ASSESSMENT OF PERIPHERAL INTRAVENOUS CANNULA INSERTION PRACTICE AMONG HEALTH CARE WORKERS OF SULAIMANI SURGICAL TEACHING HOSPITAL, SULAIMANI, IRAQ

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ABSTRACT

Background

Cannula insertion is done to provide venous access for therapeutic purposes such as administration of fluids, medications, chemotherapy, and blood products. Health care workers involved in the care of intravenous access devices must be competent because the skill level is critical in reducing and preventing complications.

Objectives

To assess the practice of the health care workers regarding intravenous cannula insertion and to find out the association between practice and socio-demographic characteristics.

Methods

An observational descriptive study was done in which a sample of health care workers in three operation theatres and 8 surgical wards of Sulaimani surgical teaching hospital during the period of 15th September 2018 up to the end of April 2019. The study sample was chosen by a convenience sample technique. Data were collected by direct interview and observation, through a questionnaire that consists of 9 items, and an observational checklist which consists of three parts with 82 items. Data were analyzed by SPSS (Statistical Package for Social Sciences) version 24.

Results

The majority of the health care workers were female (66.7%), between age group (41-50) years (56.9%), nursing institute graduate (47.1%), have been employed for more than 21 years (39.2%), equipment preparation and patient preparation practice among health care workers were low (22.7%), health care workers who performed the cannula insertion procedure properly were (34.6%), documentation and post-procedure care for the cannula insertion by the health care workers were (22.7%). The study showed that there were no significant associations between the health care worker's gender, age, level of education, and years of employment and their practice.

Conclusion

This study showed a practice deficit in most items of cannula insertion practice regarding the preparation of the equipment and preparation of the patient, cannula insertion procedure, and post-procedure care of waste and documentation. We recommend the arrangement of special training sessions for the health care workers.

Keywords: *Assessment; Cannula insertion; Practice; Surgical Teaching Hospital.*

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INTRODUCTION

Intravenous cannula insertion (IV) is a technique in which a cannula is placed inside a vein to provide venous access. Venous access allows sampling of blood, as well as administration of fluids, medications, chemotherapy, and blood products [1]. Inserting an intravenous cannula means a breach of the body's natural defenses and the circulatory system, and opens the system to risk factors like infection [2].

For every patient entering the hospital for a surgical procedure, an intravenous cannula is inserted instantly before the surgery; these intravenous cannulas remain in the postoperative period for drug administration, fluid, and blood products [3]. Insertion, monitoring and assessing peripheral venous catheter sites is a common nursing activity [4].

The ideal site is the flexor aspect of the forearm for intravenous cannulas to be inserted. Because of the higher density of skin flora in the lower extremities, femoral veins should be avoided to minimize the risk of infection that might occur [5].

An essential part of nurses' job is infection prevention. Most of the prevention strategies and interventions are part of routine nursing care. The nurse should have precise knowledge about preparation and intravenous cannula handling, they should also know about the prevention, treatment, and management of local and systematic complications supported by dynamic evidence-based practice guidelines [6].

All medical and nursing students that are going to be medical staff in the hospitals taking care of patients, the ability to insert and maintain an intravenous cannula is one of these skills, starting IV therapy is considered to be one of the most effective ways a combat medic can prevent death on the battlefield [7]. One of the most common sources of infection at hospitals is due to intravenous cannula insertion, because of skin flora migration on the site of insertion into the cutaneous tract of the cannula with the outer surface of the intravenous cannula. Due to the high risk of infection, superficial veins of the lower limbs are avoided. If the cannula is placed in the lower limbs it may resist soon [8].

Implemented procedures should be supervised by competent persons. For such a striking procedure, it is expected to have guidelines to appraise clinical practice. When the HCW's (Health Care Workers) were asked on which catheter they chose and why; the majority answered that they have developed their tradition of cannula insertion through their habit or experience they gained throughout years, or according to the availability of equipment in the hospital [9].

