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# A QUASI EXPERIMENTAL STUDY ON EFFECTIVENESS OF MAGNESIUM SULPHATE FOMENTATION VS. POTATO JUICE APPLICATION ON PHLEBITIS AMONG SICK CHILDREN BETWEEN 1-3 YEARS RECEIVING PARENTERAL MEDICINE IN THE PEDIATRIC WARD OF SELECTED HOSPITAL, GURUGRAM, HARYANA.

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**Abstract:** The purpose was to explore the effectiveness of magnesium sulphate fomentation, effectiveness of potato juice application and compare that effectiveness on phlebitis.

A quasi-experimental equivalent time series design was used for the study. Conceptual frame work of the study was based on Lad Wig Von Bertlanfly System Model. The population was 1-3 years of sick children getting intravenous medication at pediatric medicine ward in Medical College & Hospital, Gurugram, Haryana. Non –probability purposive sampling was the technique was used for selecting subject. The sample comprised of 50 sick children 1-3 years of age getting intravenous medication with phlebitis. The tools used were record analysis of selected variable, standardized phlebitis grading scale of Infusion Nurses Society Standard Practice 2011 and phlebitis measurement chart (modified). Data were collected through interview schedule and observation and assessment method.

Major findings of the study were as follows:

In total sample there were 36% children admitted with phlebitis with age group between 2.6-3 years. The percentage of type of medicine getting children on antibiotics with phlebitis was 100% on both groups. More common type of infusion getting sick children was electrolyte p, 32%. Hourly medication among both group with 12 hourly was 92%. Most common day of develop phlebitis after canulation was 3$^{rd}$ day and 4$^{th}$ day i.e 28%. Day of changing canula after canulation was 3$^{rd}$ day & 4$^{th}$ day i.e 28%.

Out of 50 children the incidence of grade II Phlebitis was 40% and grade III Phlebitis was 60%.

The t value computed between phlebitis mean score of Experimental group I and II show that t value 3.21 between on 24$^{th}$ hour, is significant when as t values of 12$^{th}$ hour ($t_{48=}$ 0.76) and 36$^{th}$ hour ($t_{48=}$1.83) not significant at 0.05 level of significance.

The mean reduction score was less in the experimental group II was treated with potato juice (22,0) than experimental group I treated with magnesium sulphate fomentation (1.3 and 0.04) in subsequent 12$^{th}$, 24$^{th}$, 36$^{th}$ , 48$^{th}$ and 60$^{th}$ hour with mean difference 1.8 and 0.04, which was statistically significant at 0.05 level with df 48 as seen by t value 2.01 .

The study result shows that potato juice was better than magnesium sulphate fomentation in reduction of phlebitis.

Conclusion: Potato juice showed no impartment in the reduction of phlebitis through adverse effect on inflamed tissue and on contrary it appears to have a stimulatory effect on tissue regeneration.

In nursing practice, potato juice is very cost effective and needed less time in reduction of phlebitis. Health education can be given on the use of potato juice an ideal first aid for pain, swelling, redness and burn.

**Keywords:** *Effectiveness, Sick children, Magnesium Sulphate Formentation, Potato juice application, Phlebitis, Pain.*

**Background of the Study:** Intravenous infusion means introduction of large amount of fluid into the body via veins Over 80% of all children entering hospital to receive IV therapy, but these can lead to life threatening conditions like thrombosis, embolism & infection. Phlebitis is the inflammation of the innermost wall of the vein. It affects 27% to 70% of all patients receiving IV therapy. Incidence of peripheral vein extravasations has been reported to range from 0.1% to 6.5%. Routine IV site observation by the phlebitis severity measurement scales could reduce the incidence & severity of phlebitis.

