DOI: https://doi.org/10.53350/pjmhs22168549

ORIGINAL ARTICLE

Evaluation of Nurses' Performance Regarding Intravenous Cannulation

BASHAR R. MOHAMMED ALI[1], IBRAHIM ALWAN AL-ASHOUR[1], MOHAMMED HAKIM SHAMRAN AL-HCHAIM[1], MOHAMMED ABDUALKAREEM ALJANABI[1], JINAN FADHEL KADUM[1]
[1]*Adults Nursing, Faculty of Nursing, University of Kufa.*
Correspondence to: Bashar R. Mohammed Ali , Email: bashar.rasheed@uokufa.edu.iq

ABSTRACT
Objective: aimed to evaluate nurses' performance regarding intravenous cannulation**.**
Methodology: In order to attain the initial stated purpose, descriptive research was conducted for the current study. The research was conducted between February 20 and March 21, 2018. The research was conducted at AL-Najaf City/AL-Najaf AL-Ashraf Health Center Directorate / AL-Sader Medical City & AL-Zahra Teaching Hospital. A non-probability (accidental sample) of (100) male and female nurses working at AL-Sader Medical City and AL-Zahra Teaching Hospital with at least one year of experience. Before assigning them to the research, we received their permission. A tool for assessing the intravenous cannulation skills of nurses was used. The data were collected using the observational checklist approach of the designed questionnaire, which was observed three times using the English version of the questionnaire, and the researchers conducted interviews in the same manner. Validity of the study instrument is conducted through a panel of experts with years of experience in the nursing field. The information was analyzed using inferential statistics, which included the mean of scores, as well as descriptive statistical analysis techniques, which included frequency, percentage, and cumulative percentage. Results: According to the research, al-Sader Medical City and Al-Zahraa Teaching Hospitals in Najaf have poor or insufficient intravenous cannulation nursing abilities. In the two hospitals, it was discovered that, respectively, 94% and 82% of the nursing staff were poor. Conclusion: The research found that most nurses utilize inadequate IV cannulation techniques. The study recommendation advises nurses to join in training sessions to develop their abilities in IV cannulation.
Keywords: Evaluation, Nurses' Performance, Intravenous Cannulation.

INTRODUCTION
The act of inserting a vascular access device (VAD) into a peripheral vein is known as peripheral venous cannulation [(1).] A flexible tube with an introducer inside called a cannula may be placed into a blood artery [(2, 3)]. and are often positioned in the lower arms' lateral veins. They may be injected into the foot's veins on occasion, but they shouldn't be done too often owing to the elevated danger of thrombophlebitis [(1, 4)]. If foot veins are utilized, the cannula has to be repositioned as quickly as feasible [(5)]. An estimated 70% of all patients are expected to have a cannula implanted during their stay [(6)]. The principles of care for the device remain the same despite the wide variety of VADs that are available to accommodate the type of therapy being provided and the patient's quality of life needs: to prevent infection, to maintain a "closed" intravenous system with few connections to reduce the risk of contamination, to maintain a patent device, to prevent damage to the device & associated intravenous equipment [(7)].

An aseptic, no-touch method must be used while inserting a cannula [(8)]. To lessen the danger of cross-infection to the patient, thorough hand washing in accordance with the hand hygiene policy must be carried out. Standard safety measures and the Nottingham University Hospitals glove selection guideline should be followed while using gloves [(8).] Each piece of disposable equipment should only be used once and disposed of in line with local regulations [(1, 9)].

Use a non-touch aseptic method to set up the equipment on the process tray [(10)]. Applying a tourniquet to the selected limb will promote venous dilatation, which will make it easier to insert a cannula and reduce the risk of infection transfer [(11)]. allows for more flexibility and control over the amount of pressure used while restraining the limb. This also makes it possible to check the eligibility of a vein for cannulation by softly palpating the chosen vein. Palpation reduces the danger of unintentional artery, nerve, or tendon puncture. To limit the chance of infection, thoroughly wipe the spot with an alcohol swab and then allow it to air dry for at least one minute. Wear disposable gloves in accordance with the "glove selection guideline" [(8)].

Inspect for evidence of deterioration . check expiration date of cannula. Remove the cannula cover and. Loosen the introducer from the cannula. Do not entirely remove introducer to limit the danger of cross infection and to avoid inadvertent harm to the skin or vein. As part of the 'working in new ways' program, the cannulation technique may be carried out by a practitioner who can show appropriate theoretical knowledge and who has been evaluated as competent using a cannulation package [(12)].