The objectives of this study is to assess peripheral intravenous cannula insertion practicese among health care workers of Sulaimani surgical teaching hospital, and to identify the socio-demographic characteristics of the participant who worked in the surgical wards and to find out the relationship between HCW's practices and their demographic characteristics.

METHODS

An observational descriptive study was done to assess the practice of health care workers (HCW's) regarding IV cannula insertion and the association between socio-demographic characteristics with their practice in three operative theaters (General surgical, orthopedic, and urology), with their post-operative wards in Sulaimani Surgical Hospital/ Sulaimani. The study was carried out during the period of the 15th September 2018 up to the end of April 2019. Formal administrative approval was obtained from the General Directorate of Health of Sulaimani Governorate. Ethical approval was obtained from the Ethical Committee at the College of Medicine/ University of Sulaimani (7/2/2019, No 4). Verbal consent was taken from respondents after clarification of the objectives of the study.

Respondents were assured that the information would be confidential and was allowed to participate in a free and unbiased environment. Inclusion criteria were all HCW's who had worked in surgical wards at Sulaimani Surgical Teaching Hospital. The exclusion criteria included nurses who refused to participate in the study. The researcher observed (51) HCW's while they were performing the procedure. The data was collected through a questionnaire that consisted of two parts. Part I:Socio-demographic characteristics included 5 variables (age, gender, levels of education, years of employment, participation in a training session on cannula insertion). Part II: included observational checklist, a questionnaire was constructed and modified by the researchers which consist of 58 items to assess cannula insertion practice [10].

The checklist was divided into 3 parts; the first part was 18 items about equipment and patient preparation: HCW's handwashing or using alcohol hand rub, trolley, sterile basin, sterile gauze, use of topical lidocaine to reduce pain during cannula insertion, touching the tip

needle of the cannula during preparation, adhesive tape or plaster, clean glove, cannula appropriate to patient condition, an antiseptic solution to clean the area of insertion, a syringe with normal saline to test the cannula, availability of trash bin beside the patient bed.

Second part is 35 items, HCW introducing himself/herself to the patient, confirming patient identity with the file, obtaining verbal consent, explaining the procedure and the purpose of procedure, checking for allergy, providing comfort to the patient either lying down or sitting with hand support, putting gloves before the procedure began or after equipment preparation, applying tourniquet 10 cm above chosen area, the chosen site for cannula insertion right or left hand (dominant or non-dominant hand), right or left for arm, right or left foot), clean the area of insertion with an antiseptic, open the cannula wings, insert tip of the needle at 10-30 angle or inserting the whole needle at the same angle, once blood is seen the whole cannula with the needle is advanced into the vein, someone else assists releasing tourniquet, gently apply pressure to vein and discard needle, put needle on bed before safety box, attach the cap to the cannula or someone else attaches it, or dropped the cap to floor, secure the cannula with small plaster to test, or someone else assists securing the cannula.

The third part consists of 5 items which include: record date, time, and sign on the cannula plaster, dispose of clinical waste and personal protective equipment (PPE) in the trash bin, instructing patient to report any swelling, redness, pain, thank the patient and leave comfortably, and finally hand washing after the procedure or the use of alcohol hand rub.

The collected data were reviewed and analyzed using the Statistical Package for Social sciences (SPSS version 22). Descriptive statistics such as frequency and percentage was calculated. P-value was obtained for a categorical variable using chi-square. P-value was considered significant if it was equal to or less than 0.05. Referencing was performed with Mendeley Desktop V 1.19.5 Reference Management System for Windows.

RESULTS

Table (1): socio-demographic characteristics of HCW's, it shows that the majority of the sample (56.9%) and (37.3%) were distributed between two age groups (41-50) and (31-40) years old respectively. Most of the HCW's were female (66.7%), Nursing institute graduates (47.1%), most of the HCW's had more than 21 years of experience (39.2%). The majority of the sample (98.0%) had not participated in training sessions concerning cannula insertion.