**A prospective survey done by Tal Malach, Ziona Jerassy, Bernard Rudensky, Yechiel Schlesinger , Etty Broide, Oded Olsha on phlebitis associated with peripheral IV catheters.**

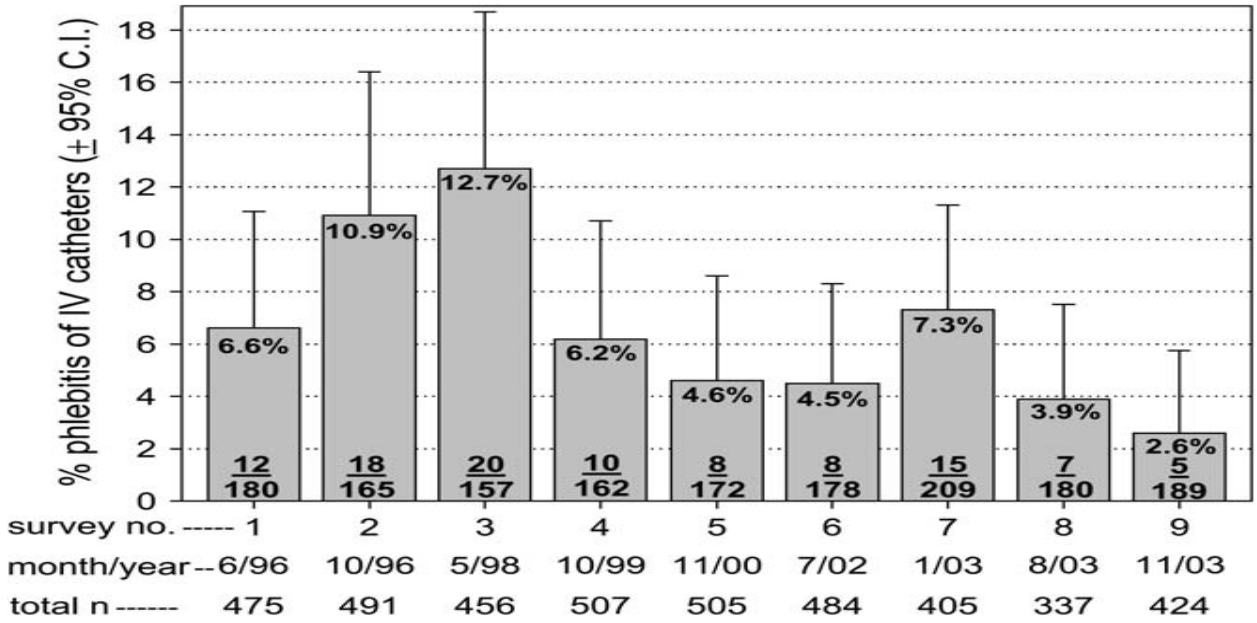


**Fig 1: Overview of all 9 point-prevalence, hospital –wide surveys of peripheral IV catheter-associated phlebitis.**

Children have to undergo many infusions for the administration of medications, so they will be at a higher risk of developing phlebitis due to their fragile veins. They will be at most risk for damage of the veins & infiltration. Phlebitis affects about 20-40% of all children receiving IV therapy. They may cause mechanical, chemical or biological trauma.

## PURPOSE OF THE STUDY

To explore occurrence of phlebitis with selected variable as well as management of phlebitis by potato juice application and magnesium sulphate fomentation and compare the effectiveness between them.

## OBJECTIVES OF THE STUDY

1. To determine the severity of phlebitis among the sick children measured by Phlebitis measurement chart.
2. To determine the effect of Magnesium sulphate fomentation on the phlebitis.
3. To assess the effectiveness of potato juice on phlebitis.
4. To assess the effectiveness between Magnesium sulphate fomentation and Potato juice application on phlebitis in sick children.

## ASSUMPTIONS

1. Magnesium sulphate fomentation has a hydrostatic effect.
2. Potato juice has anti-inflammatory effect of protease inhibitor.
3. Peripheral infusion may cause phlebitis due to mechanical as well as chemical interference.

## VARIABLES

- **Independent Variable** – Magnesium sulphate fomentation and Potato juice application.
- **Dependent Variable** - Phlebitis in terms of pain, edema, erythema palpable venous cord and streak formation.
- **Extraneous Variables** – Age of the child, Type of IV fluid infusion, Duration of IV canulation ,Type of IV medication

## HYPOTHESES

**All the Hypotheses were tested at 0.05 level of significance**

**H1** – There will be a significant difference in the reduction of mean phlebitis assessment score in experimental group I after the application of magnesium sulphate fomentation.

**H2-** There will be a significant difference in the reduction of mean phlebitis assessment score in experimental group II after the application of potato juice application.

**H3** – The amount of reduction is significantly higher among children receiving potato juice than receiving magnesium sulphate.