Peripheral intravenous catheter insertions, one of the most frequent operations done on hospitalized patients, put them at risk for infections and noninfectious consequences. On the basis of the severity of symptoms, peripheral intravenous catheter problems are categorized as mild or serious. Minor concerns include catheter occlusions, inadvertent catheter removals, needle anxiety, and soreness. On the other side, major consequences are often more severe, including phlebitis, infection, and even skin damage.

METHODOLOGY
Design of the Study: Descriptive study was carried out through the present study in order to achieve the early stated objective. The period of the study was from February. 20th , to March. 21st , 2018. The study was carried out in AL-Najaf City/AL-Najaf AL-Ashraf Health Directorate / AL-Sader Medical City & AL-Zahra Teaching Hospital.
The Sample of the Study: Anon-probability (accidental sample) of (100) males &females nurses who working in AL-Sader Medical City & AL-Zahra Teaching Hospital ,that they have at least a year of experience .we took their consent before starting assigned for the study.
The Study Instrument: An evaluation tool used to evaluate nurses' performance toward intravenous cannulation. The questionnaires was constructed and composed of two parts. Part 1: socio-Demographic characteristics consisted of (8) items, including (Hospital, Workplace, age, gender, educational level, years of experience, training courses, and training sessions). Part II. Observational checklist technique from National Clinical Policy and Procedural Guideline for Nurses and Midwives undertaking Peripheral Cannulation in Adults consisted of (5) domains including (Introduction, Preparation, Cannulation, Flushing the cannula, To complete the procedure).
Data Collection: The data were collected through the use of the observational checklist technique of the developed questionnaire, which was observed (3) times by using the English version of the questionnaire.
Validity of the instrument: The content validity of the study instrument is conducted through a panel of experts who have years of experience in the nursing field.

RESULTS

Table 1: Study Subjects Socio-Demographic Data:

Demographic data	Rating and intervals	AL-Sader		Al-Zahra	
		Freq.	%	Freq.	%
Age / years	20-24	13	26	9	18
	25- 29	13	26	10	20
	30- 34	8	16	8	16
	35- 39	12	24	12	24
	40 and more	4	8	11	22
Gender	Male	28	56	24	48
	Female	22	44	26	52
Levels of education	Nursing school graduate	16	32	19	38
	Institute	28	56	27	54
	Graduate	6	12	4	8
Years of experience	1-3	20	40	12	24
	4- 6	8	16	8	16
	7 and more	22	44	30	60
Training courses	No training courses	3	6	0	0
	1- 5	33	66	22	44
	6- 10	9	18	15	30
	11 and more	5	10	13	26
Training sessions	No training sessions	19	38	11	22
	1- 5	22	44	26	52
	6- 10	6	12	11	22
	11 and more	3	6	2	4

Table 1 shows the highest percent of study subjects are equally disturbed between the age group 20-25 and 25-29 years old in Al-Sader medical city, while in Al-Zahra hospital, study subjects high percent are between 35-39 years old. Regarding the gender of study subjects in Al-Sader medical city, 56% are male, while in Al-Zahra hospital, 52% are female. Level of education 56% of study subjects in Al-Sader medical city possess on the diploma (institutes) while in Al-Zahra hospital 54% are possess on the diploma (institutes) due small number college of Nursing and lack of its graduates. Years of experience in Al-Zahra hospital 60% of study subjects have more than 7 years of experience, while in Al-Sader medical city 44% have more than 7 years of experience. Regarding Training courses, the study subjective has 1-5 training courses in both Al-Sader medical city and Al-Zahra hospital 66%-44% respectively. All study items regarding intravenous cannulation show poor skills among Al-Sader and Al-Zahra nursing staff.

Table 2: Evaluation of Study Subjects Practices:

Items	Al-Sader		Al-Zahra	
	M.S	Evalu.	M.S	Evalu.
Introduction				
1. Washes hands.	1.1	Good	1.36	Good
2. Introduce himself.	1.14	Good	1.08	Good
3. Explains procedure.	1.06	Good	1.02	Good
4. Gains consent .	2.94	Poor	1.26	Good
Preparation				
5. Gathers equipment.	2.96	Poor	2.94	Poor
6. Applies tourniquet.	3	Poor	2.96	Poor
7. Palpates a vein.	2.94	Poor	2.8	Poor
8. Dons gloves.	1.34	Good	1.64	Poor
9. Cleans area.	1.96	Fair	2.52	Poor
10. Prepares cannula.	2.94	Poor	2.92	Poor
Cannulation				
11. Unsheathes needle .	2.96	Poor	2.66	Poor
12. Anchors vein.	2.86	Poor	2.96	Poor
13. Warns patient of a sharp scratch.	1.76	Poor	2.14	Fair
14. Inserts cannula at 20-40 degrees.	2.88	Poor	2.96	Poor
15. Observes for flashback.	2.9	Poor	3.0	Poor
16. Withdraws needle slightly.	2.82	Poor	3.0	Poor
17. Advances cannula fully into the vein.	2.88	Poor	2.98	Poor
18. Removes tourniquet.	2.86	Poor	2.86	Poor
19. Places gauze underneath cannula.	1.22	Good	1.34	Good
20. Apply pressure to the vein proximal to the cannula.	2.88	Poor	2.74	Poor
21. Removes needle.	2.9	Poor	3.0	Poor
22. Discards immediately into sharps bin.	2.36	Poor	2.44	Poor
23. Replaces cannula cap.	2.88	Poor	2.98	Poor
24. Secures cannula wings with tape.	2.88	Poor	2.94	Poor
Flushing the cannula				
25. Draw up 10ml of NaCl 0.9%.	1.68	Poor	1.24	Good
26. Attaches syringe to cannula port & asks patient to report any discomfort.	1.44	Good	1.16	Good
27. Flushes the cannula.	1.74	Poor	1.3	Good
28. Applies dressing to the cannula.	2.84	Poor	1.38	Good
29. Disposes of clinical waste.	2.82	Poor	2.94	Poor
30. Return equipment to utility room.	2.96	Poor	2.94	Poor
To complete the procedure				
31. Keep patient safe.	2.64	Poor	2.82	Poor
32. Thanks patient.	1.04	Good	1.24	Good
33. Washes hands.	1.08	Good	1.26	Good

Good (mean of scores less than 1.5), poor (mean of scores equal or more than 1.5).

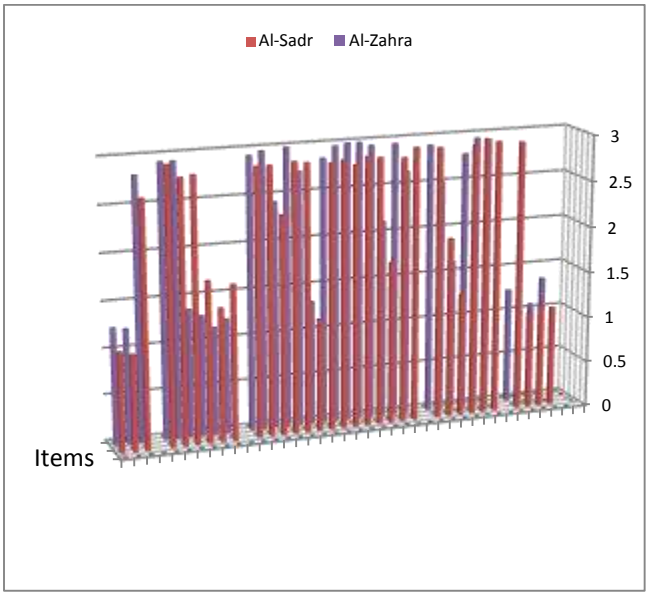

Fig. 1: Evaluation of Nurses Practice according to Mean of Score

Good (mean of scores less than 1.5), poor (mean of scores equal or more than 1.5).

Table 3: Overall Evaluation of Study Subjects Practices

	Hospitals	Rating	Frequency	Percent	M.S	Evaluation
Overall Evaluation	Al-Zahra	Good	3	6	2.32	Poor
		Poor	47	94		
		Total	50	100		
	Al-Sader	Good	9	18	2.26	Poor
		Poor	41	82		
		Total	50	100		
		Total	50	100		

Good (mean of scores less than 1.5), poor (mean of scores equal or more than 1.5)

Table 3: Overall all evaluation of study subject practices shows poor practices among nursing staff in both Al-Sader and Al-Zahra hospitals.

Table 4: Mean Difference Between Al-Sader and Al-Zahra Hospitals Nurses' Practices:

Hospitals	M.S	t-value	d.f.	p-value
Al-Sader	2.32	0.080	98	0.936 NS
Al-Zahra	2.26			

Table 4 shows no significant different between Al-Sader and Al-Zahra hospital nurses practices.

