"Evaluate The Effectiveness Of Simulation On Knowledge And Skills Of Pediatric Intravenous (Iv) Cannulation Among Staff Nurses Working In Tertiary Care Hospital Dharwad"

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ABSTRACT

Background of the study:

Pediatric IV cannulation is an integral part of modern medicine and is practiced in virtually every health care setting. Children have approximately half the number of usable veins than adults, but they have less accessible veins. Pediatric IV cannulation can be challenging. Nurses performing IV procedures in children should be skillful and knowledgeable in basic IV therapy applications. Simulation provides effective and efficient Knowledge and skills regarding pediatric IV cannulation.

Objectives of the study are to:

- To assess the pre-interventional knowledge of staff nurses regarding pediatric IV cannulation.
- To assess the pre-interventional skills of staff nurses regarding pediatric IV cannulation.
- To evaluate the effectiveness of Simulation on Knowledge and Skills of staff nurses regarding pediatric IV cannulation.

Conceptual framework adopted for the present study was based on the Ludwig Von Bertalanffy's general system theory.

Methodology:

To achieve the objective of the study with Quantitative Evaluative Approach Pre–experimental one group pre-test and post-test research design was adapted for the present study. The subject were selected by applying Non–probability purposive sampling technique to participate in the study. The tool prepared for data collection comprised of Structured knowledge questionnaires and Modified Intravenous Cannulation Skills Check List. Data analysed using descriptive and inferential statistics appropriate to achieve the set of objectives.

Results :

The pre–test mean Knowledge score was ±6.26 and Standard Deviation (SD) ±2.04 whereas the post-test mean Knowledge score of was ±18.26 and Standard Deviation (SD) ±0.78. The calculated paired 't' value was (5.59) higher than the table value of (2.05) at 0.05 level of significance. Hence H1 was accepted. The pre–test mean Skills score was ±10.33 and Standard Deviation (SD) ±2 whereas the post-test mean Skills score of was ±27.6 and Standard Deviation (SD) ±1.49. The calculated paired 't' value was (5.86) higher than the table value of 2.05 at 0.05 level of significance. Hence H2 was accepted.

Interpretation and Conclusion:

The results of the study clearly indicated that, after introduction of Simulation technique, all the staff nurses (30)100% of them had adequate knowledge and skills scores which explains that Simulation technique was effective to increase the knowledge and skills of staff nurses regarding Pediatric IV Cannulation. Since Nursing is a practice discipline. The findings of the study revealed that in- service education for nursing staffs should always be plan with Simulation which helps the staff nurses to develop necessary confidence and competencies in any given procedure. So Nursing staffs can able to practice procedure properly.

Keywords: Simulation, Knowledge and skills on Pediatric IV Cannulation

INTRODUCTION

"*There can be no keener revelation of a society's soul than the way in which it treats its children*"
Nelson Mandela

Intra Venous(IV) Cannulation is an integral part of modern medicine and is practiced virtually in every health care setting. Venous access allows the sampling of blood as well as administration of fluids, medications, parenteral nutrition, chemotherapy and blood products.[1]

IntraVenous(IV) Cannulation is complex, but a very important procedure performed skillfully by nurses.[2] There are significant differences between IV therapy in adults and children. Nurses performing IV procedures specially among children should be knowledgeable and efficient in basic IV therapy applications. Children have approximately half the number of veins than adults and have less accessible veins.[3] Although IV Cannulation is a key procedure and should be done with greatest care, because Vascular access devices cause many types of IV complications like bleeding, injury to nerve, tendon or ligament, phlebitis, catheter embolism, arterial injury causing tissue ischemia and necrosis. Nosocomial infections are commonly associated with vascular access devices and are the major concern in today's medical care. In the US hospitals 30% of the nosocomial bacteremias are associated with Intravenous catheters.[4] As Nurses practice within a

changing and evolving health care environment, they are required to update their Knowledge, Skills and Attitude in way to develop confidence in Pediatric procedures and especially with Pediatric IV Cannulation. [5]

Hence, there is need for ongoing In-service education for the nurses to be informed about Simulation which is the best method and an effective tool used to integrate realistic clinical situation in a safe practice environment. Staff Nurses apply clinical skills while keeping patients safe and offers other nurses the opportunity to practice clinical skills until they become proficient in performing tasks.[6]

STATEMENT OF THE PROBLEM

"A study to evaluate the effectiveness of Simulation on Knowledge and Skills of Pediatric Intravenous (IV) Cannulation among Staff Nurses working in Tertiary Care Hospital Dharwad".

OBJECTIVES OF THE STUDY

Objectives of the study were to,
- Assess the pre-interventional Knowledge of staff nurses regarding Pediatric IV Cannulation.
- Assess the pre-interventional Skills of Staff Nurses regarding Pediatric IV Cannulation.
- Evaluate the effectiveness of Simulation on Knowledge and Skills of Staff Nurses   regarding Pediatric IV Cannulation.

HYPOTHESES

Hypotheses will be tested at 0.05 level of significance
- **H_1-** The mean post test Knowledge scores of Staff Nurses regarding Pediatric IV Cannulation will be significantly higher than the mean pre-test Knowledge score.

