EFFECTIVENESS OF ICE CUBE APPLICATION UPON PAIN PERCEPTION OF CHILDREN UNDERGOING VENEPUNCTURE

BY

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A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

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DECLARATION

I hereby declare that the present dissertation entitled **"Effectiveness of Ice Cube Application Upon Pain Perception of Children Undergoing Venepuncture"** is the outcome of the original research work undertaken and carried out by me under the guidance of **Dr. Latha Venkatesan,** M.Sc (N)., M.Phil (N)., Ph.D (N)., Principal, Apollo College of Nursing, **Prof. Nesa Sathya Satchi,** M.Sc (N)., Ph.D (N)., Head of Department, Child Health Nursing, Apollo College of Nursing, Chennai. I also declare that the material on this has not found in any way, the basis for the award of any degree or diploma in this university or any other universities.

M.Sc., Nursing II Year

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SYNOPSIS

An Experimental Study to Assess the Effectiveness of Ice Cube Application upon Pain Perception of Children Undergoing Venepuncture at Selected Hospitals, Chennai.

The Objectives of the Study were,

1. To determine the level of pain perceived by control and experimental group of children during venepuncture.
2. To determine the effectiveness of ice cube application by comparing the pain perception among control and experimental group of children during venepuncture.
3. To determine the association between selected demographic variables and pain perception among control and experimental group of children during venepuncture.
4. To determine the association between selected clinical variables and pain perception among control and experimental group of children during venepuncture.
5. To determine the level of satisfaction of mothers and children regarding ice cube application in experimental group of children during venepuncture.

The conceptual framework of the study was based on “Gate Control theory of Pain” given by Melzack and Wall which was modified for the present study. An experimental research approach with post test only design was used to achieve the objectives of the study. The present study was conducted in Apollo Children’s

Hospital, Chennai. A sample size of 60 children who met the inclusion criteria were chosen for this study of which 30 were taken for the control group and 30 for the experimental group using systematic random sampling. The study variables were pain perception of children undergoing venepuncture and ice cube application during venepuncture.

An extensive review of literature and guidance by experts formed the foundation to the development of the tools for the study. The investigator used Demographic variables proforma, Clinical variables proforma, Wong Baker FACES Pain Rating Scale and Rating Scale on the level of satisfaction about ice cube application during venepuncture to assess the outcome.

The data collection tools were validated and reliability was established. After the pilot study, the data for the main study was collected using interview method. The children in the control group were assessed for pain perception using Wong Baker FACES Pain Rating Scale without any intervention. In experimental group ice cube application was given at the site of venepuncture for a period of one minute. At the end of this period, venepuncture was performed and post assessment of pain perception was done immediately for one minute by using Wong Baker FACES Pain Rating Scale. The level of satisfaction of experimental group of children was assessed using satisfaction rating scale.

Major findings of the study were

- Majority of the children were in lower primary class (80%, 86.7%), from nuclear family (73.3%, 93.3%) and were Hindu by religion (86.7%, 80%) in both control and experimental group respectively.

- Majority of the children in control and experimental group had no previous history of hospitalization (70%, 76.7%) and no previous history of venepuncture (70%, 76.7%).
- Majority of the children in control and experimental group were undergoing venepuncture for blood collection (63.3%, 93.3%) and the procedure was performed by nurses (93.3%, 100%).
- Majority of children in control group experienced severe pain during venepuncture (66.7%) where as in experimental group had moderate pain (43.3%).
- The mean and standard deviation of the control and experimental group of children is 7.7, 2.7, 2.11 and 1.45 respectively. The 't' value of 10.70 which is highly significant at $P< 0.001$ level of significance. Hence the null hypothesis H01 was rejected.
- Majority of mothers and children were highly satisfied (87%) with ice cube application intervention during venepuncture.
- The study findings revealed a significant association ($p<0.001$) between age of the child and pain perception in control and experimental group, but there was no significant association between other demographic variables and pain perception in control and experimental group. Hence, the null hypothesis H_{02} was partially rejected with regard to the age of the children and pain perception in both control and experimental group.
- There was no significant association between clinical variables and pain perception in both control and experimental group. Hence null hypothesis H03 was retained.

