THE EFFECT OF NORMAL SALINE FLUSH VERSUS HEPARIN SALINE FLUSH TO MAINTAIN THE PATENCY OF PERIPHERAL INTRAVENOUS LINE AMONG HOSPITALIZED PATIENTS IN SELECTED HOSPITAL AT TRIVANDRUM

Dissertation submitted to

THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY

CHENNAI

IN PARTIAL FULFILMENT OF REQUIREMENT

FOR THE AWARD OF DEGREE OF

MASTER OF SCIENCE IN NURSING

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_____ _____

INTERNAL EXAMINER **EXTERNAL EXAMINER**

DECLARATION

I, 301211706 hereby declare that this dissertation entitled **A STUDY TO ASSESS THE EFFECTIVENESS OF NORMAL SALINE FLUSH VERSUS HEPARIN SALINE FLUSH TO MAINTAIN THE PATENCY OF PERIPHERAL INTRAVENOUS LINE AMONG HOSPITALIZED PATIENTS IN SELECTED HOSPITAL AT TRIVANDRUM** has been prepared by me under the guidance and direct supervision of **Prof.Mrs. V.J. ELIZABETH,M.Sc(N),** Vice Principal, Thanthai Roever College of Nursing, Perambalur, as requirement for partial fulfilment of **M.Sc Nursing** degree course under **The Tamilnadu Dr. M.G.R. Medical University, Chennai – 32.** This dissertation had not been previously formed and this will not be used in future for award of any other degree/ diploma. This dissertation represents independent original work on the part of the candidate.

Place : Perambalur,
Date : April – 2014.

301211706,
II Year M.Sc (N) Student,
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"I shall give thanks to you, Lord and King, and Praise to you, God and Saviour For you have been my guard and support. I shall Praise your name unceasingly and gratefully with all my heart sing your praises."

– Ecclesiastics 51:1- 2

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ABSTRACT

INTRODUCTION: The concept of intermittent use of an intravenous (I.V) catheter began in the early 1970s, when a stopcock was added to plastic tubing on a winged needle. Almost all patients admitted to hospital require a peripheral intravenous catheter to provide access for administration of drugs and fluids and parenteral nutrition. Catheter flushing is the primary nursing intervention and to prevent lumen occlusion from thrombotic and precipitate cause. Some institutes use of dilution of heparin for this purpose, where as many others use of small amount of saline lock.

OBJECTIVES: To assess the effectiveness of normal saline flush Vs heparin saline flush to maintain IV line patency.

METHODS: Study design was true experimental post test only design. Sixty hospitalized patients who having IV line were selected by simple random sampling method and divided into two groups. Group I (n=30) received 2 ml of normal saline flush twice a day after IV injection and Group II (n=30) received 2ml of 50 IU/ml heparin saline flush twice a day after IV injection.

RESULTS: In the experimental group I post test level of patency of peripheral intravenous line the majority of the subjects 19 (63.33%) had mild blockage, 8 (26.67%) had severe blockage and 3 (10%) had no blockage. In the experimental group II post test level of patency of peripheral intravenous line the majority of the subjects 16 (53.33%) had no blockage and 14 (46.67%) had mild blockage among hospitalized patients.

CONCLUSION:

The study highlights that the level of patency of peripheral intravenous line after heparin saline flush was effective.

CHAPTER I

INTRODUCTION

“Prepare and prevent, don't repair and repent.”

The concept of intermittent use of an intravenous (I.V) catheter began in the early 1970s, when a stopcock was added to plastic tubing on a winged needle.

Peripheral intravenous line is the most common intravenous access method in both hospital and pre hospital services. A peripheral line consists of a short catheter inserted through the skin into a peripheral vein, any vein that is not in the chest or abdomen. There are times when underline physiological factor [obesity, peripheral vascular diseases, and intravenous drug abuse] make insertion into any available vein a medical necessity particularly if the patient is exanguinating. Arm and hand veins are typically used although leg and foot veins are occasionally used. Vein in arms are the common site in emergency settings.

Intravenous administration is the best method because of its advantages. Nurse can use the intravenous route in emergencies when a fast acting medication must be delivered quickly. The intravenous route is also the best when it is necessary to establish a constant therapeutic blood levels. Some medications are highly alkaline and irritating to muscle and subcutaneous tissue. These medications cause less discomfort when given intravenously.

Flushing procedures are necessary before and after the administration of intermittent medications through a capped catheter lumen, before and after blood sampling or the infusion of blood products, before and after the administration of incompatible medications, and when converting a catheter from a continuous to an intermittent infusion.

The health care setting also influences the frequency of flushing. For instance, a hospitalized patient will usually receive flushes after each use and at least every 8 or 12 hours. Patients in home care or an ambulatory infusion clinic will have the catheter flushed daily or after each infusion, which could be less frequent than every day.

Lack of patency is a common and confusing problem. When the catheter is flushed or failures to obtain the required brisk blood return before catheter use indicates a non-functioning catheter.

Catheter occlusion may be categorized as mild or severe occlusion. Mild occlusion means that although the nurse flushes or infuses through the catheter, it does not yield the brisk blood return required for complete assessment of catheter patency. Severe occlusion is defined as the inabilities to flush, infuse, and aspirate from the catheter. Catheter occlusion can be caused by drug precipitates and several mechanical issues, although intraluminal thrombosis is thought to be the most common factor. Many factors cause blood to move into the catheter lumen from many sources. Catheter patency is also affected by fibrin and thrombosis development inside the vein around the catheter tip, where the flushing solution or technique will have no effect.

The nurse providing infusion therapy for patients shall have clinical knowledge and technical expertise with respect to this population. Clinical management of patients shall be established in organizational policies, procedures, and/or practice guidelines and shall be according to applicable standards of practice.

NEED FOR THE STUDY

Almost all patients admitted to hospital require a peripheral intravenous catheter to provide access for administration of drugs and fluids and parenteral nutrition. Intravenous medications enter the client blood stream directly by way of vein, they are appropriate when rapid effect is required. This route is also appropriate when medications are to irritating to tissue to be given by other route. When an intravenous line is already established, this route is desirable because it avoid the discomfort of other parenteral route.

Maintenance of patency of these indwelling catheters is important for minimizing patients discomfort and expense associated with replacement. Vascular thrombosis, visible scarring, and infection related to catheter are complications associated with use of these indwelling vascular devices.

Catheter flushing is the primary nursing intervention and to prevent lumen occlusion from thrombotic and precipitate cause. The catheter and all device attached to it must be regarded as a system in which each component directly affect other. Technology flushing includes flushing solution itself, the source of solution syringe design itself.

While caring for clients with peripheral intra venous line thrombosis is a very common occurrence in the ICU leading to Phlebitis which occurs more commonly. Also, the type and size of the catheter, the duration of

cannulation and the infusion of hypertonic fluids or various drugs influence the occurrence of phlebitis. The incidence of thrombosis has been shown to range from 0.3 – 71%.

Intravenous drug administration is common in hospitalized patients. If the daily volume of infusion is less, and needed intermittently, during the gap time the intravenous catheter may occlude with blood clot which may lead to thrombo-emboli, severe pain in the subsequent infusion as the clot forcefully dislodges from the lumen and even blockage of the catheter so early this needs selection of new site. To prevent these all complications maintaining the patency is the best choice especially in elderly patients. Patency can be maintained in many ways by flushing the intra venous line with Heparin or Normal saline or sterile water.

Edward G. Lakatta. Conducted a study on “Age-associated Cardiovascular Changes in Health: Impact on Cardiovascular Disease in Older Persons”. The study reports that In the United States, cardiovascular disease, e.g., atherosclerosis and hypertension that lead to heart failure and stroke is the leading cause of mortality. As the Intra Venous catheter block leads to formation of thrombi which may block micro blood vessels. So control and prevention of complications arising from intra venous catheter is essential.

Maninder Kaur (2006). A Quasi Experimental study was conducted in Nehru Hospital to evaluate patency of Intra venous cannula with Normal Saline Lock in the control and experimental groups. Patients having Intra venous cannula inserted in peripheral veins of hand and forearm for the administration of Intra venous medication were included in the study. At the

end of the study normal Saline Lock is found to be highly effective for maintaining patency of intra venous cannula.

Heparin prevents blood clotting by its anti thrombin activity so it is widely used as an anticoagulant in clinical practice. Heparin directly acts on thrombin by suppressing its activity. Heparin also combines with anti thrombin III and it removes thrombin from circulation and it inactivates the active form of other clotting factors like IX, X, XI and XII.

A study conducted in 65 patients to find out the effectiveness of heparinised lock in maintaining the patency of intravenous line showed that 82% of patients have good result after administration of heparinised saline. The patients do not develop any clot or complication after administration of heparinised saline lock after maintaining intravenous line.

Numerous research and clinical trials have been done to determine the effectiveness of normal saline over heparin in catheter patency and its associated complications. However, there is still a significant amount of ambiguity surrounding the issue because of heterogeneity in the studies and variability in clinical practice. Some institutes use of dilution of heparin for this purpose, where as many others use of small amount of saline lock. So the researcher identified the need for conducting research regarding this topic.

STATEMENT OF THE PROBLEM

A study to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in selected hospital at Trivandrum.

OBJECTIVES

1) To assess the level of patency of peripheral IV line among patients receiving normal saline flush.

2) To assess the level of patency of peripheral IV line among patients receiving heparin saline flush.

3) To assess the effectiveness of normal saline flush Vs heparin flush to maintain IV line patency.

4) To find out the association between post test level of IV patency of patients receiving heparin saline flush with their selected demographic variables.

RESERARCH HYPOTHESIS

- **H_1** – There will be a significant difference between the effectiveness of normal saline flush and heparin saline flush to maintain the patency of peripheral intravenous line.

- **H_2** – There will be a significant association between the post test level of patency of peripheral intravenous line among hospitalized patients and their selected demographic variables who receiving heparin saline flush.

OPERATIONAL DEFINITIONS

Effectiveness

Effectiveness refers to the capability of producing a desired result.

In this study it refers to the extent to which the normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line as measured by peripheral intravenous patency assessment tool.

Normal saline flush

A normal saline flush is the method of administering normal saline to intravenous lines so that they can keep the area of entering clean, unblocked and sterile.

In this study it refers to a isotonic solution which is having 0.9% sodium chloride 2 ml to be used for flush out IV line daily twice (morning and evening).

Heparin saline flush

Heparin flush is a dilute solution of heparin that is used to flush an intravenous line.

In this study it refers to the diluted heparin in normal saline which is prepared in 50 IU / ml and 2ml to be used in twice a day (morning and evening).

Patency

The state or quality of being open, expanded, or unblocked.

In this study it refers to the state of IV line being unblocked.

Peripheral intravenous line

Peripheral venous catheter is a catheter placed into a peripheral vein in order to administer medication or fluids.