## CONCEPTUAL FRAMWORK

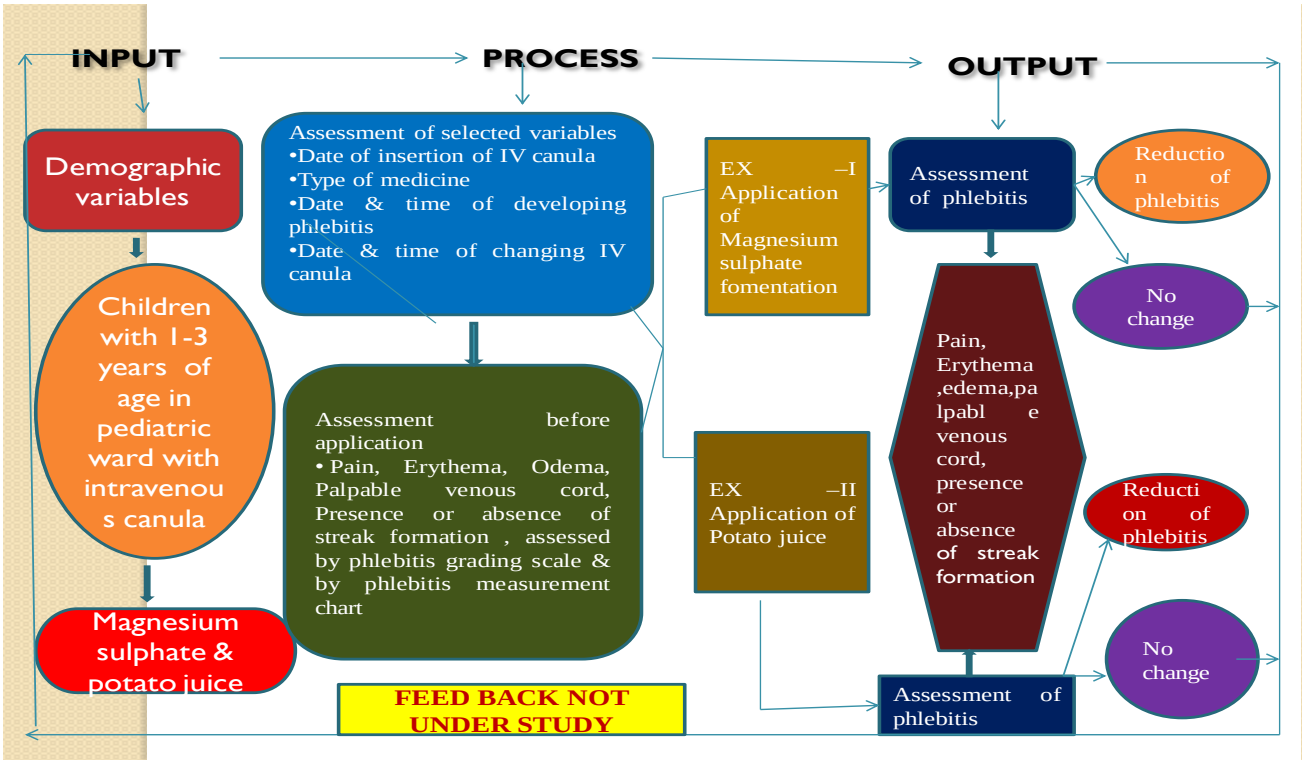


**Fig 2: Ludwig von Bertalanffy Input process output model**

## DELIMITATION OF THE STUDY

- Children in the age group of 1-3 years having phlebitis.
- Those who are getting IV medication.
- Those who are conscious.

- Those who have phlebitis.
- Parents' willingness to participate in the study.


**Fig 3: Flow chart on Research Methodology**

**SYMBOLIC REPRESENTATION OF RESEARCH DESIGN**

0 hour $12^{th}$ hour $24^{th}$ hour $36^{th}$ hour $48^{th}$ hour $60^{th}$ hour 72th hour

**Ex-I** O1X1.1 O2X1.2 O3X1.3 O4X1.4 O5X1.5 O6X1.6 O7

0 hour $12^{th}$ hour $24^{th}$ hour $36^{th}$ hour $48^{th}$ hour $60^{th}$ hour 72th hour

**Ex-II** O1X2.1 O2X2.2 O3X2.3 O4X2.4 O5X2.5 O6X2.6 O7

**Fig 4: Schematic Representation of Research Design**

**Interpretation of the Symbol**

**O1,O2,O3,04,05,06,O7** – Observation of phlebitis at 0 hour, $12^{th}$ hour, $24^{th}$ hour, $36^{th}$ hour, $48^{th}$ hour, $60^{th}$ hour, 72th hour respectively.