Recommendations

- The study can be conducted with larger samples to generalize the results.
- The study can be conducted in different settings
- The study can be conducted for pain management during other invasive procedures.
- A comparative study can be conducted to evaluate the effectiveness of various other interventions to reduce pain.
- The study can be conducted among children of different age groups.
- A comparative study can be conducted to assess the effectiveness of ice cube application with other intervention like Emla cream application during venepuncture.

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CHAPTER I

INTRODUCTION

Background of the Study

"For all the happiness mankind can gain is not in pleasure

but in rest from pain"

~ John Dryden.

A "child" generally refers to a minor, otherwise known as a person younger than the age of majority. Children are the asset any of nation. It is today's generation which can go ahead and make the world a better place. Children in their middle years treasure their families and feel they are special and irreplaceable. Families provide children with a sense of belonging and unique identity. They are precious and special in the lives of the parents. India's total population of children between the age group of Birth-14 years is 31.1 % (CIA World factbook, 2009).

Pain, the disruption of comfort is the universal human experience, but no one can experience another person's pain. Therefore pain must be viewed as a subjective sensation. The taxonomy committee of International Association for the Study of Pain (IASP) defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage." Each individual learns the application of the word pain through experiences related to injury in early life. Most pain resolves promptly once the painful stimulus is removed and the body has healed. Pain is the most common reason for physician consultation. Pain management strategy must be identified by the health personnel to promote optimal pain relief.

"Children's pain matters-for the child, for the family and for the society." (IASP- 2005). Pain perception is an inherent quality of life that appears early in fetal life to serve as a signaling system for tissue damage. This signaling includes behavioral and physiological responses that are considered as valid indicators of pain. Painful medical procedures for children begin with heel sticks and injections at birth and continue throughout childhood. Children understand the basic concept of pain at a very young age and can describe both its emotional and physical aspects.

Pain in children evokes negative physiological, metabolic and behavioral response. These responses and untreated pain affects length of hospitalization. Procedural pain is an important source of discomfort for hospitalized patients from which, all instinctively try to escape. Fears of bodily injury and pain are prevalent among children. The consequences of these fears can be far reaching; adults who experienced more medical fear and pain in childhood are tending to avoid medical care (Parte, 1996). 10% of adults in the United States have needle phobia. Numerous modalities exist to decrease procedural pain, from topical anesthetics up to complete deep sedation. Distraction for minor to moderate procedural pain is free and inexpensive, easy to perform and is an effective method of pain control.

Venepuncture is a significant source of paediatric pain and distress. Most of the children who undergoing Venepuncture may experience moderate or severe pain and elevated level of pre-procedural and procedural distress. Accumulating evidence has demonstrated that pain from venepuncture is a significant source of paediatric pain and distress with effects far more reaching than the presenting

event. Practitioners recognize the need to mitigate or decrease paediatric venepuncture pain and distress in emergency department patients, yet often do not provide the relief measures that are available.

Current methods to decrease children's needle pain include topical anaesthetics creams, vapocoolant cold spray, pinching, rubbing, or vibration near the site or parent coaching and distraction. A randomized controlled trial compared a reusable device combining cold and vibration to standard care for paediatric venous access pain relief (Amy & Mona, 2011). The combination of cold and vibration decreased venepuncture pain significantly more than standard care without compromising procedural success. A device incorporating these elements could overcome the common barriers to needle procedure pain control.

Cold and heat application relieve pain and promote healing (Crisp & Taylor, 2005). A simple and inexpensive therapy, cold application has been accepted for decades as an effective non pharmacologic intervention for pain management. Ice therapy is cheap, easy to use and requires little time to prepare. Ice packs can be made with any form of ice; however, 2 commonly used forms are cubed ice and crushed ice. Ice is believed to help control pain by inducing local anaesthesia around the treatment area. An application of cold is considered to slow the ability of pain fibres to transmit pain impulses (Ball & Bindler, 2003).

Child temperament can play a part in their responses to venepuncture pain and influence parent's decisions to prepare them for painful experiences (Lee & White-Traut, 1996). For many children, the fear of needles is the most worrying aspect of attending hospital. A proportion of children display high levels of fear,

pain and behavioural distress (Duff, 2003). The fear of pain and needle phobia in children can lead to poor health consequences, including medical treatment.

