6% )	11(33.3% )
Nurses’ practices (after)				
4	1 (12.5% )	0 (.0% )	0 (.0% )	1 (3.0% )
5	2 (25.0% )	6 (33.3% )	2 (28.6% )	10 (30.3% )
6	5 (62.5% )	8 (44.4% )	3 (42.9% )	16 (48.5% )
7	0 (.0% )	4 (22.2% )	2 (28.6% )	6 (18.2% )

Table3. Show that the nurses’ practice means scores before procedure: (0) didn’t perform any steps of the management before procedure, (1) perform the half steps, and (2) perform all steps.As regard nurses’ practice mean scores during procedure: (3) perform three steps of management during the procedure, (4) perform four steps, and (5) perform all steps. As regard nurses’ practice mean scores after procedure: (4) Perform four steps of the management after procedure, (5 )Perform five steps, (6)Perform six steps, and(7)Perform all steps .

-The table shows that no significant statistical differences in nurse’s practices before, during, and after procedure in relation to years of experience.

**Table 4 .**Percentage Distribution of nurses’ practice means scoresfor removal of central venous line.

Nurse’s practices	years’ Experience			Total
	1-4	5-9	10+	
4	2 (25.0% )	4 (22.2% )	2 (28.6% )	8 (24.2% )
5	6 (75.0% )	11(61.1% )	3 (42.9% )	20 (60.6% )
6	0 (.0% )	3 (16.7% )	2 (28.6% )	5 (15.2% )

**Table4.** shows that: (4)performfour steps of the management related to removal of central venous line, (5)performfive steps, and (6)performall steps.

- The table shows that no significant statistical differences in nurse’s practices in related to removal of central venous line in relation to years of experience.

## **V. Discussion**

The insertion of a central venous catheter is a highly invasive procedure, so a decision to insert such a device should take into account the patient's condition, symptoms and illness. At the same timethe use of such devices can put the patient at risk of the complications. The nurse has a vital role to play in helping to safe guard the patient against the potential risks associated with central venous lines. (11) Educating and training of health –care providers who insert and maintain central venous catheter is essential for preventing catheter-related infection, improving patient outcomes, and reducing health care costs. (12)

The present study was conducted at Aldamam hospital in order to evaluate nurses' knowledge, practices, and skills regarding care of central venous line. In the present study, the total studied subjects were 33 female nurses. The findings showed that nurses have years of experience (1-4) years constituted (24.2%) ,nurses have years of experience [5-9] years constituted (54.5%), and nurses have years of experience (10+) years constituted (21.2%) .while Shrestha.(2013) was observed that the basis of working experience 85.5% participants had 0-5 years of experience and (12.5%) participants had( 5-10) years of experience .(13)Alkubati , Ahmed , and et al (2015) reported that Most (57.5%) physicians held a master degree,whereasmost(55%)nurses held a baccalaureatedegree. The work experience of most (82.5%) physicians was<5 years, whereas most (40%) nurses had (15-19) years of experience. (14)

While results of present study showed that (9.1%) of central venous line inserted in emergency room,(81.8%) of central venous line inserted in intensive care unit, and(9.1%) of it inserted in different units on hospital. On Alexandria Main University Hospitalcentral venous line inserted in the ICUs.(14)

As regard degree of nurses' knowledge present study showed that There was a significant statistical differences in nurses' knowledge and years of experience ( $P < 0.001^*$ ). the mean scores of knowledge increase with increase years of experience, The highest percent of knowledge on good level was(100%) for nurses have (10+) years of experience, where the same level was ( 50%) for nurses (5-9) years of experience, and the same level was (25%) for nurses (1-4) years of experience.

This finding was supported by the finding ofBijayalaxmi,Urmila ,and Prasad(2010) that theymentioned in their study thatthere is a significant association between nurses' knowledge and years of experience in nursing. (16)This finding was supported by the finding of Shrestha( 2013)where he found that.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. (13)

These findings agrees with Mukhlif,,and Hattab(2016)theyindicatedin their study that there is a significant association between nurses' knowledge and years of experience in nursing field at ( $P$ -value =0.001).(16) Also these findings agreed with Al-Jazai'ri (2007) he mentioned that there is a significant association between nurses' knowledge and years of experience and years of employment.This indicated that the more years of experience and the more years of employment, the more knowledge the nurses may have. This result is disagreed with Salih (2007) he stated that in his study there is no significant association between nurses' knowledge and the years of experiences as a nurse .(16) This finding was also supported by study done by Sharma (2008) which concluded that educational intervention considerably improved the level of knowledge ( $p=0.001$ ). (17)

Another studies carried out in Chinese by Chen ,Shang , and et al (2012) where they found that Catheter-related bloodstream infections are associated with significantly increased morbidity, and mortality, . Such infections are a serious threat to patient safety in the intensive care unit. (18)Labeau ,Vandjjck ,and et al (2009) reported that Opportunities exist to optimize knowledge of central venous catheter-related infection prevention among European ICU nurses. We recommend including central venous catheter-related infection prevention guidelines in educational curricula and continuing refresher education programs. (19) Another studies carried out in Alexandria Main University Hospital by Alkubati, Ahmed and et al (2015) that the total percentage of correct answers of the health care workers about the guidelines for the prevention of CVC-RI was low. (14)

Regarding assess nurses practices related to nursing care for central venous line.The present results showed that no significant statistical differences in nurses' practices before, during, after procedure, and removal of central venous line in relation to years of experience. May be nursing staff shortage, nursing work overload, and inadequate supervision by the nursing supervisors could contribute to such a low practices level

This result is disagreed with Ahmed, and Khatam (2016)they stated that in theirstudy there isassociation between nurses' practice and the years of experience in nursing field ( $P$  value=0.05). Also Sadiq (2012) reported in his study that there are highly significant relationship between nurses' practices and the years of experience in general hospital. (16)

## VI. Conclusion

Based on the results of the present study it can be concluded that there was significant statistical differences in nurses knowledge in relation to years of experience, the mean scores of knowledge increase with increase years of experience, Also the present study show there is no significant statistical differences in nurses 'practice before ,during, after ,and removal of central line procedure in relation to years of experience, It require the need for improvement in practice of staff nurses regarding care of central venous line which can be achieved through various methods like in-service education, continuing education programs, more practical training program, etc.

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