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Review Article

Assessment of Knowledge and Practice Towards Intravenous Cannulation Among Nurses Who are Working in Bahirdar City Hospitals, Northwest Ethiopia

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Abstract

Objectives: Institutional based cross sectional study was designed to assess the Knowledge and Practices towards Intravenous cannulation among nurses who are working in Bahirdar city hospitals in 2019.

Result: Majority of the respondents, 234 (55.5%) were within age group of 26-30. More than half of 231(54.7%) of nurses had good knowledge regarding intravenous (IV) cannulization and Majority of study participant, 229 (54.3%) were had good practice. The mean value and standard deviation regarding practice of intravenous cannulization were 32.3 and ±3.8 respectively.

Keywords: Knowledge; Practice; Intravenous Cannulation; Bahirdar City Hospitals

Abbreviations

CI: Confidence Interval; IV: Intravenous; SPSS: Statistical Package for Social Sciences

Introduction

Intravenous cannulation is most widely used procedure in a hospital or in a community health care setting. The procedure of intravenous cannulation is the second most commonly performed invasive procedure of patients that are admitted to hospital, with an estimated 60% of patients requiring an intravenous cannulation some point during their hospital stay [1,2]. Intravenous (IV) cannulation is an essential skill that all nurses must possess to treat various types of patients, trauma or medical, and achieve fluid volume resuscitation in acutely or critically ill patients. Intravenous Cannulation is used to administer fluids, drugs, blood products and nutrition through the venous route [3,4].

Intravenous catheters become more widely used in today's healthcare environment, nurse requires expert knowledge in relation to venous catheter maintenance to prevent complications and maximize efforts to optimize the individual's health status. Nurses should be aware of this safety intravenous cannulation to implement in the clinical setting to improve the health status of the client and to minimize the complications. The Intravenous cannulation dressing should remain intact for the life of the Intravenous cannulation unless there is excessive accumulation of blood or moisture when used, sterile gauze and dressing should be changed daily and whenever loose, soiled or moist [5-7].

Successful intravenous cannulation increases with careful attention to proper technique.

The implementation of intravenous drug therapy is an increasingly common experience for patients and one that carries a significant risk for damaging side effects [8-10].

Intravenous cannula insertion is an invasive procedure that has the potential for serious immediate or delayed complications such as phlebitis, thrombophlebitis, catheter embolism, bleeding and sepsis.Worldwide among hospitalized patients, intravenous therapy is the most common invasive procedure and its phlebitis rate is between 2.3% and 60% [11-13].

Rates of thrombophlebitis related to intravenous cannulation range from 2% to 80% in United States [14,15]. The study noted that intravenous infection rate is 20% in Pakistan [16]. International uses of intravenous cannulation were Spain 83% and Argentina 79%among the countries that used the largest number of patients and the study done in Gondar referral hospital from the perceived rates of Medication administration errors reporting was reporting 29.1% respectively [17-19]. Therefore, the aim of this study was to identify the knowledge and practice regarding to intravenous cannulation among nurses who are working in Bahirdar city hospitals.

Material and Methods

Institution- based cross-sectional quantitative study was conducted from from first January 2019 to 29 December 2019 among nurses who are working in Bahirdar city hospitals. The article is descriptive quantitative study to measure frequency of nurses' knowledge about cannulation.

There are 556 members of staff's nurses working in Bahir Dar city hospitals. The sample size (422) was determined by using 50% population proportion, 95% Confidence Interval (CI), 5% margin error and 10% non-response rate. Simple random technique was used to select the study participants in each individual Hospital. Data was collected after verbal informed consent obtained from each participant by using self-administered questionnaire. The first participant from each hospital was selected by randomly. The sample from each hospital was allocated based on the total number of nurses proportionally.

Data was collected using structured self-administered questionnaires, which was adapted from Pakistan [3]. Continuous follow up and supervision by the supervisors and principal investigators was conducted throughout the data collection period. Each questionnaire was checked for completeness, missed values and then cleaned up with computer. The collected data was cleaned, coded and entered in to Epi-info version 7. And analysis was done by using statistical package for social sciences (SPSS) version 20. Descriptive statistics like frequencies and percentage was employed to describe socio-demographic, knowledge, and practice variables then results were summarized and presented by tables.

The group members were discussed for one day on how to facilitate the data collection process and prevent errors. Questionnaires were review and check for completeness, accuracy, and consistency by supervisors and the research team every day during the data collection period.

Result

A total of 422 study participants were included in the study with response rate of 100%.

More than half 229(54.3%) were females. Study participants working in two private and two government hospitals. Majority of the respondent 229(54.3%) of study participants were married and From 422 study participants only 11.8% (n = 50) had got special training for intravenous cannulation (Table 1).