Evidence indicates inconsistency in the use of pain management strategies during clinical procedures. A survey method was used to explore nurses' views on the experience of pain by young children and the pain management techniques they use. These children's nurses believe that young children feel more pain and display more distress than older children. Respondents reported that pharmacological preparations were not generally used on children prior to venous cannulation. Nurses should ensure children's receive appropriate pain management prior to and during venepuncture and venous cannulation.

Need for the Study

Children requiring needle stick such as injections, IV catheters and blood sampling view these procedures as frightening and is a significant source of pain. Intrusive procedures such as venepuncture are really a stressful event for children. Venepuncture in the paediatric population can be one of the most distressing events associated with medical encounters (Rogers & Lynne, 2004). It is recognized that paediatric patients suffer long-term effects if their pain is not managed appropriately in the acute stages. Memories of pain and past pain experiences shape responses to pain for the rest of their lives (Matthew & Matthew, 2003).

According to Taddio (2005) painful procedure are routinely performed on children for diagnostic and therapeutic reasons. The provision of analgesia for these procedures however remains uncommon. Repeated painful procedures can

lead to conditioned anxiety responses and increased pain perception. Inadequate analgesia during an initial procedure may diminish analgesic effectiveness at subsequent procedures. Moreover there is a relation between painful procedures in childhood and blood-injection –injury phobia a condition that may cause children to avoid medical care.

An observational and self report survey analysis on clinical implications of unmanaged needle insertion pain was conducted among children and adolescents undergoing routine venepuncture. Samples of 171 children ranging from 3 to 17 years were included in the study. Visual analogue scale was used to assess the pain. 36% of the children were at the age of 3 to 6 years and 13% of children 7 to 17 years of age reported moderate to severe pain.

Non-pharmacological techniques to reduce venepuncture related pain and avoid potential drug side effects are generally less costly and can be performed independently by nurses (Jacobson, 1999). A number of non-pharmacological techniques, such as distraction, relaxation, guided imagery, and cutaneous stimulation provide coping strategies that may help reduce pain perception, make pain more tolerable, decrease anxiety and enhance the effectiveness of analgesics. According to American Academy of Paediatrics (AAP, 2001) "Most acute pain experience in medical setting can be prevented or substantially relieved."

Desssire Lie 2002 conducted a study on minimizing needle pain in children. Survey suggested that venepuncture is associated with considerable distress among children. Between 34% and 64% of children experiences stress of pain from the procedure. The study suggested that 50% of children report needle

stick experiences as unpleasant and painful, which causes subsequent high levels of anticipating fear and distress. Different strategies have been reported to reduce the distress associated with venepuncture among children.

Ice or cold application on injured part is used as a standard treatment for trauma, bleeding, swelling and soft tissue injuries by blocking nerve conduction in nerve fibers (Shethks Ismail, 2000). Chris Paesero 1999 in an article on "using superficial cooling for pain relief" from American Journal of Nursing discussed that cold can be used in relieving varieties of pain. Application of cold at various acupressure sites for pain relief can range from superficial cooling to ice massage. The effects of cold may progress from partial to complete anaesthesia or numbness of the skin.

A study conducted to find out the effects of two non-pharmacological pain management measures for injection pain recommended to use cold therapy and distraction to decrease pain intensity. The first group received local cold therapy, the second group received distraction and the control group received only routine care. The result shows that average pain intensity in local cold therapy, distraction and control groups was 26.3, 34.3 and 83.3 respectively. The findings indicate that pain intensity was significantly higher in the non-interventional group than the interventional groups. This study supports the efficacy of non-pharmacologic pain management methods (Hasanpour, 2005).

A randomized controlled trial was done to determine the effects of ice application on pain relief in children of age group 1-4 years undergoing vaccine injections by Edwards 2008. Data was collected from 40 children

attending an immunization clinic in a local hospital, Toronto. The subjects included 20 intervention group members and 20 control group members. Ice or cold packs was applied to the intervention group members on the injection site immediately before the procedure (within 1 minute of injection). Pain was measured with a numeric rating scale and measuring vital signs. Children who were provided with ice application had a lower degree of discomfort than children who were not provided with this intervention ($p<0.01$).

