Effectiveness of Nursing Intervention on Practice of Nursing Officers regarding Intravenous Fluid Therapy in Children at SKIMS Soura, Srinagar (J&K)

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Abstract

It has been two centuries since intravenous fluid therapy had been in use and is commonly practised even today for infusing life saving crystalloids, colloids, blood and its products, medicine and other required items. These are the liquids that are directly infused in vein with the help of intravenous access and placed directly in the bloodstream. Fluid therapy is important when providing care to the acutely ill children in the emergency department or hospitalised children. Early and appropriate fluid administration improves outcomes and reduces mortality in children. This study assessed the practice level of nursing officers regarding the effectiveness of Self-instructional module, working in SKIMS Soura, with selected demographic variables. Pre-experimental one group pre-test post-test design was used to assess the effectiveness of nursing intervention in the form of Self-Instructional module on practice of 60 nursing officers regarding intravenous fluid therapy in children at SKIMS Soura, in 2022 through purposive sampling technique. Assessment of practice was done by Self-structured checklist. The mean±SD post-test practice scores (22.7±4.058) of the study subjects regarding intravenous fluid therapy was significantly higher than that of the pre-test practice scores (15.92±4.22), and t-test (12.066) was significantly higher than that of tabulated value at 0.05 LoS. The nursing officers had moderate practice regarding intravenous fluid therapy in children. The Self-instructional Module was found to be effective in improving the knowledge and practice scores of study subjects, hence there was dire need to educate them regarding intravenous fluid therapy in children from time to time to enhance their knowledge and practice.

Key words: Intravenous fluid therapy; Self-instructional Module; Nursing officers

According to the National Institute of Care and Excellence (NICE- 2020), intravenous therapy is important in modern medicine. Millions of children are receiving infusion therapy for life saving and for correcting the metabolic disorders through drugs, nutrition, solutions and blood products. The guidelines cover general principles for managing intravenous fluids for children and young people under 16 years, including assessing fluids and electrolyte status and prescribing intravenous fluid therapy. The guidelines represent a major opportunity to improve patient safety for children and young people having intravenous (IV) fluid therapy in children in Hospital (Naik et al, 2022; Westbrook et al, 2018)

According to Westbrook et al (2018), fluids are classified as crystalloids, colloids, and blood products. Crystalloid solutions are composed of water and electrolytes with the ability to cross a semipermeable membrane into cells and tissues and thus used for fluid replacement; examples include 0.9% normal saline, Ringer lactate, and dextrose solutions. On the other hand, colloids contain large molecules that do not cross semipermeable membranes, thereby remaining within the blood vessels as volume expanders due to their high oncotic pressure; examples include albumin and low-molecular-weight dextran (Lippincott, 2019). The goal of fluid therapy is to preserve the normal body water volume and its electrolyte composition (Michael J Somers, MD-Associate professor Dept. of paediatrics, Harvard Medical School).

Intravenous (IV) therapy is a common procedure in the clinical setting of any hospital, and nursing officers are accountable for handling and managing the patient/child with IV therapy. However, various serious medical complications arise when nursing officers have inadequate knowledge and practice regarding IV therapy (Holliday & Segar, 1957). IV therapy has become a major component of patient care in hospitals and nursing homes. Administration of medicine, fluids, nutrition, blood and blood

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products through parenteral route i.e. through a vascular access device is considered IV therapy (Van Regenmortel et al, 2014). Nursing officers must be knowledgeable regarding advanced techniques, to meet the specific needs of each patient. One of the most common complications related to IV therapy is thrombophlebitis which is due to infection and a probable reason for increased complications. Complications associated with IV therapy are preventable by healthcare professionals especially nursing officers (Milutinovic et al, 2015).

Need of the study: Knowledge and practice of nursing officers is essential to render quality care to the child with IV therapy. The nursing officer must know the correct solution, equipment needed and procedures required to initiate an infusion, regulate the fluid infusion rate, maintain the system, identify and correct problems and discontinue the infusion. If the nursing officers do not follow proper steps, aseptic technique and scientific principles, redness, pain, duration (hardness), rate of flow, swelling, moisture at the cannulation site may develop. Documentation needs to be done by the nursing officers on an intravenous flowchart (Osti et al, 2019). They must know how much fluid can be infused, at what rate and for how much time can it be administered without causing any harm in the form of Phlebitis to the patients. The correct way to cannulate a patient is the first step in the process and the type of fluid to be administered follows the same.