DISCUSSION

The study revealed that the nursing skills of intravenous cannulation were poor or inadequate between Al-Sader medical city and Al-Zahraa teaching hospitals in Najaf. It was found that 94% and 82% of nursing staff were poor in the two hospitals respectively. This finding represented the currently available nursing staff in spite of their participation in a well-prepared training course for more than six times a part in both hospitals.

Overall Evaluation of study subjects' practices revealed poor scoring in both hospitals when considering a cut of point of 1.5 . These poor scores of evaluation in greatly different from nursing skills in intravenous cannulation that were reported in some developing countries and the middle east region (Hossain AM 2016).

The participating nurses in the current study were statistically not different in socio-demographic characteristics except in the training courses of intravenous cannulation between the two comparable hospitals.

Kaur. In their cross-sectional study in Bangladesh, et al (2016) described that the majority of 49.7 % of the nurse had a good knowledge level, 25.5% had average knowledge, 21.7% revealed excellent knowledge, and 3.1% only had poor knowledge. About 53.8 % had found a poor knowledge level, followed by 39.3% had average knowledge and 5.9% at Good knowledge, whereas only 1.0% had excellent knowledge regarding indication and contraindication on IV cannulation.

The nurses who are able to do nursing plan and carry out nursing care with knowledge, skill, and confidence are representative of their specialty. Nurses practice within a changing and evolving health care environment and therefore, they are required to develop their knowledge, skill and attitude. As no study was done before in Najaf locality, this study created new knowledge to scientific community.

The inappropriate procedure of IV cannulation was detected among nurses of both Al-Sader medical city and Al-Zahraa teaching hospitals in AL-Najaf in spite of frequent training courses which required more updating and effective nursing education programs that have to be conducted at higher level of education under supervision of expert nursing personnel at hospitals and nursing institutions. The optimize best site for appropriate treatment requires the selection of vein may be a deciding factor in the success and preservation of, veins for subsequent treatment to minimize pain of insertion. (Dougherty and Lister, 2011).

The nurses in this study have to practice that the intravenous (IV) cannula offers direct access to a patient's vascular system and provides a potential risk for entry of infectious agents into that system. The contamination with organisms can cause serious infection if they are allowed to enter and proliferate in the IV cannula, insertion site, or intravenous fluid (Gibbons, et al., 2010).

The investigated sample of nurses experienced an infiltration or tissuing, which occurs when the infusion (fluid) leaks into the surrounding tissue. So it is important for them to detect early as tissue necrosis and to train well to re-site cannula immediately.

Extravasation is noticed frequently in IV cannulation in the local hospitals in which accidental administration of IV drugs into the surrounding tissue because the needle has punctured the vein and the infusion goes directly into the local tissue.

The failure of a nurse to do appropriate procedures in both hospitals of the study will expose the patient to leakage of high osmolarity solutions, or chemotherapy agents can result in significant tissue destruction, and significant complications (National Hospitals Office, 2011).

The poor frequency and scoring in practicing appropriate IV cannulation in the study hospitals reflecting poor nursing, which is disagreed with the improved nursing practice in most of developing countries which necessitates a reformed and more developed nursing programs in this country. The nurse failed to observe patient’s reaction to cannula being flushed.

Frequent observation by the nurse is necessary that made of the IV site for erythema, induration, or tenderness or pain require immediate removal of the cannula. It is a guide to clean the needle-free bung with an alcohol swab and allow to dry for 30 seconds, then re-connect IV tubing to the needle-free system. The nurses should document the procedure in the appropriate patient record (Mac Gregor and Stanley K, 2008)

The results of the current study explored the serious poor practice in this nursing procedure which professionally affect client stay at the hospital and influences risk of nosocomial infection. Nursing of IV cannulation was found poor in the current study in Al-Zahra teaching hospital which necessitates more training From time to time children are sent home with a peripheral cannula in situ. This decision is made by the multidisciplinary team involved in the children's care. It is essential in this situation that parents are competent in the management of the peripheral cannula. The consultant responsible for child care must agree that sending a child home with a peripheral cannula is reasonable. The parent is educated in the care of the cannula at home. The cannula was found not flushed prior to discharge home. And the nurse did not cover with an appropriate cover .No nurse gave a sterile dressing to the parent/guardian in the event that the cannula dislodges or falls.