Researchers found two thirds of the children (66.6% of 45 children) considered the anticipatory phase of venepuncture as a threat. Slightly more than half the children also appraised the impact phase as a threat (Calty, 1997). Hansber (1996) found venepuncture can be one of the most distress events associated with medical conditions. This is an increasing focus on the recognition, assessment and management of pain in children. As advocates for children, pediatric nurse is obligated to minimize the emotional and physical effects to painful procedures.

One of the most dramatic advances in paediatric nursing is the atraumatic care of children. Assessing and managing a child with pain is a daily problem for nurses. They are not only the agents, who carry out doctor's orders, but also the ones who implement the orders and who work closely with patients to facilitate healing processes. So nurses can use simple interventions like ice-application to relieve procedural pain in children and promote comfort for them.

The investigator during her clinical experience felt that children are often exposed to painful procedures on admission to hospital. One such common procedure is venepuncture which is very painful to children. Minimizing pain during venepuncture can help to prevent distress, development of needle fears and subsequent health care avoidance behaviors. More positive experiences during venepuncture also maintain and promote trust in health care providers. Thus, the investigator is interested to emphasize on the measure of pain relief by cold application to reduce pain among children during venepuncture. With this intention, the investigator has taken steps to find the effectiveness of local cold application on pain response during venepuncture.

Statement of the Problem

"An Experimental Study to Assess the Effectiveness of Ice Cube Application upon Pain Perception of Children Undergoing Venepuncture at Selected Hospitals, Chennai."

Objectives of the Study

1. To determine the level of pain perceived by control and experimental group of children during venepuncture.
2. To determine the effectiveness of ice cube application by comparing the pain perception among control and experimental group of children during venepuncture.
3. To determine the association between selected demographic variables and pain perception among control and experimental group of children during venepuncture.

4. To determine the association between selected clinical variables and pain perception among control and experimental group of children during venepuncture.
5. To determine the level of satisfaction of mothers and children regarding ice cube application in experimental group of children during venepuncture.

Operational Definitions

Effectiveness

In this study it refers to the expected and desired change in the level of pain perceived by children undergoing venepuncture after application of ice cubes and is measured by Wong Baker FACES Pain Rating Scale. In which the researcher observes and documents the pain perception of children during venepuncture.

Ice cube application

In this study, it refers to the application of three or four ice cubes covered by a terry wash cloth and applied to the skin area of venepuncture for a period of one minute prior to the procedure.

Pain perception

In this study, it refers to the pain experienced by children during venepuncture as measured by Wong Baker FACES Pain Rating Scale. In which the researcher has to choose the FACES that describes their pain intensity and interpret as mild, moderate and severe.

Venepuncture

In this study, it refers to the puncture of a vein with a cannula or needle for the purpose of blood collection, administration of intravenous injections or intravenous fluids for children.

Children

In this study, it refers to the children aged between 6-10 years undergoing venepuncture at selected hospital's Chennai.

Assumptions

- Children experience pain while undergoing invasive procedures.
- Every child responds to pain in a unique way.
- Ice application is one of the strategies used for pain reduction.
- Distractions can modify child's response to pain.

Null Hypothesis

H01 There will be no significant difference in pain perception during venepuncture among control and experimental group of children.

H02 There will be no significant association between selected demographic variable and pain perception during venepuncture among the control and experimental group of children.

H03 There will be no significant association between selected clinical variable and pain perception during venepuncture among the control and experimental group of children.

Delimitations

The study was delimited to children

- Aged 6-10 years.
- Undergoing venepuncture.
- Admitted in selected hospital's Chennai.

Conceptual Framework

The conceptual framework deals with the interrelated concepts that are assembled together in some rational schemes by virtue of their relevance to a common theme (Polit & Beck, 2008).

The conceptual framework for a particular study is the abstract, logical structure that enables the researcher to link the findings to the nursing body of knowledge. It is a process of ideas, which are formed and utilized for the development of a research design. It helps researcher to know what data needs to be collected and gives direction to an entire research process. Conceptual framework formalizes the thinking process so that others may read and know the framework of reference that is basic to the research problem. The present study is aimed at reducing the pain perception of children during venepuncture by ice cube application. As the gate control theory focuses on the transmission of pain impulses and pain perception, this study is based on Modified Melzack and Wall's Gate Control theory.