It refers to a short, thin, plastic tube called a catheter that goes through the skin and subcutaneous tissue into a vein to administer medications or fluids.

ASSUMPTIONS

1. Saline flush may be effective in maintaining the patency of IV line.
2. Heparin saline flush may be effective in maintaining the patency of IV line.

DELIMITATIONS OF THE STUDY

1. Data collection period was delimited to 4-6 weeks.
2. The study was limited to only one hospital.
3. The sample size was delimited to 60.

PROJECTED OUTCOME

The heparin saline flush and the normal saline flush both effective to maintain the patency of peripheral IV line. The heparin saline flush is more effective than the normal saline flush to maintain the patency of peripheral IV line.

CHAPTER II

PART I

REVIEW OF LITERATURE

Review of literature is an essential component of the research process. It aids the researcher in the formulation of the research plan or proposal and condition of the study. It aids in relating the outcomes of the study to the findings of other investigations.

Review of literature is defined as a critical summary of research on a topic of interest, often prepared to put a research problem in contest (Polit and Beck, 2006).

The current study and review of various associated literature and review study, topics can divide as follows;

Section A: Studies related to comparison of normal saline flush and heparin saline flush.

Section B: Studies related to effectiveness of normal saline flush.

Section C: Studies related to effectiveness of heparin saline flush.

Section A: Studies Related to Comparison of Normal Saline flush and Heparin saline Flush.

Elsevier (2009) did a randomized double blind controlled trial to investigate the efficacy of normal saline versus heparin saline in maintaining the patency of intravenous catheter among 150 children of paediatric unit at United States. In that, Group I received normal saline flush (n=77) whereas

Group II received heparin saline flush (n=73). The result showed that 72% of children were recovered from blockage during normal saline flush. Thus researcher concluded that the normal saline flush was effective in maintaining the patency of intravenous catheter.

Klieiber (2008) conducted prospective, randomized double blind study to determine the efficacy of saline versus heparin flush to maintain the peripheral intravenous lock in paediatric populations among 140 children. The sample was selected randomly into two groups. Group I received normal saline flush whereas Group II children flushed with heparinized saline. The findings revealed that there was no significant difference between the groups in maintaining the patency of catheter and reduces incidence of complications.

A randomized controlled double-blind trial was conducted by **Esther Mok, Tany KY Kwong (2007)** for maintaining peripheral intravenous lock among 123 children of age from one to ten years. The objective of this study was to evaluate the effectiveness and safety of three flush solutions: normal saline, one unit/ml of heparin saline and ten units/ml of heparin saline for maintaining peripheral intravenous locks in children, and to establish a research-based practice in the study hospital. Group I received one unit/ml of heparin saline, Group II received ten units/ml of heparin saline and Group III received normal saline. The result showed that there was no significant difference among the three types of flushing solution in terms of the catheter longevity and incidence of intravenous complications.

A study was conducted by **Visanu Thamlikitkul & Artit Indranoi (2006)** on switching from heparinised saline flush to normal saline flush for maintaining peripheral venous catheter patency in the patients hospitalized to

medical ward at Sir raj Hospital, Thailand. The study sites were ten medical wards containing two hundred and forty beds. Group I received heparinised saline as a flushing agent whereas Group II received normal saline as a flushing agent. The results showed that the children received heparinised saline flush in February 2005, switched on to a practice with normal saline flush in June and November 2005. Hence the researcher concluded that normal saline was effective and implemented as evidence based clinical practice.

The trial by **Fuentes I Pumarola et al. (2007)** was done in two phases. The first phase compared flushes with different concentrations of heparin solution. Only 49 of 145 catheters randomized to 100 U/ml heparin were included in the analysis, and 79 of 146 catheters randomized to 20 U/ml heparin. Another 8 and 13 cases respectively were lost to follow- up between the first measurement of catheter patency and the end of the study. Similarly high rates of attrition were reported in the second phase of the study, where only 38 of 125 catheters randomized to 20 U/ml heparin were analyzed, along with 57 of 125 randomized to saline flush. All the catheters analyzed in this study were patent after 24 or 72 hours, regardless the type of flush used. Authors concluded that there were no statistically significant differences between groups in catheter patency.

A prospective randomized study published in journal of obstetric, gynaecologic, neonatal nursing in **2003**, conducted by **Niesen KM, Harris DY** to compare the efficacy of two available preparation, heparin 10 unit per ml versus normal saline 1ml , for maintaining patency of peripheral intravenous locks during pregnancy. Eligible patients who were to receive a peripheral intermittent IV locks when randomly assigned to receive either heparin flushes or normal saline flush for iv lock maintenance. IV lock site were also

evaluated for every 12 hours for the development of phlebitis. Study found that both heparin and normal saline may be equally effective in the maintenance of peripheral IV locks.

Janet Pettit (2003) performed a randomized double blind study to identify the efficacy of saline versus heparin flush to maintain the peripheral intravenous lock in paediatric populations among 124 infants over twenty eight days of age in paediatric ICU at Doctor's Medical Centre, Modeto. The findings revealed that saline flush had longer period of patency. Thus the researcher concluded that saline was efficacious and safest flush in maintaining the peripheral intravenous catheter.

Nelson (2002) conducted a randomized double blind study to assess the use of 0.9% normal saline flush with or without heparin for maintaining peripheral indwelling intermittent infusion devices among fifty eight children up to one year with twenty four gauge needle. Group I received ten units per ml of heparin solution (n=26) and Group II received 0.9% normal saline flush (n=32). The result showed that there was no significance between 0.9% normal saline flush with or without heparin solutions in maintaining patency of twenty four gauge peripheral intermittent intravenous devices in children younger than one year.

Schultz, Drew & Hewitt (2002) investigated a randomized double blind study on comparison of normal saline and heparinized saline flushes for patency of intravenous locks among forty nine neonates at Maine Medical Center, Portland. The objective of the study was to determine the efficacy of patency of intravenous locks maintained with normal saline solution compared with heparinized saline solution. Group I received 0.5 ml of heparinized saline flush containing two units/ml of heparin (n=20) whereas

Group II received 0.5 ml of normal saline flush (n=29). There were no significant difference (p =0.841) between mean scores for heparin flushed catheters (M = 41.5 hours, SD = 44.0) and saline-flushed catheters (M = 30.4 hours, SD = 20.8). The researcher concluded that catheter failure was significantly longer for catheters flushed with heparinized saline compared with those flushed with normal saline.

A study was conducted by **Harahan & Berends (2000)** to evaluate the efficacy of saline versus ten units/ml heparin for peripheral intravenous flushes among 240 neonates of Special Care Nurseries at a Level III Large Mid Western University Teaching Hospital. Here an experimental group design was used to compare the longevity of heparin and saline intravenous locks. Data were collected from a convenient sampling technique. Group I received ten units per ml of heparin (n=123) whereas Group II received preservative-free normal saline solution (n=117). The result showed that there was no significant statistical difference in intravenous catheter longevity between intravenous locks flushed with ten units/ml heparin and those flushed with normal saline.

Section B: Studies Related to Effectiveness of Normal Saline flush.

Hephzibah Alexander (International Journal for the Advancement of Science & Arts, 2010) conducted a systematic review of the study on heparin versus normal saline as a flush solution. The electronic database of Ovid, Pub-Med, the Cochrane Library and the Cochrane Database of Systematic Reviews (CDSR) was searched for heparin or normal saline (either singly or in combinations). In terms of safety, the findings indicate that it might be safer to use normal saline as it does not have the risks associated with heparin. The result of the study revealed that normal saline should be used as an alternative to heparin in intravenous catheters.

2003 - 2012 UK Essays (2010). Published article on "A study to assess the effectiveness of intermittent normal saline flushing in maintaining the patency of peripheral intravenous catheters and reduction of pain among children between 1 to 5 years admitted in NIMS Hospital, Trivandrum, May 2010.'' Regarding intravenous patency, in pre test 7(23.33%) children had patent intravenous line, 23(76.66%) children had mild blockage and none of the children had severe blockage, but in post test 26(86.66%) children had patent intravenous line, 4(13.33%) children had mild blockage and none of them had severe blockage in experimental group. Whereas in control group, the pre test result showed, 10(33.33%) children had patent intravenous line, 20(66.66%) children had mild blockage and none of them had severe blockage, but in post test, majority 22(73.33%) children had severe blockage, 8(26.66%) children had mild blockage and none of them experienced patent intravenous line.

Anderson BJ et al (2010) conducted a systematic review of the evidence on strategies to maintain patency of CVCs. Randomized trials found that flushing with heparin had no significant effect on catheter patency rates compared with flushing using saline. As a result we revised our catheter maintenance policy and now flush CVCs with saline.

A study published in Health science journal in **2008**, conducted by **Maria Mitsiou et al** find the evidence for keeping the patency in peripheral intermittent intravenous devices. A thorough search was performed in different nursing and medical data bases, in order to find available evidences. Evidences suggest the same degree of effectiveness of normal saline solutions versus heparin solution for maintenance of patency of peripheral intermittent intravenous catheter. Since the use of heparin is considered the cause for

many side effect and complication, normal saline should be the solution of choice as it contribute patent safety satisfaction and cost saving .

Maninder Kaur (2006) Conducted a Quasi Experimental study was conducted in Nehru Hospital to evaluate patency of Intra Venous cannula with Normal Saline Lock in the control and experimental groups. Patients having Intra Venous cannula inserted in peripheral veins of hand and forearm for the administration of Intra Venous medication were included in the study. At the end of the study normal Saline Lock is found to be highly effective for maintaining patency of Intra Venous cannula.

Section C: Studies related to effectiveness of heparin saline flush.

Ashton J et-al conducted a study in Australia **(2006)** to find out the benefits of heparin over normal saline. The systematic review and meta-analysis had good methodological quality and took into consideration the heterogeneity of the studies. The authors suggest that use of heparin as intermittent flushes had no benefit over normal saline. However, continuous infusion of heparin at 10U/ml significantly reduced the risk of phlebitis, increased the duration of catheter patency and reduced infusion failure. It is difficult to draw a conclusion as to whether heparin is better than normal saline based on the available evidence as the findings are very inconsistent. However, it is important to note that a number of studies showed that normal saline is equally effective as heparin.

Kabra NS et al (2005) states that the effect of heparin on the duration of peripheral intravenous catheter use varied across the studies. Because of clinical heterogeneity and heterogeneity in treatment effect, recommendations for heparin use in neonates with PIV catheters cannot be

made. There are insufficient data concerning the effect of heparin for prolonging PIV catheter use in neonates. Further research on the effectiveness, the optimal dose, and the safety of heparin is required.

A prospective interventional study published in the journal of infusion nursing in **2008** conducted by **Tripathi et al** to assess the factor affecting complication and patency of peripheral IV's .Sample was 88 patients from neonates to 12 year olds, on who total of 377catheter were started. Intravenous cannulations were randomized for heparin flush and splint. Prospective data were collected regarding duration of patency and complication There was a statistical significant increase in the duration of patency with use of heparin flush and splint.

