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# A Study to Evaluate Effectiveness of Self-Instructional Module Regarding Intravenous Access Device and Its Complications Among Nursing Students of Myh Indore

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**Abstract**

A study to evaluate the effectiveness of self-instructional module regarding intravenous access device and its complications in MYR Hospital of Indore city was undertaken by me towards partial fulfilment of the requirement for the general research purpose.

## 1. Introduction

- Each year millions of patients admitted in hospital requires some form of vascular access device are used for the administration of medication, fluid nutritional solutions and blood product also for monitoring hemodynamic or other clinical parameter.
- Simple, safe and reliable venous access is essential for the patient requiring intravenous treatment in term of prevention of complication related to intravenous infusion therapy.
- Intravenous administration medicines that are given intravenously reach the systemic circulation immediately and without any loss due to metabolism or barrier to diffusion.
- Sterile precautions are required to avoid risk of infection at the site of infusion.

## 2. Origin of Intravenous Infusion Therapy

- 1628-WM Harvey:-Discovery of circulation of blood led to further experimentation.
- 1656- Sr. Christopher Wren-Used a quill and bladder, injected optimum into drops.
- 1662- JD Major made first successful injection in man
- 1665=A dying animal was successfully transfused with the blood of another.
- 1667-A parsian 15 year old boy was first successful human transfused with the blood of a lamb led to many problem and death.
- 1687-Edict of church and parliament" animal to man transfusion prohibited in Europe"

## 3. Landmark in Development of IV Process

- 1900-Dr. Karl Landsteiner proved not all human blood is alike.
- 1935-Slow drip- continuous method of transfusion was published by two English physicians.
- 1940-A nurse was assigned as IV therapist at mass general hospital prerequisite to perform venipuncture successfully

- NS-Used at first in early 1900's fluid and electrolyte knowledge grew and today more than 200 commercially prepared IV fluids are available.

## 4. Current Events

1/80% of hospitalized patients receive IV therapy.
Large percentage of of medication are administered intravenously.
More widespread use of long term, central venous access
IV Therapy has become a subspeciality in nursing.
National Intravenous Association established standards of practice in 1985.
IV Therapy becoming more widely used extended care facilities and in home care situations

## 5. Need Of the Study

The insertion and daily uses of intravenous devices in associated with risk and complication that can have the impact on the clinical status and outcome of the patient. A variety of complication associated with the insertion and utilization of venous access devices can generally be considered either systemic or local in nature.

A rapid advance in technology for infusion therapy has driven the need for nurses specializing in vascular and infusion therapy.

Several professional organizations strive to improve clinical outcome with infusion therapy and vascular access through educational opportunities and publications.

Keeping in view the needs and importance of educating the student nurse, health personnel and staff nurses the investigator felt the need of preparing self-instructional protocol for student nurses and care giver. Self-instructional protocol also encourages the nurses in providing information to other staff nurses and health personnel to increase their knowledge and minimizes complications of intravenous therapy.

## 6. Deviations and Acronyms

Protocol: - Protocol is a written document which includes a series of steps that help the health team member preventing and minimizing complications during intravenous therapy.

Staff Nurse: - A group of pupils who are having knowledge about infusion therapy and participate in research work.

Intravenous Therapy: - Intravenous therapy defined as introduction of fluid, nutrient substance or medication through carnet directly in to the blood stream.

## 7. Review of Literature

A review of literature is a key step in research process, various views are presented by various scientist regarding review of literature Ian D. Bier August-2000 conducted a study on peripheral intravenous nutrition therapy, he has done own study mainly on outpatients and office based PIN has unique features including rate and short.

The conclusion of his study was osmolarities of infusion can approach 1000 Mos m/L if the duration of infusion is only several hours, duration of infusion should be less than three hours to reduce the time the irritating requires high infusion rates. the cannula should be removed at the first sign of pain or redness.

## 8. Research Methodology

The research design selected for the study was pre-experimental one group pretest posttest design. The design is widely used in educational research, this study is intended to measure the gain in knowledge score by staff nurse about the infusion therapy.

