



Original Article



Knowledge of Intravenous Cannulation among Nursing Students at Two Private Nursing Schools Karachi

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ABSTRACT

Intravenous Cannulation (IVC) is a widely used, basic procedure carried out in all health care settings. Any kind of error or suboptimal practice can lead to serious complications and can worsen patient health. **Objective:** To assess the knowledge of nurses regarding IVC. **Methods:** A cross-sectional study was conducted at Horizon and Suvastu School of Nursing among post-RN BSN students from October to December 2023. Sample size was calculated with the help of openepi.com version 3.9 with a 95% confidence interval and a total of 134 participants were approached through the purposive sampling technique. Data were collected with Google Forms, shared with the students via whatsapp groups. An adopted questionnaire was used for data collection. **Results:** The results showed that 49.3% of participants were male, 50.7% were female, and 35.8% were between 26 and 30 years old. Considering the year of education, the majority 73.1% were studying in their second year. Results also showed that 35.8% of the respondents had a low level of knowledge, 32.8% had moderate knowledge, and 31.3% had a high level of knowledge regarding IVC. **Conclusions:** The study showed a low level of knowledge of IVC among nursing students; therefore, there should be an educational seminar to enhance the knowledge of nursing students regarding IVC.

INTRODUCTION

Intravenous Cannulation (IVC) is one of the most widely used and basic procedures carried out in health care settings, with an estimated 60% of patients requiring an IVC during their stay in hospitals [1]. IVC is an invasive procedure that carries the risk of serious immediate or delayed consequences, such as phlebitis, thrombophlebitis, catheter embolism, hemorrhage, infection, and sepsis [2]. IVC is a technique in which a cannula is placed inside the vein to gain venous access for the sampling of blood as well as the administration of IV fluids, medication, and total parenteral nutrition, chemotherapy, and blood products [3]. The client's vein is approached with a needle to allow the insertion of a plastic catheter, which is known as an intravenous cannula. It is an

essential part of the nursing profession in all healthcare settings [4]. Nurses must have proper knowledge of all IV devices and starting of IV infusions. Also they should know about the prevention, management, and treatment of local and systematic complications caused by IVC. These side effects may occur due to insertion of IVC by inexperienced nursing staff [5]. Hence, medical personnel, especially nurses who often administer IVC in any hospital setting, need to possess knowledge of this procedure. Many complications, such as extravasation, infiltration, inflammation, blockage, phlebitis, thrombophlebitis, infection, sepsis, needle stick injuries, and discomfort over the cannula site, can result from improper use of this vascular access device [6]. A study conducted in Saidu



Group of Teaching Hospital, Swat, in 2023, about the nurses' knowledge and practice towards the care and management of intravenous cannulas showed that 77% of participants had strong knowledge of IVC [7]. Similarly, another study carried out in Chitwan Medical College Teaching Hospital, Nepal, showed that 84.72% of respondents were performing correct practices, despite the fact that only 82.47% of respondents had proper knowledge of IVC [8]. Similarly, according to a study conducted at the University Kebangsaan Malaysia Medical Centre; all 77 participating nurses conformed to standards, with 27.3% having a high understanding of PIVC insertion. In general, more knowledgeable nurses performed better during PIVC insertion [9]. Additionally, another study was done to assess nurses' knowledge, attitudes, and practice to prevent problems after cannulation. Nurses with professional degree have a good level of knowledge regarding IVC [10]. IVC is a common nursing procedure. An error or a suboptimal practice can lead to complications or adverse outcomes for a patient [11]. By assessing the nurse's knowledge, we can identify areas for improvement and promote targeted educational interventions to enhance the student nurse's knowledge regarding IVC. Therefore, this study aimed to evaluate the knowledge of nurses regarding intravenous cannulation at two different nursing institutes, Horizon and Suvastu School of Nursing, Karachi, Pakistan.

