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ASSESSMENT OF NURSES KNOWLEDGE AND PRACTICE TOWARDS THE CARE AND MANAGEMENT OF INTRAVENOUS CANNULA.

Usama Siddique[1], Shafiullah[2], Atta ullah[3], Haya ul Batool Abbasi[4], Meena Luther[5], Noman dilshad[6], Amir Sultan[7]

ABSTRACT

BACKGROUND: In peripheral intravenous cannulation (PIC), a temporary plastic tube is inserted into a vein through a puncture in the patient's skin using a needle for fluid therapy, parental nutrition, and blood. Objective: The study was conducted with the aim of determining the knowledge and attitude of nurses towards intravenous cannulation. **METHODOLOGY:** A descriptive cross-sectional study was conducted with a sample size of 176 nurses collected from November 2022 to march 2023 in the Saidu Group of Teaching Hospital Swat (SGTH) through sample random sampling. A valid and reliable questionnaire was used for data collection that contains three parts. A descriptive statistic of categorical and continuous variables was calculated, while an independent t-test was used for the association between knowledge and attitude with demographic variables using SPSS 22.0. **RESULTS:** The total number of participants in the study was 176, while the number of female participants was in the majority (58%) compared to male nurses (42%). The majority of the participant's knowledge was good (77%), while 23% of the knowledge was poor. The nurse's practice of IV cannulation was good (82%), while the remaining 18%'s practice was poor. The mean score of knowledge of male nurses was better (1.2 ± 0.18) than that of female nurses (1.1 ± 0.15), while the mean score of practices of female nurses was higher (3.9 ± 0.31) than that of male nurses (3.8 ± 0.34). In the category of education, the mean score of MSN nurses was higher in both knowledge (1.4 ± 0.1) and practice (4.1 ± 0.1). **CONCLUSION:** The study concluded that nurses have good knowledge of intravenous cannulation and that their practice is good. The study further concluded that males have good knowledge of intravenous cannulation, while females' level of practice towards IV skills is high. Furthermore, it is concluded that gender affects knowledge because it is highly significant. While age, education, and experience affect the practice of nurses and are highly significant.

KEYWORDS: Intravenous Catheter, Nurse, Peripheral, Knowledge, Attitude

1. Registered Nurse / THQ hospital Takht-e-Nasrati, KPK.
2. Principal / Assistant Professor: Farabi College of Nursing and health Sciences Charsadda, KPK.
3. Assistant professor (Hamdan Institute of Nursing and Allied health sciences).
4. Claim consultant in EFU life assurance Ltd.
5. Tutor Nurse: College of Nursing Jam Ghulam Qadir Hospital, Hub chowk Balochistan.
6. Vice prinicipal: Jesus and Mary Institute Of Nursing And Allied Healh Science Karachi.
7. Prinicpal / Assistant professor, Tasleem College of nursing swat, KPK.

Corresponding Author: Amir Sultan, Prinicpal / Assistant professor, Tasleem College of Nursing Swat, KPK

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INTRODUCTION

Peripheral venous catheter (PVC) vascular access cannulation is a common procedure and is regarded as the most common invasive procedure performed on hospitalized patients. [1]. It is also known as peripheral intravenous cannulation (PIC), in which a temporary plastic tube is inserted into a vein through a puncture in the patient's skin using a needle. It is a necessary piece of expert nursing practice in all medical care organizations [2]. Most of the time, intravenous (IV) therapy is done in hospitals with peripheral venous catheters (PVC) [3]. PVCs are used for a variety of purposes, including fluid therapy, parenteral nutrition, blood products, and diagnostic tests. The type of catheter chosen is determined by the anticipated duration and type of treatment that will be infused [4]. PVC is kept for different periods of time depending on the patient's condition, with a potential risk of microbial growth [5].

Roughly 60% of clinic inpatients every year go through PIC to get remedial IV medicine. Since the PIC is directly responsible for 6.2% of hospital-acquired bacteremias, this may result. Localized infection is more frequently associated with PIC than systemic infection [2]. The contamination comprises acute inflammation of the veins with irritation of the venous endothelium in the part or portion cannulated by the catheter [6]. Evaluation of possible signs and symptoms in the insertion area, such as erythema, tumefaction in the vein, pain, heat, and fever, is necessary for phlebitis diagnosis [7]. These infections are also part of nosocomial infections and are linked to an increase in hospital days spent in the hospital, morbidity, mortality, and costs [8]. Annually, there are 250,000 cases of catheter-related bloodstream infections (CRBSIs) in intensive care units in the United States [9].