Variable	Categories	Frequency	Percent
Sex	Male	193	45.7
	Female	229	54.3
	Total	422	100
Age in year	21-25	82	19.4
	26-30	234	55.5
	31-35	70	16.6
	>=36	36	8.5
	Total	422	100
Clinical experience in year	<1	8	1.9
	2-5	222	52.6
	6-10	154	36.5
	>10	38	9
	Total	422	100
Level of education	Diploma	185	43.8
	Degree	234	55.5
	Msc nurse	3	0.7
	Total	422	100
Name of hospital	Felege-Hiwot	334	79.1
	Gamby	43	10.2
	Adisalem	27	6.4
	Adinas	18	4.3
	Total	422	100
Monthly income	<=3575	109	25.8

	3576-4465	102	24.2
	4466-5293	53	12.6
	>=5294	158	37.4
	Total	422	100
Marital status	Single	176	41.7
	Married	229	54.3
	Divorced	14	3.3
	Widowed	3	0.7
	Total	422	100
Special training on intravenous cannulation	Yes	50	11.8
	No	372	88.2
	Total	422	100

Table 1: Socio-demographic characteristics of study participants of nurses working in Bahir Dar city hospitals, North West Ethiopia, 2019 (n = 422).

More than half of nurses' 54.7% (n = 231) had good knowledge level regarding IV cannulization scores above the mean level 87.7% (36.8) and 45.3% (n = 191) had Inadequate knowledge level regarding IV cannulization. Individual response was counted and the mean (36.8) and standard deviation (±3.7) was calculated using SPSS to classify nurses as to have good or inadequate knowledge level (Table 2).

Sr. No	Variables	Yes	No	I don't know
1	The cannula gauge (14G, 16G, 18G and 20G) are suitable to use for peripheral intravenous Cannulation	n = 368 87.4%	n = 39 3.2%	n = 14 3.3%
2	Veins use for intravenous cannulation normally located at dorsal) and ventral surface of the upper extremities right and left hand/arm (metacarpal, cephalic and basilic)	n = 359 85.1%	n = 52 12.3%	n = 11 2.6%
3	Peripheral IV cannula must be removed every 12-72 hours from insertion time	n = 295 69.9%	n = 110 26.1%	n = 17 4%
4	Based on Universal Infection Control Guidelines, IV cannula can be used 48-72 hours if no signs and symptoms of complication	n = 341 80.8%	n = 56 13.3%	n = 25 5.9%
5	Phlebitis is the most identifiable infection related to IV cannulation	n = 363 86%	n = 42 10%	n = 17 4%
6	The environment situation (e.g. cleanliness) will influence the risk of infection related to IV cannulation.	n = 351 83.2%	n = 61 14.5%	n = 10 2.4%
7	Hand hygiene before procedure IV insertion is important in order to prevent infection.	n = 382 90.5%	n = 32 7.6%	n = 8 1.9%
8	Maintaining aseptic technique only during insertion of IV cannula will help to prevent infection occur	n = 335 79.4%	n = 77 8.2%	n = 10 2.4%
9	Wearing non-sterile gloves during insertion of IV cannula are advisable.	n = 195 46.2%	n = 221 52.4%	n = 6 1.4
10	Skin preparations at insertion site are require before IV cannula inserted.	n = 382 90.5%	n = 33 7.8%	n = 7 1.7%
11	Increase attempts for cannulation will increase the risk of infection.	n = 326 77.3%	n = 87 20.6%	n = 9 2.1%
12	Using transparent dressing will help to recognize early signs and symptoms of infection	n = 353 83.6%	n = 53 12.6	n = 16 3.8
13	Removing IV cannula immediately if not in use, will help to reduce risk of infection occur.	n = 365 86.5%	n = 52 12.3%	n = 5 1.2%
14	Giving intravenous therapy will increase risk of infection through peripheral IV catheter.	n = 314 74.4%	n = 91 20.6%	n = 17 4%

Table 2: Shows the responses of nurses regarding knowledge of IV cannulization who were working at Bahir Dar city hospitals, North West Ethiopia, 2019 (n = 422).

Majority 54.3% (n = 229) were had good practice. The mean value and standard deviation regarding practice of intravenous cannulization were 32.3 and ±3.8 respectively (Table 3).

Sr. No	Variables	Yes	No	I don't know
1	I always change IV cannula after 72 hours Inserted.	n = 283 67.1%	n = 136 32.2%	n = 3 0.7%
2	When I saw there is a sign of phlebitis, I immediately change the IV cannula to Non-affected part.	n = 378 89.6%	n = 40 9.5%	n = 4 0.9
3	I always use transparent dressing when securing IV cannula.	n = 306 72.5%	n = 91 26.6%	n = 25 5.9%
4	I always write date, time, site, size, drug, dose, documentation and name of person cannulated	n = 318 75.4%	n = 93 22%	n = 11 2.6%
5	I use administration set for IV cannula within 72 hours.	n = 349 82.7%	n = 64 15.2%	n = 9 2.1%
6	I aware of complications of IV cannulation for instance infiltration, phlebitis and extravasations.	n = 347 82.2%	n = 49 11.6%	n = 26 6.2%
7	I always maintain aseptic technique during preparing, inserting and removing of IV cannula	n = 358 84.8%	n = 56 13.3%	n = 8 1.9%
8	I always change the dressing when it wet or dislodge.	n = 367 87%	n = 43 10.2%	n = 12 2.8%
9	I always educate my patient how to care the IV cannula.	n = 389 92.2%	n = 33 7.8%	n = 0
10	I always educate my patient how to recognize the signs and symptoms of IV cannulation infection.	n = 370 87.7%	n = 43 10.2%	n = 9 2.1%
11	I aware the important of hand hygiene before IV cannulation being carried out.	n = 375 88.9%	n = 43 10.2%	n = 4 0.9%
12	I aware the important of doing skin preparation before the procedure insertion of IV cannula.	n = 389 92.2%	n = 27 6.4%	n = 6 1.4%

