

Practice of Aseptic Technique on Intravenous Injection given by Nursing Personnel in Synod Hospital, Durtlang, Aizawl, Mizoram, India

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Abstract: ***Background:** Aseptic technique safeguards the patient from microorganism and the concept of asepsis needs to be practiced in all clinical settings. Intravenous insertion has an increased chance of introducing infection into the blood stream. **Methodology:** A descriptive research design was adopted to assess the practice of aseptic technique on intravenous injection given by nursing personnel. 35 nursing personnel were selected using non probability convenience sampling technique. **Result:** The analysis revealed that 17 (48.6%) of the participants' practice of aseptic technique was adequate, 15 (42.8%) of the participants' practice was moderately adequate, and 3 (8.6%) of the participants' practice was inadequate. The chi square computations revealed a significant association between the practice of aseptic technique with the age of the nursing personnel ($\chi^2 = 10.36$) and the working unit ($\chi^2 = 19.63$). **Conclusion:** The findings revealed negligence as a common factor that influence the standards of practice of aseptic technique on intravenous injection given by nursing personnel.*

Keywords: Assess, Practice, Aseptic Technique, Intravenous Injection, Nursing Personnel

1. Introduction

Aseptic technique is defined as distinct range and practices done under strict condition with the aim of reducing the risk of infection. The aim of aseptic technique is to safeguard the patient from disease causing microorganism and the concept of asepsis is to be incorporated in all clinical setting. It includes practices performed just before, during, or after any invasive procedures. Poor adherence to aseptic technique results in considerable morbidity and mortality. Even in countries with well-established infection control programmes, hospital acquired infection (HAI) related to poor compliance with aseptic technique is an important public health problem. ^[1]

The incidence of local or bloodstream infection is related to IV (intravenous) therapy. For most endemic pathogens causing catheter related blood stream infections, the primary source is through the insertion site or through the catheter hub. Contamination may be caused as a result of patient's own flora or from health care workers' hands during insertion and manipulation of the catheter and during administration of injections. These organisms move along the inside and outside lumen of the intravenous catheter (IV) and lodge the (IV) site causing growth of microorganisms and progress to systemic and localised infection. ^[1]

Peripheral intravenous injection and cannulation is one of the common procedures which nurses perform and it carries high risk of complication. For example, phlebitis rates for patients receiving intravenous therapy have been as high as 80%. Other complications include thrombophlebitis, extravasation and infection resulting in bacteremia and septicemia. ^[2]

In the national and multi centre studies conducted by WHO, it was identified that the prevalence of hospitalized patients who acquired at least one hospital acquired infection ranged from 3.5% to 12%. This increasing concern in number of health care associated infection has prompted the need for further research in asepsis. ^[1] The researchers were interested in assessing the practice and factors influencing the standard of practice on intravenous injection given by Nursing Personnel.

Objective of the study

- 1) To assess the practice of aseptic technique on intravenous injection given by nursing personnel.
- 2) To identify factors that influences the standard of practice of aseptic technique on intravenous injection given by nursing personnel.
- 3) To determine the association between practice of aseptic technique on intravenous injection given by nursing personnel and the selected demographic variables.

Hypothesis

H₁: There is a significant association between the practice of aseptic technique on intravenous injection given by nursing personnel and the selected demographic variables.

2. Literature Survey

Literature survey for the study was carried out with the view of description and analysis of literature relevant to aseptic technique, factors that affect the practice of aseptic technique and the practice of aseptic technique in intravenous injection and cannulation.

Sonoiki, T., Young, J. and Alexis, O. (2020) conducted a study to assess challenges faced by nurses in complying with aseptic non touch technique principles during wound care. The study objectives were to identify the barriers and enablers that influence nurse's adherence to the principles of ANTT during wound care. The method used was a literature search using a systemic approach was carried out. Four data bases were searched to identify relevant study published between January 1993 and December 2018. Titles and abstracts were reviewing study that met the inclusion criteria were reviewed for quality. The extracted data were then synthesized. The results reveal that Nurses' compliance with aseptic practice is directly influenced by environmental and psychological factors. Ensuring compliance to ANTT may require an integrated approach involving local, national and worldwide organizations, in collaboration with higher education institutions that teach nurses and similar healthcare professionals.^[3]

