

# A Study to Evaluate the Effectiveness of Self Instructional Module on Knowledge and Practice Regarding Intravenous Fluid Therapy among Nursing Students

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## ABSTRACT

**Introduction:** As compared to adults, children have a smaller build, smaller circulatory systems and smaller cardiac size and hence intravenous hydration needs to be titrated so as to avoid over or under-hydration in them. The nurses who are in constant vigilance of these children should be able to assess clinically and maintain adequate hydration in them so as to help them return to health. The current study was conducted to evaluate the effectiveness of self-instructional module on knowledge and practices regarding intravenous fluid therapy among third year Basic B.Sc. Nursing students at selected nursing colleges Bangalore.

**Methodology:** Research design was pre experimental one group pre test and post test design. The samples of 60 were drawn by purposive sampling technique. The knowledge questionnaire and practice checklist was used for assessing the knowledge and practices. The descriptive and inferential statistics were used to analyze the data.

**Results:** In the pre test mean percentage knowledge score was 37.45% with mean and SD of 14.98 ±3.2. In the pre test, 45(75%) respondents had average knowledge, 11(18.33%) were had poor knowledge and 04(6.67%) had good knowledge. In the post test the mean percentage knowledge score was 81.12% with mean and SD of 32.45±2.31. The mean percentage difference was 43.67% with mean of 17.47. The paired t test was 13.98, df=59, p<0.05. shown significant difference. The posttest levels of knowledge shown that the 48(80%) were had good knowledge and 12(20%) were had average knowledge. The mean percentage pre test practice score was 39.42% with mean and SD of 12.67±3.42.

The pretest level of practices scores of respondents was, the mean percentage practice score was 39.59 with mean and SD of 12.67±3.42. In the pre-test, 37(61.67%) were had unsatisfactory practices and 23(38.33%) had satisfactory practices. In the post test the mean percentage practice score was 90.56% with mean and SD of 28.98±1.82. The mean percentage difference was 50.97% with mean of 16.31. The paired t test was 12.56, df=59, p<0.05. shown significant difference. In the post test, the 53(88.33%) respondents had satisfactory practices and 07(11.67%) had unsatisfactory practices. The chi square values for the state belongs to shown significant association between the pre test levels of knowledge. The other demographic variables did not shown the significant association. The chi square values for the state belongs to shown significant association between the pre test levels of practices. The other demographic variables did not shown the significant association.

**Conclusion:** The study concludes that the SIM was effective on enhancing the levels of knowledge and practice. The study recommended that same type of studies can be conducted on larger population.

**Key words:** Effectiveness, Self instructional module, knowledge, Practice, Intravenous therapy

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## INTRODUCTION

Just as hydration is important to maintain homeostasis in adults, the fluid, electrolytes and caloric needs of the little one of man, the child, is unique. In a hospital setting, where the oral intake of the child is affected due to various reasons,

need for intravenous (IV) fluids, be it for hydration, as maintenance fluids or for nutrition purposes become imperative.<sup>1,2</sup>

As compared to adults, children have a smaller build, smaller circulatory systems and smaller cardiac size and hence intravenous hydration needs to be titrated so as to avoid over or under-hydration in them. The nurses who are in constant vigilance of these children should be able to assess clinically and maintain adequate hydration in them so as to help them return to health.

Exposure to paediatric studies and paediatric population at large is less during the student period for the budding nurses and hence we intend to assess their knowledge and look at the clinical processes they assist during this period so as to help in modification of the teaching modules of the nursing students (if necessary). There is a lack of data and no major studies to assess these aspects and hence the need for study. Although it is the physicians responsibility to calculate and order daily fluid requirements for patients, Registered Nurses are responsible for double checking the order for accuracy<sup>3,4,5</sup>.

### NEED FOR STUDY

India is a young nation and has a growing paediatric population. The future nurses will need a definite knowledge to manage paediatric population. Placement of intravenous cannula, calculation of their fluid requirement, administration of fluids, aseptic precautions required, handling of the equipment safely and safe disposal of the sharps are some of the basics the nurses are required to know. The knowledge of the nurses with this regards helps them to provide safe or effective care.<sup>6</sup>

Nurses use a wide range of theoretical and practical knowledge in their work. In recent years they have needed a considerable amount of new knowledge to provide the appropriate level of care for patients. The need for paediatric nurses who are specialized in caring for the children is expected to grow in coming years, with a 22 percent increase in nursing employment between 2008 and 2018, according to the Bureau of Labour Statistics.<sup>7,11</sup>