METHODS

A descriptive cross-sectional study was conducted from October to December 2023 at Horizon and Suvastu School of Nursing among post RN BS Nursing students working in different hospitals, in Karachi. The schools are registered with the Pakistan Nursing and Midwifery Council, Islamabad, and affiliated with the Dow University of Health Sciences, Karachi. Sample size was calculated with the help of openepi.com version 3.9 with a 95% confidence interval on a target population of 300 Post RN BS Nursing students. The obtained sample size was 169. Permission was obtained from the principals of both of the schools, Horizon and Suvastu School of Nursing, for ethical considerations (Reference # HSNHS/2023/359 dated 8th September 2023). Data were collected online with Google Forms; a link was shared on whatsapp groups and questionnaires were filled out by 134 students; the response rate was 79%. Both junior and senior students of post-RN BSN who were willing to participate and had experience of more than 1 year were included in the study and those who were on leave were excluded. Data were collected through the purposive sampling technique with a valid and reliable structured questionnaire, adopted from a study conducted by Hassan et al., in 2022 in Malaysia [12]. The validity of the tool was already checked. The questionnaire has two sections. Section I is about

respondents' demographic characteristics, Section II is about knowledge of IVC, which was calculated by 22 questions with a dichotomous scale ("yes," "no"). Each question was given one mark and nurses who obtained above 70% considered a high level of knowledge, score between 50-70 % moderate and below 50% a low level of knowledge regarding IVC. SPSS software version 26.0 was used for data analysis, frequencies and percentages were computed for demographic and knowledge variables.

RESULTS

Table 1 showed that 33.6% of the students were in the age group between 21 and 25 years, 35.8% were between 26-30 years, 20.1% were between 31-35 years, and 10.4% were in the age group between 36-40 years. The study results also showed that 49.3% were male and 50.7% were female. Considering the year of education, the majority of the respondents were in their second year, constituting 73.1% of the sample, while first year students were 26.9%.

Table 1: Sociodemographic Characteristics of Nursing Students

Variables	Total (n =134) N (%)
Age	
21-25 Years	45 (33.6%)
26-30 Years	48 (35.8%)
31-35 Years	27 (20.2%)
36-40 Years	14 (10.4%)
Gender	
Male	66 (49.3%)
Female	68 (50.7%)
Year of Education	
1 st Year Students	36 (26.9%)
2 nd Year Students	98 (73.1%)

Table 2 showed the knowledge level of student nurses regarding IVC. 35.8 % of the respondents had a low level of knowledge, 32.9% had moderate knowledge, and 31.3% had a high level of knowledge about IVC.

Table 2: Nursing Students Level of Knowledge Regarding IVC

Variables	Total (n =134) N (%)
Low Level of Knowledge	48 (35.8%)
Moderate Level of Knowledge	44 (32.9%)
High Level of Knowledge	42 (31.3%)

DISCUSSION

The present study was aimed to assess the knowledge of IVC among student nurses at two different nursing institutions, Horizon and Suvastu School of Nursing, Karachi. The study findings showed that 35.8% of the students had a low level of knowledge regarding IVC, while only 31.3% had a high level of knowledge, which is lower than a study conducted in Osti et al., in 2019, which showed 82.47% of respondents had proper knowledge regarding IVC [13]. In the present study, almost half of the participants were female (50.7%) and mostly fell in the

26–30 year age group (35.8%), which is similar to a study conducted in Swat in 2023, which also showed that 58% were females and 48.9% were in age group between 20–30 years. To compare the knowledge level, their nurses had a higher level of knowledge (77%) as compared with the present study, which showed only 33.3% had a high level of knowledge, which is different from the present study [14]. Similarly, a study was conducted in Nepal, where most of the students (38.9%) were in their second year of generic BSN, which is different from the present study result, which showed that 73.1% were in their second year of academic year [15]. Additionally, according to another study that was conducted in North West Ethiopia, almost half of the respondents (54.7%) had good level of knowledge regarding IVC, which is also different from the present study, which showed only 33.3% of the respondents had good level of knowledge regarding IVC [16]. Similarly, the study findings were also compared with a study conducted in Kathmandu, in 2022, which showed that 55% interns of a teaching hospital in Kathmandu had knowledge about IVC which is higher than the present study [17]. The study results were also compared with developed country like Saudi Arabia. A descriptive cross-sectional study was conducted in Kufa in 2022, to evaluate the nurse's performance regarding IVC, the results showed poor performance of nurses regarding IVC. These findings are almost similar to the present study [18]. A study done in Al-Basrah Teaching Hospital, in 2021, showed that nurses had poor level of knowledge regarding IVC which is similar as compared to the present study [19]. Similarly, a study done in Karaoğlu et al., in 2022, found nurses good in experience and knowledge which is different as compared to the present study. [20]

CONCLUSIONS

The study revealed that majority of the nursing students (35.8%) had low level of knowledge regarding IVC. Therefore, there should be educational training programs to enhance the knowledge of nurses regarding IVC and prevent complications for patients.

Authors Contribution

Conceptualization: JK, SA

Methodology: MA, RM, AMJ, R.

Formal analysis: AQA

Writing, review and editing: AB, MH, MN

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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