Table 3: Shows the responses of nurses regarding practice of IV cannulization who were working at Bahir Dar city hospitals, North West Ethiopia, 2019 (n = 422).

Discussion and Conclusion

The aim of this study was to assess the Knowledge and Practices towards Intravenous cannulation among nurses who are working at Bahir Dar City hospitals.

All of the participants (422) answer the question fully without interrupting. More than a half participants were (55.5%) had degree and 43.8% participants had diploma in nursing. While only 0.7% of study participants had masters in nursing. This was agreed with other study in Sudan in which more than half of them 60% had bachelor degree. But contradicted by other study done in Malaysia which 79.2% was diploma level ant other study in USA 56.9% had some college education. If majority were degree this may increase nurse's knowledge and practice regarding IV cannulization [3,12,24].

Regarding their service year 52.6% of participants had 2-5 years of experience, 36.5% had 6-10 years of experience, 9% nurses had more than 10 years of experience in their respective professions. This was supported by the same study in Sudan in which 65% of nurses had 1-3 years of experience. Similarly study done in Malaysia which 37.6% had 1-5 years clinical experience, while others less than a year, some more than 5 and 10 years [12,24].

Most of the study participants (69.9%) knew that IV cannula to be removed or replace after 72 hours of insertion time while, 26.1% were did not know when to remove the IV cannula. This is disagree with other study was conducted in University of Malaysia in which only 31.7% respondents knew that IV cannula to be removed after 72 hours while, 62.5% did not know it. This was supported study

conducted Egypt in which IV cannula should be routinely replaced every 72 hours to prevent phlebitis and infection [8,12]. However, 83.2% of study participants were aware those clean environment situations will prevent IV cannulation related infections. Similarly other study was conducted in Pantai Hospital show that 81.7% aware those environment situations will influent the risk of infection related to IV cannulation [12].

According to study participants' estimation of their own hand hygiene practice, 89% were washing their hands before carried out IV cannulization. This is supported by study done in Sudan in which 94% wash their hands. Hands should be cleaned before and after palpating, inserting, accessing, replacing or dressing an IV cannula [8,24].

In this study half of nurses' (54.7%) had good knowledge level regarding IV cannulation and 45.3% had inadequate knowledge level regarding IV cannulation. these study lower than study done in India knowledge regarding peripheral intravenous infusion, 70% were having adequate knowledge and 30% were having moderately adequate knowledge [26]. It has also disagree with study done in Bangladesh about 53.8 % had found poor knowledge level and 5.9% had good knowledge on indication and contraindication of intravenous cannulization [1].

More than half (54.3%) of study participants were had good practice and few 45.7% were had inadequate practice regarding intravenous cannulation. These results supported by study done in Sudan in which more than half of study group had a satisfied knowledge and practice regarding cannula insertion [24]. Descriptive study conducted in Pakistan in 2017 show that 49.3% of nurses had good practice, 15.4% of nurses had fair practice and 3.3% of nurses had poor practice regarding intravenous cannulization [16].The study done in Medical College of India reveals that about the practice of nurses regarding intravenous cannulization 63.3% were had adequate knowledge on practice and 36.7% were had moderate knowledge on practice [26]. But study done in Bangladesh about 2.67% participants had excellent, 12% had well, 73.33% had average practice and 12% had poor practice of IV cannulization [1].

Limitations of the Study

- Our study investigate through the quantitative design only, however, qualitative study design should also be examined.
- Our study were did not dig out factors that influence nurses' knowledge and practice towards IV cannulation. Therefore, other studies should also examine the factors which may affect the nurses' knowledge and practices.
- Even if we have used standardized checklist, our study was not addressed direct observation during data collection.

Ethics Approval and Consent to Participate

Ethical clearance was obtaining from Bahir Dar University Ethical Review Board. The aim of the study was clearly explaining to participant and hospital officials. Privacy of each respondent was maintained throughout the data collection process. The data collection was beginning after obtain consent from each participant. Confidentiality was maintained by exclude the name of participants from questionnaires. Participants also were told the objective of the study and gave the right to refuse, stop or withdraw at any time of data collection.

Consent for Publication

Not applicable.

Availability of Data and Materials

All data generated or analyzed during this study are available from the corresponding author on reasonable request.

Competing Interest

The authors declare that no competing interests.

Funding Statement

Not applicable.

Author's Contribution

Haileyesus G. Conceived the idea for the research and wrote the framework, design of the study and performed the statistical analysis.

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