Some studies in developing courtiers verified that about half of the nurses had good knowledge. Therefore there is high scope to upgrade rest half of the respondents to get qualified service from such nurses, which was not consistent with the current study in AL-Najaf. But these studies revealed that more than half of the nurses had poor knowledge about the indications and contraindications of IV cannulation. In a study conducted to assess the knowledge of graduate nurses verified that one-third of the samples experienced poor knowledge of IV cannulation, 42% of them did not care about applying aseptic techniques, 25% of them practiced cannulation well but did not know the complication of the peripheral venous cannulation (Hugenetal, 2007). Another study was conducted to compare the knowledge of IV cannulation among graduates and undergraduate nurses.

CONCLUSIONS

According to the result of the present study, the study concludes that: Most nurses have poor IV cannulation practices.

Recommendations: Base on the result of the present study, the study recommends are following:

1. The nurses should be encouraged to be enrolled in training sessions to improve their skills toward I.V. cannulation.
2. A blended learning program, which included a combination of online and simulation-based instruction, significantly improved nurses' knowledge, confidence, and skills in the IV insertion process in a simulated environment.
3. It is believed that the dissemination of these findings may contribute to the development of permanent education strategies and training courses, considering that professionals with scientific knowledge are necessary to promote patient safety and healthcare quality.
4. Further studies should be conducted with a larger sample (national level).

REFERENCES

1- Abolfotouh, M. A., Salam, M., Bani-Mustafa, A. A., White, D., & Balkhy, H. H. (2014). Prospective study of incidence and predictors of peripheral intravenous catheter-induced complications. Therapeutics and clinical risk management, 10, 993.

2- Anderson, K., & Anderson, L. E. (1995). Mosby's pocket dictionary of nursing, medicine and professions allied to medicine. Mosby..

3- Shue, M. J., Shue, P., & Huang, D. (2005). U.S. Patent No. 6,921,386. Washington, DC: U.S. Patent and Trademark Office.

4- Kayashima, K., Uezono, S., & Andropoulos, D. B. (2015). Vascular access and monitoring. Anesthesia for Congenital Heart Disease, 199.

5- Phillips, S., Collins, M., & Dougherty, L. (Eds.). (2011). Venepuncture and cannulation. John Wiley & Sons.
6- Rivera, A. M., Strauss, K. W., Van Zundert, A. A. J., & Mortier, E. P. (2006). Matching the peripheral intravenous catheter to the individual patient. Acta Anæsthesiologica Belgica, 58(1), 19.
7- Dougherty, L., & Lister, S. (2011). The royal marsden hospital manual of clinical nursing procedures. Australian Nursing and Midwifery Journal, 12(8), 29.
8- Furtado, L. C. D. R. (2011). Incidence and predisposing factors of phlebitis in a surgery department. British Journal of Nursing, 20(Sup7), S16-S25.
9- Al-Asmari, A. M., & Nooh, R. (2017). Hand Hygiene Practices at Mina Hospitals' Emergency Departments During Hajj Season 2012, Saudi Arabia. Journal of US-China Public Administration, 14(1), 1-15.
10- Loveday, H. P., Wilson, J., Pratt, R. J., Golsorkhi, M., Tingle, A., Bak, A., ... & Wilcox, M. (2014). epic3: national evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. Journal of Hospital Infection, 86, S1-S70.
11- Scales, K. (2008). Intravenous therapy: a guide to good practice. British Journal of Nursing, 17(Sup8), S4-S12.
12- Scales, K. (2008). Intravenous therapy: a guide to good practice. British Journal of Nursing, 17(Sup8), S4-S12.
13- Hossain, A., Arif, I. H., & Haque, M. (2016). Assessment of the Level of Knowledge and Practice on Intravenous Cannulization among Staff Nurses of Selected Tertiary Care Hospital in Dhaka City. MOJ Public Health, 4(5), 1-5.
14- Kaur, S., Kaur, N., Kaur, R., Kaur, R., & Kaur, R. (2017). 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. International Journal of Health Sciences & Research Vol.7; Issue: 12; 151-157.
15- Gibbons, N., Lunny, L., Harrison, P., & O'Neill, G. (2010). Roscommon child care case: Report of the Inquiry Team to the Health Service Executive. Dublin, Ireland: Health Services Executive.
16- National Hospitals Office, 2011.
17- Mac Gregor, Stanley K (2008) Comparitive study of skills of peripheral Cannulation among graduates and under graduates. Infection control Journal 20: 54-58.
18- Hugenetal (2007) Knowledge of undergraduate nurses on peripheral .