

Assessment of Nurses' Knowledge towards Infections of Peripheral Intravenous Cannula in Al-Basrah Teaching Hospital

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Abstract

Aimed at assessing nurse's knowledge regarding infection of the peripheral cannula. Descriptive, hospital-based study was conducted in Al-Basrah city in Al-Basrah Teaching Hospital from October 24th, 2019, to June 11th, 2020. The study included nurses in the hospital; they were (60) nurses. The instrument used for the study was a self-administrated questionnaire; the data were presented in a pre-designed questionnaire firstly. The questionnaire consisted of two parts: socio-demographic characteristics and knowledge about the infection of a peripheral intravenous cannula. Inferential and descriptive statistics have been utilized for the analysis of data. Data were analyzed manually and then through the use of the statistical package for social science (SPSS, v. 23). The results of the study present that the high percent (61.7%) of the study sample are male, (66.7%) of them at the (20-29) year age group, (45.0%) of them nursing institute, (61.7%) their years of work experience were arranged between (1-9 year), most of them (60.0%) don't have previous training about cannula infection. There has been a significant correlation between nurses' knowledge, previous training in infection of a peripheral cannula, and level of education, and there has not been any significant correlation between nurses' knowledge and nurses' gender, age group, and years of experience. Recommendation: This study recommended establishing a regular training program and workshops about infection control measures, especially for an invasive procedure.

Keywords: nurses' Knowledge ,infections, Peripheral intravenous cannula , Hospital

Introduction

The peripheral venous cannula is an essential and common Intravenous (IV) device, which is often utilized in medical practice. The cannulas are utilized for putting fluids or medicine straight into the blood-stream. It may be utilized in some cases for taking the samples of blood throughout the investigations and tests^(6,4). It is an invasive procedure that is carried out for the hospitalized patients, where the skin of the patient is punctured using a needle for the purpose of allowing to insert a temporary plastic tube in the vein. It has been considered as one of the integral parts of the professional nursing practices in every health-care institution, it is performed for a variety of the purposes such as IV infusion and medications, and it is kept for various durations of time according to the condition of the patient with a possible microbial growth risk^(10,11). Those infections also belong to nosocomial infections and are related to increased hospital costs,

hospital stay days, mortality, and morbidity^(7,8). Each year, about 60% of the hospital inpatients undergo PIC for the purpose of receiving the therapeutic IV medications. This can be resultant in hospital-acquired bacteremia as 6.20% of this rate is a direct result of the PIC, which is more often related to the localized infections instead of systemic ones. Infections and thrombophlebitis are common PIC complications⁽⁶⁾. Between 2.30% and 67% of the patients get thrombophlebitis, Between 1.50% and 60% of the phlebitis are related to the PIC. In the US, 80000 cannula-related blood-stream infections (CRBSI) and 250000 CRBSI cases happen in the ICUs every year^(7,12). The nurses have a significant impact on preventing such infections; the majority of prevention and intervention strategies like the insertion, assessment, and monitoring of the peripheral venous cannula (PVC) site are part of the routine nursing care^(5,8). Nurses must have the correct knowledge of the administration and

preparation of intravenous infusion and intravenous devices. Moreover, they should as well be aware of how to prevent, treat, and manage systematic and local complications, supported by the dynamic evidence-based practice guidelines. The documentations play an important role in generating real-time data and improve the abidance of the staff with the care guidelines, which are helpful in providing quality care with the peripheral venous cannulas⁽¹²⁾.

Material and Method

Study design: This was a descriptive cross-sectional study to assess nurse's knowledge regarding peripheral cannula infection.

Study duration and area: This study was done during the period which extended from October 24th, 2019 to June 11th, 2020,

Setting: The present study has been conducted at the units of (Medical, Surgical, Emergency, Children, Intensive care, Coronary care, Hemodialysis) in Al-

Basrah Teaching hospital of Al-Basrah city.

The questionnaire was an instrument of the study consisted of two parts, which include demographic characteristics consist of (6) items (Gender, age group, Academic qualification, Years of work experience, Working area, Previous Training about cannula infection), knowledge about peripheral cannula infection (25) Items of the knowledge were rated and scored as (2) for know, (1) for don't know and (0) for don't sure.

