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Original Research Article

A Descriptive Study to Assess the Knowledge and Practice Regarding Venous Access Devices and Its Care among Staff Nurses in Selected Hospitals of District Mohali

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ABSTRACT

Introduction: Venous access devices are frequently required for hospitalized patients for a variety of clinical indications. This requirement may range from short term or temporary need to long term or even permanent access. A variety of vascular access options are available to the physicians who care for patients to meet the required treatment needs.

The indication for and duration of vascular access should be carefully considered before placement is attempted to help minimize the number of attempts and the trauma to the patient and the family. The physician should have a thorough knowledge of the anatomy, confidence in undertaking the procedure and awareness of the likely complications associated with each type of access.

Materials & Method: Sixty staff nurses of Civil Hospital, Kharar and Civil Hospital, Phase 6, Mohali were selected by consecutive sampling as per inclusion and exclusion criteria. The data was collected from subjects by structured questionnaire, consisting of socio-bio-demographic characteristics, questionnaire related to knowledge regarding venous access devices and 3 point numeric observational rating scale regarding practice of venous access devices (Peripheral VADs: IV cannula) and its care.

Result: The study findings revealed that the mean knowledge and practice score of subjects regarding venous access devices & its care was 22.18 ± 5.66 and 17.9 ± 03.44. It also showed that maximum 37 (61.66) of subjects had average level of knowledge and majority 56 (93.30) had average level of practice. The statistical testing of knowledge and practice score reveals a moderately positive correlation. However, the association of knowledge and practice separately with various socio-bio-demographic variables (i.e., age, professional qualification, experience, area of work and experience in current area) showed no significant association at $p>0.05$ level.

Conclusion: The study concluded that staff nurses had average level of knowledge and practice related to venous access devices and its care. The association of knowledge and practice revealed moderately positive correlation, whereas there is no significant association of knowledge and practice with selected socio-demographic variables.

Key words: Venous access devices, Knowledge, Practice, and Staff nurses.

INTRODUCTION

Intravenous therapy is the infusion of fluids directly into a vein. It is the fastest way to deliver fluids and medications throughout the body. It allows rapid and more predictable delivery of drugs. In case of some drugs, it allows higher doses than would be tolerated orally and also allows administration of large volumes which is not dependent on gut function or muscle perfusion. [1]

IV therapy was first studied in 1831 by Dr. Thomas Latta of Leith and used IV saline in 1832 cholera epidemic. IV was

further developed in 1930s by Hirschfeld, Hyman & Wanger. [2]

Intravenous therapy is used for fluid administration, to correct electrolyte imbalances, to deliver medications and for blood transfusion. For IV administration, a thin plastic tube called an IV cannula is inserted either into central or peripheral vein. The catheter allows health care provider to give multiple safe doses of medication without needing to poke with a needle each time and multiple medicines can be given at same time through different ports. [1]

Peripheral (Standard IV lines) are simple, inexpensive and typically used for short term therapy. Veins are typically accessed in the patient's hand or arm, and sometimes in the foot. [3] For instance, they may be used during a short hospital stay to administer medication during treatment or surgery. With standard IV administration a needle is usually inserted into a peripheral vein. The cannula is then pushed over the needle. [1]

Midline catheters are inserted into the antecubital (or other upper arm) vein. They are typically 20 cm long and their tip does not reach the central veins of the thorax. They are used for venous access of between 1 and 4 weeks' duration but are not advised for administration of vesicant or highly irritating drugs that could harm the peripheral veins (e.g., chemotherapy). Midline catheters are safe and effective but their use is declining in favor of Peripherally Inserted Central Catheters (PICCs), which have similar insertion costs but added benefits of central tip location and longer potential dwell-times. [3]

For central insertion, preferred veins include the internal and external jugular. Although access to the subclavian might be technically easy using bony landmarks in the absence of ultrasound guidance, it is generally not advised to place VADs directly into this vein owing to the relatively high incidence of venous thrombosis and the increased risk of catheter damage or fracture associated with subclavian lines. The 3 main types of centrally inserted catheters are non-tunneled, skin-tunneled, and implantable ports. As these are inserted in the major or the large veins, these catheters hold large risk of varied complications like bloodstream infections, pneumothorax, thrombosis, misplacement and other complications. [3]

