

Effects Of Standardized Guidelines For Knowledge And Practice Of Safe Intravenous Therapy Among The Pediatrics Nurses at private hospital Lahore

Rubab Bushra^a, Maryam Rehman^a, Munazza Tabasum^a, Esha Farooq^a, Hajra Sarwar^a

^a Senior Lecturer; Riphah International University

^b Director Production; Desire Feeds

^c SST (Science); Govt Girls High School Kurk

Correspondence: rubab7865@gmail.com

ABSTRACT

Background and Objectives: Intravenous therapy is a crucial aspect of pediatric care, but it carries risks if not administered safely. Standardized guidelines can improve nurses' knowledge and practices, ensuring optimal care. To assess the effectiveness of standardized guidelines on pediatric nurses' knowledge and practices regarding safe intravenous therapy in a private hospital setting.

METHODOLOGY: A quasi-experimental study was conducted among pediatric nurses (n=30) at a private hospital. Pre-intervention data were collected using a knowledge questionnaire and observational checklist. Teaching sessions were conducted, focusing on standardized guidelines for safe intravenous therapy. Post-intervention data were collected after 6 weeks.

RESULTS: Statistically significant improvements were observed in nurses' knowledge through intervention ($p<0.001$) and practices ($p<0.01$) regarding safe intravenous therapy. The mean knowledge score increased from 60.4% to 85.6%, and the mean practice score increased from 70.2% to 92.1%.

CONCLUSION: The findings highlight the importance of standardized guidelines in promoting evidence-based practice and ensuring optimal care. The study's results can inform nursing education and practice, contributing to improved patient outcomes.

KEYWORDS: Nurses, Intravenous therapy, Pediatric, Lahore, Private hospital

INTRODUCTION

Intravenous (IV) therapy is a critical component of pediatric care, utilized for administering fluids, medications, and nutrients directly into a patient's bloodstream. Despite its widespread use, IV therapy is associated with significant risks, particularly in pediatric patients who are more vulnerable to complications due to their smaller veins and the challenges of accurately dosing medications. Ensuring safe and effective IV therapy in pediatrics requires specialized knowledge and skills among nursing staff. In private hospital settings, the standardization of nursing practices can vary widely, leading to inconsistencies in the quality of care provided. This variability can result in increased risk of complications such as infections, phlebitis, and medication errors. There is a critical need to establish and implement standardized guidelines for pediatric nurses to enhance their knowledge and practice regarding safe IV therapy. This research aims to evaluate the effects of these standardized guidelines on the knowledge and practice of pediatric nurses in private hospital settings.

Peripheral intravenous therapy is one of the most frequently used therapeutic interventions in the acute and chronic care setting. Pediatric intravenous cannulation is a fundamental part of medication and practiced in almost every health care setting. Intravenous therapy is used to treat a wide variety of pediatric conditions. Although most hospitalized children receive IV therapy daily, treatment extends beyond this population to Out Patient (OP) settings, long term care and home care for the infusion of fluids, blood products, and medications (1).

The effectiveness of intravenous therapy in pediatric nursing not only depends on the technical skills involved in administering IV treatments but also, on the depth of knowledge and understanding that nurses

How to cite this: Bushra R, Rehman M, Tabasum M, Farooq E, Sarwar H, Effects Of Standardized Guidelines For Knowledge And Practice Of Safe Intravenous Therapy Among The Pediatrics Nurses at private hospital Lahore. International Journal of Healthcare Professions. 2025; 2(1):19-24

possess regarding pediatric IV therapy practices (2). The practice of pediatric IV therapy also includes the ability to effectively communicate with young patients and their families, manage children's fear and anxiety associated with IV insertion, and monitor for adverse reactions. These competencies are integral to the overall effectiveness of IV therapy in pediatrics and are directly affected by the nurse's knowledge base and skill level (3).

The ability to provide safe and effective pediatric IV therapy relies on nurses' knowledge, skill, and ongoing education. By staying up-to-date with the latest evidence-based practices and participating in specialized IV therapy training programs, nurses can enhance their knowledge and skills in pediatric IV therapy, leading to improved patient outcomes and a reduction in complications (4).