AACN was conducted a study in America**(2003)** to evaluate the effect of heparin on duration of catheter patency and on prevention of complications associated with use of peripheral venous and arterial catheters. The sample consisted of 260 surgical patients from general surgery and cardio vascular surgery nursing unit a tertiary care hospital. Result indicated that heparinised saline is not needed to maintain patency of an intermittent intravenous site and the use saline solution alone is less irritating cause less phlebitis is less expensive to patients.

Bowers et al (2008) was conducted a study by compared heparin flush to saline flush. Patients were randomized to having their catheters flushed with 10ml of saline and then 3ml of 100units /ml heparin. Despite randomization, there was statistically significant difference between the patient groups. Out of 50 patients randomized to the saline flush, three experienced occlusion of their catheters while none of the 52 patients randomized to the heparin flush experienced occlusion.

PART II

CONCEPTUAL FRAMEWORK

The conceptual framework for this study is based on general system theory developed by **Ludwig von Bertalantty** in 1968. This system theory explains dividing the whole thing in to parts and working together of these parts in system. According to this model, a system is a set of objects which are related between themselves and their attributes. The object contributing to the system behaves together as a whole. Changes in any part will affect the whole system. All living systems are open systems which mean that they exchange energy matter and information across their boundaries with the environment. General system theory consists of the scientific explanation of whole or wholeness, it has its subsystem. The main concepts of this subsystem are input, throughput, and output. Input and output are the process by which a system is able to communicate and react with its environment.

INPUT

Refers to matter, energy and information enters in to the system its boundary.

THROUGHPUT

Is a process that occurs at some point between the input and output process. It enables the input to be transformed in such a way that it can be readily by the system.

OUTPUT

Is an energy, information (or) matter that is transformed to the environment.

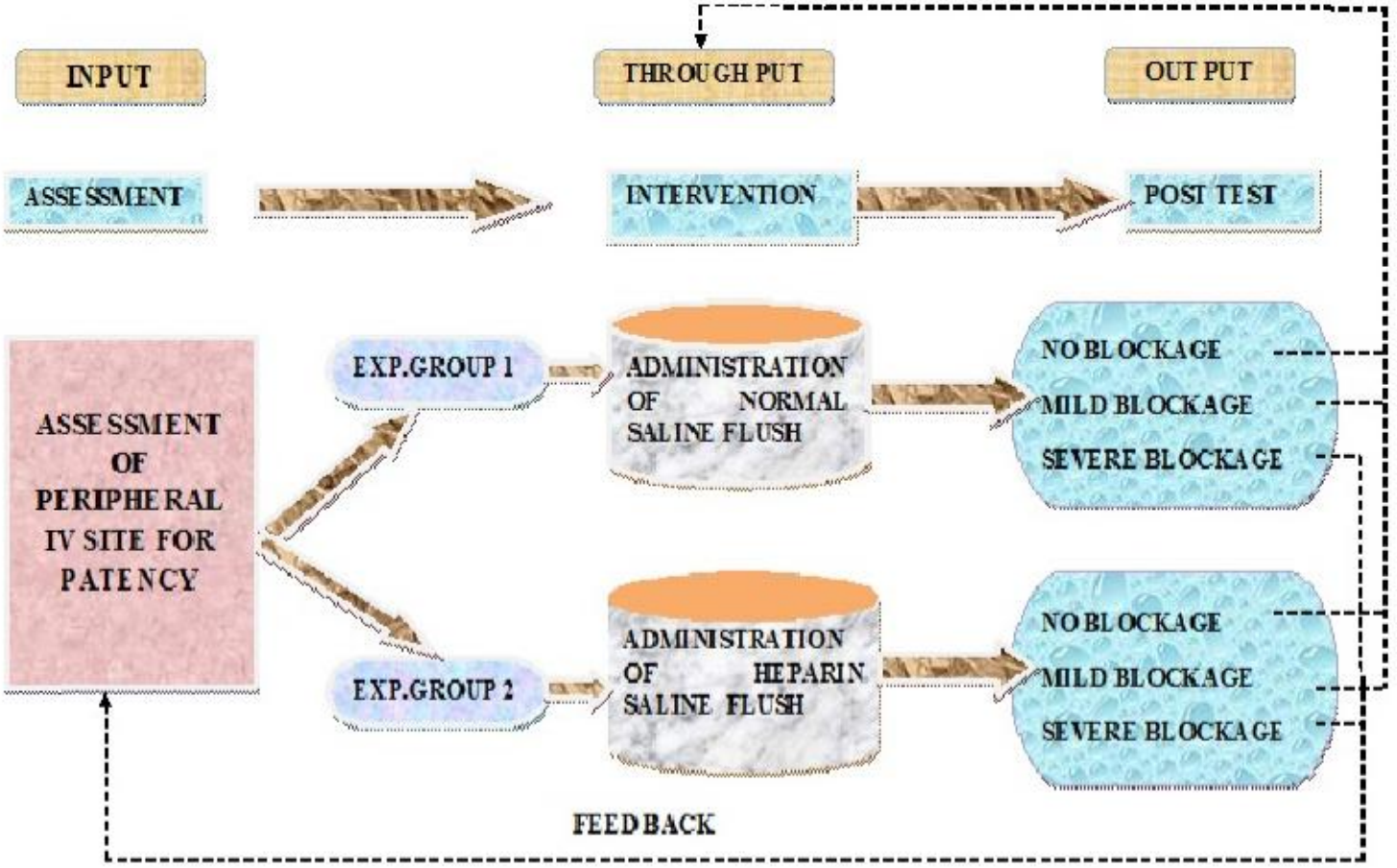


Fig: 1 Modified Ludwing Von Bertalanffy's General System Model (1968)

INPUT

In this study, input consists of demographic variables of age, sex, body built, frequency of iv medications, type of ambulation and also assessment of patency of peripheral iv catheter by observation check list.

THROUGH PUT

In this study throughput was considered as intervention like NORMAL SALINE FLUSH for EX GRP; 1and HEPARIN SALINE FLUSH for EX GRP;2 in order to maintain the patency level of peripheral iv catheter.

OUTPUT

Output refers to maintenance of adequate patency was introducing the intervention. Output refers to the maintenance of adequate patency of peripheral IV catheter of normal saline flush and heparin saline flush. This output was evaluated by post test after treatment. This ultimately results in the improvement of quality of care.

FEED BACK

Refers to an analysis of the post test in this study. It refers to the valuation of Normal Saline and heparin saline flush. It improves the patency of peripheral IV catheter in both groups.

CHAPTER III

RESEARCH METHODOLOGY

This chapter describes the methodology followed to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients. It includes research design, variables, settings, population, and sample, criteria for sample selection, sample size, sampling technique, development and description of tool, content validity, pilot study, data collection procedure and plan for data analysis.

RESEARCH APPROACH

Quantitative evaluative approach was used for the study.

RESEARCH DESIGN

True experimental post test only design was used in the study.

Group	Pretest	Intervention	Post test
Experimental Group I		X_1	O_1
Experimental Group II		X_2	O_1

X_1 : Normal Saline Flush

X_2 : Heparin Saline Flush

O_1 : Post test assessment of patency of peripheral IV line.

VARIABLES

Dependent variable **:** The patency of the IV line.

Independent variable **: N**ormal saline flush, heparin saline flush

STUDY SETTING

The wards and ICUs of NIMS Hospital, Neyyatinkara

STUDY POPULATION

Patients in the wards and ICU.

SAMPLE

Patients in the wards and ICU who have IV line.

SAMPLING TECHNIQUE

Simple random sampling technique was used in this study.

a) Sample Size

60 patients in the wards and ICU who have IV line.

b) Duration of study

4 Weeks.

CRITERIA FOR SAMPLE SELECTION

a) INCLUSION CRITERIA

1. The patients who are having IV line.
2. The patients who are willing to participate.
3. The patients who are receiving IV medications for at least 3 days.

b) EXCLUSION CRITERIA

1. The patients who are not willing to participate in the study.
2. Patients who are all having known bleeding & coagulation disorders.
3. Patient who are having peripheral vein disorders.
4. Patients already on anti coagulation therapy.

TOOLS OF RESEARCH

The investigator developed a **Peripheral intra venous patency assessment tool** for collecting data regarding effect of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line with the selected demographic variables.

DESCRIPTION OF THE DATA COLLECTION TOOL

PART I

Interview guide which consist of questions to collect the demographic data.

PART II

Peripheral intravenous patency assessment tool was used to assess the patency of peripheral intravenous line in experimental group I and experimental group II. The score ranges from 5 to 20 and patency level of peripheral intravenous line was assessed by the researcher.

GRADING PROCEDURE

Level of patency	Score
No blockage	5
Mild blockage	6-15
Severe blockage	16-20

CONTENT VALIDITY

For content validity the research experts were requested to give their opinion about the content areas and 1st relevance and appropriateness of the items. Content validity obtained from five experts from the department of Medical & Surgical nursing. Items were modified based on their suggestions.

RELIABILITY

To ensure the reliability of the tool, that has been administered in each group. Reliability was established using test retest method. The reliability for Peripheral intravenous patency assessment tool is 0.82.

PILOT STUDY

The pilot study was done at NIMS Hospital Neyyatinkara between 12.06.13 to 15.06.13 to test the feasibility, relevance and practicability. Permission was sought from the Managing Director, NIMS Hospital Neyyatinkara. The objectives of the study were explained to the Managing Director and the Nursing Superintendent. The consent was obtained from all the samples after explaining the purpose of the study. The pilot study was conducted among 6 patients, 3 on each group, they selected by simple random sampling technique. The intervention Normal saline flush 2ml was given after

IV medication administration twice a day for 3 days for experimental group I and heparin saline flush 2 ml of 50 IU/ml was given for experimental group II for 3 days. The post test level of intravenous line patency test was done at the end of the 3rd day. The data analysis shows the study was found to be feasible.

COLLECTION OF DATA

Data collection was done from 24.6.2013 to 20.07.2013 at NIMS Hospital Neyyatinkara. The objectives of the study were explained to the Managing Director and the Nursing Superintendent. The samples were selected by simple random sampling technique. Data was collected all the days except Sunday. The purpose of the study was explained and written consent was obtained from all patients before the study. 60 patients in the ward and ICU who have IV line was assessed using **Peripheral intra venous patency assessment tool** for to know the effect of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line by the researcher by 3rd day. The researcher himself collected the data by using observation method with the help of observation checklist.

PLAN FOR DATA ANALYSIS

All the analysis was done by SPSS 13th version. The collected data was tabulated to represent the findings of the study.