Gate control theory of pain

The Gate-Control theory of Melzack and Wall (1965) states that stimulation of larger diameter fibers (e.g., using appropriate pressure or

vibration) can close the neural gate so that the central perception of itch and pain is reduced. It is based on the fact that small diameter nerve fibers carry pain stimuli through a gate mechanism but larger diameter nerve fibers going through the same gate can inhibit the transmission of the smaller nerves carrying the pain signal.

The theory explains that “the substantiagelatinosa, a functional unit of densely packed cells which extends the length of the spinal cord, is the site of a transmission blocking action which ‘closes the gate’ to impulse entering the spinal cord on their way to the transmission cells, when non-nociceptive touch fibres are stimulated. Conversely “when open, the gate permits sensory input to reach the transmission cells in the dorsal horn of the spinal cord”, allowing the perception of pain to get through. This potential blocking mechanism can result in little or no pain perception regardless of the intensity of the painful stimuli. Based on the principle of gate control theory, the following conceptual framework was developed.

Intervention

In this study the intervention refers to application of ice cubes to the skin at the site of venepuncture for a period of one minute prior to the experimental group. It stimulates the pain receptors which send back impulses into spinal cord via the posterior root and effectively block the pain pathway. The control group receives the conventional method of nursing care without intervention.

Pain perception during venepuncture

Children who undergo venepuncture experience pain. In the control group there is more stimulation of pain receptors during venepuncture. In case of experimental group there is less stimulation of pain receptors during venepuncture due to application of ice cube.

Pain gating mechanism

It refers to the means of reducing pain. It either regulates or blocks the pain impulses along the central nervous system. When gates are opened, pain impulses flows freely through pain pathways. When gates are closed, the pain pathways are blocked and pain impulses become reduced. In this study, when ice cube is applied in the experimental group, the pain gates are closed and the child experience less pain. In control group it was not applied, therefore the pain gate was opened and the child perceived the pain.

Pain perception after venepuncture

Both in control and experimental group pain perception is assessed by Wong Baker FACES Pain Rating Scale. The experimental group experiences less pain compared to control group children.