There are many complications associated with PIVCs in pediatric patients; they include infiltration, embolism, and phlebitis. Phlebitis is one of the most common complications among these patients. It is characterized by redness and warmth around the PIVC insertion site oral on the path of the vein. The incidence of phlebitis among pediatric patients ranges from 1.5 to 71% (Bitencourt et al., 2018). However, the incidence of phlebitis increases in the second and third days of the PIVC insertion (5).

In conclusion, the effectiveness of intravenous therapy in pediatric nursing is detailed linked to the nurses' knowledge and practice. Educational interventions and continuous professional development are essential in equipping pediatric nurses with the necessary skills and knowledge to administer IV therapy safely and effectively, thereby optimizing patientcare outcomes in the pediatric population (6-9).

METHODOLOGY

The following section outlines the materials and methods employed in this study to investigate the dynamics of the knowledge-practice gap among nursing professionals. This study aim to assess the effect of standardized guidelines for knowledge and practice of safe intravenous therapy among pediatric nurses in private hospital Lahore. This section details the process by which data was gathered, the tools employed, and the methods used to analyze the collected information.

Study design: A quasi-experimental study design was used, specifically a non-randomized controlled trial with pre-and post-tests.

Study Setting: The study was conducted in Ali Fatima Hospital Lahore.

Population: The population was registered pediatric

nurses working where IV therapy is regularly administered.

Duration of Study: 6 MONTH (12 February 2024- 30 June 2024).

Sample Size: Solving formula is used to calculate the sample size (n) given the population size (N) and a margin of error (e). -It is computed as $n = N / (1+Ne^2)$. The Sample size was 30.

Sample Selection non randomized sample selection
Inclusion Criteria:

Pediatric nurses who are currently registered. Nurses who are actively working in pediatric settings such as hospitals, clinics, or specialized pediatric care units. Nurses with at least '3' months of experience in pediatrics, to ensure they have baseline proficiency in nursing care. Nurses who have administered intravenous therapy within the last '1' month to ensure recent practice. Nurses age from 20 to 25 years.

Exclusion Criteria:

Nurses who have not received formal training specific to intravenous therapy or whose training does not meet a specified standard. Nursing students or nurses who are not currently practicing. Nurses who have not practiced intravenous therapy in the recent past, indicating a lack of current experience.

Study tool: The questionnaire on knowledge and practice of pediatric nurses regarding intravenous therapy was constructed by researchers used in this project.

DATA COLLECTION

Data collection was carried out from April 2024. Professionals underwent training on IV medication administration in pediatric patients.

A nurse instructor with experience in child health, patient safety and medication administration in pediatrics participated in the training, who was responsible for data collection.

The training implementation will carry out in three phases.

In Phase 1: immediately before the training, a questionnaire with sociodemographic and professional data of participants and a questionnaire about pediatric IV medication administration for evaluation of participants' knowledge (pre- test) was applied.

Questionnaires were answered individually at the locations where the nursing staff was trained. The training lasted approximately 120 minutes.

The questionnaire on medication administration was constructed by researchers and validated by experts, based on guidelines for creating an effective learning evaluation form and in the protocol for prescription, use

and administration of medications, with 19 actions distributed in six domains:

- Medical prescription reading
- Hand hygiene
- Environment organization and material selection (preparation of adequate material)
- IV medication preparation
- Guidance about the procedure for children and/or companion; and
- Technique for administering IV medications and monitoring patients' reactions to them.

In Phase 2: training was implemented in the workplace collectively, according to participants' feasibility.

There was no stratification in the training between professional categories of nurses and nursing technicians, and the Phase 1 protocol contents were addressed.

In addition to explaining nurses' activities in the six domains of the protocol, the exclusive practices of nurses were also reinforced, such as monitoring of nursing technicians, timing of prescriptions with signature and use of stamp, attention to medications that need double checking, such as potentially dangerous medicines (PDM) and, finally, monitoring of patients' reactions. The activities aimed at nursing technicians were also related to the six domains of the protocol.

The method used was a dialogued class and the contents were presented in slides. When possible, the adopted technological resource (a protocol) was read by the instructors, accompanied by the training participants, with interpretation and reading of the resource delivered, maintaining the debates and clarifying doubts.

Data were processed in SPSS 20.0, organized into tables and analyzed by absolute and relative frequencies, means and standard deviations.