**X1-** Treatment with Magnesium sulphate fomentation at 0 hour, $12^{th}$ hour, $24^{th}$ hour, $36^{th}$ hour, $48^{th}$ hour, $60^{th}$ hour respectively.

**X2-** Treatment with Potato juice at 0 hour, $12^{th}$ hour, $24^{th}$ hour, $36^{th}$ hour, $48^{th}$ hour, $60^{th}$ hour respectively.

**Name of the Research Tool**

| Tool Number | Name of the Tool | Variables | Technique |
|---|---|---|---|
| **Tool -1 (A)** | Structured Interview Schedule for obtaining demographic data | Demographic Variables | Questioning and analysis |
| **Tool -1 (B)** | Interview Schedule on selected variable | Selected Variables | Record Analysis |
| **Tool – II** | Standardized Phlebitis grading scale | Status of the phlebitis | Observation & Assessment (Infusion Nurses Society) |
| **Tool- III** | Phlebitis measurement chart | Status of the clinical characteristics of phlebitis | Rating scale |

**Methods of data collection:**

- The necessary **approval** has been obtained
- **Ethical permission** from the respective Hospital.
- **Informed consent** has been obtained from every subject based on the inclusion criteria who be included in the study after explaining the aim of the study and assuring them of confidentiality of the collected data. Confidentiality will be maintained by the use of code number instead of name and the right of withdrawal will be reserved.
- A **pilot study** will be conducted on (10) each for Experimental as well as for Control group students to test the tools for its **clarity, organization, applicability** and to **determine** the **length of time** needed to collect the data.