Table (2): HCW's practice in the equipment preparation and patient preparation. Equipment preparation and patient preparation level of practice among HCW's are low (22.7%). HCW's who washed their hands properly were (88.2%), only (19.6%) used alcohol hand rub, only (2.0%) of the HCW used trolley or sterile basin none of them used disinfecting wipes to sterilize the trolley. While (51.0%) of the HCW's used a safety box to discard their needle, and (45.0%) of the HCW's did not have a trash bin by their side during the procedure, only (5.9%) of the HCW's touched the cannula tip. HCW's who used appropriate cannula to the patient condition was (88.2%)

HCW's who used their own hands as a tourniquet was (2.0%), HCW's who used antiseptic to clean the skin were (70.0%), only (2.0%) of them used syringe with normal saline to test the cannula.

Table (3): HCW's practice in cannula insertion procedure, it shows that HCWs who performed the cannula insertion procedure properly were (34.6%). Providing comfort for the patient position (74.5%), cleaning the area of insertion with disinfectant (56.9%), inserting the whole cannula at (10-30) angle and, gently applying pressure to the vein discard needle were same (78.4%).

Table (4): HCWs practice of documentation and waste disposal. None of the HCW's recorded the date, time, and sign on the cannula plaster, HCW's disposal of the clinical wastes and personal protective equipment (PPE) in the trash were (62.7%), only (7.8%) of the HCW's instructed the patient to report any signs of abnormality, (72.5%) of the HCW's did not wash their hands neither used alcohol hand rub to clean their hands.

Table 5 shows that there was no significant relationship between socio-demographic characteristics and the equipment, and patient preparation. All the HCW's had bad practice in the equipment and patient preparation procedure.

Table 6 shows that there was no significant relationship between socio-demographic characteristics and cannula insertion technique, most of the HCW's either had bad or fair practice.

Table 7 shows that there was no significant relationship between socio-demographic characteristics cannula

insertion and post-procedure care. The majority of the HCWs either had bad or fair practice, some of the HCWs had average or good practice with no significant p-value. Up to our knowledge, this is the first study to be done in Sulaimani, on the assessment of peripheral intravenous cannula insertion practice among health care workers in Sulaimani Surgical Teaching Hospital.

Table 1. The Socio-demographic Characteristics of HCW's.

Socio-demographic Characteristics of HCWs		N	Percentage
Age (in years)	21 – 30	3	5.9
	31 – 40	19	37.2
	41 – 50	29	56.9
Gender	Male	17	33.3
	Female	34	66.7
Level of education	Nursing Secondary school graduate	10	19.6
	Nursing Institute graduate	24	47.1
	Nursing College graduate	2	3.9
	Anesthesia Institute graduate	4	7.8
	Senior physician	2	3.9
	Resident anesthesiologist	8	15.7
	Other (radiologist)	1	2.0
Participating in training session concerning cannula insertion	Yes	1	2.0
	No	50	98.0
Years of employment	1 – 5	4	7.8
	6 – 10	11	21.6
	11 – 15	7	13.7
	16 – 20	9	17.6
	≥ 21	20	39.2

Table 2. The equipment preparation step and patient preparation step practices by the HCW's.

Part one / pre–procedure	Yes (%)	No (%)
Hand washing before equipment preparation	6 (11.8)	45 (88.2)
Alcohol hand rub	10 (19.6)	41 (80.4)
Trolley or sterile basin	1 (2.0)	50 (98.0)
Discard needle in safety box	26 (51.0)	25 (49.0)
Disinfecting wipes to sterilize trolley	0 (0.0)	51 (100.0)
Used topical Lidocaine gel to reduce pain	1 (2.0)	50 (98.0)
Touch the cannula tip	3 (5.9)	48 (94.1)
Appropriate cannula to patient condition	45 (88.2)	6 (11.8)
14 Gauge	1 (2.0)	50 (98.0)
16 Gauge	0 (0.0)	51 (100.0)
18 Gauge	1 (2.0)	50 (98.0)
20 Gauge	27 (52.9)	24 (47.1)
22 Gauge	16 (31.4)	35 (68.6)
24 Gauge	6 (11.8)	45 (88.2)
Make hands tourniquet	1 (2.0)	50 (98.0)
Antiseptic to clean skin	36 (70.6)	15 (29.4)
Syringe+ distal water to test cannula	1 (2.0)	50 (98.0)
Trash bin	28 (54.9)	23 (45.1)
Total	11.6 (22.7)	39.3 (77.2)