According to the Infusion Nurses Society (INS), the acceptable phlebitis rate should be less than 5%. At present, a phlebitis rate of 0.5% to 59.1% is assessed, with predominance somewhere in the range of 20 and 80% of patients following intravenous treatment [10]. In the fight against infections like these, nurses play a crucial role. The majority of interventions and preventative measures, including the insertion, monitoring, and evaluation of the site of a peripheral venous catheter (PVC), are routinely provided by nurses [8]. These complications can be reduced by nurses' knowledge of how to properly manage PVC and their early recognition of risk factors [11].

A study conducted by Shahnaz et al. (2021) in Pakistan shows that only 12 (6%) of the inspected cannula sites showed signs of phlebitis and were treated by removal only [12]. Nurses work in a changing and propelling well-being care climate; thus, they are expected to make changes in their data, attitude, and state of mind. Therefore, the study aimed to evaluate the knowledge and practices of nurses towards intravenous cannulation.

METHODOLOGY

A sample of 176 nurses was calculated at a 95% confidence level, with 5% error and 50% prevalence. Data was collected from March 2022 to July 2022 in the saidu group of Teaching Hospital Swat (SGTH). Permission for the study was received from the ethical review board, and a letter of permission from the saidu group of the teaching hospital was received for the data collection of this descriptive cross-sectional study. Inclusion criteria were set for the participant: all the nurses who performed duty at SGTH and nurses who were available during the period of the study. Those nurses who were on medical, educational, or maternity leave during data collection, internship students, and those nurses who were unwilling to be participants were excluded from the study. An informed consent form was taken from each participant.

Data collection procedure and instrument

Data will be collected through convenient sampling techniques. The objectives and aims of the study were explained: the participants' data will be kept confidential, they will not receive any benefit directly from the study, and they have the right to leave the study at any time. A consent form was given to nurses for their participation.

Data was collected through an adopted questionnaire that consists of Part-a demographic data (age, gender, experience, qualification), Part-b contains 2 sections (section 1: contains 1–17 questions regarding the practice of nurses with the dichotomy option of "yes" and "no") that were prepared with the help of practice of intravenous cannula guidelines and later validated by 2 nursing educators, while section 2 contains an adopted valid and reliable checklist (18-25 contains knowledge

of intravenous cannula among nurses with the options "yes" "no," and I don't know" [2].

Data Analysis and ethical consideration

SPSS version 25 was used to analyze the data. Frequency and percentage for categorical variables mean, and standard deviation were calculated as descriptive statistics. The study was approved by an ethical review board. The participants were informed orally about the study's goals and objectives, the confidentiality and anonymity of the data, and that they could withdraw from the study at any time.

RESULTS

Demographic data

The number of total participants in the study was 176, while the number of female participants was higher (58%) than male nurses (42%). While nurses qualifying 3 years of diploma nursing was higher in number (35.2%), followed by 4 years BSN (Bachelor of Science in nursing) (30.7%) and 2 years Post-RN BSN nurses (30.7%) (See table 1).

Table 1: Demographic data of the study participant

Characteristics		Frequency (n-176)	Percent %
Gender	Male	74	42 %
	Female	102	58 %
Marital Status	Single	86	49 %
	Married	90	51 %
Education	Diploma in nursing	62	35.2 %
	BSN 4 years	54	30.7 %
	Post-Rn	54	30.7 %
	MSN	6	3.4 %
Age	20-30 years	86	48.9 %
	30-35 years	54	30.7 %
	36 and above	36	20.5 %
Experience	1-2 years	86	48.9 %
	3-5 years	66	37.5 %
	Above 5 years	24	13.6 %

Table 1: Demographic data

Knowledge and practice of nurses regarding IV cannulation

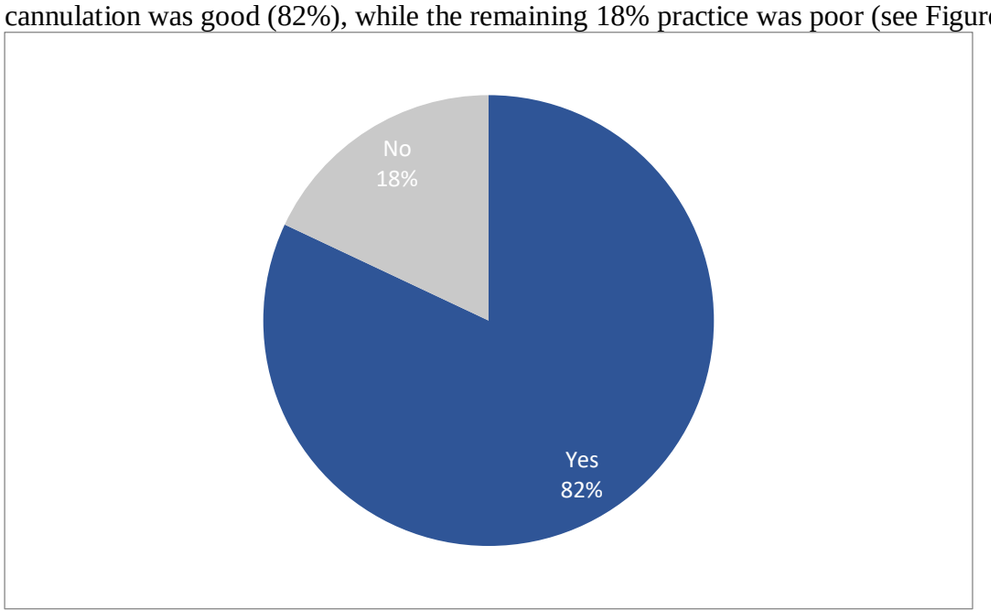
Table 2 reveals that the overall mean score of knowledge among the nurses was 1.2 ± 0.16, while the overall attitude mean score was 3.9 ± 0.33. The findings illustrate that the mean score of knowledge of males was good than females, while the mean score of the practice of females was maximum than male nurses. In the category of age, the mean score of 20-30 years and 31-35 years were the same, while in practice the mean score of 31-35 years was higher compared to other age groups. In the category of education, the mean score of MSN nurses was higher in both knowledge and practice. (See Table 2).