Paediatric peripheral intravenous access can be a difficult task and with rising paediatric population the need for experienced staff nurses or IV nurse specialists is increasing too. With training being imparted at the student nurse period itself will help them to acquire the skill to successfully cannulate the peripheral lines in paediatric population under aseptic precautions. With training the complications caused due to the intravenous cannulation can be prevented.<sup>1,2,14</sup>

Nerve or arterial injury related to the insertion of peripheral IV catheters, venipuncture for blood collection, and the insertion of peripherally inserted central catheters is the most commonly reported insertion complication. Nurses who insert peripheral and central vascular access devices are responsible, both clinically and legally, to have a working knowledge of the vascular, arterial, and nerve anatomy of the extremities so as to avoid undue injuries. Nerve compression injury is related to large infiltrations and extravasations that can cause compartment syndrome. A hematoma can develop when inadequate pressure is applied to vascular and arterial puncture sites and can result in local hematomas and subsequently cause nerve compression injury. These injuries are preventable with appropriate site selection, early identification of the problems associated with cannulation, assess IV sites regularly and use proper venipuncture techniques.

A study was conducted in Pantai Hospital BatuPahat to assess the knowledge and practice of nurses regarding peripheral IV cannulation, care and maintenance of IV cannula, obstacles encountered in caring and maintaining IV cannula. In this study it is found that 75.9% of the nurses have knowledge in caring and maintaining IV cannula and 24.1% still do not know; 87.3% followed correct practice of care and maintenance of IV cannula.<sup>9</sup>

A study was conducted to evaluate the effective documentation of IV practices by nurses. This study reports from a clinical audit by 298 member of the Royal college of Nursing IV Therapy Forum who used audit tool based on evidence based national IV Standard to evaluate 625 peripheral venous catheters for adherence to the standards of care. Nursing staff were interviewed to determine their knowledge on IV guidelines. Total of 29 nurses were interviewed. A total of 123 peripherally inserted catheters was audited, of them 43% (53) had date of insertion documented on the dressing. Just fewer than 14% (17) had IV catheters in place longer than the recommended 72 hour maximum. Almost 25% (28) showed evidence of phlebitis. Of the 28 patients less than 50% (13) had IV catheter that showed the date of insertion on the dressing label.<sup>10</sup>

This study identified a significant need for further nursing education and research regarding the types, maintenance and care of intravenous connectors. Paediatric nurses are required to be well trained with respect to the placement of the IV cannula or IV access, calculation of intravenous fluids and should administer fluids and intravenous medications with accuracy. This can be achieved if the nurses are well informed right from their student days. Taking into account all the above facts, a module shall be used to understand the knowledge of student nurses (who as registered nurses shall

handle the paediatric children individually) regarding their understanding of the IV fluids in paediatric population. There have been no such studies published from India. Hence the plan is to perform a study among the Indian nursing students with regards to assessment of their knowledge with regards to IV cannulation and maintenance of IV fluid in paediatric population. The study shall deal with the knowledge regarding the procedure of cannulation, complications during or after the procedure, the identification of early signs of inflammation or infection, the fluid administration rate, calculation of the maintenance fluid and assessment of whether the correct format is being followed or not. A module shall be created so as to help the student nurses understand the various steps involved and improve upon their knowledge.

### Statement Of The Problem

“A study to evaluate the effectiveness of self instructional module on knowledge and practice regarding intravenous fluid therapy among 3<sup>rd</sup> year B. Sc Nursing students at selected nursing colleges”

### Objectives Of The Study

- To assess the existing knowledge of third year basic B. Sc nursing students regarding intravenous fluid therapy.
- To assess the existing practices of third year basic B. Sc nursing students regarding intravenous fluid therapy.
- To develop and administer self-instructional module regarding intravenous fluid therapy.
- To evaluate the effectiveness of self-instructional module regarding intravenous fluid therapy.
- To find the association of knowledge and practices of third year B.Sc Nursing students regarding intravenous fluid therapy with selected socio- demographic variables.

### Hypothesis:

H<sub>1</sub>. There will be significant difference between the pre and post test knowledge scores of the 3<sup>rd</sup> year B.Sc. Nursing students regarding intravenous fluid therapy.

H<sub>2</sub>. There will be significant difference between the pre and post test practice scores of the 3<sup>rd</sup> year B.Sc. Nursing students regarding intravenous fluid therapy.

### Assumptions

- It is assumed that 3<sup>rd</sup> year B. Sc Nursing students will have some knowledge on IV fluid therapy.
- It is assumed that self instructional module will improve their knowledge and skills on IV fluid therapy.