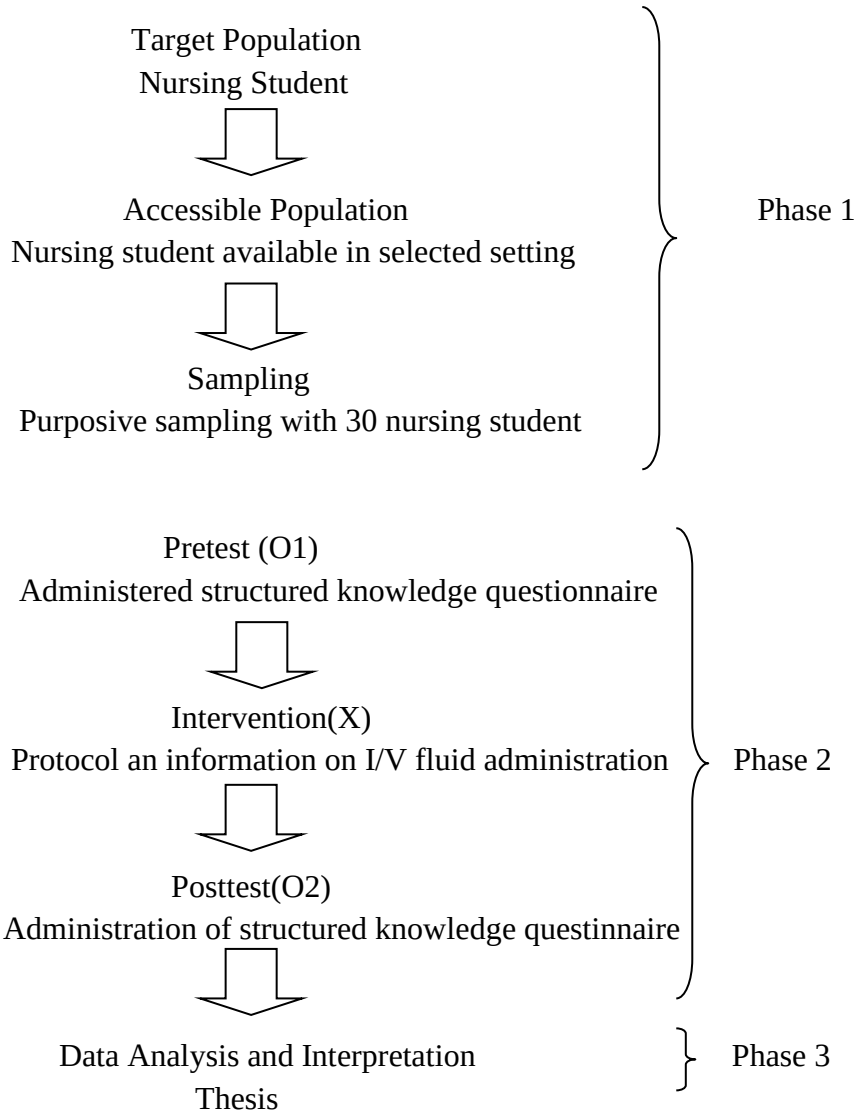
Here only one group is observed before and after introducing the independent variable.

The design can be represented

E--------→O1----------→X----------→O2

(Figure1: One group, pretest, posttest, pre-experimental design)

Key- O1- pretest knowledge score
X - Treatment (intervention)
O2 – posttest knowledge score




The study was conducted in Indore maharaja Yashwant rao hospital, this hospital has a capacity of 1000 patients and provide for education referral service with specialist of medical, surgical pediatrics and special unit included ICCU, ICU, SICU.

Sampling criteria

**Inclusion Criteria-** General nursing students those who are studying in second year, students those who are willing to participate in this study.
**Exclusion criteria: -** First year general nursing student those who are not practicing intravenous infusion therapy.

**Description of tools:**
The tools consist of two sections
**Section 1-** Demographic Variable
It Describes the demographic variable, it comprises of 5 items for obtaining information regarding age, educational qualification, category, in service education, and year of experience.
**Section 2-**
It consist of 25 knowledge item categorized under the following broad areas:
1. Type of intravenous fluid.
2. Type of vascular access devices.
3. Type of administration set.
4. Selection of vein.
5. care and maintenance of catheter.
6. Complication of intravenous infusion therapy.

The test items were objective type consisting of multiple choice questions with one correct answer, every correct answer was awarded a score of one point and every wrong answer was assigned a zero a score.
The maximum total score of the knowledge questionnaire was 25 score was graded as follows.

| Grade | Score |
|---|---|
| Excellent | 21 to 25 |
| Good | 16 to 20 |
| Average | 11 to 15 |
| Poor | 06 to 10 |
| Very poor | Below 5 |

A sample of 30 nursing student were selected using purposive sample technique, the pretest was given using a structured knowledge questionnaire the time taken to complete questionnaire was 15 to 20 minutes.

The following pretest a copy of intravenous therapy was given to the nursing student with following instructions:
Read thoroughly.
Come for the posttest on $7^{th}$ day.
The most of the subjects 80% were in the age group of 21-22 years, 10% were between the age group of 19-20 years, and 10% were in the age group of above 22 years.
With regards to education, most of the subjects 100% were general nursing students.
Data shows that most of the subjects 100% in general nursing second year.
Most of the student 80% had in-service education exposure from text book, 13.33% had from jornals, 3.33% had from conference, 3.33% had exposure from workshop.