Table 3. The cannula insertion procedure step by the HCW's

Part two / procedure	Yes (%)	No (%)
Introduce self to the patient	2 (3.9)	49 (96.1)
Confirm patient identity with the file	34 (66.7)	17 (33.3)
Explain the procedure and purpose	14 (27.5)	37 (72.5)
Obtains verbal consent	26 (51.0)	25 (49.0)
Check for allergies	2 (3.9)	49 (96.1)
Provide comfort patient position	38 (74.5)	13 (25.5)
Patient lying down with arm support	28 (54.9)	23 (45.1)
Patient sitting with arm support	15 (29.4)	36(70.6)
All equipment ready for procedure on trolley or in basin	1 (2.0)	50 (98.0)
Gloves	22 (43.1)	29 (56.9)
Clean Gloves	20 (39.2)	31 (60.8)
Nylon gloves	3 (5.9)	48 (94.1)
Putting gloves on first step	23 (45.1)	28 (54.9)
Putting gloves after equipment preparation	0 (0.0)	51 (100.0)
Applying tourniquet 10cm above chosen area	27 (52.9)	24 (47.1)
Ask patient to close hands for better view at vein	30 (58.8)	21 (41.2)
Right hand assessed	11 (21.6)	40 (78.4)
Left hand assessed	20 (39.2)	31 (60.8)
Right forearm	6 (11.7)	45 (88.3)
Left forearm	14 (27.5)	37 (72.5)
Right foot	0 (0.0)	51 (100.0)
Left foot	0 (0.0)	51 (100.0)
Clean the area of insertion with disinfectant	29 (56.9)	22 (43.1)
Open cannula wings	36 (70.6)	15 (29.4)
Insert the tip of needle at 10-30 angle	10 (19.6)	41 (80.4)
Insert whole cannula at 10-30 angle	40 (78.4)	11 (21.6)
Once blood seen advance cannula with needle	33 (64.7)	18 (35.3)
Someone else releases tourniquet	34 (66.7)	17 (33.3)
Gently apply pressure to vein discard needle	40 (78.4)	11 (21.6)
Put needle on bed before safety box	23 (45.1)	28 (54.9)
Attach the cap to cannula	35 (68.6)	16 (31.4)
Someone else assists attaching the cap	14 (27.5)	37 (72.5)
Dropped the cap to the floor	9 (17.6)	42 (82.4)
Secure the cannula with small plaster to test	0 (0.0)	(51) 100.0
Someone else assists in securing the plaster	16 (31.4)	35 (68.6)
Total	18.7 (34.6)	32.2 (63.3)

Table 4. The post-procedure waste disposal and documentation step practice by the HCW's.

Part three/ post procedure	Yes	No
Record date time and sign on strip of plaster	0 (0.0)	51 (100.0)
Dispose clinical waste gloves and PPE in trash	32 (62.7)	19 (37.3)
Instruct patient to report swelling, pain and redness	4 (7.8)	47 (92.2)
Thank the patient and leave comfortably	8 (15.7)	43 (84.3)
Wash hands or alcohol hand rub	14 (27.5)	37 (72.5)
Total	11.6 (22.7)	39.4 (77.2)

Table 5. Association between pre-procedure and equipment preparation with socio-demographic data