## METHODOLOGY

An evaluative research approach which is pre experimental one group pre-test post-test research design is used. The present study is aimed at evaluating the knowledge and practice on intravenous fluid therapy among third year (Basic) B.Sc. (Nursing) students as assessed by a structured questionnaire and an practices performed with an observational checklist specifically designed for the study. In the present study the dependent variable is knowledge and practices on intravenous fluid therapy and the independent variable is self-instructional manual for intravenous fluid therapy. The extraneous variables are age in the year, general education, gender and the subjects belongs to which state, which was collected in sociodemographic data. The study was conducted at College of Nursing Sciences, Bangalore, which is reputed and well equipped with modern treatment facility.

In this study the population was the third year (Basic) B.Sc. Nursing students studying at College of Nursing Sciences, Bangalore. The sample for the present study composed of 60 students. Non-probability purposive sampling technique was used.

### Inclusion criteria:

- Third year (Basic) B.Sc. Nursing students studying Selected Nursing colleges, Bangalore.
- Students who are willing to participate in the study.
- Students who are present during the study.

### Exclusion criteria:

- Students who are not willing to participate in the study.
- Students who are not present during the study.

**Data collection technique:** Since the purpose of the study was to assess the knowledge and practices on

intravenous fluid therapy. Self administered knowledge questionnaire and observational checklist were found to be appropriate. In this study, the researcher used structured knowledge questionnaire. The tool was developed in order to attain the objectives of the study and observational checklist was prepared. This consist of items pertaining to the three domains of learning i.e., knowledge, understanding and application. There was 7 items (28%) on knowledge domain, 3 items (12%) on understanding and 15 items (60%) on application. An observational checklist on Intravenous fluid therapy was prepared. This consisted of items pertaining mainly on the application aspects comprising 24 items. The content validity of the tool was obtained by the experts. The tools were prepared in English. Reliability was established by split half method using the Spearman’s Brown prophecy formula. The reliability co-efficient of the tool was found at be 0.75; which showed that tool was reliable.

**Data collection and analysis process:**

The students were taken by purposive sampling. Each student was observed while performing Intravenous fluid therapy scoring. After the participant observation, the knowledge questionnaire was administered. Plan data analysis. The data was presented under the following headings;

Section I: Description of sample characteristics

Section II: Level of knowledge on Intravenous fluid therapy

Section III: Level of practices on Intravenous fluid therapy scoring

Section IV: effectiveness of SIM.

Section IV: Association between level of practices and gender

**RESULTS**

**Table 1: Frequency and percentage distribution of subjects according to their personal characteristics. N=60**

Sl. No.	Characteristics	Frequency	Percentage
1.	<b>Age</b>		
	19-22	54	90.00
	23-27	06	10.00
2.	<b>Gender</b>		
	Male	11	18.33
	Female	49	81.67
3.	<b>Exposure to specific educational program</b>		
	Yes	-	0.00
	No	60	100.00
4	<b>Which state you belong</b>		
	Karnataka	23	38.33
	Kerala	35	58.33

**Table. No2 . Comparison between the pre test and post test levels of knowledge on intravenous fluid therapy among 3<sup>rd</sup> year B. Sc Nursing. N=60**

Sr. No	Levels of knowledge.	Pre test		Post test	
		Frequency	Percentage	Frequency	Percentage
1	Poor Knowledge	11	18.33	00	00
2	Average Knowledge	45	75	12	20
3	Good knowledge	04	6.67	48	80

**Table. No.3 Effectiveness of Self-instructional module on knowledge regarding intravenous fluid therapy among 3<sup>rd</sup> year B.Sc Nursing students. N=60**

Sr. No	Aspect	Max. Score	Pre test			Post test			Difference		Paired t test
			Mean	SD	Mean %	Mean	SD	Mean %	Mean	Mean%	
1	Knowledge	40	14.98	3.2	37.45	32.45	2.31	81.12	17.47	43.67	13.98, df=59, p<0.05. S*

**Table.4 Effectiveness of self instructional module on practices regarding intravenous fluid therapy among 3<sup>rd</sup> year B.Sc Nursing. N=60**

Sr. No	Aspect	Max. Score	Pre test			Post test			Difference		Paired t test
			Mean	SD	Mean %	Mean	SD	Mean %	Mean	Mean%	
1	Practices	32	12.67	3.42	39.59	28.98	1.82	90.56	16.31	50.97	12.56, df=59, p<0.05, S*

**Table 5. Describes the association between the pre test levels of knowledge with selected demographic variables. N=60**