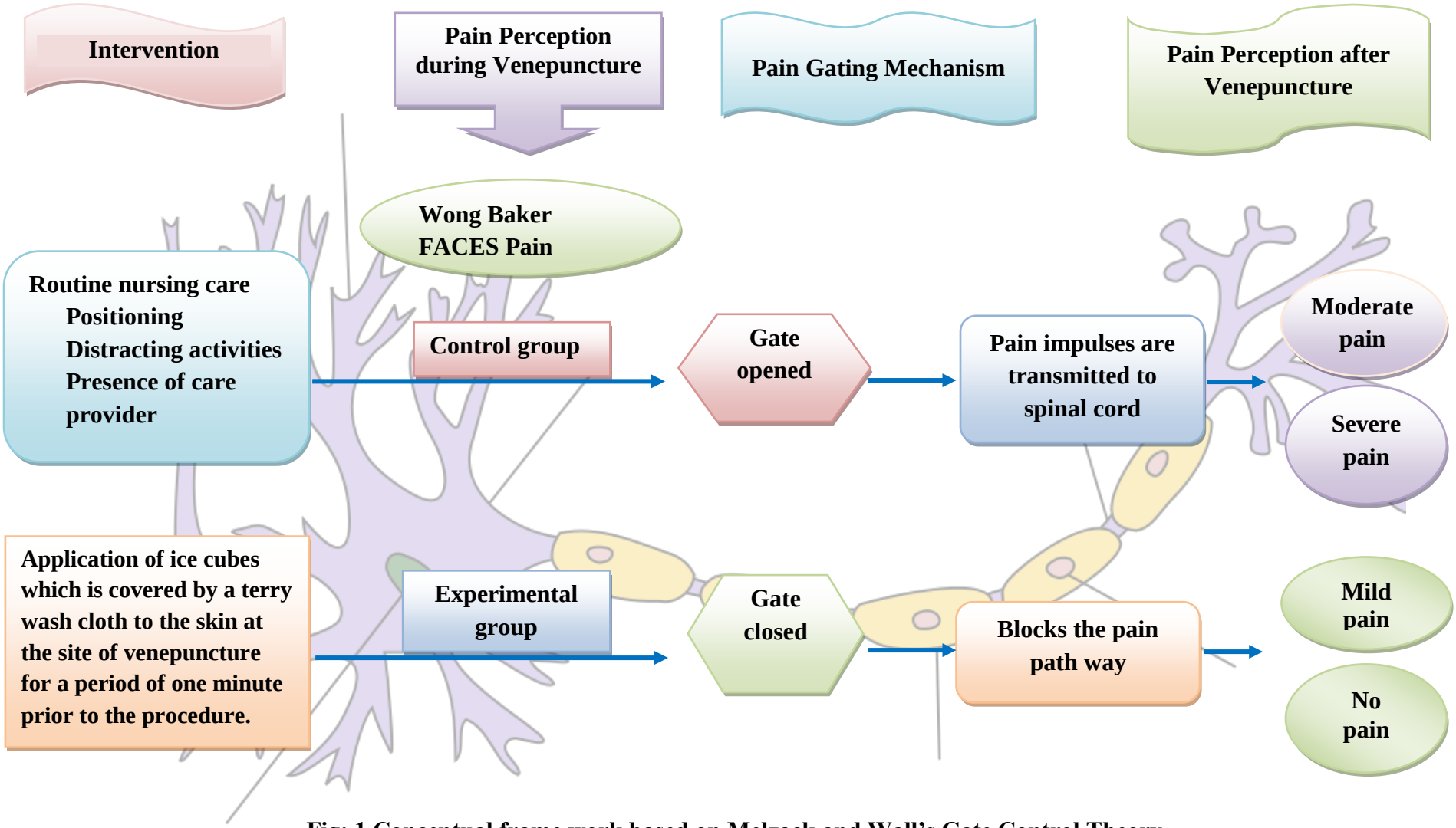

Fig: 1 Conceptual frame work based on Melzack and Wall's Gate Control Theory

Projected Outcome

Ice cube application during venepuncture, will help the children to have decreased pain perception and mother's satisfaction. The intervention will be affordable, safe and easy to administer.

Summary

This chapter has dealt with the background, need for the study, and statement of the problem, objectives, operational definitions, assumptions, null hypothesis, delimitations and conceptual framework.

Organization of the Report

Further aspects of the study are presented in the following five chapters.

In chapter II **:** Review of literature

In chapter III **:** Research Methodology which includes research approach, design, Setting, population, sample and sampling techniques, tool description, content validity and reliability of the tool, pilot study, data collection procedure and plan for data analysis.

In chapter IV **:** Analysis and interpretation of data.

In chapter V **:** Discussion

In chapter VI **:** Summary conclusion, implications and recommendations.

The report ends with selected references and annexure.

CHAPTER II

REVIEW OF LITERATURE

Review of literature is an essential component of the research process. A literature review is an organized written presentation of what has been published on a topic by scholars (Burns & Groove, 2007).

A literature review is a summary of previous research topic. Literature reviews can be either a part of larger report of a research project, a thesis or bibliographic essay that is published separately in a scholarly journal. The purpose of literature review is to convey to the reader what knowledge and ideas have been established on a topic and what are the strength and weaknesses.

This chapter deals with a review of published and unpublished research studies and related material for the present study. The review helped the researcher to develop an insight into the problem and build the foundation of the study.

The review of literature in this chapter has been presented under the following headings.

- **Literature related to pain in children**
- **Literature related to alternative therapies for reducing pain**
- **Literature related to ice cube application as a pain relief measure**
- **Literature related to ice cube application during venepuncture.**

Literature related to Pain in Children

Shah (2009) conducted a study on effectiveness and tolerability of pharmacologic and combined interventions for reducing injection pain during routine childhood immunizations. Thirty-two studies, involving 3856 infants and children aged from 2 weeks to 15 years of age, were included in this systematic review; 23 of these trials were included in meta-analyses. The study analysis revealed that topical local anesthetics, sweet-tasting solutions and combined analgesic interventions, including breastfeeding were associated with reduced pain during childhood immunizations and should be recommended for use in clinical practice.