Equipment preparation and patient preparation		Levels of Practice				Total
		> 50 bad	50-60 fair	60-70 average	70-80 good	
Age	21 – 30	3(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	3(100.0)
	31 – 40	19(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	19(100.0)
	41 – 50	29(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	29(100.0)
Total		51(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	51(100.0)
Gender	Male	17(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	17(100.0)
	Female	34(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	34(100.0)
Total		51(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	51(100.0)
Level of education	Nursing Secondary school graduate	10(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	10(100.0)
	Nursing Institute graduate	24(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	24(100.0)
	Nursing College graduate	2(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	2(100.0)
	Anesthesia Institute graduate	4(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	4(100.0)
	Medicine College graduate	1(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	1(100.0)
	Senior physician	1(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	1(100.0)
	Resident Anesthesiologist	8(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	8(100.0)
	Other	1(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	1(100.0)
Total		51(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	51(100.0)
Years of employment	1 – 5	4(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	4(100.0
	6 – 10	11(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	11(100.0)
	11 – 15	7(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	7(100.0)
	16 – 20	9(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	9(100.0)
	≥ 21	20(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	20(100.0)
Total		51(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	51(100.0)

Table 6. Association between IVC insertion procedures with socio-demographic data.

Cannula insertion procedure		Levels of Practice				Total	P-value chi-square
		> 50 bad	50-60 fair	60-70 average	70- 80 Good		
Age	21 – 30	3(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	3(100.0)	0.39
	31 – 40	19(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	19(100.0)	
	41 – 50	26(89.7)	3(10.3)	0.0 (0.0)	0.0 (0.0)	29(100.0)	
Total		48(94.1)	3(5.9)	0.0 (0.0)	0.0 (0.0)	51(100.0)	
Gender	Male	17(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	17(100.0)	0.54
	Female	31(91.2)	3(8.8)	0.0 (0.0)	0.0 (0.0)	34(100.0)	
Total		48(94.1)	3(5.9)	0.0 (0.0)	0.0 (0.0)	51(100.0)	
Level of education	Nursing Secondary school graduate	8(80.0)	2(20.0)	0.0 (0.0)	0.0 (0.0)	10(100.0)	0.52
	Nursing Institute graduate	23(95.8)	1(4.2)	0.0 (0.0)	0.0 (0.0)	24(100.0)	
	Nursing College graduate	2(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	2(100.0)	
	Anesthesia Institute graduate	4(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	4(100.0)	
	Medicine College graduate	1(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	1(100.0)	
	Senior physician	1(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	1(100.0)	
	Resident Anesthesiologist	8(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	8(100.0)	
	Other	1(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	1(100.0)	
Total		48(94.1)	3(5.9)	0.0 (0.0)	0.0 (0.0)	51(100.0)	
Years of employment	1 – 5	3(75.0)	1(25.0)	0.0 (0.0)	0.0 (0.0)	4(100.0	0.37
	6 – 10	11(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	11(100.0)	
	11 – 15	7(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	7(100.0)	
	16 – 20	9(100.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	9(100.0)	
	≥ 21	18(90.0)	2(10.0)	0.0 (0.0)	0.0 (0.0)	20(100.0)	
Total		48(94.1)	3(5.9)	0.0 (0.0)	0.0 (0.0)	51(100.0)	

Table 7. Association between IVC post-procedure care and waste disposal with socio-demographic data.

