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Prevention and control of central venous catheter infection in Omdurman military hospital, Khartoum state, Sudan (2016-2019)

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Abstract
Central venous catheters (CVCs) are life-sustaining devices but are associated with a risk for infections that can increase morbidity and mortality, Infections associated with intravascular catheters account for 10% to 20% of all nosocomial infections. The mean rate of CVC-related bloodstream infection in the intensive care unit (ICU) is 5.3 per 1000 catheter days From 10% to 70% of all CVC-related infections are preventable, therefore based guidelines have been publish (Galpern, D., Guerrero2013), this study was conducted to study Prevention and control of Central Venous Catheter infection in Omdurman military hospital, Khartoum State, Sudan (2016-2019) Total of 150 intensive care unit nurses in Omdurman military hospital were selected, A well-structured questionnaire for interviewing the respondents, Check list included the nurse's practice regarding infection prevention of central venous catheters, data was analyzed using statistical package of social science (SPCC).55% of the participant using stander precautions in pretest and they improving in posttest by 60% regarding the hand washing compliancy the participant need more awareness and encouragement to perform proper hands washing only 40% of the participant performing hand hygiene before touching the patients, in the posttest 42% performing hand haygeine,53% of the participant performing hand washing after touching patients, in the posttest 39% only performing,20% of the respondent performing hand hygiene after early procedure which is minimum percentage and it is increased in posttest by 30%,37% of the respondent performing hand washing after removing gloves and the is alight improvement in posttest by 39%,55% of the participant aware about organisms that cause central venous catheter 24% of the participants aware about the factor associated with central venous Catheter infection, only 40% of pretest and posttest participant aware about the inserting the central venous catheter, the compliancy of hands hygiene increased from 20%in pretest participant to 30% in posttest participant, using of stander precaution increased from 23%-30%.the participant need more awareness regarding hand hygiene and use of stander precaution the study recommended that Cautiously updating the staff of infection control programmes and policies, Determine a clinical resource nurse to update and evaluate the staff regarding their knowledge and practice and Availability of equipment and solutions needed during hand washing and inserting of central venous catheters.

Keywords: substituted Li ferrite, magnetostatic and spin waves, microstrip array antenna, X-band frequency range

Introduction

A central line-associated bloodstream infection (CLABSI) is defined as a laboratory-confirmed bloodstream infection not related to an infection at another site that develops within 48 hours of a central line placement. Of all the healthcare-associated infections, CLABSIs are the most costly, accounting for approximately $46,000 per case. Most cases are preventable with proper aseptic techniques, surveillance, and management strategies 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. In the United States, the CLABSI rate in intensive care units (ICU) is estimated to be 0.8 per 1000 central line days. International Nosocomial Infection Control Consortium (INICC) surveillance data from January 2010 through December 2015 (703 intensive care units in 50 countries) reported a CLABSI rate of 4.1 per 1000 central line days. Many central lines are found outside the ICUs. In one study, 55% of ICU patients and 24% of non-ICU patients had central lines. However, as more patients are located outside of the ICU, 70% of hospitalized patients With central venous catheters were outside the ICU. CLABSI rates outside ICUs are assumed to be similar to those within ICUs Recent data reveal no difference in the infection rate based on the insertion catheter site (Norris LB, Kablaoui F, Brilhart (2017) [9] The following are some key components of a prevention program, abstracted from an extensive list provided by the CDC and IDS Hand hygiene by washing hands with soap and water or with alcohol-based gels or foams. Gloves do not obviate the need for hand hygiene. Strict aseptic technique by using maximal sterile barrier precautions, including a full-body drape when inserting central venous catheters, Use of 2% chlorhexidine skin preparations for disinfecting/ cleaning skin before insertion, Ultrasound guidance by an experienced provider for placement to circumvent mechanical complications and reduce the number of attempts, Avoid the femoral vein as a choice for central line placement, and prefer the subclavian vein when possible for non-tunneled catheters. Promptly and remove any central line that is no longer required. Place central lines placed during an emergency (asepsis not assured) as soon as possible or at least within 48 hours. (Lee KH, Cho NH, Jeong SJ, Kim 2018) [8].

Mat Erial and methods

The Study Design

This interventional study design to structure a training framework, the study group given pretest and posttest questionnaire respondent given educational training and 10 days lecture Containing haw to deal with central venous catheter dressing.

Study Population

There were 200 registered nurses, working in different intensive care units at Omdurman Military hospital at the time of data collection. Nurses comprise the majority of workers in the Critical Care Units of Omdurman military hospital. These nurses came from different institutions bringing with them their varied training, education and experiences.

Sample Size

Sample size will consist of (150) nurses during the period of the study

Sample selection technique

The total population was 200staff nurses in the Omdurman military hospital. After the inclusion criteria have been met, 150 nurses were randomly selected by purposive sampling technique. The assignment for the respondents in each group was done through a random sampling technique. Sampling was done by the database and the self-administered questionnaires for ICU nurses. All the nurses in the different ICUs were listed in one Rotation Schedule. Experimental and comparison group were then selected from the same pool of potential participants in the ICU. It is important to note that the research acquired rich data, because the participants represented a range of, ages and years of critical care experience across a large critical care unit.
Introduced, (Lo-Biondo Wood & Haber 2010).