Sl. No.	Characteristics	F					Chi square
			≤Median		>Median		
			F(33)	%	F(27)	%	
<b>1</b>	<b>Age</b>						<b>0.06, df=1, p&gt;0.05, NS</b>
	19-22	54	30	55.56	24	44.44	
	23-27	06	3	50.00	3	50.00	
<b>2</b>	<b>Gender</b>						<b>0.52, df=1, P&gt;0.05, NS</b>
	Male	11	5	45.45	6	54.55	
	Female	49	28	57.14	21	42.86	
<b>3</b>	<b>Exposure to specific educational program</b>						<b>Chi square cannot be computed</b>
	Yes	-					
	No	60	33	55.00	27	45.00	

4	Which state you belong						7.38, df=2, P<0.05, S*
	Karnataka	23	9	39.13	14	60.87	
	Kerala	35	24	68.57	11	31.43	
	Other	2	0	0.00	2	100.00	

Table 6. Describes the association between the pre test levels of practices with selected demographic variables. N=60

Sl. No.	Characteristics	F					Chi square
			≤Median		>Median		
			F(35)	%	F(25)	%	
1	Age						0.19, df=1, NS.
	19-22	54	31	57.41	23	42.59	
	23-27	06	4	66.67	2	33.33	
2	Gender						0.07, df=1, P>0.05, NS
	Male	11	6	54.55	5	45.45	
	Female	49	29	59.18	20	40.82	
3	Exposure to specific educational program						Chi square cannot be computed
	Yes	-					
	No	60	35	58.33	25	41.67	
4	Which state you belong						7.35, df=2, p<0.05, S*
	Karnataka	23	10	43.48	13	56.52	
	Kerala	35	25	71.43	10	28.57	
	Other	2	0	0.00	2	100.00	

## DISCUSSION

### The major findings of the study regarding demographic variables:-

With regard to the age 54(90%) were belongs to 19-22 years and 6(10%) were belongs to 23-17 years.

- With regard to gender, 49(81.67%) were females and 11(18.33%) were males.
- In relation, to exposure to specific educational program, 60(100%) were not engaged.
- With respect to which state belongs to, 35(58.33%) were form Kerala, 23(38.33%) were from Karnataka, and 2(3.33%) from other states.

### To assess the existing knowledge of third year BSc nursing students regarding intravenous fluid therapy:

The mean percentage knowledge score obtained by the third year B. Sc Nursing students was 37.45% with mean and SD of 14.98 ±3.2. The median was 15 and range was 9-21. In the pre test, 45(75%) respondents had average



knowledge, 11(18.33%) were had poor knowledge and 04(6.67%) had good knowledge.

**To assess the existing practices of third year BSc nursing students regarding intravenous fluid therapy:**

The pretest level of practices scores of respondents was, the mean percentage practice score was 39.59 with mean and SD of  $12.67 \pm 3.42$ . The median was 13 and range was 10-18 scores.

In the pre-test, 37(61.67%) were had unsatisfactory practices and 23(38.33%) had satisfactory practices.

**To evaluate the effectiveness of self-instructional module regarding intravenous fluid therapy:**

The mean percentage pre test knowledge score was 37.45% with mean and SD of  $14.98 \pm 3.2$ . In the post test the mean percentage knowledge score was 81.12% with mean and SD of  $32.45 \pm 2.31$ . The mean percentage difference was 43.67% with mean of 17.47. The paired t test was used to assess the effectiveness of the SIM on intravenous fluid therapy, the obtained t test was 13.98,  $df=59$ ,  $p<0.05$ . shown significant difference.

The posttest levels of knowledge shown that the 48(80%) were had good knowledge and 12(20%) were had average knowledge.

The mean percentage pre test practice score was 39.42% with mean and SD of  $12.67 \pm 3.42$ . In the post test the mean percentage practice score was 90.56% with mean and SD of  $28.98 \pm 1.82$ . The mean percentage difference was 50.97% with mean of 16.31. The paired t test was used to assess the effectiveness of the SIM on intravenous fluid therapy, the obtained t test was 12.56,  $df=59$ ,  $p<0.05$  - showed significant difference.

In the post test, the 53(88.33%) respondents had satisfactory practices and 07(11.67%) had unsatisfactory practices.

**To find the association of knowledge and practices of third year B.Sc Nursing students regarding intravenous fluid therapy with selected socio- demographic variables:**

The chi square was used to assess the association between the pre test levels of knowledge with selected demographic variables. the obtained chi square values for the state belongs to shown significant association between the pre test levels of knowledge. The other demographic variables did not show the significant association.