In 2005 Anand conducted a study on analgesia and local anesthesia during invasive procedures in the neonate. Clinical studies examining various therapies for procedural pain in neonates were identified by searches of review articles. The study results showed that well-designed clinical trials investigating currently available and new therapies for acute pain in neonates will provide the scientific framework for effective pain management in neonates undergoing invasive procedures.

A descriptive study to investigate the prevalence of pain and characteristic of pain (frequency, duration, intensity) among children was compared across different age and gender was conducted by Priyadarshini Johnson (2004). In this study about 735 children from school's were surveyed, in which results showed that 715 (97.3%) have answered the questionnaires related to pain completely. The study concluded that the prevalence of pain, is increased with age and more pain was complained by female children.

In a study conducted by Olsson (1995) pain induced by various procedures was assessed in the pediatric surgical emergency department at St Goran's Children's hospital in Stockholm. Assessment of pain was obtained from the nurse, parents and children aged 3-9 years, and the Smily Five-Five Scale was used. The nurse and the parent also answered questionnaires about analgesic medication, the child's behavior, and the parent's overall opinion of the pain management. Forty-four percent of the children cried during the procedure and 16% fought against being restrained. In 24% of the cases, the child was judged to be in a state of "panic". He concluded that the pain induced by procedures in the emergency rooms is unacceptably high. Children estimate higher pain scores than parents and nurses do. There was a poor correlation between the parent's and child's estimates of pain. Parents are not well informed about the possibilities for pain treatment.

Literature related to Alternative Therapies for Reducing Pain

Tufekci (2009) assessed the effect of distraction (looking through kaleidoscopes) to reduce perceived pain, during venipuncture in healthy school-age children. 206 children who underwent venepuncture were selected randomly for the study. The study results showed that the distraction made with kaleidoscope effectively reduced the pain related to venepuncture in healthy school children.

To investigate the effect of parental presence of facial expression of children when experiencing pain, a descriptive study was conducted by Vervoot (2008). The children experienced pressure pain in either one or two condition.

One when observed by parents and two when observed by an adult stranger (n-31 children). Analysis revealed that children showed more facial expression in the presence of parents than in the presence of stranger.

A systematic review of 28 studies to assess the effect of distraction therapy to reduce pain and anxiety in needle related procedures was conducted by Uman (2006). The result of the study supports the use of distraction as a method of reducing pain and anxiety in needle related procedures.

In 2000 Pricilla conducted a study on comparison of four analgesic agents for venepuncture. A convenience sample of 280 subjects was assigned randomly to 1 of 4 groups. Group 1 received prilox cream, group 2 received dichlorotetra fluroethane spray, and group 3 received 0.5% lignocaine subcutaneously, and group 4 received normal saline with 0.9% benzyl alcohol subcutaneously. The study results show that benzyl alcohol had all 4 qualities of an ideal venepuncture analgesic.

Literature related to Ice cube Application as a Pain Relief Measure

Farhadi (2011) conducted a study to assess the effect of local cold on intensity of pain due to Penicillin Benzathin intramuscular injection. 60 patients were taken and divided into case and control group using a randomized location sampling. Results showed that local cold significantly decreased the severity of pain due to Penicillin Benzathin IM injection in case groups compared with control group. This signifies that local cold application could play an important role in decreasing pain during Penicillin Benzathin IM injection**.**

A study was conducted to assess the effectiveness of ice application on injection site in reducing pain among toddlers by Neethu (2011). In this study the children of age group 15-18 months attending the PHC receiving DPT, HIB or MMR vaccine were selected. Analysis revealed that the ice application considerably reduced the pain of toddlers during injection.

A study to assess the effectiveness of ice application at acupressure point prior to injection in reducing the pain was conducted by Bellamkonda (2008). It was conducted on 60 children between the ages of fifteen to eighteen months. The study result shows 80% of the children in experimental group had mild pain perception after ice application at the acupressure point.