Descriptive Statistics

1. The frequency and percentage distribution will be used to analyze the demographic variables and level of IV line patency among hospitalized patients.

2. Mean and Standard deviation will be used to assess the effectiveness of Normal Saline flush Vs heparin flush to maintain the patency of peripheral intravenous catheter.

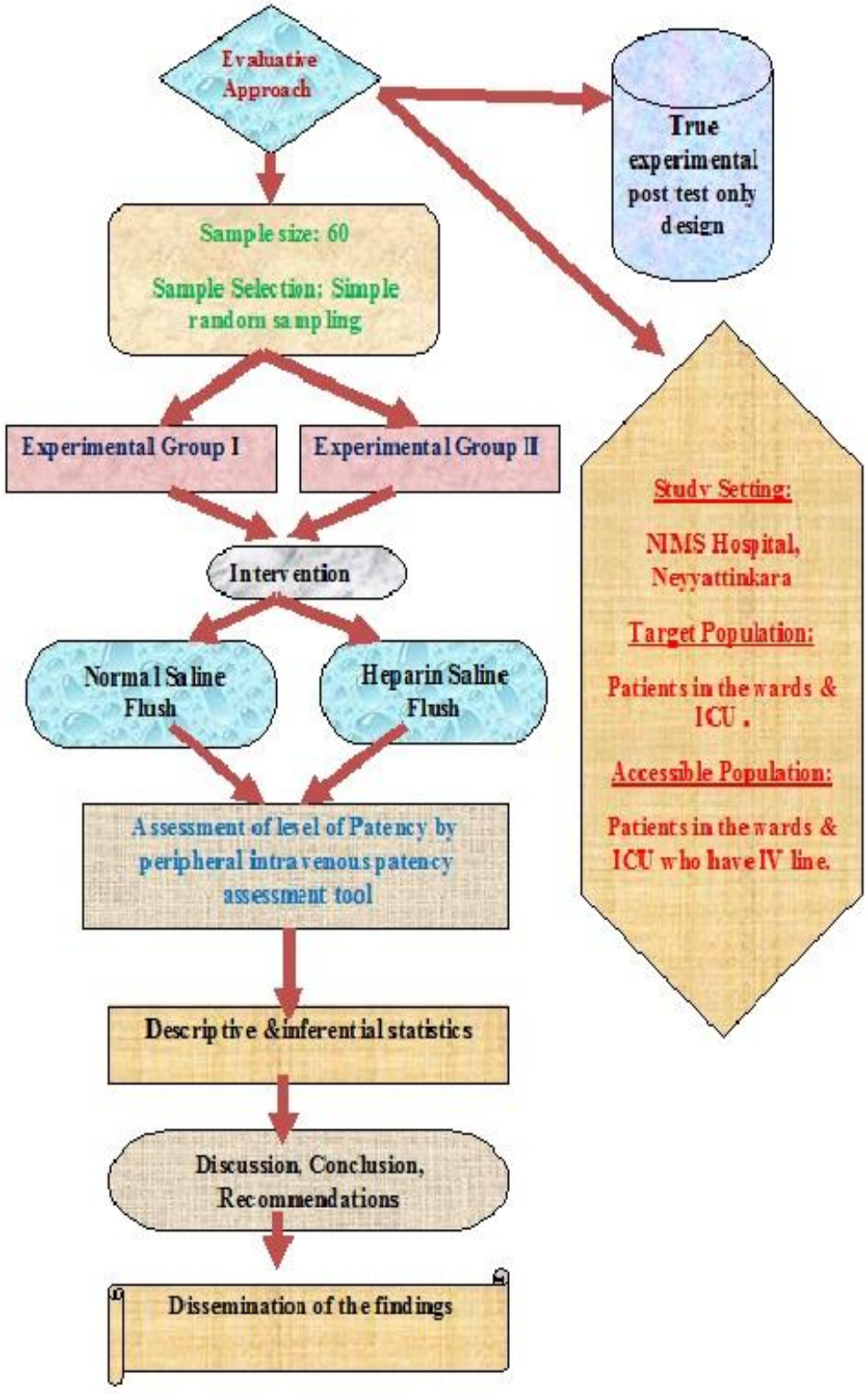
Inferential Statistics

1. Independent‘t’ test will be used to assess the effectiveness between two groups.
2. Chi square test will be used to find out the association of post test scores with their selected demographic variables.

ETHICAL CONSIDERATION

- The study was performed after getting approval from the dissertation committee, Thanthai Roever College of nursing.
- Permission was obtained from the managing director of NIMS Hospital Neyyatinkara.
- Consent was obtained from each study subject before collecting data.
- Confidentiality was maintained throughout the study.

Fig. 2 SCHEMATIC REPRESENTATION OF RESEARCH METHODOLOGY



CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the description of the sample analysis and interpretation of the data to assess the effectiveness of normal saline flush Vs heparin flush to maintain the patency of peripheral intravenous line among hospitalized patients.

The obtained data were classified and grouped and analyzed statistically based on the objective of the study.

ORGANIZATION OF DATA

The study findings were analyzed and interpreted under the following sections.

Section I

Frequency and percentage distribution of sample according to demographic variables in experimental group I and experimental group II.

Section II

A) Post test level of patency of peripheral intravenous line among patients with normal saline flush.

B) Post test level of patency of peripheral intravenous line among patients with heparin saline flush.

Section III

Post test level of patency of peripheral IV line among patients in experimental group I and experimental group II.

Section IV

A) Association of post test level of patency of peripheral intravenous line among patients in experimental group I with their selected demographic variables.

B) Association of post test level of patency of peripheral intravenous line among patients in experimental group II with their selected demographic variables.

SECTION I

TABLE 1 FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLE ACCORDING TO DEMOGRAPHIC VARIABLES IN EXPERIMENTAL GROUP I AND EXPERIMENTAL GROUP II.

Sl.No	DEMOGRAPHIC VARIABLES	EXPERIMENTAL GROUP I N=30 P=100%		EXPERIMENTAL GROUP II N=30 P=100%	
		Frequency	Percentage	Frequency	Percentage
1	**Age in years**				
	a) 20–40	**14**	**46.67**	**12**	**40**
	b) 41–60	**13**	**43.33**	**13**	**43.33**
	c) Above 60	**3**	**10**	**5**	**16.67**
2	**Gender**				
	a) Male	**15**	**50**	**13**	**43.33**
	b) Female	**15**	**50**	**17**	**56.67**
3	**Diet Pattern**				
	a) Vegetarian	**11**	**36.67**	**9**	**30**
	b) Non Vegetarian	**19**	**63.33**	**21**	**70**
4	**Habits**				
	a) Cigerette smoking	**3**	**10**	**3**	**10**
	b) Alcohol consumption	**7**	**23.33**	**5**	**16.67**
	c) Tobacco	**4**	**13.33**	**7**	**23.33**
	d) None	**16**	**53.34**	**15**	**50**
5	**Whether undergone surgical treatment**				
	a) Yes	**11**	**36.67**	**12**	**40**
	b) No .	**19**	**63.33**	**18**	**60**
6	**Body mass index**				
	a) Thin	**9**	**30**	**7**	**23.33**
	b) Moderate	**17**	**56.67**	**17**	**56.67**
	c) Obese	**4**	**13.33**	**6**	**20**
7	**Frequency of medication**				
	a) Once in a day	**5**	**16.67**	**6**	**20**
	b) Twice in a day	**15**	**50**	**16**	**53.33**
	c) Thrice in a day	**10**	**33.33**	**8**	**26.67**

8	**Type of ambulation**				
	a) Mobilized	**16**	**53.33**	**16**	**53.33**
	b) Partially mobilized	**12**	**40**	**10**	**33.33**
	c) Immobilized	**2**	**6.67**	**4**	**13.34**

Table 1 reflects the frequency and percentage distribution of sample according to demographic variables in Experimental Group I and Experimental Group II.

- Majority of subjects 14 (46.67%) belonged to the age group of 20 to 40 years in experimental group I and majority of subjects 13 (43.33%) belongs to the age group of 41 to 60 years in experimental group II.
- Regarding the gender, males 15 (50%) and females 15 (50%) were equally in experimental group I and in experimental group II majority of subjects 17 (56.67%) were female.
- Majority of the subjects 19 (63.33%) in experimental group I and 21 (70%) in experimental group II consume non-vegetarian.
- Majority of subjects 16(53.34%) in experimental group I and 15 (50%) in experimental group II had no bad habits.
- Majority of the subjects 19 (63.33%) in experimental group I and 18 (60%) in experimental group II were not undergone surgical treatment.
- Majority of subjects 17 (56.67%) in experimental group I and 17 (56.67%) in experimental group II have moderate body built.
- Majority of subjects 15 (50%) in experimental group I and 16 (53.33%) in experimental group II were taking medication twice in a day.
- Majority of 16 (53.33%) subjects were mobilized in experimental group I and experimental group II.