Ruby, I. M. M. (November 2020) conducted a study to assess the practice of aseptic technique on starting a peripheral intravenous cannula by staff nurses at tertiary teaching Hospitals Puducherry. The study objectives were to assess the practice of aseptic technique on starting a peripheral IV cannula, to identify the factors influencing the standards of practice followed in aseptic technique on starting a peripheral IV cannula, to associate the level of practice on starting a peripheral IV cannula with selected demographic variables. The sample selected for the study was 50 staff nurses. The method was a descriptive non-experimental study. This study reveals that the current study assessed the practice of aseptic technique on starting a peripheral intravenous cannula among staff nurses with the help of observational checklist and self-administered questionnaire. The study revealed that majority of the study participants 60% of them had unsatisfactory level of practice in following the aseptic techniques on starting a peripheral intravenous cannula. The study concludes that there is an important need for reinforcement among staff nurses in following the aseptic technique while starting a peripheral intravenous cannula and continuing nursing education programs and skill training can be arranged on this topic.^[1]

3. Methods and Approach

Research approach: Quantitative research approach

Research design: Descriptive research design

Setting of the study: Synod Hospital, Durtlang, Aizawl, Mizoram, India

Duration of the study: 1 week

Sample size: 35 Nursing Personnel

Sampling technique: Non-probability convenience sampling technique

Selection and development of tool:

The following steps were followed for the development of tool.

- Review of literature.

- Discussion and suggestions from the guide and discussion with experts.
- Content validity by the experts.
- Establishing reliability of the tool.

The tool consisted of 3 parts

PART A: Demographic data

- It consists of demographic characteristics such as age, sex, professional qualification, working unit and work experience.
- No score were allotted

PART B: Observation checklist

- It consists of observational checklist consisting of items on different steps in performing aseptic technique on intravenous injection procedure.
- The items will be given a score of one if it is present and a score of zero if it is absent.

PART C: Factors identification checklist

- It consists of observational checklist consisting of items on different steps in performing aseptic technique on intravenous injection procedure with the reasons for not performing the steps of the procedure
- The reasons are quoted as:
 - A: no time
 - B: negligence
 - C: inadequate knowledge
 - D: Patient's request
- No scores were allotted

Procedure for data collection:

- 1) Subsequent to obtaining administrative approval from the concerned authorities, the data collection was from 1st November, 2023 to 3rd November, 2023.
- 2) Verbal and written consent was obtained from all the participants of the study following explanation of the purpose and details of the study.
- 3) The data were collected from six nursing personnel using non-probability convenience sampling technique.
- 4) The data was collected from 3 samples in a day and around 15-20 minutes was needed in completing data collection and observation of one participant.
- 5) Observation of the participant's practice of aseptic technique on intravenous injection was performed from the first day till the last day of data collection.
- 6) After observation, the participants were enquired regarding the reason for deviation from proper practice of aseptic technique

Plan for data analysis:

The analysis of data was based on the objective and hypothesis of the study by using descriptive and inferential statistics.

- Section I: Demographic variables of nursing personnel in terms of frequency and percentage.
- Section II: Assessment of adequacy of steps followed by nursing personnel while performing intravenous injection in terms of frequency and percentage.
- Section III: To identify factors that influences the standard of practice of aseptic technique on intravenous injection given by nursing personnel.

- Section IV: To determine the association in practice of aseptic technique on intravenous injection given by nursing personnel and the selected demographic variables.

4. Results and Discussion

Section I: Demographic variables of nursing personnel in terms of frequency and percentage

Table 1: Frequency and percentage distribution of nursing personnel according to demographic variables, n=35

Demographic variables	Group	f	%
Age	a) <30 years	8	22.9%
	b) 30-50 years	25	71.4%
	c) >50 years	2	5.7%
Sex	a) Male	6	17.1%
	b) Female	29	82.9%
	c) Others	-	-
Educational Qualification	a) M.sc (N)	-	-
	b) B. Sc (N)	4	11.4%
	c) Pb. B. Sc. (N)	4	11.4%
	d) GNM	27	77.2%
Working unit	a) Surgical & ENT	6	17.1%
	b) ICU / NICU	8	22.9%
	c) Medical Ward	10	28.6%
	d) Pediatric Ward	5	14.3%
	e) Palliative ward	6	17.1%
Work Experience	a) <1 year	4	11.4%
	b) 1-5 years	7	20.0%
	c) 5-10 years	5	14.3%
	d) 10-15 years	8	22.9%
	e) >15 years	11	31.4%

The data presented in table 1 depicts that, out of the 35 nursing personnel, majority 25 (71.4%) were 30-50 years old. With regards to sex, majority 29 (82.9%) were female. With regards to educational qualification, majority 27 (77.2%) were GNM. In terms of working unit, majority 10 (28.6%) were from medical ward. In terms of work experience, majority 11 (31.4%) had experience of >15 years.