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## FINDINGS OF THE STUDY

**Section 1: Description of the sample characteristics by frequency percentage**

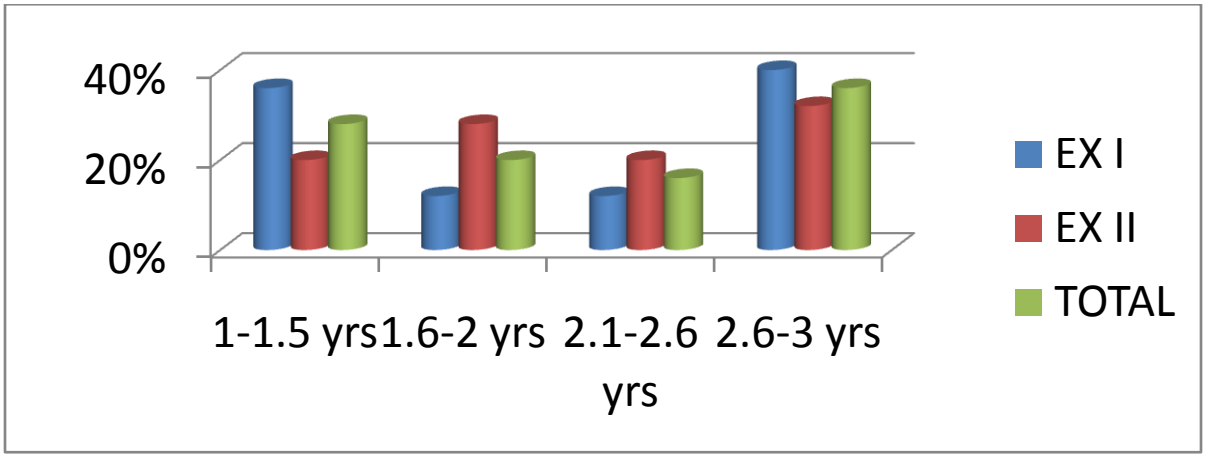


**Fig-5 Bar diagram showing percentage distribution of age of the sick children with phlebitis**

**Section 1: Description of the sample characteristics by frequency percentage**

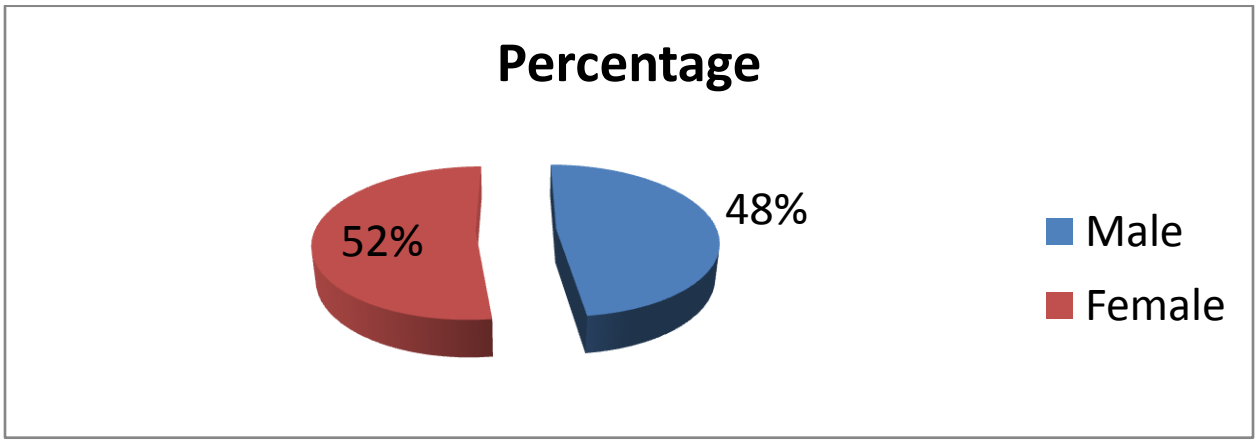


**Fig-6 Pie diagram showing percentage distribution of sex of the sick children with phlebitis in Experimental group- I**

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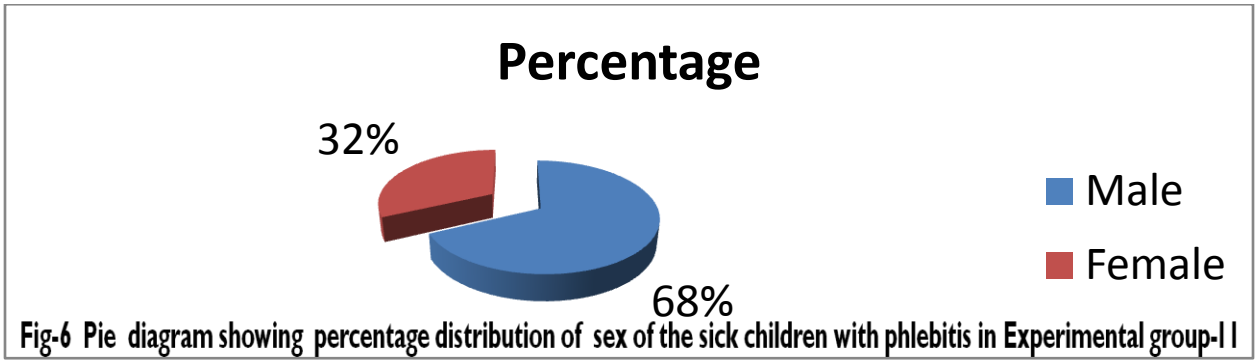


Fig-6 Pie diagram showing percentage distribution of sex of the sick children with phlebitis in Experimental group-I I