Table 2: Knowledge and practice of Nurses regarding care and management of IV cannula

		Knowledge of Nurses	Practice of Nurses
Overall Mean and SD		1.2 ± 0.16	3.9 ± 0.33
Gender	Male	1.2 ± 0.18	3.8 ± 0.34
	Female	1.1 ± 0.15	3.9 ± 0.31
Age	20 – 30	1.21 ± 0.16	3.8 ± 0.37
	31 – 35	1.21 ± 0.16	4.1 ± 0.24
	36 and above	1.20 ± 0.16	3.8 ± 0.22
Education	Diploma in nursing	1.20 ± 0.14	4.0 ± 0.18
	4 year BSN	1.17 ± 0.15	3.7 ± 0.38
	Post-RN	1.2 ± 0.19	4.0 ± 0.32
	MSN	1.4 ± 0.1	4.1 ± 0.1
Experience	1 -2 years	1.2 ± 0.17	3.9 ± 0.4
	3 – 5 years	1.2 ± 0.17	3.8 ± 0.1
	6 and above	1.1 ± 0.1	3.8 ± 0.1

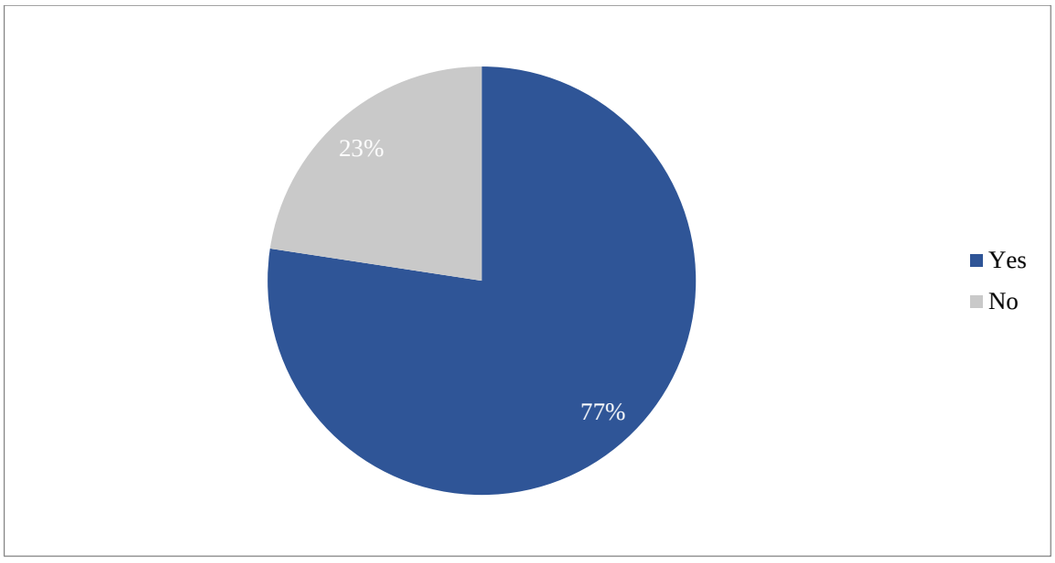
Practice of nurses toward intravenous cannulation

Figure 1 show that the majority of the nurse's practice of care and management towards cannulation was good (82%), while the remaining 18% practice was poor (see Figure 1).



Knowledge of Nurses regarding care and management of IV cannula

Figure 2 show that the majority of the participant's knowledge was good (77%) regarding intravenous cannulation, while (23%) knowledge was poor (see figure 2).



Association of Knowledge and practice with selected variables

Table 3 shows that gender has an effect on knowledge; therefore, the p value (0.000) is highly significant. While age, education, and experience affect the Practice of the nurses, the P-values of age (0.001), education (0.000), and experience (0.000) were highly significant (see table 3).