Section II: Assessment of adequacy of steps followed by nursing personnel while performing intravenous injection in terms of frequency and percentage.

Table 2: Frequency and percentage distribution of practice of aseptic technique on intravenous injection given by nursing personnel, n=35

Adequacy of practice	Frequency (f)	Percentage (%)
Adequate	17	48.6%
Moderately adequate	15	42.8%
Inadequate	3	8.6%

Data on table 2 revealed that 17 (48.6%) of the participants' practice of aseptic technique was adequate, 15 (42.8%) of the participants' practice was moderately adequate, and 3 (8.6%) of the participants' practice was inadequate.

Section III: Identification of factors that influences the standard of practice of aseptic technique on intravenous injection given by nursing personnel

Table 3: Frequency and percentage distribution of nursing personnel according to factors influencing the practice of aseptic technique on intravenous injection given by nursing personnel, n=35

S no.	Observation	yes		no		Influencing factor			
		(f)	(%)	(f)	(%)	A	B	C	D
1	Perform hand washing.	27	77.1%	8	22.9%	2	6	-	-
2	Wipe and dry hands with towel.	27	77.1%	8	22.9%	2	6	-	-
3	Wear gloves.	30	85.7%	5	14.3%	-	3	-	2
4	Maintain sterile technique while handling equipment.	20	57.2%	15	42.8%	1	7	-	7
5	Use clean injection tray.	32	91.4%	3	8.6%	-	3	-	-
6	Maintain clean environment.	19	54.3%	16	45.7%	1	14	-	1
7	Use new sterile syringe/needle/ cannula.	24	68.6%	11	31.4%	-	11	-	-
8	Have visual inspection of ampule and vile from contamination with particles.	25	71.4%	10	28.6%	-	10	-	-
9	Clean the injection site using spirit swab.	14	40%	21	60%	6	15	-	-
10	Place cannula cap on alcohol swab during manipulation.	1	2.9%	34	97.1%	6	27	1	-
11	Prevent contact between injection materials and non-sterile environment.	19	54.3%	16	45.7%	-	14	2	-
12	Wipe the cannula cap with a spirit swab before recapping.	7	20%	28	80%	6	22	-	-
13	Dispose used articles in appropriate biomedical waste bins.	35	100%	-	0%	-	-	-	-
14	Wash hands.	31	88.6%	4	11.4%	-	4	-	-
Total						24	142	3	10

Data on table 3 depicts that 27 (77.1%) of nursing personnel performed the steps of hand washing, 27 (77.1%) performed the steps of wipe and dry hands with towel, 30 (85.7%) performed wear gloves, 20 (57.2%) maintained sterile technique while handling equipment, 32 (91.4%) used clean injection tray, 19 (54.3%) maintained clean environment, 24 (64.6%) used new sterile syringe/needle/ cannula, 25 (71.4%) have visual inspection of ampoule and vial from

contamination with particles, 14 (40%) clean the injection site using spirit swab, 1 (2.9%) place cannula cap on alcohol swab during manipulation, 19 (54.3%) prevent contact between injection materials and non-sterile environment, 7 (20%) wiped the cannula cap with a spirit swab before recapping, 35 (100%) disposed used articles in appropriate biomedical waste bin, 31 (88.6%) wash hand after performing procedure.

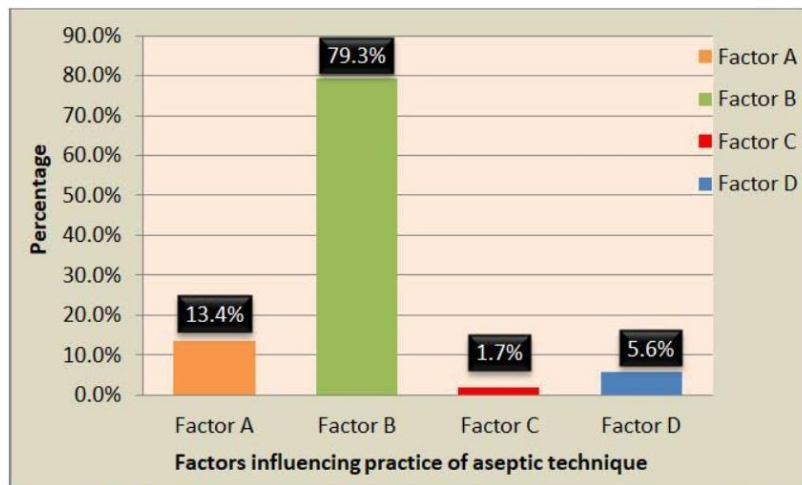


Figure 1: Bar diagram showing percentage distribution of factors influencing practice of aseptic technique, n=35