Cannula insertion post procedure care		Levels of Practice				Total	P-value chi-square
		> 50 bad	50-60 fair	60-70 average	70- 80 Good		
Age	21 – 30	2(66.7)	1(33.3)	0(0.0)	0(0.0)	3(100.0)	0.1
	31 – 40	17(89.5)	0(0.0)	2(10.5)	0(0.0)	19(100.0)	
	41 – 50	19(65.5)	6(20.7)	2(6.9)	2(6.9)	29(100.0)	
Total		38(74.5)	7(13.7)	4(7.8)	2(3.9)	51(100.0)	
Gender	Male	16(94.1)	0(0.0)	1(5.9)	0(0.0)	17(100.0)	0.08
	Female	22(64.7)	7(20.6)	3(8.8)	2(5.9)	34(100.0)	
Total		38(74.5)	7(13.7)	4(7.8)	2(3.9)	51(100.0)	
Level of education	Nursing Secondary school graduate	6(60.0)	1(10.0)	1(10.0)	2(20.0)	10(100.0)	0.7
	Nursing Institute graduate	16(66.7)	6(25.0)	2(8.3)	0(0.0)	24(100.0)	
	Nursing College graduate	2(100.0)	0(0.0)	0(0.0)	0(0.0)	2(100.0)	
	Anesthesia Institute graduate	4(100.0)	0(0.0)	0(0.0)	0(0.0)	4(100.0)	
	Medicine College graduate	1(100.0)	0(0.0)	0(0.0)	0(0.0)	1(100.0)	
	Senior physician	1(100.0)	0(0.0)	0(0.0)	0(0.0)	1(100.0)	
	Resident Anesthesiologist	7(87.5)	0(0.0)	1(12.5)	0(0.0)	8(100.0)	
	Other	1(100.0)	0(0.0)	0(0.0)	0(0.0)	1(100.0)	
Total		38(74.5)	7(13.7)	4(7.8)	2(3.9)	51(100.0)	
Years of employment	1 – 5	2(50.0)	2(50.0)	0(0.0)	0(0.0)	4(100.0	0.3
	6 – 10	9(81.8)	0(0.0)	1(9.1)	1(9.1)	11(100.0)	
	11 – 15	6(85.7)	0(0.0)	1(14.3)	0(0.0)	7(100.0)	
	16 – 20	6(66.7)	3(33.3)	0(0.0)	0(0.0)	9(100.0)	
	≥ 21	15(75.0)	2(10.0)	2(10.0)	1(5.0)	20(100.0)	
Total		38(74.5)	7(13.7)	4(7.8)	2(3.9)	51(100.0)	

DISCUSSION

An intravenous cannula is one of the most routine, procedures done in any hospital. In several hospitals, intravenous cannula insertion is the main job of doctors despite having specialized intravenous cannula teams in many centers to perform IV cannula insertion professionally. Despite the frequency of this activity, there are few studies in the literature giving guidance to medical personnel as to the most appropriate and successful means of doing this [11].

Analysis of socio-demographic variables of the HCW's recruited in the study showed that the ages of more than half HCW's were ranged from 41-50 years old with a percentage of (56.9%). Female HCW's were (66.7%) and males were (33.3%) compared to another study done in Pakistan, the study showed that (43.8%) of the HCW's were ranged between 26-30 years, (94.2%) of them were females [8]. Another study showed that the majority (46.9%) of the health workers age 28-37 years, and are mostly females (87.7%) [12].

In our study, we found that there was no significant relation between HCW's demographic characteristics with the practice of peripheral IV cannula insertion, P-value (age = 0.39, gender = 0.54, level of education = 0.52). The study revealed that, the practice of IV cannula insertion by HCW’s poorly influenced by staff’s experience, P-value (years of employment = 0.37). The study revealed that (34.6%) of the HCW's performed the intravenous cannula insertion procedure properly but (63.3%) of the HCW's performed it poorly. Practices in the different studies showed that (12%) of

HCW's in their study had poor practices in the cannula insertion procedure [8].

Less than half of the HCW's (47.1%) in our study graduated from the nursing institute, while (19.6%) of the HCW's graduated from nursing, nearly the same as another study who found that (48.3%) of the HCW's had level education of Nursing institute and (49.6%) of the HCW's had 1-5 year experience but in our study, nearly two-thirds of the HCW's had more than 21-year experience with the percentage of (39.2%) [8], another study revealed that (36.9%) HCW's had Nursing Diploma (65.7%), and the majorities (36.2%) have had between 5-7 years of experience [12].