The validity of the instrument had been achieved by (8) experts from different scientific branches from faculty on the nursing university of Basrah having at least ten years of experience in their field of work. Minor changes have been performed on a few items, such as change demographic data and nurse's knowledge.

Statistical Analyses: A statistical program such as SPSS v. 23 has been utilized for the data analysis. There were two types of statistical data analysis that were used to obtain the results of the research study: Descriptive Data Analysis and Inferential Data Analysis.

Results

Table 1: Study sample distribution by socio-demographic characteristics

Variables	Classification	Frequencies	Percentages (%)
Gender	Male	37	61.7
	Female	23	38.3
	Total	60	100.0
Age group	20-29 years	40	66.7
	30-39 years	13	21.7
	40 year and above	7	11.7
	Total	60	100.0
Academic qualification	Nursing school	21	35.0
	Nursing institute	27	45.0
	Bachelors in nursing	12	20.0
	Total	60	100.0
Years of work experience	1-9 years	37	61.7
	10-19 years	17	28.3
	≥20 years	6	10.0
	Total	60	100.0

Cont... Table1: Study sample distribution by socio-demographic characteristics

Working area	Medical unit	10	16.7
	Surgical unit	11	18.3
	Emergency unit	10	16.7
	Children unit	5	8.3
	Intensive care unit	8	13.3
	Coronary care unit	7	11.7
	Hemodialysis unit	9	15.0
	Total	60	100.0
Previous training about cannula infection	Yes	24	40.0
	No	36	60.0
	Total	60	100.0

Table 2: Assessment of the nurse's knowledge about the infection of the peripheral intravenous cannula

No.	Items of nurse's knowledge	Know	Not sure	Don't know	MS	Assess.
		F	F	F		
1	Explained procedure to the patient	10	17	33	1.62	Poor
2	Take permission from patient before the procedure	18	10	32	1.77	Poor
3	Hand hygiene has to be provided prior to the insertion of a peripheral cannula.	13	16	31	1.70	Poor
4	Sterile gloves have to be worn when inserting the peripheral intravenous cannula	10	11	39	1.52	Poor
5	The cannula gauge 14-20G suitable for adults patients, 22-24G suitable for pediatric patient, to use for peripheral intravenous cannulation.	33	20	7	2.43	Good
6	The antiseptic solution, which is applied prior to the insertion of the cannula, has to be left to dry.	23	15	22	2.02	Good
7	It is best to avoid small and near veins at the arterial sites, joints, and hardened veins	31	9	20	2.18	Good
8	Routine replacements of the peripheral intravenous cannula is unnecessary in the pediatric patients unless the case of the development of the complications.	27	22	11	2.27	Good
9	try again at the same place after the third failed venipuncture attempt	45	7	8	2.62	Good
10	Veins at the ventral and the dorsal surface of the upper extremities are utilized for the intravenous IV Cannulation	11	16	33	1.63	Poor
11	Should be check daily the cannula insertion point for evidence of local infection	23	14	23	2.00	Good
12	Patient education on who to care IV cannula is significant as it does helps at reducing the risks of infections.	3	10	47	1.27	Poor

Cont... Table 2: Assessment of the nurse’s knowledge about the infection of the peripheral intravenous cannula

13	Phlebitis can be defined as the most identifiable of the infections.	7	22	31	1.60	Poor
14	Increasing the cannulation attempts will result in increasing infection risks	7	25	28	1.65	Poor
15	Immediately removing the IV cannula in the case where it is not in use, will result in reducing the risks of infections.	25	10	25	2.00	Good
16	Cannula with a larger diameter is used to pump fluids and medications faster and in greater quantity	50	8	2	2.80	Good
17	Patient with peripheral intravenous cannula is on risk of nosocomial infection	14	19	27	1.78	Poor
18	The infusion sets that are utilized for delivering the blood and its products have to be changed within 48h following the beginning of infusion	12	9	39	1.55	Poor
19	I/V cannula has to be flushed through the injection of the NS following any IV Medications	12	9	39	1.55	Poor
20	The insertion sites of the cannula on the lower extremity bear higher infection risks compared to the upper extremities.	14	12	34	1.67	Poor
21	According to the Universal Guidelines of the Infection Control, the intravenous cannula may be utilized 48h to 72h in the case where there have not been any complication signs.	33	17	10	2.38	Good
22	The environment situation (i.e. the cleanliness) has an influence on the risks of IV cannulation infections	16	8	36	1.67	Poor
23	Providing IV therapy increases the risks of infections through the peripheral IV Cannula	17	18	25	1.87	Poor
24	Apply some warm compresses or nitroglycerin ointment before the procedure	12	22	26	1.77	Poor
25	Utilizing transparent dressing is helpful for recognizing the early infection signs.	28	12	20	2.13	Good
Total					1.89	Poor