Pretest knowledge score of the sample

| S. No. | Score | Frequency | Percentage |
|---|---|---|---|
| 1 | Very poor (0-5) | ----- | ------ |
| 2 | Poor (6-10) | 5 | 16.66% |
| 3 | Average(11-15) | 14 | 46/66% |
| 4 | Good(16-20) | 10 | 33.33% |
| 5 | Very good(21-25) | 1 | 3.33% |

Mean, Standard deviation mean difference between pretest and posttest knowledge score

| S. No. | Knowledge score | Mean | Standard Deviation | Mean difference |
|---|---|---|---|---|
| 1 | Pretest | 13.4 | 3.5 | 9.7 |
| 2 | Posttest | 23.1 | 1.45 | |

This indicates that self-instructional module (protocol) is effective in increasing knowledge score of nursing student regarding intravenous access device and its complications.

Grading of sample based on pretest and posttest knowledge score

| S No. | Score | Grading | Pretest | | Posttest | |
|---|---|---|---|---|---|---|
| | | | Frequency | Percentage | Frequency | percentage |
| 1 | (0-5) | Very poor | 0 | --- | 0 | 0 |
| 2 | (6-10) | Poor | 5 | 16.66% | 0 | 0 |
| 3 | (11-15) | Average | 14 | 46.66% | 0 | 0 |
| 4 | (16-20) | Good | 10 | 3.33% | 0 | 0 |
| 5 | (21-25) | very good | 1 | 3.33% | 30 | ND |

Maximum no. of student had 100% scores ranging from between 80-100% in the post test compared to pretest where most of the students 46.66% obtain score between 40 to 50%. It indicates a considerable gain in the knowledge scores and the effectiveness of self-instructional module(protocol)

It was found that mean pretest knowledge score this result is suggesting that protocol was effective in increasing the knowledge of student regarding intravenous access device and its complication.

## 9. Discussion

The data showed that nursing student have deficit knowledge regarding intravenous access device and its complication, the total mean score secured by nursing student is 13.4, this shows that the knowledge deficit is around 50%.

Effectiveness of self-instructional module regarding intravenous access device and its complication in terms of gain in knowledge score.

Pretest knowledge score of 14 student 46.66% was limited to 11 to15 score and 10 respondents 33.33% was limited to 6 to 10 score, and 1 respondent 3.33% was limited to 21 to 25 score.

This indicates that the subject had inadequate knowledge regarding intravenous access device and its complications

In the post test all the respondents 100% had scored between 21-25 (80 to 100%) and none of them scored below 80% The mean post test knowledge 23.1 higher than mean pretest score 13.4.
The above results clearly indicate that self-instructional module was effective in increasing the knowledge score among students regarding intravenous access device and its complications.

## 10. Recommendations

On the basis of finding of the study, it is recommended that

1. A similar study may be replicated on a large sample so that the finding can be generalized.
2. A comparative study may be conducted to find out the effectiveness between self-instructional module(protocol) and planned teaching program regarding the same topic
3. A study can be conducted to assess long term effects of self-instructional module in nursing student regarding intravenous access device and its complications.

## 11. Limitations

The few limitations of the study are listed below

1. The finding of the study cannot be generalized because of the small sample and purposive sampling technique.
2. A limited time available for data collection.
3. Structured knowledge questionnaire was used to data collection which restricted the amount of information that could be obtained from the students.
4. No attempt was made to measure the retention of knowledge after posttest
5. The study did not use a control group the investigator had no control over the event that took place between pretest and posttest.

## 12. Appendix

1. Letter requesting permission for conducting the research study for principal.
2. Letter requesting permission from matron for conducting the research study.
3. Permission letter from head of the department for conducting the study.
4. A structured questionnaire designed for feedback of target set in which part 1 dealt with demographic characteristics and part2 dealt with multi choice questions.
5. Self-instructional module(protocol) has following headlines to make aware the target group of research work
   Infusion therapy
   Purposes
   Types of fluids
   Intravenous fluids
   Para natal fluids
   Blood transfusion and other components
   Medication
   Vascular access devices
   Types of vascular access device
   Short peripheral catheter insertion and placement
   Choosing the gauge size for peripheral catheter

Midline catheter
Indication
Peripherally inserted central catheter placement and insertion
Indication
Non tunneled percutaneous central catheter
Contraindication
Tunneled catheter
Indications
Administration sets generic continuous administration set, secondary administration set, intermittent administration set.
Veins selection for intravenous infusion veins of hands, veins of forearm.
Catheter care and maintenance-educating the client, confirming tip location, performing the nursing assessment, changing administration sets and needle less connectors, controlling infusion pressure, flushing the catheter, obtaining blood sample from the catheter, removing the catheter.

## 13. Acknowledgement

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