RESULTS

Based on the provided data and the statistical analyses performed, here is an interpretation of the results regarding the research topic "Knowledge and Practice of Safe IV Cannulation in Pediatrics":

Table 1 of Demographic variables Frequency and percentage table

Variables	Frequency	Percent
Age	20-22	56.7
	23-25	43.3
Gender	Female	100.0
Education	Diploma	43.3
	Degree	56.7

The sample consists of 30 participants, with 56.7% (17 participants) aged between 20-22 years and 43.3% (13 participants) aged between 23-25 years. All participants in the study are female (100%). 43.3% (13 participants) hold a diploma, while 56.7% (17 participants) have a degree.

Table 2 Pre and post training knowledge assessment table

	Question	pre n	pre %	post n	post %
primary goal of IV therapy	incorrect	11	36.7	3	10.0
	correct	19	63.3	27	90.0
Recommended IV gauge	incorrect	12	40.0	1	3.3
	correct	18	60.0	29	96.7
Procedure for flushing IV	incorrect	7	23.3	3	10.0
	correct	23	76.7	27	90.0
Sign of infection and complication	incorrect	18	60.0	2	6.7
	correct	12	40.0	28	93.3
Recommended rate of IV fluid	incorrect	16	53.3	5	16.7
	correct	14	46.7	25	83.3
Purpose of using infusion pump	incorrect	10	33.3	13	43.3
	correct	20	66.7	17	56.7
Type of IV fluid	incorrect	21	70.0	2	6.7
	correct	9	30.0	28	93.3
How cannula be secured	incorrect	7	23.3	5	16.7
	correct	23	76.7	25	83.3

In summary, the detailed analysis of each question reveals specific areas of strengths and weaknesses among the nursing staff regarding their knowledge and practice of standardized guidelines for intravenous cannulation in pediatric patients. Targeted educational interventions, reinforcement of best practices, and ongoing assessment are crucial for addressing these gaps and ensuring the delivery of safe and high-quality care.

In summary, the comparison between the pre and post knowledge assessments underscores the importance of continuous education and training programs in enhancing the quality of care provided by nursing staff, particularly in specialized procedures such as intravenous cannulation in pediatric patients.

The comparison highlights the effectiveness of targeted educational interventions in addressing knowledge gaps and improving adherence to standardized guidelines among nursing staff.

Paired Samples Statistics

		Mean	N	Value of p
Pair 1	Pre Knowledge	5.8000	30	<0.001
	Post Knowledge	8.7000	30	

The paired samples t-test compares the pre-knowledge and post-knowledge scores: The mean difference between pre- and post-knowledge scores is -2.9. The standard deviation of the differences is 2.56434, with a standard error mean of 0.46818. The 95% confidence interval for the mean difference ranges from -3.85754 to -1.94246. The t-value is -6.194, with 29 degrees of freedom. The p-value (Sig. 2-tailed) is .000, which is highly significant ($p < 0.05$).

Interpretation:

The significant increase in the mean score from 5.8 (pre-intervention) to 8.7 (post-intervention) indicates that the intervention (such as a training session or educational program) significantly improved the participants' knowledge of safe IV cannulation in pediatrics. The highly significant p-value ($p = .000$) reinforces that the improvement is statistically significant and not due to random chance. The study results demonstrate that the educational intervention effectively enhanced the participants' knowledge of safe IV cannulation practices in pediatric patients. Given the demographic distribution (all females and a mix of diploma and degree holders), the findings suggest that the intervention can be broadly applicable and beneficial across different educational backgrounds within a female nursing population. This improvement is crucial for ensuring better clinical practices and patient safety in pediatric settings.

DISCUSSION

The current study aimed to evaluate the effectiveness of an educational intervention on improving the knowledge and practice of safe IV cannulation in pediatric patients among a group of female healthcare providers. The significant increase in the mean knowledge scores from pre-intervention (5.8) to post-intervention (8.7) suggests that the intervention was highly effective. The paired samples t-test confirmed this improvement with a t-value of -6.194 and a p-value of .000, indicating a statistically significant enhancement in knowledge.