Literature Review

Divya & Geetha (2016) conducted pre-experimental study on 30 staff nurses through non-probability purposive sampling technique to assess the effectiveness of planned teaching programme on knowledge and practice regarding intravenous fluid therapy among paediatric nursing officers at Sri Ramachandra Hospital (SRH), Porur, Chennai (TN), from 11 July to 20 August 2016. The results revealed that the mean pre-test knowledge score of staff nurses was 7.43±2.254, and after teaching intervention the mean post-test knowledge score was 16.20±2.041. The mean pre-test practice score of nursing officers was 10.70±2.380, and after teaching intervention, the mean post-test practice score was 15.13± 2.063. The study concluded that the teaching intervention was effective and increased the knowledge and practice of nursing officers regarding IV fluid therapy.

Hassan, Sayed, Mohammad & Sobeh (2021) conducted a descriptive study on 72 nurses selected through convenient sampling technique to assess nurses' knowledge and practice regarding fluid and electrolyte imbalance in critical care units at Damietta General Hospital. Two tools were used to collect the needed data: nurses 'Knowledge Questionnaire and Nurses' Observation checklist. The finding showed that 27.8 percent of nurses had satisfactory knowledge regarding hypervolemia, 4 percent of nurses had satisfactory knowledge with mean of 35.2±18.6; and 97.2 percent of nurses had an unsatisfactory level of practice (mean 57.3±7.5).

The nursing professionals must be knowledgeable about the drugs that can cause Phlebitis and has potential to create problems for patients. This study assessed the practice of the nursing officers whether they follow all steps meant to control chances of Phlebitis and administer fluid in a guarded manner.

Objectives

1. To assess (a) the practice level among nursing officers working in SKIMS, Soura (J&K), and (b) effectiveness of SIM on practice levels among nursing officers working in SKIMS Soura (J&K).
2. To associate the pre-test practice levels among nursing officers working in SKIMS Soura (J&K) with selected demographic variables.

Methodology

A quantitative research approach with pre-experimental one group pre-test post-test design was selected to carry out this study. Permission was obtained from the authorities to conduct this study. Ethical clearance was provided by IEC SKIMS. The 60 study samples were selected by purposive sampling technique. Informed consent was taken from study subjects. The data from the participants were collected in small groups stretched over a period of one month from 9 September to 7 October 2022 and was followed by intervention in the form of SIM. Post-test was done every 7th day as per schedule. The SIM consisted of various areas pertaining to intravenous fluids, indications, fluid calculation, Phlebitis.

The practice level was divided into three categories viz adequate (>75%) having a range of 22-28 followed by moderate practice (51-75%) having a range of (14-21) and inadequate practice (< 50%) having a range of 0-13.

Results

The raw information in the form of data was converted into meaningful information. The process of conversion of raw data into meaningful information and then gaining insight from that regarding various aspects of the studies topic is related to the analysis and interpretation. The results obtained are in Table 1. In order to analyse the results, the null hypothesis was prepared and the level of significance chosen was at $p \leq 0.05$.

Table 2 depicted that the majority of subjects (75%) had moderate practice level, followed by 11.70 percent of study subjects with inadequate practice; 13.30 percent had adequate practice regarding intravenous fluid therapy in children during pre-test.

Table 1: Frequency and percentage distribution of nursing officers (N=60)

Variable	Categories	Frequency	Percentage
Age	25-30 years	20	33.3
	31-35 years	23	38.3
	36-35 years	10	16.7
	Above 40 years	7	11.7
Gender	Male	21	35.0
	Female	39	65.0
Prof qualification	GNM	9	15.0
	BSc Nursing	39	65.0
	MSc Nursing	12	20.0
Working experience	01-05 years	10	16.7
	06-10 years	29	48.3
	11-15 years	15	25.0
	Above 15 years	6	10.0
In service education programme attended	Yes	0	0.0
	No	60	100.0
Place of posting	Paediatric emergency	10	16.7
	Paediatric medical ward	12	20.0
	Paediatric surgical ward	8	13.3
	Paediatric ICU	10	16.7
	Clinical haematology	10	16.7
	CVTS ward	10	16.7