The chi square was used to assess the association between the pre test levels of practices with selected demographic variables. The obtained chi square values for the state belongs to shown significant association between the pre test levels of practices. The other demographic variables did not show the significant association.

## CONCLUSION

The findings indicates that the self-instructional module was effective in improving the knowledge and practices levels of the 3rd year BSc Nursing students regarding intravenous fluid therapy. Further researches should be conducted on Intravenous fluid therapy to improve its quality. Training and re-training of Nursing students and nurses should be carried out, based on the latest guidelines of administering Intravenous fluid therapy, so that they can effectively administer intravenous fluid therapy and thus save life which is precious to everyone.

## SUMMARY

The present study conducted to evaluate the effectiveness of self-instructional module on knowledge and practices regarding intravenous fluid therapy among third year Basic B.Sc. Nursing students at selected nursing colleges Bangalore.

The justification of the study was based on the facts that nurses and nursing students are the people who constantly come across patients. Most of the nurses possess inadequate knowledge regarding intravenous fluid therapy. Thus an extensive review of literature enabled the investigator to study the extent of the selected problem, to develop conceptual framework, data analysis and interpretation.

### Implications

- The present study emphasizes on enhancement of knowledge regarding intravenous fluid therapy. In order to achieve this nurse should equip themselves by reading more books, recent advances and current issues attending programmes on intravenous fluid therapy.
- Appropriate material about Practices and guidelines on intravenous fluid therapy should be included in the nursing curriculum and in health textbooks.
- There must be motivation adequate supervision, instruction and evaluation of nursing students while providing Intravenous fluid therapy technique.
- Nurses Should enhance their knowledge on intravenous fluid therapy by attending the training programs on

- intravenous fluid therapy
- Orient the student nurses to the guidelines being followed in the hospital regarding intravenous fluid therapy
- Nurses should involve the student nurses in training programs regarding intravenous fluid therapy and monitor the student nurses while performing Intravenous fluid therapy.
- Simulation lab with well equipment should be arranged so that the training can be issued for the student nurses.

### Limitations

- The study was limited to one selected college of nursing. Therefore the possibility for wider generalization is limited.
- The study is limited to 3<sup>rd</sup> year Basic B.Sc Nursing Students.
- Samples selected for the study is restricted to 60 only.

### Recommendations

- The study can be replicated in a larger sample for better generalization.
- Follow up studies can be conducted to evaluate the effectiveness of the SIM on knowledge regarding intravenous fluid therapy.
- A similar kind of study can be conducted among the general nursing and other batches of Basic B.Sc. Nursing students.
- Periodical assessment programme about intravenous fluid therapy related knowledge, activities and actions should be conducted for the nurses.
- Experimental studies can be conducted with large sample size among Basic B.Sc Nursing Students.

### BIBLIOGRAPHY

- [1]. Parul Datta, 'Text book of Paediatric Nursing 3<sup>rd</sup> edition, 2014
- [2]. Marlow's Text book of Paediatric nursing, South Asian edition, 6<sup>th</sup> Edition
- [3]. S. Holliday MA, Segar WC, 'Fire maintenance need for water in parenteral fluid therapy, 1957; 19:823-832
- [4]. Journal of Paediatric pharmacological therapy; 2009 Oct-Dec; 14(4):204-211
- [5]. Provisional committee on quality improvement, subcommittee on acute gastroenteritis. Practice parameters: the management of acute gastroenteritis in young children; Paediatric 1996; 97: 424- . 35
- [6]. Innocent Karan Knowledge a power source for nurses. 2011. Available from: <http://arsirgcentex.com/Biog/post/2011/01/14/Knowledge-A-Power-Source-for-Nurses.asp>
- [7]. Angela Hall. Defining nursing knowledge; 2005 November 29. Available from: <http://www.nursingtimes.net/nursing-practice-clinical-research/defining-nursing-knowledge/203491.article>.
- [8]. Mg Bhat. What are all the ways nurses use math. Available from: [http://wiki.answers.com/Q/What are the ways nurses use math](http://wiki.answers.com/Q/What%20are%20the%20ways%20nurses%20use%20math)
- [9]. Pillitteri Adele. Child health nursing: care of the child and family. Philadelphia: Lippincott; 1999.
- [10]. Bibudha B, Acharya U, Pattanayak SP. Knowledge of staff nurses regarding intravenous catheter related infection working in Orissa. NH. 2010; 6
- [11]. Janet L T. Peripheral intravenous extravasation: nursing procedure for initial treatment. NNS'.2007; 26(6):379.