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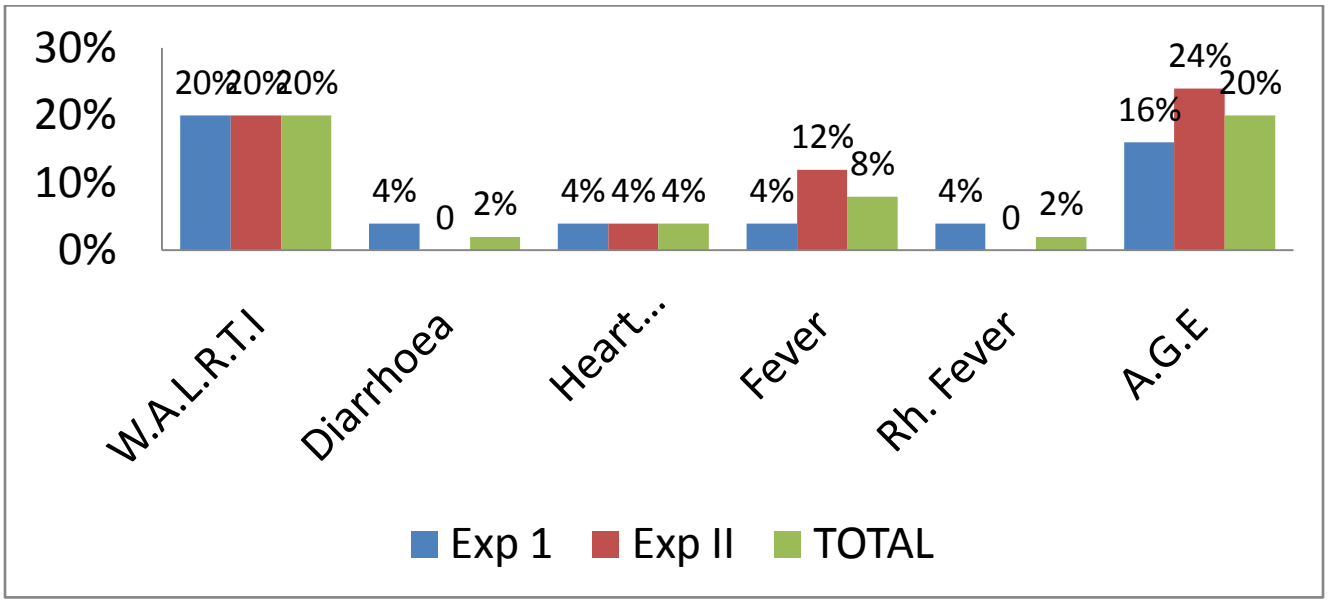


**Fig-7 Bar diagram showing percentage distribution of cause of hospitalization among sick children with phlebitis in Experimental group- I and II and Total**

**Section 2: Evaluation of Severity of phlebitis as measured by phlebitis grading scale.**

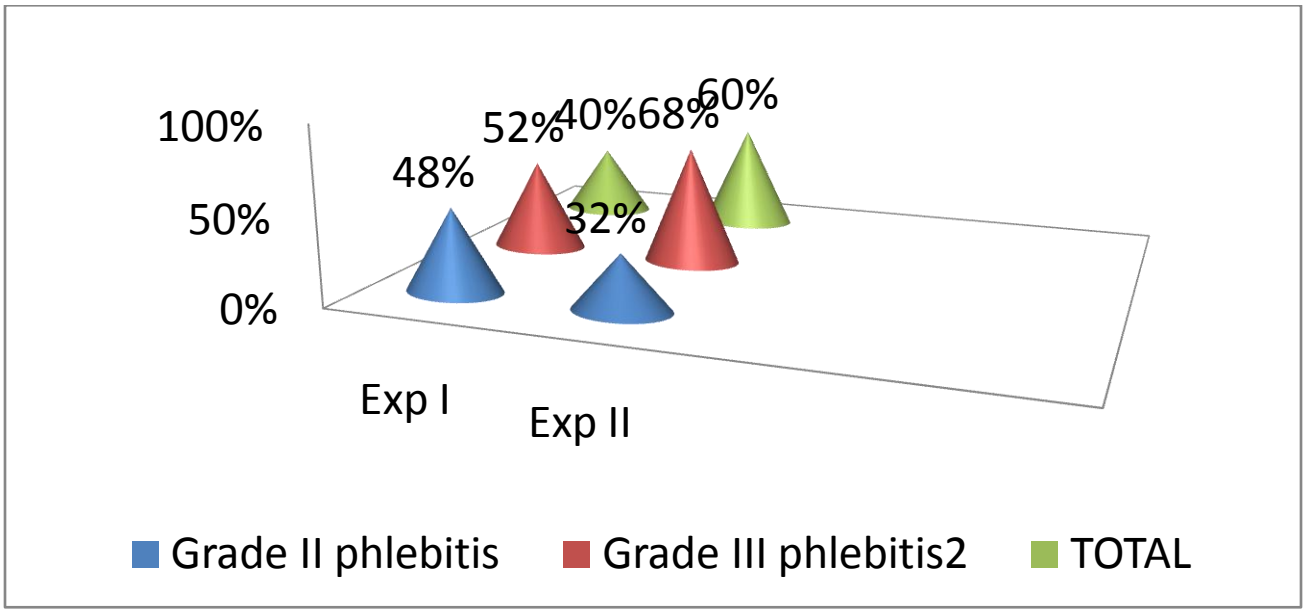


**Fig-8 Conical diagram showing the severity of phlebitis according to grade**

**Section 3: Evaluation of effectiveness of Magnesium sulphate fomentation**

- The obtained mean difference in phlebitis reduction score in subsequent hour $12^{th}$, $24^{th}$,$36^{th}$, $48^{th}$,$60^{th}$ after application of treatment was found to be statistically significant as evident from 't' value of 4.8,5.7, 6.81, 8.2 and 13.37 for df (24) at 0.05 level of significant.