Intravascular catheters required for the care of hospitalized patients can give rise to bloodstream infection, a complication of care that occurs most frequently in intensive care unit (ICU) settings. Elucidation of the pathogenesis of catheter-related bloodstream infections (CRBSIs) has guided development of effective diagnostic, management, and prevention strategies. When CRBSIs occur in the ICU, physicians must be prepared to recognize and treat them. Prevention of these infections requires careful attention to optimal catheter selection, insertion, maintenance and removal of catheters when they are no longer needed. [3]

One of the most serious complications of VADs is infection, including bacterial endocarditis. Central devices including PICCs carry greater risk of infection because they are open to the larger veins of the body. Tunneled catheters have lower infection rates and ports risk even fewer infections. [3]

It is essential to differentiate between local insertion site inflammation and true infection. Infections can be divided into entrance-site cellulitis (which usually responds to antibiotic treatment), skin tract or tunnel infection, and catheter-related bacteremia. [3]

Most IV central line infections are caused by coagulase negative staphylococci; less common they are due to staphylococcus aureus. Even less commonly central line infections are caused by some "water organisms" (e.g., Serratia, Enterobacter, Pseudomonas cepacia, Citrobacter, Flavobacteria, etc.) and these are common colonizers in the CCU. In compromised hosts, almost any organism can cause IV line infection. Therefore, unusual organisms

isolated from IV lines in compromised hosts should be regarded as potential pathogens, not routinely considered as nonpathogenic commensals/specimen contaminants. [1]

Preventive use of antibiotics has not been shown to reduce the risk of infection. Meticulous sterile technique at the time of catheter insertion, when accessing the central line, and when changing dressing is essential. Antimicrobial-coated or impregnated catheters have also been developed; however, these are seldom used in clinical practice. [3]

IV line infections are not only important medically but also represent an economic burden to the health care system. It has been estimated that each blood stream infection costs the hospital approximately $6000 and increase the length of stay by an additional week. Although the overall incidence of infections from central lines in hospitalized patients is approximately 1% lower than the incidence in CCU patients, especially with multiple central lines and prolonged intravenous cannulation. [4]

The critical step in the treatment of central IV line infections is to remove the involved catheter. Anti-microbials are usually given adjunctively but is not a substitute for catheter removal. [1] IV lines must be replaced frequently as the complication rates of infiltration and phlebitis increases dramatically with increased catheter dwell-time. In order to reduce the possibility of phlebitis, the Center for Disease Control and Prevention recommends replacing peripheral venous catheters and rotating the site at least every 72 to 96 hours. This increases the expense for patients who require IV access for more than a few days and makes outpatient treatment more complex. [3]

Reliable venous access is an essential aspect of medical care. There are many options and approaches from which to choose—selecting the appropriate device and knowledge of the detection and management of complications are skills that are essential to family physicians. [3]

MATERIALS & METHODS

The total of sixty (60) staff nurses employed in Civil Hospital, Kharar and Civil Hospital, Phase-6, Mohali were selected for study.

- The subjects were informed about the purpose and objectives of the study.
- The informed verbal consent was taken from subjects.
- Selection of study sample was done by using consecutive sampling.
- Data was collected from subjects regarding socio-bio-demographic characteristics, knowledge related to central venous access devices and practice of venous access devices (peripheral VAD: IV cannula) and its care through 3 point numeric observational rating scale.

Inclusion criteria

- Staff nurses having work experience of more than one month in the Hospital.
- Registered staff nurses working in the hospital.
- Staff nurses willing to participate in the study.

Exclusion criteria

- Staff nurses having work experience of less than 1 month.
- Staff nurses who are not willing to participate in the study.
- Staff nurses who are on leave or not available during time of data collection.

Data processing and analysis-

The Collected data has been analyzed using both Descriptive and Inferential statistics and presented in the form of tables and figures. The various statistical measures used for analysis included frequency, range, percentage distribution, measures of central tendency (mean), measures of dispersion (range and standard deviation). Association of knowledge and practice was assessed by using Karl Pearson's correlation coefficient and association with selected socio-bio-demographic variables by Analysis of Variance (ANOVA) test.

RESULTS

Analysis and interpretation of data were organised under the following headings:

Part 1- It included data related to socio-bio-demographic variables.