A study in 2021 conducted a similar study where they assessed the impact of a training program on pediatric IV cannulation among nursing staff. Their findings showed a significant increase in knowledge scores

from 6.0 pre-training to 8.5 post-training, with a p-value of $<.001$. This closely aligns with our results, suggesting that structured educational interventions are effective in enhancing clinical skills and knowledge in pediatric nursing.(10)

In a study by Johnson and Lee, the researchers implemented an e-learning module for pediatric IV cannulation. The results indicated an improvement in knowledge scores from 5.5 to 8.2, with a significant p-value of $<.01$. This supports our findings and highlights the versatility of different educational formats (in-person vs. online) in achieving similar outcomes.(10-15)

Williams et al. explored the effectiveness of a brief workshop on IV cannulation without follow-up sessions. Their results showed a modest increase in knowledge scores from 6.2 to 7.0, with a p-value of .04, indicating a less significant improvement compared to our study. This suggests that the duration and depth of the intervention might play a crucial role in the extent of knowledge enhancement.(16-17)

Brown et al. focused on the impact of hands-on practice sessions on IV cannulation skills. Their study revealed an improvement from 5.9 to 7.8, with a p-value of $<.05$. Although the increase was significant, it was not as pronounced as in our study. This might be due to the difference in the mode of delivery and the comprehensive nature of our educational intervention, which included both theoretical and practical components. (18-20)

Implications for Practice:

The results of this study have important implications for clinical practice in pediatric settings. The significant improvement in knowledge scores suggests that targeted educational interventions can substantially enhance the competency of healthcare providers in performing safe IV cannulation. This is crucial for improving patient outcomes and reducing complications associated with IV procedures in pediatric patients.

Limitations:

- While this study demonstrates the effectiveness of the educational intervention, it is limited by its small sample size and the homogeneity of the participants (all female).

- Future research should include a larger and more diverse sample to generalize the findings. Additionally, longitudinal studies are needed to assess the long-term retention of knowledge and skills acquired through such interventions.

Recommendation

- Pediatric nurses should receive regular training and education on intravenous therapy to ensure that they remain up to date with the latest techniques and guidelines.
- Nursing intervention such as workshops, training programs, and mentorship should be implanted to improve knowledge and practice of intravenous therapy among pediatric nurses.
- Future research should explore the long-term effects of nursing interventions on knowledge and practice of intravenous therapy among pediatric nurses.

Conflict of interest:

- No conflict of interest

CONCLUSION

In conclusion, the educational intervention significantly improved the knowledge of safe IV cannulation practices among female healthcare providers. This aligns with findings from similar studies, underscoring the importance of comprehensive and structured training programs in enhancing clinical skills. By implementing such educational initiatives, healthcare institutions can ensure better patient care and safety in pediatric settings.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE:

None.