Figure 3 Percentage distribution of age of patients having peripheral IV line

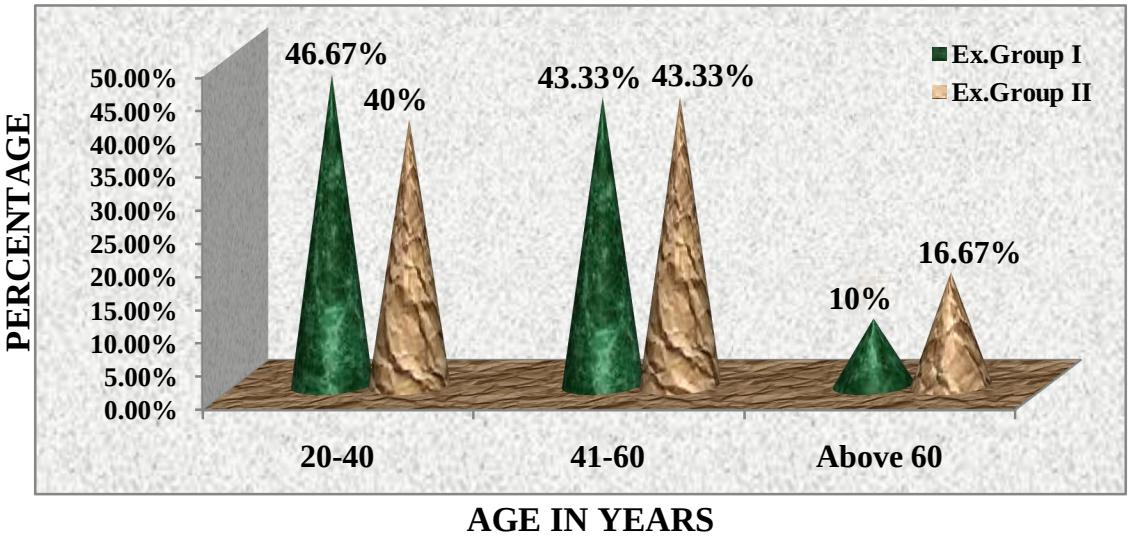


Figure 4 Percentage distribution of gender of patients having peripheral IV line

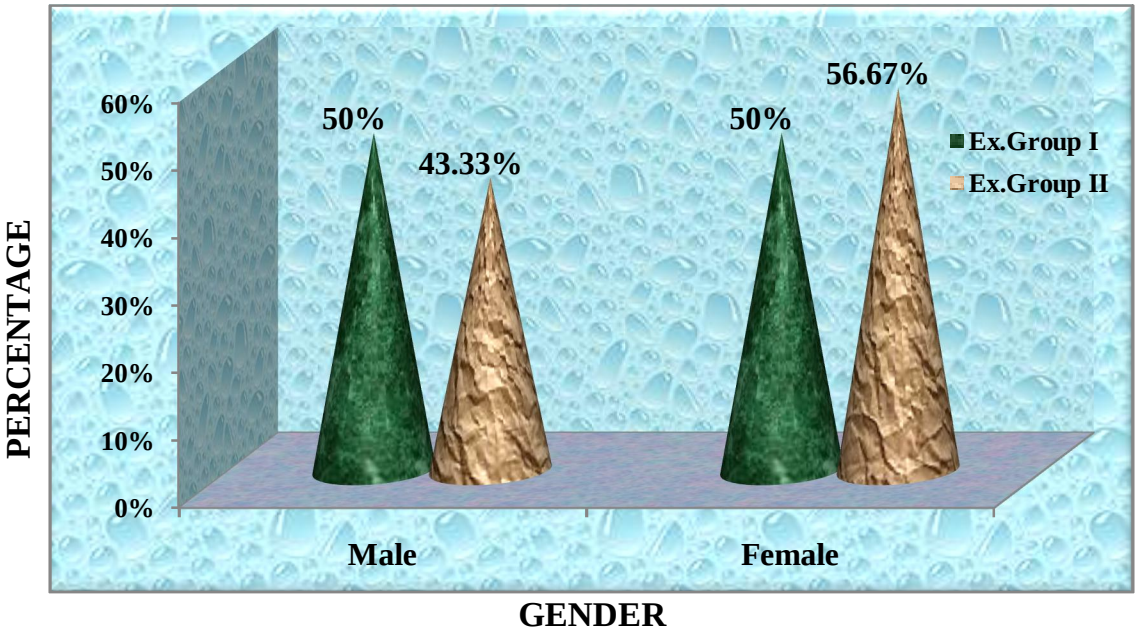


Figure 5 Percentage distribution of diet pattern of patients having peripheral IV line

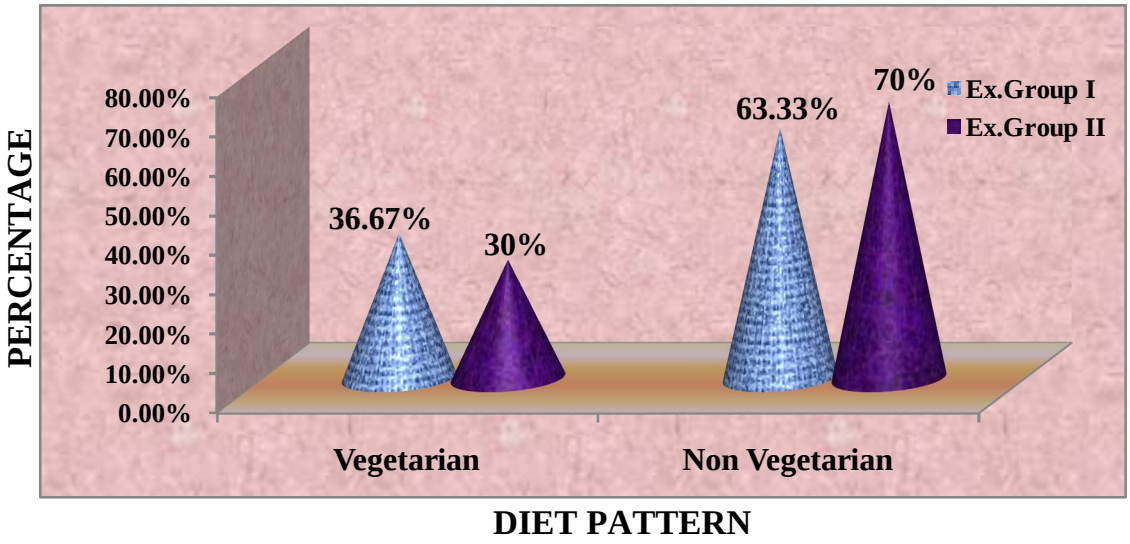
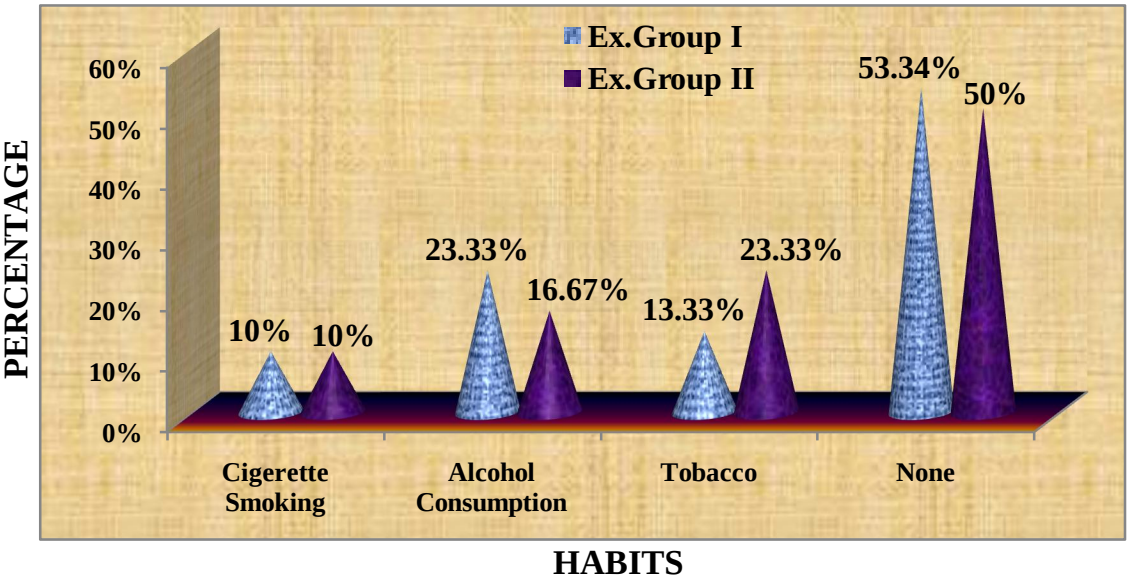


Figure 6 Percentage distribution of habits of patients having peripheral IV line



SECTION II

TABLE 2 (A) POST TEST LEVEL OF PATENCY OF PERIPHERAL INTRAVENOUS LINE AMONG PATIENTS WITH NORMAL SALINE FLUSH

S.NO	LEVEL OF PATENCY	FREQUENCY	PERCENTAGE
1	No blockage	**8**	**26.67**
2	Mild blockage	**19**	**63.33**
3	Severe blockage	**3**	**10**

Table 2 depicts the assessment of post test level of patency of peripheral intravenous line among patients who having peripheral intravenous line in experimental group I. The majority of subjects 19 (63.33%) had mild blockage, 8 (26.67%) had no blockage and 3 (10%) had severe blockage.

Figure 7 **Percentage distribution of post test level patency of peripheral intravenous line among patients in experimental group I**

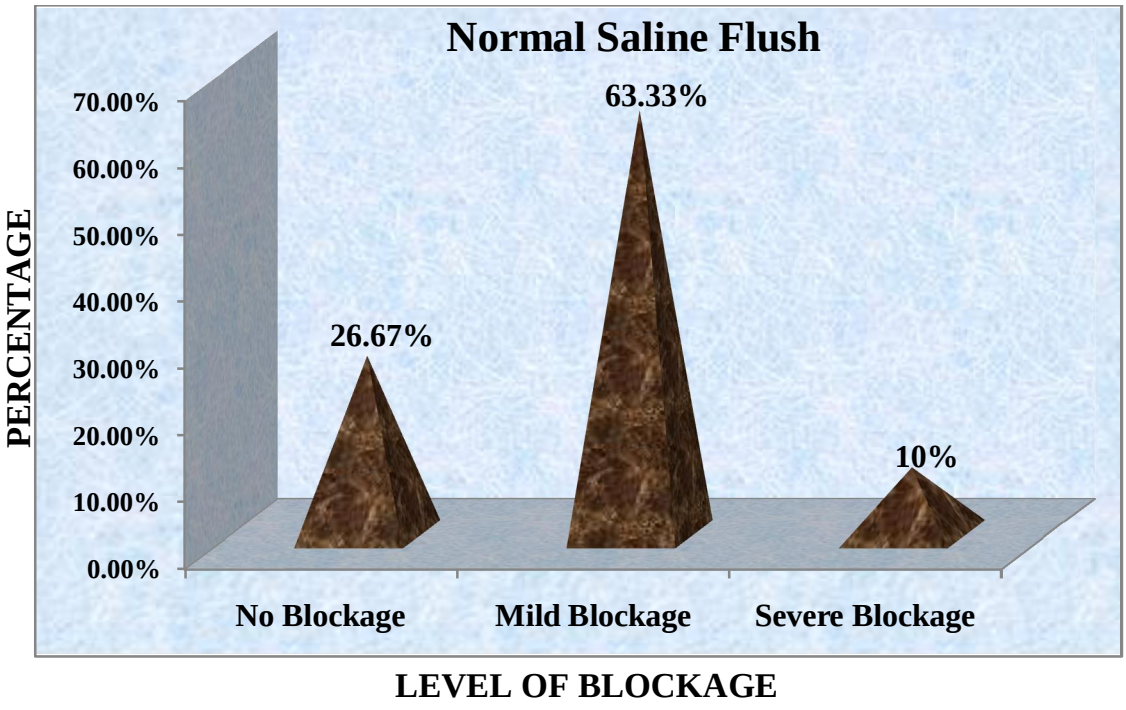
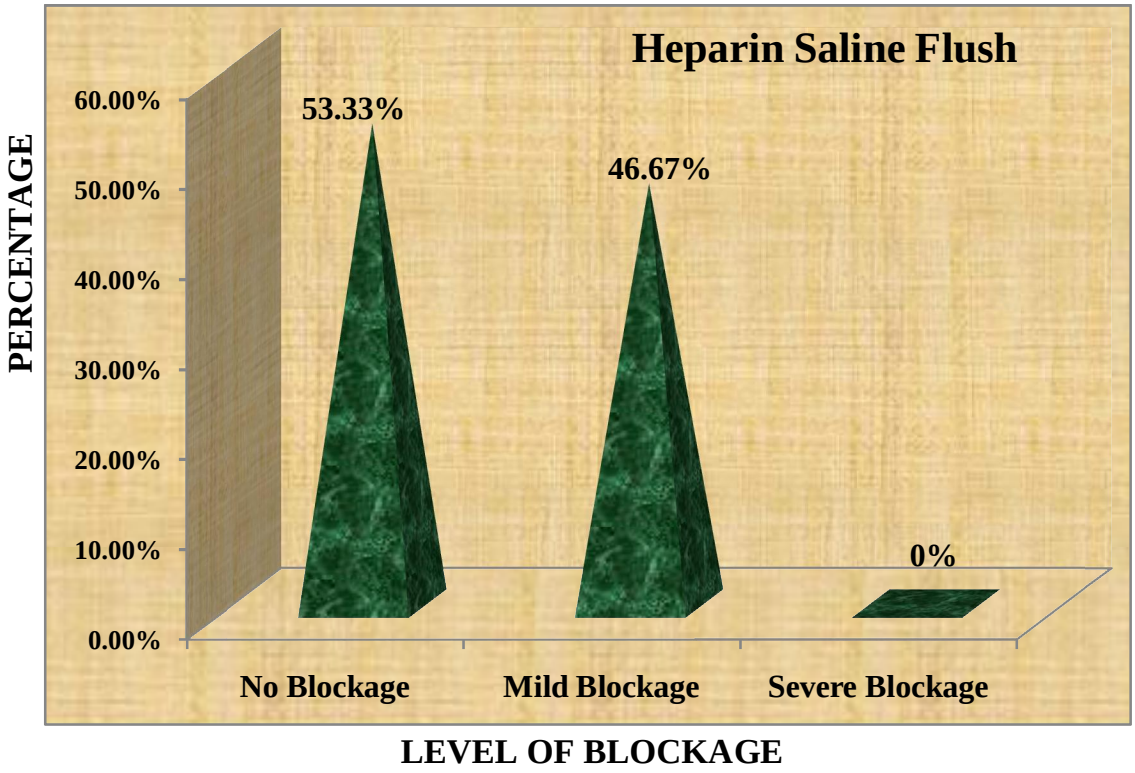