- The obtained mean differences between 0 with subsequent $12^{th}$, $24^{th}$,$36^{th}$ ,$48^{th}$ and $60^{th}$ hour of observations in experimental group I were true differences and not by chance.

**Discussion regarding effectiveness of magnesium sulphate fomentation**

The present study reveals that significant difference was found with Magnesium sulphate fomentation in term of reduction of pain , edema, erythema and palpable venous cord, within 72th hour compare to the baseline values.

Xulean (2000) reported same difference methods in managing tissue damage caused by extravasations. Magnesium sulphate should be chosen according to different characteristics of tissue damage for healing . So it was concluded that magnesium sulphate has a better effect on reducing congestion and edema of local tissue.

**Section 4: Evaluation of effectiveness of Potato juice application** –

- The obtained mean difference in reduction of phlebitis score in 24th,36th, 48th and 60th hour after application of treatment, was also found 1.42, 3.26 and 4.2 between 0 and 12th, was also found to be statistically as evident from "t" value of 7.8, 8.2 , 9.81, 9.96 and 10.76 for df (24) at 0.05 level of significance .

- Therefore it was concluded that obtained mean differences between 0 and 12th, 24th,36th ,48th and 60th hour of observations in experimental group II were true differences not by chance.

**Discussion regarding effectiveness of Potato juice application**

Phlebitis reduction score decreases in term of pain , swelling, edema, erythema, palpable venous cord faster in subsequent hour by potato juice application than magnesium sulphate wet fomentation .

Dr. Lam (2011) reported that anti-inflammatory effect of potato reduces the phlebitis caused by venous inflammation.

**Section 5: Comparison of effectiveness of between Magnesium sulphate fomentation and potato juice application**

- The mean reduction score is less in the Experimental group II (22 and 0) than experimental group I (1.3 and 0.4) in subsequent 48th and 60th hour with mean difference 1.8 and 0.04 , which statistically significant at 0.05 level with df 48 as seen by "t" value is 2.01.

- Thus it can be concluded that obtained mean difference between 24th,48th,and 60th hour of observations in experimental group I and II was true difference and not by chance.

- Potato juice application enhances reduction of phlebitis rate which is much faster than that attained by magnesium sulphate fomentation as evidenced by mean score of phlebitis by potato juice was at 0 at 60th hour and mean score of phlebitis by magnesium sulphate fomentation was 0.04.

- The same findings are reported by Li Sicui, Liao Huijuan (2009). There was statistical difference in terms of recovery rate by Potato external application which was better than 50% magnesium sulphate wet compress to treat patients with drug induced phlebitis.

## CONCLUSION

- Based on this scientific evidence it was concluded that potato juice is effective as compared to Magnesium sulphate in reducing phlebitis in terms of pain, erythema, edema, palpable venous cord, streak formation.
- Potato juice showed no impairment in the reduction of phlebitis through adverse effect on inflamed tissue and on contrary it appeared to have a stimulatory effect on tissue regeneration.

## LIMITATION

- During sampling randomization was not done.
- A tightly controlled situation was not made
- As the study was too limited (twenty one days) , complete follow up of phlebitis could not be done for more than three consecutive days.

## RECOMMENDATION

1. Study can be conducted on adult and more population .
2. A comparative study can be conducted on application of raw potato juice vs boiled hot potato application on inflammation.
3. Large randomized double or triple blinded multi-centric trials may be undertaken to compare the efficacy of cold magnesium sulphate fomentation vs raw potato juice application on phlebitis.
4. Study can be conducted to use Potato juice application on phlebitis& different cases as compared with the results usually experienced with the more commonly used nursing care for phlebitis such as aloe vera, ichtmol , cabbage, glycerin magsulf.
5. Comparative study is needed on cost effective on potato juice application as compared with the more commonly used dressings including with or without combination of heparin or dexamethazone.

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