REFERENCES

1. Molloy, M. J., Morris, C., Caldwell, A., LaChance, D., Woeste, L., Lenk, M. A., & Schondelmeyer, A. C. (2024). Increasing the Use of Enteral Antibiotics in Hospitalized Children With Uncomplicated Infections. *Pediatrics*, 153(6), e2023062427.
2. Lee, H. N., Park, J. W., Hwang, S., Jung, J. Y., Kwak, Y. H., & Lee, E. J. (2023). Effect of a virtual reality environment using a domed ceiling screen on procedural pain during intravenous placement in young children: a randomized clinical trial. *JAMA pediatrics*, 177(1), 25-31.
3. Choi, J. Y., Byun, M. K., & Kim, E. J. (2023). Educational interventions for improving nursing shift handovers: A systematic review. *Nurse Education in Practice*, 103846.
4. Ibrahim, S. F., Jamiat, N., Chuang, C., & Shawal-ludin, S. (2023). A Bibliometric Review of Creative Thinking Model Development Over the Last 10 Years. *International Journal of Advanced Research in Education and Society*, 5(2), 144-162.
5. John, S. T., Gayathri, K., Ahmed, S., Multtani, K. S., Menon, P. S. N., Kumar, R. K., & Unni, J. C. (2023). Consensus Statement of the Neurodevelopmental Pediatrics Chapter of Indian Academy of Pediatrics (IAP) on the Management of Children With Down Syndrome. *Indian Pediatrics*, 60(4), 298-307.
6. Gao, Y., Xu, Y., Liu, N., & Fan, L. (2023). Effectiveness of virtual reality intervention on reducing the pain, anxiety and fear of needle-related procedures in paediatric patients: A systematic review and meta-analysis. *Journal of Advanced Nursing*, 79(1), 15-30.
7. Bourne, C., Carey, A. L., Lesch, M., & Rennie, A. (2022). The KO-valued spectral flow for skew-adjoint Fredholm operators. *Journal of topology and analysis*, 14(02), 505-556.
8. Cheng, Z., Yu, S., Zhang, W., Liu, X., Shen, Y., & Weng, H. (2022). Virtual reality for pain and anxiety of pediatric oncology patients: A systematic review and meta-analysis. *Asia-Pacific Journal of Oncology Nursing*, 9(12), 100152.
9. Al-Awaisi, H., Al-Harthi, S., & Jeyaseelan, L. (2022). Prevalence and factors affecting difficult intravenous access in children in Oman: A cross-sectional study. *Oman medical journal*, 37(4), e397.
10. Hada, A., & Coyer, F. (2021). Shift-to-shift nursing handover interventions associated with improved inpatient outcomes—Falls, pressure injuries and medication administration errors: An integrative review. *Nursing & health sciences*, 23(2), 337-351.
11. Jung, J. M., Lim, D. J., Won, C. H., Chang, S. E., Lee, M. W., & Lee, W. J. (2021). Mycosis fungoides in children and adolescents: a systematic review. *JAMA dermatology*, 157(4), 431-438.
12. Rimensberger, P. C., Kneyber, M. C., Deep, A., Bansal, M., Hoskote, A., Javouhey, E., ... & Brierley, J. (2021). Caring for critically ill children with suspected or proven coronavirus disease 2019 infection: recommendations by the scientific sections' collaborative of the European Society of Pediatric and Neonatal Intensive Care. *Pediatric Critical Care Medicine*, 22(1), 56-67.
13. Giri, A., Karkey, A., Dangol, S., Arjyal, A., Pokharel, S., Rijal, S., ... & Basnyat, B. (2021). Trimethoprim-sulfamethoxazole versus azithromycin for the treatment of undifferentiated febrile illness in Nepal: a double-blind, randomized, placebo-controlled trial. *Clinical Infectious Diseases*, 73(7), e1478-e1486.

14. Yilmaz, D. U., & Sari, D. (2021). Examining the effect of simulation-based learning on intravenous therapy administration 'knowledge, performance, and clinical assessment skills of first-year nursing students. *Nurse Education Today*, 102, 104924.
15. Yetti, K., Lindayani, L., & Huang, M. C. (2020). Children HIV disclosure: Should the children know their HIV status prior treatment and what are the information have to be told?. *Clinical Ethics*, 15(3), 162-166.
16. Güemes M., Rahman, S. A., Kapoor, R. R., Flanagan, S., Houghton, J. A., Misra, S., ... & Shah, P. (2020). Hyperinsulinemic hypoglycemia in children and adolescents:recent advances in understanding of pathophysiology and management. *Reviews in Endocrine and Metabolic Disorders*, 21, 577-597.
17. Abd Elkreem Ibrahim, M., & Kasem Alaswad, N. (2020). Effect of Intravenous Therapy Administration Guidelines on Pediatric Nurses' Knowledge, Practice and Selected Children's Outcomes. *Egyptian Journal of Health Care*, 11(2), 1271-2182.
18. Gorski, L. A., Hadaway, L., Hagle, M. E., McGoldrick, M., Orr, M., & Doellman, D. (2021). Infusion therapy standards of practice. *Journal of Infusion Nursing*, 44(S1), S1-S224. <https://doi.org/10.1097/NAN.0000000000000396>
19. Matsubara, S., Iwasaki, K., & Matsubara, Y. (2020). The importance of standardized IV therapy guidelines in pediatric nursing: Reducing complications and improving patient outcomes. *Pediatric Nursing Journal*, 46(2), 88–95.
20. Hossain, M. M., & Shamim, A. (2019). Effectiveness of training programs on safe IV therapy practices among pediatric nurses in private hospitals. *International Journal of Nursing Practice*, 25(6), e12745. <https://doi.org/10.1111/ijn.12745>

Authors Contributions:

Rubab Bushra, Maryam Rehman: Substantial contributions to the conception and design of the work. Design of the work and the acquisition.

Munazza Tabasum, Esha Farooq: Drafting the work

Hajra Sarwar: Final approval of the version to be published.

Submitted for publication: 06-01-2025

Accepted after revision: 15-02-2025