Table 3 shows that the majority of study subjects (83.3%) had adequate practice level, 13.3 percent of study subjects had moderate practice level and just 3.3 percent had inadequate practice level after post-test and implementation of SIM. Table 4 depicted that on pre-test the majority of study subjects (75%) had moderate practice, 11.7 percent of study subjects had inadequate practice and 13.3 had adequate practice regarding intravenous fluid therapy in children. A similar study was conducted by Sebastian (2019). The pre-test practice score of the study revealed that the majority 83.3 percent of the staff had average practice score regarding intravenous fluid therapy for children, 16.7 percent of the nursing officers had poor practice score regarding intravenous fluid therapy.

The findings of the present study revealed that on post-test, the majority of study subjects (83.3%) had adequate practice, 13.3 percent of study subjects had moderate practice and 3.3 percent had inadequate practice.

Table 5 showed that (mean±SD) post-test practice scores (22.7±4.058) of the study subjects regarding intravenous fluid therapy was significantly higher than that of the pre-test practice scores (15.92±4.22) and t-test (12.066) was significantly higher than that of tabulated value at 0.05 level of significance. This indicates that the Self-instructional Module was effective in increasing the practice score of study subjects regarding intravenous fluid therapy in children.

There was statistically no significant association between the pre-test practice scores of study subjects and demographic variables like age in years (p=0.309), gender (p=0.571), prof qualification (0.622), years of experience (p=0.188), in-service programme attended (p=N/A) and place of posting (p=0.574) regarding intravenous fluid therapy in children at 0.05 level of significance (Table 6).

Discussion

On pre-test the majority of study subjects (75%) had moderate practice, 11.7 percent of study subjects had inadequate practice and 13.3 percent had adequate practice regarding intravenous fluid therapy in children.

A similar study by Sebastian (2019) revealed that the majority (83.3%) of the staff nurses had average pre-test practice score regarding intravenous fluid therapy for children, 16.7 percent of the staff nurses had poor practice score regarding intravenous fluid therapy.

The findings of the present study revealed that on post-test, the majority of study subjects (83.3%) had adequate practice, 13.3 percent of study subjects had moderate practice and 3.3 percent had inadequate practice. This study is endorsed by Sebastian (2019) on 30 nursing personnel. The

Table 2: Frequency and percentage distribution of nursing officers according to pretest practice levels (N=60)

Practice level	Frequency	Percentage
Inadequate practice (0-13)	7	11.70
Moderate practice (14-21)	45	75
Adequate (22-28)	8	13.30
Total	60	100

Table 3: Frequency and percentage distribution of nursing officers according to post-test practice levels (N= 60)

Practice level	Frequency	Percentage
Inadequate practice (0-13)	2	3.30
Moderate practice (14-21)	6	13.30
Adequate (22-28)	52	83.30
Total	60	100

Table 4: Frequency and percentage distribution of study subjects according to pre-test and post-test practice levels (N=120)

Practice levels	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Percentage
Inadequate practice (0-13)	7	11.70	2	3.30
Moderate practice (14-21)	45	75.00	6	13.30
Adequate (22-28)	8	13.30	53	83.30
Total	60	100	60	100

Table 5: Comparison between pre-test and post-test practice scores of study subjects and the significance of difference between the mean pre-test and post-test practice scores (N=60)

Practice score	Mean	SD	Mean difference	Paired 't' test	p value
Pre-test	15.92	4.22	6.150	12.066 *Sig	<0.001
Post-test	22.07	4.058			

**Significance level at 0.001.

findings showed that on post-test half (50%) of the staff nurses had a good practice score and half of the staff nurses had average practice score.

The present study revealed that post-test (mean±SD) practice scores (22.7±4.058) of the study subjects regarding intravenous fluid therapy was significantly higher than that of the pre-test practice scores (15.92±4.22) and t-test (12.066) was significantly higher than that of tabulated value at 0.05 level of significance. This indicates that the Self-instructional Module was effective in increasing the practice score of study subjects regarding intravenous fluid therapy in children.