Findings in our study revealed that equipment preparation and the pre-procedure of cannula insertion is poorly practiced by the HCW's, handwashing before starting the procedure was done by (11.8%) of the HCW's and were divided between the nursing institute graduate and nursing school graduate, while another study done in Nepal thought that the handwashing is the cost-effective measures to minimize nosocomial infection. In their study, almost all the entire respondent (98.5%) knew the importance of hand hygiene before IV insertion [6].

In our study most of the HCW's 45 (88.2%) chose the correct size of cannula to be inserted, 27 (52.9%) of the HCW's used cannula gauge 20 which was the most used cannula size, then cannula gauge 22 was second 16 (31.4%). Another study done in Australia agreed with the use of a smaller cannula gauge to avoid phlebitis and claimed that the current guidelines do not recommend cannula size but could recommend preferential use of gauge 20 peripheral intravenous cannula, which is suitable for almost all infusion requirements (55.4%) HCW's in their study used cannula gauge 20 and (22.9%) of the HCW's used cannula gauge 22 [13].

A different study in Saudi Arabia showed that cannula gauges 20 and 22 were the main cannula sizes used (37.8% and 36.6%, respectively), followed by gauge18 (22.8%) [14]. Which disagreed with the findings of another study that patients with small-size catheters were about two times more likely to get complications than those with bigger-sized catheters [13].

Another finding in our study was the only one nurse (2.0%) of the HCW's used a sterilized trolley, none of the HCW's used disinfecting wipes to maintain a sterile field, and none of the HCW's used aseptic technique during the procedure, while another study in Ireland decided to draw out the degree of attention to infection control concerning the precautions taken when inserting an IV cannula, (63%) of their HCWs had the opinion that IV cannula is a clean technique, while (37%) of the HCW's performed it as an aseptic technique [15].

Explaining the procedure to the patient is the first trustful step between the HCW and the patient, 14 (27.5%) of the HCW's explained the procedure 9 (64.3%) of them were female 7 (50.0%) were nursing school graduate, while a different study in Bangladesh showed that 28 (37%) of the HCW's explained the procedure, also shows that 75 respondents had (100%) obtained verbal consent, while in our study more than half of the HCWs 26 (51.0%) obtained verbal consent [16].

Another finding of our study was the site of insertion, 20 (39.2%) of the HCWs put the cannula on the left hand of the patient which is non-dominant hand, 14 (27.5%) used the patients non-dominant (left) forearm, and 11 (21.6%) used patients dominant (right hand). A study done in Chicago showed that (89.8%) intravenous cannulas started in the forearm and hand [17]. But another study in Ghana revealed in their study that (15.6%) of the cannulas were inserted on the cubital fossae, (38.8%) on the forearm, (29.5%) on the dorsal hand, and (16.1%) on the wrist [18].

In our study we found that none of the HCWs documented the date, time, and signed on the cannula, only 4 (7.8%) of them instructed the patient to report swelling, pain, and redness, and 14 (27.5%) washed their hands or used alcohol hand rub after the procedure, another study showed that (28.3%) of the HCW's educated the patients on how the care of an IV cannula is important to reduce the risk of infection [8]. Another study done in Saudi Arabia mentioned that (79%) of all cannulas inserted were either not documented or incomplete. Furthermore, (67%) of the cannulas inserted were over dated [19].

In conclusion, most of the HCW's were middle-aged females had nursing institute diploma, had more than 21 years of employment, have not participated in training sessions regarding cannula insertion. The best practice was in the cannula insertion procedure, while the lowest practice was in the equipment preparation, patient preparation and documentation, waste disposal steps equally. There is no significant relationship between age, gender, level of education with intravenous cannula insertion practice. Special training sessions regarding intravenous cannula insertion practice is highly recommended.

Recommendation

Our recommendations are to implement special training sessions regarding intravenous cannula procedure for all HCWs working in the hospitals. Specially trained and highly qualified nurses should teach other medical staff working in the hospitals, documentation, and labeling should be mandatory in intravenous cannula procedure.

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