Figure 1 revealed that out of the 179 missed performed steps by the nursing personnel, majority of i.e., 79.3% failed to performed the steps of aseptic technique on intravenous injection due to ‘negligence’, followed by 13.4% due to ‘no time’, 5.6% due to ‘shortage of equipment’ and 1.7% failed to performed the steps of aseptic technique on intravenous injection due to ‘inadequate knowledge’.

Section IV: Determination of the association in practice of aseptic technique on intravenous injection given by nursing personnel and the selected demographic variables.

Table 4: Association between the practice of aseptic technique on intravenous injection given by nursing personnel with their demographic variables, n=35

Demographic Variables	Group	Adequacy of practice				df	χ ²	Tab val	p val	Remarks
		Adeq	Mod	Inadeq	Total					
Age	a) <30 years	7	1	0	8	4	10.36	9.49	0.0347	S*
	b) 30-50 years	10	12	3	25					
	c) >50 years	0	2	0	2					
Sex	a) Male	4	2	0	6	4	1.258	9.49	0.868	NS*
	b) Female	13	13	3	29					
	c) Others	0	0	0	0					
Educational Qualification	a) M.Sc.(N)	0	0	0	0	4	3.749	9.49	0.441	NS*
	b) B.Sc(N)	3	1	0	4					
	c) Pb. B.Sc	1	3	0	4					
	d) GNM	14	10	3	27					
Working unit	a) Surgical & ENT	6	0	0	6	8	19.63	15.51	0.01	S*
	b) ICU/NICU	3	5	0	8					
	c) Medical	3	6	1	10					
	d) Paediatric	1	4	0	5					
	e) Palliative	4	0	2	6					
Work Experience	a) <1year	4	0	0	4	8	6.2	15.5	0.62	NS*
	b) 1-5years	3	4	0	7					
	c) 5-10years	3	2	0	5					
	d) 10-15years	4	4	1	8					
	e) >15years	4	5	2	11					

*p<0.05 level of significance S- Significant NS- Non significant

Data on table 4 showed that in terms of age, the χ² value for df (4) was found to be 10.36 with corresponding p value 0.034. The calculated χ² value was larger than the tabulated value (i.e., χ² =9.49) at 0.05 level of significance which indicated that there is a statistically significant association between the practice of aseptic technique with their age. With regards to working unit, the χ² value for df (4) were found to be 19.63 with corresponding p value 0.01. The calculated value for χ² was larger than the tabulated value

(i.e., χ² =15.51) at 0.05 level of significance which indicated that there is a statistically significant association between the practice of aseptic technique with their working unit. Thus the research hypothesis H₁ which stated that there is a significant association between the practice of aseptic technique on intravenous injection given by nursing personnel and the selected demographic variables was accepted in terms of age and working unit. The hypothesis

H₁ is rejected in terms of sex, educational qualification and work experience.

5. Discussion

The present study revealed that 79.3% failed to performed the steps of aseptic technique on intravenous injection due to 'negligence', followed by 13.4% due to 'no time', 5.6% due to 'shortage of equipment' and 1.7% failed to performed the steps of aseptic technique on intravenous injection due to 'inadequate knowledge'. Similarly, a study conducted by Ruby, I. M. M., Malarvizhi, S. and Chelliah. (2020) revealed that the factors influencing the practice of starting a peripheral intravenous cannula are lack of time, during emergency situation, non-availability of equipment's, negligence, and inconvenience.

6. Recommendations

- 1) The study can be replicated in specific settings like outpatient department, oncological department, cardiology department, Operation Theater and other medical departments.
- 2) The study can be replicated in a larger scale to bring about a better generalization.
- 3) The study can be done to evaluate the factors that influence the practice of aseptic technique on intravenous injection given by nursing personnel.
- 4) A pre experimental study to assess the skills and practice of aseptic technique on intravenous injection given by nursing personnel.
- 5) Future research needs to focus on the practice of aseptic technique on intravenous injection given by nursing personnel.

7. Conclusions

From the findings of the present study, it can be concluded that nurses' practice of aseptic technique demands more vigilance in order to promote and improve asepsis so as to prevent complications and reduce hospital stay of patients.

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