Part 2- It included data related to knowledge regarding venous access devices and its care.

Part 3- Data related to practice regarding venous access devices and its care.

Part 4- It included data related to association of knowledge and practice regarding venous access devices and its care.

Part 5- Data related to association of knowledge with selected socio-bio-demographic variables.

Part 6- It includes data related to association of practice with selected socio-bio-demographic variables.

Table 1: Mean knowledge score of subjects regarding venous access devices and its care N=60

Descriptive parameter	Knowledge score
Mean	22.18
SD	05.66
Mean %	61.61
Range	0-36

Table 2: Mean distribution of knowledge among subjects regarding venous access devices and its care. N=60

Categories	Range	Mean ± SD	Mean%
General knowledge	0-6	3.91 ± 10.57	65.16
Insertion	0-5	3.26 ± 10.60	65.20
Usage	0-5	3.20 ± 10.47	64.00
Infusion	0-4	2.16 ± 8.31	54.00
Care	0-9	5.45 ± 12.44	60.55
Removal	0-3	1.55 ± 7.00	51.66
Discard	0-2	1.13 ± 6.13	56.50
Complications	0-2	1.41 ± 7.62	70.50

Table 3: Level of knowledge of subjects regarding venous access devices and its care N=60

Knowledge Level	f (%)
Good	21 (35.00)
Average	37 (61.66)
Poor	02 (03.33)

***Good: 25-36 Average: 13-24 Poor: ≤12**

Table 4: Mean practice score of subjects regarding venous access devices and its care. N=60

Descriptive parameter	Practice score
Mean	17.90
SD	03.44
Mean%	49.72
Range	0-36

Table 5: Level of practice of subjects regarding venous access devices and its care N=60

Level*	f (%)
Good	01 (1.66)
Average	56 (93.33)
Poor	03 (05.00)

***Good: 25-3 Average: 13-24 Poor≤12**

Table 6: Relationship of knowledge and practice regarding venous access devices and its care. N=60

Knowledge Mean(x)	Practice Mean (y)	$\sum(x-\bar{x})(y-\bar{y})$	$\sum(x-\bar{x})^2$	$\sum(y-\bar{y})^2$	r
22.18	17.90	44.81	281.80	03.82	0.382

Table 7: Association of age and knowledge regarding venous access devices and its care. N=60

Age group (in years)	f (%)	Mean ± SD
21-23	(00.00)	00.00 ± 0.00
24-26	10 (16.63)	22.20 ± 3.84
24-26	03 (05.00)	21.66 ± 7.01
27-29	47 (78.33)	22.36 ± 1.77

ANOVA TEST	Square of Variance	df	Sum of Square	Mean of sum of square	F Ratio
	Between the group	02	1.48	0.74	0.02^{NS}
	Within the group	57	2099.11	36.82	
	Total	59	2100.59		

NS = Non significant at p>0.05

Table 8: Relationship of Professional Qualification and knowledge regarding venous access devices and its care. N=60

Professional Qualification	f (%)	Mean ± SD
ANM	05 (08.33)	19.40 ± 6.42
GNM	41 (68.30)	22.14 ± 5.72
BSN	08 (13.30)	23.87 ± 7.03
BSN(PB)	06 (10.00)	23.50 ± 4.84

ANOVA TEST	Square of Variance	df	Sum of Square	Mean of sum of square	F Ratio
	Between the group	03	71.48	23.82	0.68^{NS}
	Within the group	56	1942.69	34.69	
	Total	59	2014.17		

NS = Non significant at p>0.05

Table 9: Relationship of professional experience and knowledge regarding venous access devices and its care.N=60

Professional Experience (in years)	f (%)	Mean ± SD
<1	11 (18.30)	21.36 ± 6.43
1-5	25 (41.60)	23.36 ± 4.39
6-10	12 (20.00)	18.58 ± 6.54
>10	12 (20.00)	22.58 ± 4.03

ANOVA TEST	Square of Variance	df	Sum of Square	Mean of sum of square	F Ratio
	Between the group	03	194.04	64.68	2.37^{NS}
	Within the group	57	1528.13	27.28	
	Total	59	1722.18		