TABLE 3 (B) POST TEST LEVEL OF PATENCY OF PERIPHERAL INTRAVENOUS LINE AMONG PATIENTS WITH HEPARIN SALINE FLUSH

S.NO	DISTRIBUTION	FREQUENCY	PERCENTAGE
1	No blockage	**16**	**53.33**
2	Mild blockage	**14**	**46.67**
3	Severe blockage	**-**	**-**

Table 3 represents the assessment of post test level of patency of peripheral intravenous line among patients who having peripheral intravenous line in experimental group II. The majority of subjects 16 (53.33%) had no blockage, 14 (46.67%) had mild blockage.

Figure 8 Percentage distribution of post test level patency of peripheral intravenous line among patients of experimental group II



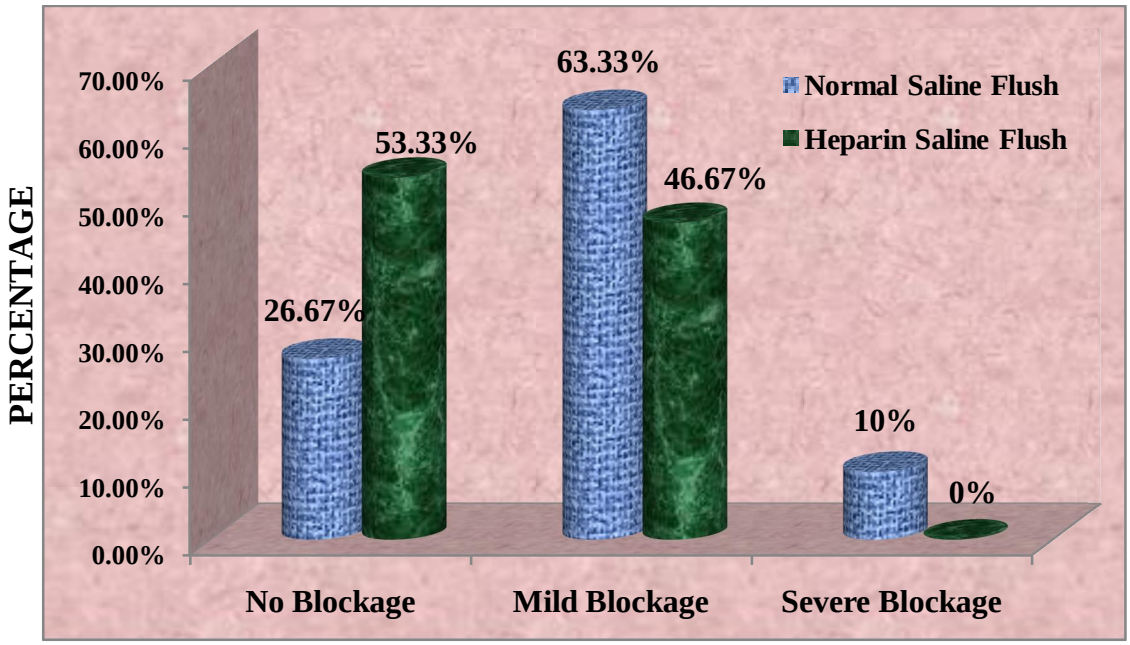
SECTION III

TABLE 4 COMPARISON OF POST TEST MEAN SCORE OF PATENCY AND STANDARD DEVIATION IN EXPERIMENTAL GROUP I AND EXPERIMENTAL GROUP II

GROUP	Total Score	MEAN	M.D	S.D	t cal
EX GROUP I (NORMAL SALINE FLUSH)	**20**	**10**	**2.8667**	**4.017**	**3.234**
EX GROUP II (HEPARIN SALINE FLUSH)	**20**	**7.1333**		**2.726**	

Table 4 represents to compare the mean and standard deviation of the post test level of patency of peripheral intravenous line among patients who having peripheral intravenous line in experimental group I and experimental group II. In experimental group I the mean score was 10 with standard deviation of 4.017 and in experimental group II the mean score was 7.133 with standard deviation of 2.726. The mean difference was 2.8667 and the calculated t value was 3.234 indicating that there was a significant difference in post test level of patency of peripheral intravenous line among patients who having peripheral intravenous line in experimental group I and experimental group II at $P<0.05$ level.

Figure 9 **Percentage distribution of post test level patency of peripheral intravenous line among patients in experimental group I and experimental group II.**



SECTION IV

TABLE 5 A) ASSOCIATION OF POST TEST LEVEL OF PATENCY OF PERIPHERAL INTRAVENOUS LINE AMONG PATIENTS IN EXPERIMENTAL GROUP I WITH THEIR SELECTED DEMOGRAPHIC VARIABLES

S. NO	DEMOGRAPHIC VARIABLES	NO BLOCKAGE	MILD BLOCKAGE	SEVERE BLOCKAGE	X^2 VALUE
		Frequency	Frequency	Frequency	
1.	**Age in years**				
	a) 20–40	**5**	**9**	**-**	
	b) 41–60	**3**	**8**	**2**	**4.717**$^{\#}$
	c) Above 60	**-**	**2**	**1**	
2.	**Gender**				
	a) Male	**7**	**6**	**2**	**7.412***
	b) Female	**1**	**13**	**1**	
3.	**Diet Pattern**				
	a) Vegetarian	**2**	**8**	**1**	**0.725**$^{\#}$
	b) Non Vegetarian	**6**	**11**	**2**	
4.	**Habits**				
	a) Cigarette smoking	**-**	**2**	**1**	
	b) Alcohol Consumption	**4**	**2**	**1**	**7.776**$^{\#}$
	c) Tobacco	**1**	**3**	**-**	
	d) None	**3**	**12**	**1**	
5.	**Whether undergone surgical treatment**				
	a) Yes	**2**	**8**	**1**	**0.725**$^{\#}$
	b) No	**6**	**11**	**2**	

6.	**Body mass index**				
	a) Thin	**4**	**5**	**-**	
	b) Moderate	**4**	**11**	**2**	**4.226#**
	c) Obese	**-**	**3**	**1**	
7.	**Frequency of medication**				
	a) Once in a day	**3**	**2**	**-**	**3.693#**
	b) Twice in a day	**3**	**10**	**2**	
	c) Thrice in a day	**2**	**7**	**1**	
8.	**Type of ambulation**				
	a) Mobilized	**5**	**9**	**2**	
	b) Partially mobilized	**3**	**8**	**1**	**1.578#**
	c) Immobilized	**-**	**2**	**-**	

***Significant**

 # Non significant

Table 5 signifies the association of post test level of patency of peripheral intravenous line among patients who having peripheral intravenous line in experimental group I with their selected demographic variables.

The findings propose that there was a significant association found between post test level of patency and gender, whereas there was no significant association found between post test level of patency and age, diet pattern, habits, surgical treatment, body built, frequency of medication and type of ambulation at $P<0.05$ level.

TABLE 6 B) ASSOCIATION OF POST TEST LEVEL OF PATENCY OF PERIPHERAL INTRAVENOUS LINE AMONG PATIENTS IN EXPERIMENTAL GROUP II WITH THEIR SELECTED DEMOGRAPHIC VARIABLES

S.NO	DEMOGRAPHIC VARIABLES	NO BLOCKAGE	MILD BLOCKAGE	SEVERE BLOCKAGE	X^2 VALUE
		Frequency	Frequency	Frequency	
1.	**Age in years**				
	a) 20–40	**7**	**5**	-	
	b) 41–60	**9**	**4**	-	**7.155***
	c) Above 60	**-**	**5**	-	
2.	**Gender**				
	a) Male	**9**	**4**	-	**2.330#**
	b) Female	**7**	**10**	-	
3.	**Diet Pattern**				
	a) Vegetarian	**5**	**4**	-	**0.26#**
	b) Non Vegetarian	**11**	**10**	-	
4.	**Habits**				
	a) Cigarette smoking	**2**	**1**	-	
	b) Alcohol Consumption	**3**	**2**	-	**2.296#**
	c) Tobacco	**2**	**5**	-	
	d) None	**9**	**6**	-	
5.	**Whether undergone surgical treatment**				
	a) Yes	**7**	**5**	-	**0.201#**
	b) No	**9**	**9**	-	
6.	**Body mass index**				
	a) Thin	**5**	**2**	-	
	b) Moderate	**9**	**8**	-	**1.886#**
	c) Obese	**2**	**4**	-	

7.	**Frequency of medication**				
	a) Once in a day	**4**	**2**	-	**1.289**[#]
	b) Twice in a day	**9**	**7**	-	
	c) Thrice in a day	**3**	**5**	-	
8.	**Type of ambulation**				
	a) Mobilized	**11**	**5**	-	
	b) Partially mobilized	**4**	**6**	-	**3.532**[#]
	c) Immobilized	**1**	**3**	-	

***Significant**

 # Non Significant

Table 6 signifies the association of post test level of patency of peripheral intravenous line among patients who having peripheral intravenous line in experimental group II with their selected demographic variables.

