Infection Control Measures for Patient with Central Line: Nurses' Performance

Thesis

Submitted for Partial Fulfillment of Master Degree in Medical-surgical Nursing (Critical Care Nursing)

By

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LIST OF CONTENTS

	Title	e		Page
-	List of	f Tables		I
-	List of	f Figures		III
-	List of	f Abbreviation	S	IV
-	Abstra	act		VI
•	Intro	oduction		1
•	Aim	of the Stud	dy	7
•	Revi	iew of Lite	rature	
	>	Central ver	nous catheter	10
	>	Vein select	ion for CVC insertion	11
	>	Types of C	VCs	15
	>	Nursing ro	le of central venous catheter	18
	>	Complicati	ons of CVC insertion	26
	>	Diagnosis of	of catheter related infection	34
	>	_	le for prevention of infection associated le venous catheters	
		i.	Education and Training of Health Car Personnel	
		ii.	Measures to prevent CLABSI at time of central venous catheter insertion	
		iii.	Measures To Prevent CLABSI After Central Venous Catheter Insertion	
	>	Attitudes o	f nurses toward patient with central line	54

		List of Contents 🕏
•	Subjects and Methods	57
•	Results	68
•	Discussion	91
•	Conclusion	110
•	Recommendations	111
•	Summary	113
•	References	122
•	Appendices	144
•	Protocol	
•	Arabic Summary	

LIST OF TABLE

No.	Table	Page
1	Frequency distribution of studied nurses as regards their demographic characteristic.	71
2	Frequency distribution of the studied nurses according to their knowledge as regards infection control measures for patient with central line.	72
<u>3</u>	Frequency distribution of the studied nurses according to their practice before CVC use (Insertion procedure) as regard infection control measures.	73
4	Frequency distribution of the studied nurses according to their practice toward daily maintenance procedures as regard infection control measures for patient with central line.	74
<u>5</u>	Frequency distribution of the studied nurses according to their practice after CVC use (Removal procedure) as regard infection control measures.	75
<u>6</u>	Frequency distribution of the studied nurses according to their total practice toward infection control measures for patient with central line.	76
7	Frequency distribution of the studied nurses' attitude regarding infection control measures for patient with central line among nurses under study.	77
<u>8</u>	Relation between nurses' knowledge regarding infection control measures for patient with central line and their practice.	80

١

No.	Table	Page
9	Relation between nurses' knowledge regarding infection control measures for patient with central line and their attitude.	81
<u>10</u>	Relation between nurses' practice regarding infection control measures for patient with central line and their attitude.	82
<u>11</u>	The correlation between nurses' knowledge, practice and attitude regarding infection control measures for patient with central line.	83
<u>12</u>	Relation between nurses' knowledge regarding infection control measures for patient with central line and their demographic characteristics.	84
<u>13</u>	Relation between nurses' practice regarding infection control measures for patient with central line and their demographic characteristics.	85
<u>14</u>	Relation between nurses' attitude regarding infection control measures for patient with central line and their demographic characteristics.	87
<u>15</u>	Relation between nurses' attitude regarding infection control measures for patient with central line and their demographic characteristics.	89

LIST OF FIGURE

Mo.	Figure	Page
1	Illustrated the degree and qualification of	
	experts. The tool were revised by 2 professor, 2	163
	assist professor, 3 lecturer and 2 medical staff.	

LIST OF ABBREVIATIONS

Abb. Meaning

BSIs : Bloodstream infections

CCUs : Critical Care Units

CDC : Center of Disease Control

CHG : Chlorhexidine

CLABSIs: Central line-associated blood stream infections

CRBSI : Catheter-related blood stream infections

CRI : Catheter-Related Infection

CVC : Central Venous Catheter

CVL :Central Venous Line

CVP : Central Venous Pressure

FV : Femoral Vein

ICUs : Intensive care units

IHI : Institute For Healthcare Improvement

IJV : Internal Jugular Vein

MIC : Minimal inhibitory concentration

MLC : A multi-lumen catheter

List of Abbreviations 🕏

Abb. Meaning

MRSA : Methicillin-Resistant S-Aureus

NHSN: National Healthcare Safety Network

NNIS : National Nosocomial Infection Surveillance

PICC: Peripherally Inserted Central Catheter

SV : Subclavian Vein

TPN: Total Parental Nutrition

UK : United Kingdom

USA : United States of America

VADs : Vascular Access Devices

WHO: World Health Organization.