Table 3: Relationship between the nurses’ knowledge and the socio-demographic data as age group, gender, education level, years of experience and place of work, and previous training in infection of a peripheral cannula

Nurse’s knowledge Variables	Pearson Chi-Square			
	Value (X2)	df	P-Value	Sig.
Gender	30.952	34	0.618	NS
Age group	83.632	68	0.096	NS
Level of education	72.619	54	0.046	S
Years of experience	75.964	68	0.237	NS
Place of working	202.276	204	0.521	NS
Previous training in infection of a peripheral cannula	52.014	34	0.025	S

*Correlation is significant at the $p < 0.05$ level.

Table 3: presents that there have been significant associations between nurses' knowledge and education Levels and previous training in infection of a peripheral cannula, and there has not been a significant correlation between the nurses' knowledge and their gender, age group, experience years, and place of working.

Discussion

The Socio-Demographic Characteristics of the sample in the present study represented that majority of the respondents 60 (61.7%) of the study sample are male; this result is inconsistent with the study stated that most of the participants (94.2%) were female⁽⁹⁾. This means most of the nurses who work in Iraq's hospitals were men. Most of the participants, 60 (40%) in the age group (20-29). This result is consistent with that study stated that majority of the nurses (54%) in the age group from (21-29)⁽²⁾. and according to the educational levels, the majority (45.0%) of participants reported that their graduates were nursing institute. This consistent with the result of the study that showed that most of the participants (79.2%) their graduated were diploma in nursing⁽³⁾. Regarding years of work experience majority of the nurses, 37 (61.7%) have (1-9) years of experience. This finding is inconsistent with the result of the study that found that years of experience more than (5 years) were (37%)^(2,5). Most of the nurses reported that they didn't have any previous training about cannula infection (60%). This result is inconsistent with the result of the study, which finds that the majority of participants have previous training. Previous training aid in the knowledge about peripheral cannulation and it is infection and more about this subject⁽¹⁾. The researcher believes that most nurses how didn't have previous training programs. This is due to the neglect of the hospitals for the nursing staff in terms of providing training courses and educational programs.

Nurses have knowledge about peripheral intravenous cannula infection at a good level at the (5,6,7,8,9,11,15,16,21,25) items and a poor level at all remaining items. And that knowledge at the total means of scores (1.89) was poor level. The results of this study are inconsistent with a study done to assess nurses' knowledge about a central venous line who finds that the majority of the participants have good knowledge about

peripheral intravenous cannulation⁽⁹⁾.

The results present that there were significant associations between nurses' knowledge, education level, and previous training in infection of a peripheral cannula, and there has not been any significant correlation between the nurses' knowledge and the gender, age group, years of experience, and place of working. This result is inconsistent with the study that showed there had not been any considerable differences between the education qualification of the respondents toward the care of the PIC with the value of p higher than 0.05. None-the-less, findings have stated that the respondents possessing a Bachelor of Nursing have been deemed to be scoring slightly higher in the knowledge on PIC⁽²⁾.

Conclusions

The present study has come with the following conclusions:

1. Majority of the study sample are male, most of them at (20-29) year age group, their level of education was nursing institute, their years of work experience were arranged between (1-9 year), most of them don't have previous training about cannula infection.
2. Nurses' knowledge toward peripheral intravenous cannula, and it is an infection which as the total means of all items knowledge was poor level.
3. There has been a significant correlation between nurses' knowledge and previous training in peripheral cannulation, and it is an infection, and there has not been any significant correlation between nurses' knowledge and their gender, age group, level of education, years of experience and place of working.