Table 3: Association of knowledge and practice with selected variables

Demographic variables	Study variables	Sig
Gender	Knowledge	0.000
	Practice	0.999
Age	Knowledge	0.958
	Practice	0.001
Education	Knowledge	0.263
	Practice	0.000
Experience	Knowledge	0.501
	Practice	0.000

DISCUSSION

The study was conducted with the aim of determining the level of knowledge and practice of nurses in the maintenance and management of patients' intravenous cannulation.

In the present study, it was identified that the majority of the nurse's level of knowledge was good (77%), while the remaining nurses knowledge was poor (23%). The findings are supported by a study that reveals that the majority of the respondent knowledge was good (82.47%) [8]. Further studies findings are also in line with our results, like Sharma et al. 2022 showing the majority of intern knowledge was (55.6%) [13], Hossain et al. revealing (49.7%) was good [14], Soliman et al. 2019 [50.6%] knowledge was satisfactory [15], Haileyesus Muluken 2022 illustrates (54.7%) [16], and Sharadha 2020 reporting (68%) good knowledge among students nurses [17].

In the current study (75%), nurses have the knowledge to select the appropriate size of IV cannula, like 14 and 16 in emergencies, 18 for blood transfusions, and 24 for paediatric patients. Due to the maximum number of patients (heavy workload) they deal with every day, in the study setting, nurses' deal with approximately 200 and above patients in the emergency department, while the ward nurse takes care of a minimum of 30 patients in each ward in a single shift. The results are in accordance with our findings that report that 87.4% of nurses know the appropriate gauze for an IV cannula [16], 76.7% of nursing interns know the suitable gauze [11], March et al. (2018) report that the majority of their respondents know that 20g is used for various applications [18], and Hanumaiah et al. 2019 illustrate that 62.4 percent know that 20g line is used for infusion [19].

In this study, the level of knowledge of nurses regarding the complications of IV cannulas, especially thrombophlebitis, was 93.2%. That is supported by a study that reports that the knowledge of the respondent was (98%) regarding the identification of complications [11], while Hanumaiah et al.'s 2019 study shows (99%) interns aware of complications [19], Carr et al. (2011) report 60% awareness [20], and the study of Sharma et al. (2022) reveals 34.4% awareness [13].

The present study reveals that 86 percent of nurses have the knowledge to change an IV line after 12–72 hours after insertion. That is acknowledged by a study that found 87% knew the duration to change an IV line [11], another study found 69.9% [16], and 68% of nurses replaced new cannulas after 72 hours [11].

One of the most crucial measures for reducing the spread of infections among healthcare workers is good hand hygiene. In this study, it was shown that 90% of nurses wash their hands before IV cannulation and 61% use gloves for the insertion of the IV cannula. The results are in line with a study that reveals that 53% of nurses maintain hand hygiene and only 15% use gloves [14]. Other studies report that 96.2% wear gloves before the procedure [13], nursing interns (94.4%) know hand washing is important, and 97.8% use gloves for IV cannulation [19], and the study of Carr et al. (2011) reveals that 72.4% have the knowledge that hand washing is important before the procedure [20].

In regard to the practices of nurses regarding the care and management of IV cannulation, the current study reports that the majority of the nurses follow proper practice and the good practice nurses were 82%.. The results are supported by a study that reveals that the maximum number (84.72%) of the nurses practice according to guidelines [11], other studies findings were similar, revealing that the majority of nurses practice was good (54.3%) [16], 54% of respondents practices correctly [17], more than half of the respondent practice was good [21], 49.3% of nurses practice was good [22], and 63.3% were had adequate knowledge regarding the practice of IV cannulation [23].

CONCLUSION

The study concluded that nurses working in tertiary care hospitals in SWAT have good knowledge regarding the care and management of intravenous cannulas, while male nurses' knowledge was higher compared to female nurses. Nurses knowledge plays a vital role in the maintenance and management of IV cannulation to prevent complications. Based on the current findings, the study reveals that the majority of the nurses follow proper guidelines while practice intravenous cannulation, while female nurses follow proper practical guidelines compared to male nurses. The study recommends that the nursing administration develop a plan for continuous training and assessment of nurses to maintain and improve their knowledge and practice.

The study also concluded that gender affects the level of study response, while age, education, and experience affect the practice of nurses.

LIMITATION

The study design was quantitative, so a qualitative study design should be conducted for deeper analysis.

The study doesn't address the challenges faced by nurses during duty hours that affect their ability to follow proper guidelines.

The study addresses only knowledge and practices, while a study should be required that focuses on the type and prevalence of complications.

The study was conducted in only one tertiary care hospital so a study would be required that collect data from multiple tertiary care hospital and match their competencies.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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CONFLICT OF INTEREST: No competing interest declared.

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