The findings propose that there was a significant association found between post test level of IV patency and age, whereas there was no significant association found between post test level of patency and gender, diet pattern, habits, surgical treatment, body built, frequency of medication and type of ambulation at $P<0.05$ level.

CHAPTER V

DISCUSSION

The main aim of the study was to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in NIMS hospital Neyyatinkara**.**

The research design adopted for this study was post-test only design. The setting of the study was NIMS hospital Neyyatinkara. The sample size consists of 60 in which 30 subjects were in the experimental group I (Normal saline flush) and 30 in the experimental group II (Heparin saline flush).

The first objective of the study was to assess the level of patency of peripheral IV line among patients receiving normal saline flush.

In the experimental group I post test level of patency of peripheral intravenous line the majority of the subjects 19 (63.33%) had mild blockage, 8 (26.67%) had severe blockage and 3 (10%) had no blockage among patients who having peripheral intravenous line.

The second objective of the study was to assess the level of patency of peripheral IV line among patients receiving heparin saline flush.

In the experimental group II post test level of patency of peripheral intravenous line the majority of the subjects 16 (53.33%) had no blockage and 14 (46.67%) had mild blockage among patients who having peripheral intravenous line.

The third objective of the study was to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain IV line patency.

The calculated post test mean score in experimental group I is (10) and in experimental group II is (7.1333) .The mean Difference was 2.8667 and the obtained‘t’ value (3.234) was significant at 0.05 level. It shows that the heparin saline flush was effective than the normal saline flush to maintain the patency of peripheral intravenous line. Hence the stated hypothesis, **H_1:**There will be a significant difference between the effectiveness of normal saline flush and heparin saline flush to maintain the patency of peripheral intravenous line was accepted.

Bowers et al.(2008) conducted a randomized controlled trial to find out the effectiveness of saline and heparin flush to maintain the patency of peripherally inserted central lines. Patients were flushed with 10 ml of saline and then 3ml of 100 U/ml heparin. Out of 50 patients randomized to the saline flush, three experienced occlusion of their catheters while none of the 52 randomized to the heparin flush experienced occlusion. The findings revealed that heparin can be used as an effective flush solution.

The fourth objective of the study was to find out the association between post test level of IV patency of patient receiving heparin saline flush with selected demographic variables

There was a significant association found between post test level of Patency of peripheral intravenous line and age. The observed chi-square value (7.155) was greater than tabulated value (5.99) at 0.05level.According to the researcher point of view, heparin saline flush reduce the blockage in the peripheral intravenous line.

The calculated value is less than tabulated value (at 0.05level) for other demographic variable like gender, diet pattern, habits, whether undergone surgical treatment, body built, frequency of medication, type of ambulation. Hence the stated hypothesis, **H_2:** There will be a significant association between the post test level of patency of peripheral intravenous line among hospitalized patients and their selected demographic variables who receiving heparin saline flush was not accepted.

CHAPTER VI

SUMMARY, MAJOR FINDINGS, IMPLICATIONS, RECOMMENDATIONS AND CONCLUSIONS

This chapter was divided into two sections in the first section, summary of the study, findings and conclusions were presented. In the second section the Implication in various areas of nursing practice, nursing education, nursing administration, nursing research and recommendations for further study were presented.

SUMMARY OF THE STUDY

The main objective of the study was to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in NIMS hospital Neyyatinkara**.** An evaluative approach, post test only design was adopted for this study. Simple random sampling technique was used to select the sample and the sample size was 60. Conceptual frame work – Ludwing Von Bertalanffy's general system model was used for this study.

The tool selected for the present study included interview schedule for demographic variables, peripheral intra venous patency assessment tool was used to assess the patency of peripheral intravenous line among hospitalized patient who have peripheral intravenous line.

The intervention of normal saline flush to experimental group I and heparin saline flush to experimental II was given. Data collection was done over 4 weeks at NIMS Hospital Neyyatinkara.

The collected data were analyzed by the descriptive and inferential statistics, interpreted in terms of objectives and hypotheses at the study. The study revealed that heparin saline flush is found effective to maintain the patency of peripheral intravenous line among hospitalized patient who have peripheral intravenous line.

MAJOR FINDINGS OF THE STUDY

- In the experimental group I post test level of patency of peripheral intravenous line the majority of the subjects (63.33%) had mild blockage (26.67%) had severe blockage and (10%) had no blockage among patients who having peripheral intravenous line.
- In the experimental group II post test level of patency of peripheral intravenous line the majority of the subjects (53.33%) had no blockage and (46.67%) had mild blockage among patients who having peripheral intravenous line.
- The mean post test score of patency of peripheral intravenous line in the experimental group II (7.1333) lesser than mean post test score of patency of peripheral intravenous line in the experimental group I (10).
- The calculated unpaired t value was (3.234) greater than the table value (2.01) and it is found significant at 0.05 level.
- The observed chi-square value (7.412) was greater than the tabulated value (5.99) and it is significant association found between post test level of patency of peripheral intravenous and gender in experimental group I.
- The observed chi-square value (7.155) was greater than tabulated value (5.99) and it is significant association found between post test level of patency of peripheral intravenous and age in experimental group II.

IMPLICATIONS

The findings of the study have implication in various areas of nursing practice, nursing education, nursing administration and nursing research.

IMPLICATIONS FOR NURSING PRACTICE

- The practice nurse can use the normal saline flush to maintain the patency of peripheral intravenous line.
- The practice nurse can use the heparin saline flush to maintain the patency of peripheral intravenous line.
- Learn about accurate assessment of patency of peripheral intravenous line with the use of peripheral intravenous patency assessment tool.
- The study findings help the nursing personnel include normal saline flush Vs heparin saline flush as a nursing intervention for the hospitalized patients who have peripheral intravenous line.
- The nurse should contribute to the evidence based practice through the experience gained from normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line.

IMPLICATIONS FOR NURSING EDUCATION

- Nursing personnel should be oriented, guided and trained in normal saline flush and heparin saline flush to maintain the patency of peripheral intravenous line.
- The effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line is to be published in the nursing journals to make awareness among nursing students.
- Encourage the students for effective utilization of research based practice.

IMPLICATIONS FOR NURSING ADMINISTRATION

- Nurse Administrator should take the major role in normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line and should modify the programme which suits to the patients.
- Supervision and evaluation of future nurses ought to be encouraged.
- Nursing administrator can organize continuing nursing education programme or In-service education programme for health professional regarding the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line.

IMPLICATIONS FOR NURSING RESEARCH

- Blockage in the peripheral intravenous line is one of the important issue in health care. Research studies can be conducted in various areas to take up projects on new methods of interventions, its quality, focusing on people`s interest also.
- As a researcher, promote more research on effective management for maintaining the patency of peripheral intravenous line.
- Promote effective utilization of research findings on patients who have peripheral intravenous line.
- Disseminate the findings of the research through conferences, seminars and publishing in nursing journals.
- A study can be conducted in a larger population to generalize the findings.

LIMITATIONS

- Sample size only 60.
- Data collection period is 4 weeks only.

RECOMMENDATIONS

The study recommends the following future research,

- ✓ The similar study can be conducted with larger samples for better generalization.
- ✓ The study can be conducted in two different settings with similar facilities.
- ✓ A study can be conducted in a specific age group of people.

CONCLUSION

The purpose of this study was to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in NIMS hospital Neyyatinkara**.** The overall post-test mean score of the level of patency of peripheral intravenous line in the experimental group I was higher than post - test mean score of the level of patency of peripheral intravenous line in the experimental group II. The study highlights that the level of patency of peripheral intravenous line after heparin saline flush was effective.

On the whole, carrying out the present study was really an enriching experience to the investigator. It also helped a great deal to explore and improve the knowledge of the researcher and the respondents. The constant encouragement and guidance by the guide, co operation and the interest of the respondents in the study contributed to the successful completion of the study.

"Praise the LORD! Oh, give thanks to the LORD for He is good! For his mercy endures forever"

Psalms 106:1

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ANNEXURE I

LETTER SEEKING EXPERT'S OPINION FOR CONTENT VALIDITY

From

301211706,
M.Sc (Nursing)II Year,
Thanthai Roever College of Nursing,
Perambalur.

To

Respected Sir/Madam,

Sub: Requisition for content validity of tool.

I am doing M.Sc (Nursing) II Year in Thanthai Roever College of Nursing, Perambalur, Under The Tamil Nadu Dr.M.G.R. Medical University Chennai. As a partial fulfillment of my M.Sc (Nursing) Degree Programme, I am conducting a research on **'A study to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in selected hospital at Trivandrum'.** A tool has been developed for the research study. I am sending the above stated for your expert and valuable opinion, I will be thankful for your kind consideration. Kindly return it to the Undersigned.

Thanking you

Yours sincerely,

Place: (301211706).

Date:

ANNEXURE II

LIST OF EXPERTS OPINION FOR CONTENT VALIDITY OF RESEARCH TOOL

1. **Dr. Shareek. M.B.B.S., M.D (Gen.Medicine)**
   Senior Consultant,
   Dept of Infectious Disease,
   NIMS Hospital, Neyyatinkara.

2. **Prof.Mrs.R. Punithavathi M.Sc(N),**
   Principal,
   Thanthai Roever college of Nursing.
   Perambalur.

3. **Prof. Mrs. V. J. Elizabeth. M.Sc(N),**
   Vice principal,
   Thanthai Roever College of Nursing,
   Perambalur.

4. **Prof. Mrs. Victoria Selva Kumari.C. M.Sc (N),**
   Principal,
   Mercy college of Nursing,
   Valakom, Kottarakara,
   Kollam District.

5. **Prof. Mrs. Rajina Rani. M.Sc (N), Ph.D,**
   Principal,
   Doctor's College of Nursing,
   Pudhukottai.

6. **Prof.Mr.Victor Devasirvadam M.Sc (N), Ph.D,**
   Mercy college of Nursing,
   Valakom, Kottarakara,
   Kollam District.

ANNEXURE III

EVALUATION CRITERIA CHECKLIST FOR VALIDATION

Respected Sir/Madam,

Kindly review the items in the tool. If you are agree with the criteria, please place a tick in ‘Relevant’ column otherwise place a tick in ‘Need Modification’ column or ‘Not Relevant’ and give your comments in the remarks column.