NS = Non significant at p>0.05

Table 10: Relationship of area of work and knowledge regarding venous access devices and its care N=60

Area of work	f (%)	Mean ± SD
OPD	07 (11.60)	25.57 ± 6.24
Labor room	19 (31.60)	19.63 ± 5.46
Medical ward	18 (30.00)	21.27 ± 4.69
Emergency	11(18.30)	22.77 ± 4.81
Dialysis	05 (08.30)	24.20 ± 5.50

ANOVA TEST	Square of Variance	df	Sum of Square	Mean of sum of square	F Ratio
	Between the group	04	236.62	59.15	0.49 NS
	Within the group	55	1600.22	29.09	
	Total	59	1836.85		

NS = Non significant at p>0.05

Table 11: Relationship of Experience in present ward and knowledge regarding venous access devices and its care.N=60

Experience in present ward (In years)	f (%)	Mean ± SD
1-5	19 (31.60)	21.68 ± 5.05
6-10	29 (48.30)	23.03 ± 6.10
>10	12 (20.00)	21.90 ± 7.73

ANOVA TEST	Square of Variance	df	Sum of Square	Mean of sum of square	F Ratio
	Between the group	02	24.61	12.30	0.33 NS
	Within the group	57	2117.97	37.15	
	Total	59	2142.58		

NS= Non Significant at p>0.05

Table 12: Relationship of age and practice regarding venous access devices and its care.N=60

Age group (in years)	f (%)	Mean ± SD
21-23	00 (00.00)	0.00 ± 0.00
24-26	10 (16.63)	17.60 ± 2.59
27-29	03 (05.00)	14.00 ± 3.60
>29	47 (78.33)	17.95 ± 3.78

ANOVA TEST	Square of Variance	df	Sum of Square	Mean of sum of square	F Ratio
	Between the group	02	44.28	22.14	1.69 NS
	Within the group	57	746.31	13.09	
	Total	59	790.60		

NS= Non Significant at p>0.05

Table 13: Relationship of Professional Qualification and practice regarding venous access devices and its care N=60

Professional Qualification	f (%)	Mean ± SD
ANM	06 (08.33)	18.40 ± 2.70
GNM	41 (68.3)	17.36 ± 3.39
BSN	08 (13.30)	18.25 ± 2.81
BSN (PB)	06 (10.00)	19.16 ± 6.17

ANOVA TEST	Square of Variance	df	Sum of Square	Mean of sum of square	F Ratio
	Between the group	03	22.20	7.40	0.56 NS
	Within the group	56	737.04	13.16	
	Total	59	759.25		

NS= Non Significant at p>0.05

Table 14: Relationship of professional experience and practice regarding venous access devices and its care.N=60

Professional Experience (in years)	f (%)	Mean ± SD
<1	11(18.30)	16.09 ± 1.86
1-5	25 (41.60)	18.44 ± 3.94
6-10	12 (20.00)	16.83 ± 3.83
>10	12 (20.00)	18.50 ± 3.82

ANOVA TEST	Square of variance	df	Sum of square	Mean of sum of square	F ratio
	Between the group	03	58.86	19.62	1.50 NS
	Within the group	56	731.73	13.06	
	Total	59	790.60		

NS=Non significant at p>0.05

Table 15: Relationship of area of work and practice regarding venous access devices and its careN=60

Area of work	f (%)	Mean ± SD
OPD	07 (11.60)	17.57 ± 3.10
Labor Room	19 (31.60)	16.31 ± 3.01
Emergency	18 (30.00)	19.38 ± 4.21
Medical ward	11 (18.30)	17.54 ± 3.85
Dialysis	05 (08.30)	16.80 ± 1.92

ANOVA TEST	Square of variance	df	Sum of square	Mean of sum of square	F ratio
	Between the group	04	92.02	23.00	1.84 NS
	Within the group	55	687.62	12.50	
	Total	59	779.65		

NS=Non significant at p>0.05

Table 16: Relationship of Experience in present ward and practice regarding venous access devices and its care.N=60

Experience in present ward (in years)	f (%)	Mean ± SD
1-5	19 (31.60)	18.73 ± 4.47
6-10	29 (48.30)	17.60 ± 4.00
>10	12 (20.00)	17.09 ± 2.91