Recommendations

The researchers recommended at the end of the study the following:

1. Nurses should be having sufficient knowledge of caring for and maintaining intravenous cannula due to the fact that its complications or risks could result in endangering the life of the patient. Attending specialized training and/or workshops about infection control measures, especially for an invasive procedure, is a way to enhance their confidence and knowledge. As a result, managing of such institutions has to take

corrective actions and implement innovative strategies so that patients and nurses will benefit from them.

2. Nurses keep a fixed program to discuss problems that faced them during cannula insertion.

3. Researchers recommend that a manual handbook has to be designed for increasing the knowledge of the nurses towards preventing infections from the peripheral IV cannula through the use of new technical approaches.

4. Evidence base concerning IV therapy should be reviewed and strengthened through additional researches due to the fact that it remains weak in several clinical fields.

Ethical Considerations: Permission has been obtained from the College of the Nursing/ University of Basra and takes permission from the Ministry of Health, Health Department of Basra, Training and Human Development Center to Al- Basra teaching hospital, before conducting the study.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College Nursing and all experiments were carried out in accordance with approved guidelines.

References

1. Sriupayo A, Nonglak I, Supaporn B, Kaphan K, Utama J, Budsabongphiwan S, et al. Effectiveness of peripheral vascular catheter care bundle in the Pediatric Nursing Service , Chiang Mai University Hospital , Thailand. *Chiang Mai Med J.* 2014;53(2):69–71.
2. Siew Eng H. Nurses' Knowledge and Practice in Relation to Peripheral Intravenous Catheter Care. *Med Health.* 2016;11(2):88-90.
3. Ghazali ANM, Arbaee I. Nurses Knowledge and Practice Towards Care and Maintenance of Peripheral. *Res Gate.* 2018;6(5):37-39.
4. Chen S, Yao J, Chen J, Liu L, Miu A, Jiang Y, et al. knowledge of “guidelines for the prevention of intravascular catheter-related infections (2011)”: A survey of intensive care unit nursing staffs in China. *Int J Nurs Sci [Internet].* 2015;2(4):22-21.
5. Ahmed SA, Jasim AH, Katea MJ, Foad AS, Hashim HA, Noori DA. *KUFA JOURNAL FOR NURSING SCIENCES . VOL . 9 No . 1 / 2019* Assessment of Nurses' knowledge concerning Prevention of Central Venous Catheter Infection in Intensive Care Units at Baghdad Teaching Hospitals 2019;9(1):6-7.
6. Arbaee, I. Nurses knowledge and practice towards care and maintenance of peripheral cannulation. *Qualitative Research.*2016; 1(3): 401–405.
7. Miller, D& O'Grady, P. Guidelines for the prevention of intravascular catheter-related infections: Recommendations relevant to interventional radiology for venous catheter placement and maintenance. *Journal of Vascular and Interventional Radiology.*2012; 23(8): 977.
8. Osti, C, Wosti D, Pandey, B, Zhao, Q. Ventilator-associated pneumonia and role of nurses in its prevention. *Journal of Nepal Medical Association.*2017; 56(208): 467.
9. Qamar Z, Afzal M, Kousar R, Waqas A, Gilani S. Assess Nurses Knowledge and Practices towards Care and Maintenance of Peripheral Intravenous Cannulation in Services Hospital Lahore, Pakistan. *Saudi .Journal of Medical and Pharmaceutical Sciences.* 2017; 3: Iss-6B:608.
10. Ray-Barruel G, Polit, D, Murfield, J. Infusion phlebitis assessment measures: A systematic review. *Journal of Evaluation in Clinical Practice.*2014; 20(2): 199–202.
11. Urbanetto J, S, Peixoto, C, May T. Incidence of phlebitis associated with the use of peripheral IV catheter and following catheter removal. *Revista Latino-Americana De Enfermagem.*2016; 24: e2746.
12. Webster J, Osborne S, Rickard, C. Clinically-indicated replacement versus routine replacement of peripheral venous catheters. *Cochrane Database of Systematic Reviews.*2015; (8): CD007798.