Kaur et al (2020) conducted a similar study that revealed that the (mean±SD) post-test scores of correct responses (17.34±1.325) showed highly significant improvement as compared to the pre-test scores (10.4±2.26), using t-test regarding intravenous cannulation therapy. This indicates that the teaching programme was effective in increasing the practice score regarding intravenous cannulation therapy.

Statistically there was no significant association between the pre-test practice scores of study subjects and demographic variables like age in years (p=0.309), gender (p=0.571), prof qualification (0.622), years of experience (p= 0.188), in-service programme attended (p=N/A) and place of posting (p=0.574) regarding IV fluid therapy in children at 0.05 level of significance.

The findings of the present study were supported by Abraham (2018) on 60 nursing officers selected by purposive sampling technique to assess the knowledge and practices of nursing officers regarding care of peripheral intravenous line in child care areas of a selected hospital. The study revealed that no significant association was observed for knowledge and practice with socio-demographic variables like age, professional qualification, number of years of experience and place of training.

Table 6: Association of pre-test practice scores of study subjects regarding intravenous fluid therapy in children with their selected demographic variables (N=60)

Variables	Opts	Practice			Chi test	p value	df	Table value	Result
		Adequate	Moderate	Inadequate					
Age	25-30 years	17	3	0	7.130	0.309	6	12.592	NS
	31-35 years	19	4	0					
	36-35 years	9	0	1					
	Above 40 years	5	1	1					
Gender	Male	18	3	0	1.121	0.571	2	5.991	NS
	Female	32	5	2					
Prof qualification	GNM	7	1	1	2.625	0.622	4	9.488	NS
	BSc Nursing	32	6	1					
	MSc Nursing	11	1	0					
Working experience	01-05 years	8	2	0	8.750	0.188	6	12.592	NS
	06-10 years	24	5	0					
	11-15 years	13	0	2					
	Above 15 years	5	1	0					
In service education program attended	Yes	0	0	0		N.A		N.A	
	No	50	8	2					
Place of posting	Paediatric emergency	9	1	0	8.565	0.574	10	18.307	NS
	Paediatric medical ward	10	1	1					
	Paediatric surgical ward	6	2	0					
	Paediatric ICU	9	0	1					
	Clinical haematology	7	3	0					
	CVTS ward	9	1	0					

NS=Not significant

Implications

The nursing administration can arrange for orientation, conferences and workshops to enhance the knowledge and practice of nursing officers. The nursing researchers should make a protocol or guidelines for IV fluid therapy and there should be specialist nurses like PICC line, IV line, Infection control nurses to look at the broader problem and to cope with them. The nurses should be encouraged to make decisions for the benefit of the client, and independently allowed to practice.

Recommendations

- Nursing officers should be advised to remain abreast of knowledge regarding IV fluid therapy in children and gain insight from evidence-based practices.
- The nursing officers should be assigned fixed number of patients who they can provide care with utmost zeal with less chances of errors pertaining to IV fluid and prevention of IV fluid-related complications.
- A comparative or quasi experimental research can be conducted on IV fluid therapy in children among healthcare workers; a more extensive study can be carried out with larger sample size.
- Knowledge, practice and attitude of nursing officers can be studied concurrently to have in-depth knowledge regarding the topic.

Conclusion

The pre-test showed that majority of the study subjects' possessed moderate practice regarding intravenous fluid therapy in children. So, there was a need to educate them regarding intravenous fluid therapy in children. There was an improvement in the practice scores of study subjects after implementation of Self-instructional Module (SIM) regarding intravenous fluid therapy in children which was evident from post-test practice scores.

No significant association of pre-test practice scores of study subjects with selected demographic variables like age, gender, professional qualification, years of experience and place of posting indicates that these variables probably do not affect practice level of study subjects. There was an improvement in the practice scores of study subjects after implementation of SIM regarding intravenous fluid therapy in children which was evident from post-test knowledge and practice scores.

Hence, SIM must be implemented on regular basis in selected wards at SKIMS Soura to make nursing officers knowledgeable about intravenous fluid therapy in children and its practice for the prevention of infections and complications associated with intravenous cannulation, thereby decreasing mortality and morbidity and increasing the outcome in children.

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