X : Arithmetic mean

Infection Control Measures for Patient with Central Line: Nurses' Performance

Abstract

Central venous catheters (CVCs) are vascular infusion tools utilized for studying hemodynamic variables, dialysis, administration of medication, and nutrition. Catheter related blood stream infection (CRBSI) is a complication of central venous catheter (CVC) use. Central venous catheter-related infection (CVC-RI) is considered a common cause of increased morbidity, mortality, and medical care costs in intensive care units (ICUs). Aim of the study: to assess nurses' performance through assess nurses' knowledge, practice and attitude regarding infection control measures for patient with central line in critical care unit. Research design: A descriptive exploratory design was utilized. Methods: Purposive sample of critical care nurses working in the ICU, at El-Fayoum university hospital, 40 nurses from both genders, with different ages, educational levels and years of experience was selected for this study. Data were obtained through three main tools; Selfadministered questionnaire sheet, observational checklist and attitudes questionnaire tool. Results: Nurses had unsatisfactory level of knowledge, practice and negative attitude. There were statistically significance relation between level of knowledge, practice and attitude. Knowledge, practice & attitude were found to differ significantly in relation to socio-demographic data. Conclusion: About more than two thirds of studied nurses had unsatisfactory knowledge and practice regarding infection control measures related to central line. Also, about more than negative three quarter had **Recommendation:** Designing nurses' infection control program to improve their knowledge and practice for infection control measures related to central line. Periodically and continuously, evaluation of nurse's performance should be done to improve quality of their performance. The study should be replicated on large sample & in different hospitals setting in order to generalize the results.

Keywords: Knowledge, Practice, central venous catheter, central venous catheter-related infection, prevention, intensive care units.

Introduction

Central venous catheters are widely used in critically ill patients and particularly in the critical care units. CVCs are usually inserted into deep veins such as the subclavian, jugular, or femoral veins, and then advanced into the vena cava .central venous catheters (CVCs) are vascular infusion tools utilized for checking hemodynamic changing, administration of medication, total parenteral nutrition (TPN), intravenous fluid, or blood withdrawal (Akinwole,2015).

The function of a central venous catheter (CVC) is to permit access to the venous circulation without the necessity of repeated venipuncture. There are many different types of CVC, including peripheral and central catheters, tunneled and non-tunneled catheters, and vascular access devices with implanted and non-implanted ports (Centers for Disease Control and Prevention [CDC], 2014).

Although CVCs provide reliable vascular access, there are associated risks with their use. The complications of central venous cannulation are many and can occur at any time during infusion therapy. Complications from CVC insertion include arterial puncture, pneumothorax,

hematoma, cardiac arrhythmias and venous perforation and are associated with higher mortality rates. Other complications induce phlebitis, thrombus formation, air embolism, nerve injury and finally catheter – related blood stream infection (**Wikipedia**, **2016**).

The most common risk associated with CVCs is central line-associated blood stream infections (CLABSIs). CLABSIs defined as a laboratory-confirmed bloodstream infection more likely caused by a CVC in place during or within 48 hours of insertion (O'Grady, Alexander, Burns, Dellinger, Garland, Heard& Lipsett, 2011).

There are four recognized routes for contamination of central catheters: 1) migration of skin organisms such as (gram-positive bacteria) at the insertion site into the cutaneous catheter tract and along the surface of the catheter with colonization of the catheter tip; this is the most common route of infection for short-term catheters; 2) direct contamination of the catheter or catheter hub by contact with hands or contaminated fluids or devices; 3) less commonly, catheters might become hematogenously seeded from another focus of infection; and 4) rarely, infusate contamination might lead to catheter related blood stream infection (Mermel, Allon & Bouza, 2010).

Risk factors for the development of central line-associated bloodstream infections range from site selection for catheter placement and a lack of sterile technique for insertion to maintenance practices and duration of catheter placement, this risk factor may be related to patient or related to health care worker such as hand contamination (Mermel, Allon & Bouza, 2010).

The introduction of catheter care protocol may involve strict adherence to guidelines for use of aseptic conditions during CVC placement, exit-site care, dressing management, catheter flushing, and applying the appropriate clamping technique with disconnection. So that, the introduction of and adherence to a strict aseptic catheter care protocol may lead to sustained reduction in the incidence of CRBSI is which positively influence patient outcome (Infusion Nurses Society, 2011).

Infection control practices, including care of intravenous administration sets and catheter sites, are undertaken by nurses in an attempt to avoid infection. The CVCs are requested and inserted by physicians; however post-insertion catheter care is predominantly a nursing responsibility, providing an opportunity for nursing care to influence infection rates (**The Joint Commission, 2014**).

According to the recommendations of the Agency for Healthcare Research and Quality and the Center for Disease Control (CDC), the quality measures for prevention of central line infection must be followed: Hand hygiene, maximal sterile barrier precautions, Chlorhexidine skin antisepsis, appropriate insertion site selection and prompt removal of unnecessary catheters (Centers for Disease Control and Prevention, 2014).

Significance of the study:

Central venous catheters are life-saving and the majority of patients in intensive care units (ICUs) have them placed in order to receive medicine and fluids. However, the use of these catheters can result in serious bloodstream infections. Bloodstream infections associated with the insertion and maintenance of central venous (CVC) the catheters are among most dangerous complications that can occur. These complications worsen patients' health, prolong hospital stay and increase the cost of care (WHO, 2017).

Worldwide, each year thousands of patients with Central venous line in place die of Catheter Related Blood Stream Infection (CRBSI). Approximately 80% are affected by complication due to CVL associated blood stream infection (Abdel Azim, 2013).