ANOVA TEST	Square of variance	df	Sum of square	Mean of sum of square	F ratio
	Between the group	02	31.80	15.90	1.19 NS
	Within the group	57	758.79	13.31	
	Total	59	790.60		

NS= Non Significant at p>0.05

DISCUSSION

In the study, it was found that more than half 47 (78.33%) of subjects were in age group of more than 29 years with all 100 females and maximum 32 (53.33%) belonged to urban areas. More than half 33 (55.00%) of subjects had their secondary education from government schools and

maximum 41 (68.33%) of nurses were diploma holders i.e., (GNM). 25 (41.60%) nurses had experience of 1-5 year and maximum 46 (76.66%) of subjects' parents were in occupation other than medical and paramedical. The main source of information regarding VADs was clinical experience for maximum 44 (73.33%) of subjects and 55 (91.66%) had not attended any educational program or workshop related to venous access devices and its care.

In the present study it was found that the mean knowledge score of subjects was 22.18 ± 05.66 and maximum 37 (61.66%) had average level of knowledge whereas 21 (35.00%) had good knowledge while only 02 (03.33%) had poor knowledge regarding venous access devices and its care.

It was also found that mean practice score of subjects was 17.90 ± 3.44 and majority 56 (93.33%) had average level of practice, whereas 03 (05.00%) had poor practice and 01 (01.00%) had good level of practice.

The statistical testing showed that there is moderately positive co-relational between knowledge and practice related to venous access devices and its care.

The statistical testing of association of knowledge and practice separately with selected socio bio-demographic characteristics (age, professional qualification, experience, area of work and experience in current area) shows no significant association at $p>0.05$.

Hossain (2016) conducted a descriptive cross-sectional study on 290 staff nurses in a Tertiary Care Hospital-Dhaka Medical College Hospital, Bangabandhu Sheikh Mujib Medical University, Delta Medical College Hospital, Dhaka, Bangladesh with the aim to find out the level of knowledge and practice on intravenous cannulization. It was found that a majority of 49.7 % nurses had good knowledge level followed by 25.5% who had average knowledge, 21.7% had excellent knowledge and 3.1% had poor knowledge. About 53.8 % had poor knowledge level followed by 39.3% who had average knowledge and 5.9% had Good knowledge, whereas only 1.0% had excellent knowledge regarding indication and contraindication on IV cannulization. About 2.67% respondents had Excellent, 12% had Good, 73.33 % had Average Practice and 12% had poor practice. [5]

Similar to this, the present study shows that maximum 37 (61.66%) of subjects had average level of knowledge (22.18 ± 05.66), 21 (35.00%) had good knowledge while only 02 (03.33%) of subjects had poor knowledge regarding venous access devices and its care. It also showed that majority 56 (93.33%) had average level of practice, whereas 03 (05.00%) had poor practice and only 01 (01.00%) had good level of practice.

Wilkinson (1996) conducted a survey of nurses' knowledge and anxieties about intravenous (IV) therapy at The Royal College of Nursing. An anonymised questionnaire survey canvassed nurses' views on education about the use of IV devices and complications arising from IV therapy that caused them greatest concern for patient welfare. The author reported widespread dissatisfaction with the level of education that was provided and many sites published guidelines and reports which could help to provide information to nurses. [6]

Contrary to this, the present study shows that maximum 37 (61.66%) of subjects had average level of knowledge (22.18 ± 05.66) regarding venous access devices and its care.

CONCLUSION

The present study considered the following hypothesis-

H_1: There will be positive correlation between knowledge and practice of staff nurses regarding venous access devices and its care.

- The study revealed that the mean knowledge score of subjects regarding venous access devices and its care is 22.18 ± 05.66 between range 0-36 with

mean percentage 61.61% and maximum 37(61.66%) of subjects had average level of knowledge.

- The study revealed that maximum 56 (93.33%) subjects have average level of practice related to venous access devices and its care with mean practice score as 17.90 ± 03.44 between range 0-36 with mean percentage of 49.72%.
- There is moderately positive correlation between knowledge and practice related to venous access devices and its care. So, the research hypothesis was accepted.
- There is no significant association of knowledge and practice with selected socio-demographic variables (i.e., age, professional qualification, professional experience, area of work and experience in present ward) at $p>0.05$ level.

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