Part – 1 Demographic Data

Sl.No	Relevant	Needs Modifications	Not Relevant	Remarks
1				
2				
3				
4				
5				
6				
7				
8				

ANNEXURE IV

CONTENT VALIDITY CERTIFICATE

This is to certify that the tool for "**A study to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in selected hospital at Trivandrum"** prepared by II year M.Sc., (Nursing) student of Thanthai Roever College Of Nursing, Perambalur found to be valid and up to date.

Name:

Place: Signature of the expert

Date:

Designation and Address

ANNEXURE V

LETTER SEEKING PERMISSION TO CONDUCT RESEARCH STUDY

From

301211706,
II yr M.sc(N),
Thanthai Roever college of nursing,
Perambalur.

To

The principal,
Thanthai Roever college of nursing,
Perambalur.

Respected Madam,

Sub: seeking permission to conduct the study, regarding…

I am studying II yr M.sc(N) I would like to conduct a study as a partial fulfillment for the degree of M.sc(N).The statement of problem is **A study to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in selected hospital at Trivandrum.** I humbly request you to guide me and kindly give suggestions for conducting the study. I will be thankful mam. Hence I request you to kindly grant me permission to the same.

Thanking you,

Place: Yours sincerely,

Date: (301211706).

ANNEXURE VI

PERMISSION LETTER FOR RESEARCH PURPOSE

From

301211706,
M.Sc., (Nursing) II Year,
Thanthai Roever College of Nursing,
Perambalur.

Through

The Principal,
Thanthai Roever College of Nursing,
Perambalur.

To

The Medical Director,
NIMS Hospital,
Trivandrum.

Respected Madam/Sir,

I am doing **M.Sc (Nursing)** II year in Thanthai Roever College of Nursing Perambalur. **Under the Tamil Nadu, Dr.M.G.R. Medical University Chennai.** As a Partial Fulfillment of My **M.Sc.,(Nursing)** Degree Programme, I am going to conduct , ‘‘**A study to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in selected hospital at Trivandrum.”** I would like to select your hospital for my data collection, as I understand that I may get many patients in your hospital. Hence I kindly request you to give me permission to precede the data collection.

Thanking You

Place: Yours sincerely,
Date:

(301211706)

ANNEXURE VII(A)

CERTIFICATE OF ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work "**A study to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in selected hospital at Trivandrum"** done by 301211706, II year M.sc Nursing, in Thanthai Roever college of Nursing, Perambalur is edited for English language appropriateness by **Prof. K. Nesapriya M.A., M.Phil., Dept of English, Hans Roever College, Perambalur.**

Signature

ANNEXURE VII (B)

CERTIFICATE OF MALAYALAM EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work **A study to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in selected hospital at Trivandrum,** 301211706, II year M.sc Nursing, in Thanthai Roever college of Nursing, Perambalur is edited for Malayalam language appropriateness by **Prof. Prasanna K Mathew, M.A., M.Phil., B.Th., HOD, Dept of Malayalam, Christian College, Kattakada.**

Signature

ANNEXURE VIII (1)

DATA COLLECTION TOOL ENGLISH

SECTION A DEMOGRAPHIC VARIABLES

1. Age in years

   a) 20 – 40 ☐

   b) 41 – 60 ☐

   c) Above 60 ☐

2. Gender

   a) Male ☐

   b) Female ☐

3. Diet Pattern

   a) Vegetarian ☐

   b) Non Vegetarian ☐

4. Habits

   a) Cigarette smoking ☐

   b) Alcohol Consumption ☐

   c) Tobacco ☐

   d) None ☐

5. Whether undergone surgical treatment

a) Yes ☐

b) No ☐

6. Body mass index

a) Thin ☐

b) Moderate ☐

c) Obese ☐

7. Frequency of medication

a) Once in a day ☐

b) Twice in a day ☐

c) Thrice in a day ☐

8. Type of ambulation

a) Mobilized ☐

b) Partially mobilized ☐

c) Immobilized ☐

SECTION B

PERIPHERAL INTRAVENOUS PATENCY ASSESSMENT TOOL

Sl.No:	Item	Criteria	Score
1	Back flow of Blood	a) Free flow b) Moderate back flow c) Back flow with mild difficulty d) No back flow	1 2 3 4
2	Flow of medicine through the peripheral intravenous catheter	a) Fast free flow b) Slow free flow c) Flushes with difficulty d) Complete resistance while flushing	1 2 3 4
3	Pain along the path of intravenous cannula	a) Not experiencing pain b) Experiencing pain by touching c) Experiencing pain by movement d) Experiencing pain while administering the medication	1 2 3 4
4	Swelling and tenderness around the intravenous cannula site	a) Not present b) Up to 1 cm around the site of insertion c) > 2 cm in proximal / distal area d) > 4 cm in proximal / distal area	1 2 3 4
5	Warmth	a) Not present b) Mild c) Moderate d) Severe	1 2 3 4

SCORING KEY :-

5 : No blockage

6 – 15 : Mild blockage

16 - 20 : Severe blockage

Total score ☐

ANNXURE VIII (2)

DATA COLLECTION TOOL MALAYALAM

`mKw F km¼nÄ \¼À:

ASn Ø m\ hnhc§Ä

1. hbÊ
   F) 20- 40 ☐
   _n)41-60 ☐
   kn) 60 \ apIfnÂ ☐
2. enwKw
   F) B ¬ ☐
   _n) s] ¬ ☐
3. B lmc{law
   F) k kymlmcw ☐
   _n) amwkmlmcw ☐
4. ioew
   F)]pIhen ☐
   _n) aZy]m\w ☐
   kn)]pIbne ☐
   Un) H¶pan Ã ☐
5. GsX¦nepwHm¸tdj \ hnt[bambn«pt- m?
   F) AsX ☐
   _n) CÃ ☐
6. icoc LS\
   F) saen ª ☐
   _n) anXambh®w ☐
   kn) AanXh®w ☐

7. acp¶nsâ CSthf

F) Hcn¡Â ☐

_n) c-{]mhiyw ☐

kn) aq¶p{]mhiyw ☐

8. \S¡m\pÅtijn

F) \Ãh®w \S¡mw ☐

_n) anXambn \S¡mw ☐

kn) \S¡m³]ä¯nÃ ☐

`mKw _n km¼nÄ \¼À:

ssIbpsS A{K¯pÅ cà hmIn\nbpsS AI¯pÅ k^pSX\nÀ®bn¡p¶ D]IcWw

{Ia \¼À	C\w	am\ZWUw	amÀ¡
1	cà ¯ns â]pdt¯m«pÄ Hgp¡	F) XSÊanÃm¯ Hgp¡ _n) anXamb]pdt¯m«pÅ Hgp¡ kn) B bmkt¯mSp IqSnb Hgp¡ Un)]pdt¯m«pÅ Hgp¡nÃ	1 2 3 4
2	ssIbpsS A{K¯pÅ cà hmIn\nbnse Syq_nÂ IqSnbpÅ acp¶ns â Hgp¡	F) thK¯nepÅ Hgp¡ _n)]Xps¡bpÅ Hgp¡ kn) {]bmkw IqSnb Hgp¡ Un)]qÀ® {]Xntcm[w	1 2 3 4
3	cà hmIn\nbnse Syq_ns â `mK¯pÅ thZ\	F) thZ\bnÃ _n) sXmSpt¼mgpÅ thZ\ kn) Nen¸n¡pt¼mÄ thZ\ Un) acp¶Ip¯nhb¡pt¼mÄ thZ\	1 2 3 4
4	cà hmIn\nbnse Syq_ns â Npäpap Å ho¡hpw i àn¡pdhpw	F) CÃ _n) 1sk.an hsc Ip¯nbXn\p Npäpw kn) 2sk.an hsc ASp¯/Zqsc bpÅ `mKw Un) 4sk.an hsc ASp¯/Zqsc bpÅ `mKw	1 2 3 4
5	NqS	F) CÃ _n) hfsc Ipd¨ kn) Hcphn[w henb NqS Un) `b¦c NqS	1 2 3 4

amÀ¡\Â Im\pÅ coXn

5 - XSÊanÃ

6 -15 - `mKoIamb XSÊw

16-20 -]qÀ® XSÊw

BsIamÀ¡

ANNEXURE IX(1)

INFORMED WRITTEN CONSENT

I, _____, have attended the presentation of the entitled, A study to assess the effectiveness of normal saline flush versus heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in selected hospital at Trivandrum

The study has been fully explained to me by the researcher to my understanding by the researcher and I am affixing my signature to signify my willingness to include myself as a respondent.

_____ _____

Signature Signature

ANNEXURE IX(2)

സമ്മതപത്രം

ഈ പഠനത്തെ കുറിച്ച് ഗവേഷക എനിയ്ക്ക് പൂർണ്ണമായി വിശദീകരിച്ച് തരികയുണ്ടായി. എനിയ്ക്ക് ഇതിൽ പങ്കെടുക്കുന്നതിന് സമ്മതമാണെന്നുള്ളതിനുള്ള തെളിവിനായി എന്റെ കൈയ്യൊപ്പ് രേഖപ്പെടുത്തുന്നു.

....

ഒപ്പ് ഒപ്പ്

ANNEXURE X

CERTIFICATES

NIMS
Phone : 0471 - 2223544, 2223542
Fax : 0471 - 2225154
NOORUL ISLAM INSTITUTE OF MEDICAL SCIENCE (NIMS) & RESEARCH FOUNDATION
The Last Word in Patient Care
NIMS MEDICITY, Aralummoodu, Neyyattinkara, Thiruvananthapuram - 695 123
E-mail: nimsmedicity@niuniv.com Website: www.nimshospital.com
A UNIT OF N.I. EDUCATIONAL TRUST

22/07/2013

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Reg. No: 301211706,** II year M.Sc Nursing student of Thanthai Roever College of Nursing, Perambalur has been conducted the research **"A study to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line in selected hospital at Trivandrum"** in our institution from **22/06/2013 to 22/07/2013.** We wish him all the best.

Authorized signature

NIMS HOSPITAL ARALUMMOODU TRIVANDRUM PIN-695123 NIMS MEDICITY

CERTIFICATE OF MALAYALAM EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work **A study to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in selected hospital at Trivandrum" 301211706**, II year M.sc Nursing, in Thanthai Roever college of Nursing, Perambalur is edited for Malayalam language appropriateness by

Signature

CHRISTIAN COLLEGE KATTAKADA TVM. (Dist)

Prasanna. K. Nalbeo
HOD & Asso. Professor
Dept. of Malayalam
Christian College
Kattakada.

CERTIFICATE OF ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work "**A study to assess the effectiveness of normal saline flush Vs heparin saline flush to maintain the patency of peripheral intravenous line among hospitalized patients in selected hospital at Trivandrum"** done by **301211706**, II year M.sc Nursing, in Thanthai Roever college of Nursing, Perambalur is edited for English language appropriateness by

THANTHAI HANS ROEVER COLLEGE
PERAMBALUR
621 212

Signature

K. Nesapriya, M.A., M.Phil.,