- **H_2** - The mean post test Skills scores of Staff Nurses regarding Pediatric IV Cannulation will be significantly higher than the mean pre-test Skills score.

DELIMITATION
 The study is delimited to:

- Staff Nurses working in Pediatric unit of SDM Tertiary Care Hospital Dharwad.
- Prescribed data collection period is limited to 4-6weeks.

METHODOLOGY

- ***Research approach***: Quantitative approach
- ***Research design***: Pre experimental one group pre-test and posttest research design was adopted for the study.
- ***Sample:***Staff Nurses who are working in the Pediatric unit of the SDM Tertiary care hospital, Dharwad.
- ***Sampling technique:*** Non - probability purposive sampling technique.
- ***Sample size:***30 staff Nurses working in Pediatric unit at SDM tertiary care hospital, Dharwad.
- ***Tools:*** Data was collected with the help of Demographic proforma ,structured knowledge questionnaires and Modified Intravenous Cannulation Skills Check List.

- *Plan for data analysis:* Descriptive statistics (frequency, percentage, range, mean, median and standard deviation) and inferential statistics (t- test) were used for the analysis and interpretation of data.

- *Setting of the study:* Pediatric unit of SDM Tertiary care hospital, Dharwad.

- *Sampling criteria:*
  Inclusion criteria:
       Staff nurses who were:
- Working in Pediatric unit of SDM Tertiary Care Hospital Dharwad.
- Willing to participate in the study.
- Available and present at the time of data collection.

  Exclusion criteria:
  Staff Nurses who were:
- Working in NICU.
- Having more than 5 years of working experiences in Pediatric unit.
- Not directly involved in the patient care.

CONTENT VALIDITY OF THE TOOL:

In order to obtain the validity of tool, the prepared instrument along with the problem statement, objectives, blue print and checklist designed for validation were submitted to expert of departments of Child Health Nursing and other Nursing departments there was 100% agreement by all experts on all the items.

RELIABILITY OF THE TOOL:

The reliability of the tool was computed by using Karl Pearson correlation coefficient technique. The reliability coefficient 'r' value of Structured Knowledge Questionnaire and Modified Intravenous Cannulation Skills Check List regarding assessment of Knowledge and Skills of staff nurse with intervention of Simulation was 0.93 and 0.91 respectively. The developed tool was found to be valid, reliable and feasible to conduct main study.

DATA COLLECTION INSTRUMENTS:

The tool used for data collection was Demographic proforma of staff nurses working in pediatric unit, Structured knowledge questionnaires and Modified Intravenous Cannulation Skills Check List regarding pediatric IV Cannulation.

RESULTS:

Data was analyzed by using descriptive and inferential statistics.
The analysis of the data organized under the fallowing sections.

SECTION I: Frequency and percentage distribution of subjects according to the demographic variables.

Table 2: Frequency and percentage distribution of Staff Nurses in Pediatric unit

[n=30]

SL. NO.	DEMOGRAPHIC VARIABLES	FREQUENCY	PERCENTAGE %
1	**Age(In Years)**		
	a)21-25	15	50
	b)26-30	12	40
	c)31-35	2	6.7
	d)36& above	1	3.3
2	**Gender**		
	a)Male	3	10
	b)Female	27	90
3	**Professional Qualification**		
	General Nursing and Midwifery	25	83.3
	Post. Basic. B. S. c Nursing	2	6.7
	Basic B. S. c. Nursing	3	10
4	**Present area of working**		
	Pediatric Medical ward	19	63.4
	Pediatric Intensive Care Unit	10	33.3
	Pediatric Surgical ward	1	3.3
5	**Experience in pediatric unit _____in years**		
	a)Less than one year	17	56.7
	b)2year - 3year	11	36.7
	c)4year - 5year	2	6.6

Data presented in the above table revealed that, Majority (90%) of the study participants were females and 50% were in the age group of 21-25years. Most of the participants (83.3%) were Diploma graduates. Majority of (63.4%) the Staff Nurses were working in Pediatric Medical ward and majority of them (56.7%) had less than one year experience in Pediatric unit.

Section II: Pre and Post test Knowledge scores of Staff Nurses regarding Pediatric IV Cannulation.

Table 3: Frequency and percentage Distribution of subjects by Pre and Post-test Knowledge scores.

[n=30]

Knowledge	Intervals	Pre-test knowledge score		Post-test knowledge score	
		Frequency	Percentage(%)	Frequency	Percentage(%)
Inadequate Knowledge	0-6	18	60	0	0
Moderate Knowledge	7-13	12	40	0	0
Adequate Knowledge	14-20	00	00	30	100
Total		30	100	30	100

The above table shows that in a pretest Staff nurses 60% (18) had inadequate Knowledge , 40%(12) had moderate Knowledge and in post test all 100%(30) had adequate Knowledge regarding Paediatric IV Cannulation.

Section III : Pre and Post-test Skills score of Staff nurses regarding Pediatric IV Cannulation.

Table 4: Frequency and percentage Distribution of subjects by pre and post-test Skills scores.