Data Collection tools

Data will collect using the fallowing

1. A well-structured questionnaire for interviewing the respondents. The questionnaire will include information that covered the variables under study.
2. Check list will include the nurse's practice regarding central venous catheters
3. Educational training for intensive care unit nurses will include:-

A. Maximal sterile barrier precautions including large sterile drape, sterile gown and gloves, mask, and a cap,
B. Daily review of the line necessity and prompt removal of unnecessary lines
C. The central line dressing. Changing the central line dressing
D. Use antiseptic technique
E. Proper technique for obtaining blood sample
F. Frequency of CVC changes

Inclusion criteria

The study choose based on ICU Nurses graduated of bachelor in science in nursing (BSN) or higher, has a contract with the hospital or will stay at least for one year, has an ICU experience At least 1 Year. Nurse's staff or a charge nurse has an depth experience in critical care knowledge.

Exclusion criteria

From the study all nurses worked out intensive care unit those nurses who will be resigning within the study period, also the study leave nurses having less than one year experience in intensive care unit.

3.6 Data Analysis

For the purposes of this study, the data will be analyzed through using statistical package for social sciences (SPSS).

Results and discussions

Table 1: On the basis of the guidelines, interventions or strategies related to central venous catheters and with relevance for nursing practice were selected

The nurse	Never	Some times	Most of the time	All the time
Pretest N = 150				
1- The central line dressing.	0	53.3%	33.3%	13.3%
2- Changing the central line dressing	0	66.6%	26.66%	6.66%
3-use antiseptic technique		73.33%	22%	4%
4-use barrier protection	2 1.33%	65.33%	26.66%	66.6%
5-proper technique for obtaining blood sample		66.66%	30%	3.33%
6-use personal protective equipment	2%	88.66%	10%	0
7- Use of gauze and polyurethane catheter dressings	0	40%	56.66%	3.33%
8- Frequency of changes in administration sets	0	79.33%	20.66%	0

Table 2: On the basis of the guidelines, interventions or strategies related to central venous catheters and with relevance for nursing practice were selected

The nurse	Never	Some times	Most of the time	All the time
Posttest N = 150				
1- The central line dressing.	0	50.3%	36.3%	13.3%
2- Changing the central line dressing	0	40.6%	46.66%	14.36%
3-use antiseptic technique		10.33%	22%	67%
4-use barrier protection		65.33%	26.66%	8.1%
5-proper technique for obtaining blood sample		60.66%	36%	3.33%
6-use personal protective equipment		88.66%	10%	2%
7- Use of gauze and polyurethane catheter dressings	0	30%	66.66%	3.33%
8- Frequency of changes in administration sets	0	73.33%	26.66%	0

In the pretest On the basis of the guidelines, interventions or strategies related to central venous catheters and with relevance for nursing practice the result show that13% of nurses are early do the central line dressing all the time,33%

doing the dressing most of the time, and 53% doing the dressing all the time. The result shown that only 6.% of the staff changing the central line dressing all the time which is considered lower percentage regarding changing of the central line dressing and there is possibility of central line infection,26% of nurses changing the central line most of the time and 66% of nurses changing the central line dressing sometimes.

73% of the nurses using the antiseptic techniques most of the time,22% of them using antiseptic technique some times and only 4% of nurses using the antiseptic technique all the time which should be most of the nurses using the antiseptic technique all the time.66% of nurses using barrier protection all the time which is acceptable to protect themselves and their patients from infection,66% of the nurses sometimes doing the proper technique of obtaining blood sample,3% of the nurses obtaining the blood sample all the time. Nurses need to be aware about the importance of proper obtaining blood sampling.

2% of nurses are not using personal protective equipment, 88% of nurses using personal protective equipment sometimes. only 10% of nurses using the personal protective equipment most of the time. Nurses need to be aware about the personal protective equipment and the process of donning and doffing including hand hygiene.

Use of gauze and polyurethane catheter dressings 40% of nurses used sometimes, 56% used most of the time and only 3% used the gauze and polyurethane all the time.

79% of nurses are frequently changing the administration all the time and 66% are changing the administration set most of the time.

In the posttest On the basis of the guidelines, interventions or strategies related to central venous catheters and with relevance for nursing practice the study result shown that there is slight improvement of nurse's intervention regarding central line dressing from 33%to 36%.

There is improving in changing the central line dressing from 6.6% to 14% all the time.

Nurse's staff upgrade their percentage from 41% to 67% regarding using antiseptic technique.

Still 26% of nurses use barrier protection when performing central line dressing

3% of nurses obtaining the correct blood sample all the time

21% of nurses are using personal protective equipment all the time, the importance of wearing personal protective equipment for nurses and their patients.

Using of gauze and polyether catheter dressing most of the time dropped from 66% to 56%.

There is improvement from 20% to 26% of nurses regarding frequently changing of administration set. Nurses need to be aware about the ideal dressing of central venous Cather and used of stander precaution and the performance of hand hygiene including hand washing and hand rubbing.

Chapter Five

Recommendations

1. Conutiosly updating the staff of infection control programmes and policies.
2. Countiously evaluation the staff of infection control examinations.
3. Attaching posters and posts consisting of infection.
4. Control practise including the five moment, hand washing and hand rubbing.
5. Increasing the infection control committee and improve their practice
6. 5- Encourage staff to attend infection control symposiums and courses.
7. 6- Availability of equipment and solutions needed during handwashing and inserting of central venous catheters.
8. 7- Determine a clinical resource nurse to update and evaluate the staff regarding their knowledge and practice

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