[n=30]

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Level of Skills	Intervals	Pre test skills score		Post test skills score	
		Frequency	Percentage	Frequency	Percentage
Inadequate Skills	0-10	20	66.7%	0	0%
Moderate Skills	11-20	10	33.3%	0	0%
Adequate Skills	21-31	00	00%	30	100%
Total		30	100%	30	100%

above table shows that in a pretest Staff nurses 66.7% had inadequate skills, 33.3% had moderate Skills and in post test all 100%(30) had adequate Skills regarding Paediatric IV Cannulation.

Section VI: **Comparison of mean and standard deviation of pre and post-test Knowledge scores of Staff Nurses regarding Pediatric IV Cannulation to evaluate the effectiveness of Simulation method.**

Table -5: Comparison of mean   and standard deviation of pre and post-test   Knowledge scores
[n=30]

Level of Knowledge	Mean	Standard deviation	Degree of freedom	'P' value	Calculated 't' value	Table t value
Pre-test	6.26	2.04	29	0.05	5.59	2.05
Post-test	18.26	0.78	29	0.05		

The above table showed the calculated paired 't' value was ±5.59 which was higher than the table value i.e. 2.05, which was significant at 0.05 level. Hence H1 was accepted. This shows that Simulation was effective in

increasing the Knowledge of Staff Nurses regarding Pediatric IV Cannulation.

Section VII: **Comparison of mean and standard deviation of pre and post-test Skills scores of Staff Nurses regarding Pediatric IV Cannulation to evaluate the effectiveness of Simulation technique.**

Table 6: Comparison of mean and standard deviation of pre and post-test Skills scores

[n=30]

Level of Skills	Mean	Standard deviation	Degree of freedom	'P' value	Calculated 't' value	Table t value
Pre-test	10.33	2	29	0.05		
Post-test	27.6	1.49	29	0.05	5.86	2.05

The table above showed the calculated paired 't' value was ±5.86 which was higher than the table value i.e. 2.05, which was significant at 0.05 level. Hence **H₂** was accepted. This shows that Simulation was effective in increasing the Skills of staff nurses regarding Pediatric IV Cannulation.

DISCUSSION:

The first objective was to assess the pre-interventional Knowledge of Staff Nurses regarding Pediatric IV Cannulation.
The study findings showed that in pre-test Staff nurses 18 (60%) had inadequate Knowledge and 12(40%) had moderate Knowledge regarding Pediatric IV Cannulation.
The second objective was to assess the pre-interventional Skills of Staff Nurses regarding Pediatric IV Cannulation.
In a pre-test Staff nurses 20 (66.7%) had inadequate skills, 10(33.3%) had moderate Skills regarding Paediatric IV Cannulation.
The third objective was to evaluate the effectiveness of Simulation on Knowledge and Skills of staff nurses regarding Pediatric IV Cannulation.
H₁: The mean post-test knowledge scores of staff nurses regarding Pediatric IV Cannulation will be significantly higher than the mean pre-test at 0.05 level of significance.
The pre–test mean Knowledge score was ±6.26 and Standard Deviation (SD) ±2.04 whereas the post-test mean Knowledge score of was ±18.26 and Standard Deviation (SD) ±0.78. The calculated paired 't' value was 5.59 which was higher than the table value of 2.05 at 0.05 level of significance. Hence H1 was accepted. This shows that Simulation was effective in increasing the Knowledge of Staff Nurses regarding Pediatric IV Cannulation.
H₂: **The mean post-test Skills scores of Staff Nurses regarding Pediatric IV Cannulation will be significantly higher than the mean pre-test Skills score at 0.05 level of significance.**
The pre–test mean Skills score was ±10.33 and Standard Deviation (SD) ±2 whereas the post-test mean Skills score of was ±27.6 and Standard Deviation (SD) ±1.49. The calculated paired 't' value was 5.86 which was higher than the table value of 2.05 at 0.05 level of significance. Hence H2 was accepted. This shows that Simulation was effective in increasing the Skills of Staff Nurses regarding Pediatric IV Cannulation.
The findings of the study demonstrated that Paediatric IV Cannulation is a matter of concern and clinically significant issue in Nursing ,due to many complication associated with multiple pricks due to first

time failure of insertion of IV cannula ranging from Psychological trauma to bacteremia.

CONCLUSION

The study revealed that in a pretest Staff nurses 60% (18) had inadequate level of Knowledge and in post test all 100%(30) had adequate Knowledge regarding Paediatric IV Cannulation. In a pretest Staff nurses 66.66% had inadequate skills and in post test all 100%(30) had adequate Skills regarding Paediatric IV Cannulation. Hence Simulation was effective in increasing the Knowledge level and Skills of Staff Nurse regarding Pediatric IV Cannulation.

NURSING IMPLICATION

Simulation method can be used to teach the student nurses and staff nurses to enhance the knowledge and skill regarding pediatric IV Cannulation. The nurse educator periodically organize special training programme for students and staff nurses regarding pediatric IV Cannulation to build their Knowledge and skills and bring up productivity.

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