An experimental study to assess the effectiveness of ice application at acupressure point for the reduction of dental pain in 120 school children was conducted by Charles in the year 2006. The study result shows that 74% of children were having mild pain, 14 % of children had moderate pain and 12% of children had no pain. The result shows that application of ice at acupressure point is very effective in reduction of pain after injection.

Literature related to Ice cube Application during Venepuncture

In 2012, a comparative study was conducted by Water House to investigate the effect of Cryotherapeutic topical analgesics for paediatric intravenous catheter placement: ice versus vapocoolant spray. Among 95 patients, aged 9 to 18 years, in a pediatric emergency department. Subjects were randomly assigned to receive vapocoolant spray or topical ice pack for 3 minutes, before IV catheter placement. The study results shows that both agents caused a decrease in

pain during IV insertion, but Vapocoolant spray may be more effective than ice as an analgesic for IV insertion.

Liu (2012) conducted a study to assess the integration of vibration and cold relieves venepuncture pain in a paediatric emergency department. In this study 81 children between the age of 4 to 18 years were randomized to the device (n = 41) or standard care (n = 40). Analysis revealed that the combination of cold and vibration decreased venepuncture pain significantly more than standard care without compromising procedural success.

A study was conducted in 2010 by Sruthy to assess the effectiveness of local cold application on pain response during intravenous procedures among children. In this study 60 children with age group of 3-12 yrs; 30 children for experimental group and 30 children for control group who were undergoing intravenous procedures were selected by purposive sampling. The study concluded that the local cold application during intravenous procedure can be an effective method to reduce the pain.

A quasi experimental study to assess the effectiveness of ice application prior venepuncture on pain was conducted by Movahedi (2006). It was conducted on 80 children between the age of 6-12 years. The study result showed that the use of ice application prior to venepuncture can be considered an easy and effective intervention of reducing venepuncture related pain.

Summary

This chapter has dealt with review of literature related to the problem stated. The literatures presented here were extracted from Medline, Pubmed, Medscape, Journal of Indian Paediatrics and Journal of complementary and alternative medicine, it includes 11 primary and 5 secondary sources. It helped the researcher to understand the impact of the problem under study. It has also enabled the investigator to design the study, develop the tool and plan the data collection procedure and to analyze the data.

CHAPTER III

RESEARCH METHODOLOGY

The methodology of the research study is defined as the way the data is gathered in order to answer the question to analyze the research problem. It enables the researcher to project the blue print of the research undertaken. The research methodology involves a systemic procedure by which the researcher starts from the initial identification of the problem to its final conclusion (Polit & Beck, 2008).

The present study was conducted to assess the effectiveness of ice cube application upon pain perception of children during venepuncture. This chapter deals with a brief discussion of different steps undertaken by the researcher for the study. It involves research approach, research design, setting, population, sample and sampling technique, selection of tool, content validity, reliability, pilot study, data collection procedure and plan for data analysis.

Research Approach

Research approach is the most significant part of any research. The appropriate choice of the research approach depends on the purpose of the research study which is undertaken. According to Polit & Beck (2008), an Experimental research is an extremely applied form of research and involves finding out the efficiency of any programme and the practice of policies. Its goal is to assess or evaluate the success of the programme. In this study, the researcher wanted to assess the effectiveness of ice cube application upon pain perception of children during venepuncture. After extensive review of the literature the researcher found that the experimental approach was the best suited approach.

Research Design

Polit & Beck 2008 defined research design as the overall plan for addressing a research question, including specifications for enhancing the study's integrity. A research design incorporates the most important methodological design that a researcher works on conducting a research study. A true experimental research design was used for this study. True experimental research is a powerful method available for testing the hypothesis of cause and effect relationship between variables. It has the characteristic feature such as manipulation, control and randomization. Randomization was carried out to select 60 samples and to assign them in the control and experimental group. Ice Cube application was given as intervention in the experimental group.

In this study, post test only design was adopted. The researcher manipulated the independent variable i.e., ice application to the experimental group of children. The effectiveness of ice cube application upon the independent variable i.e., the pain perception in children was computed. The research design is represented diagrammatically as follows:

Post test only design

R - O1

R X O2

R - Randomization

X - Ice application on venepuncture

O1 - Control group

O2 - Experimental group

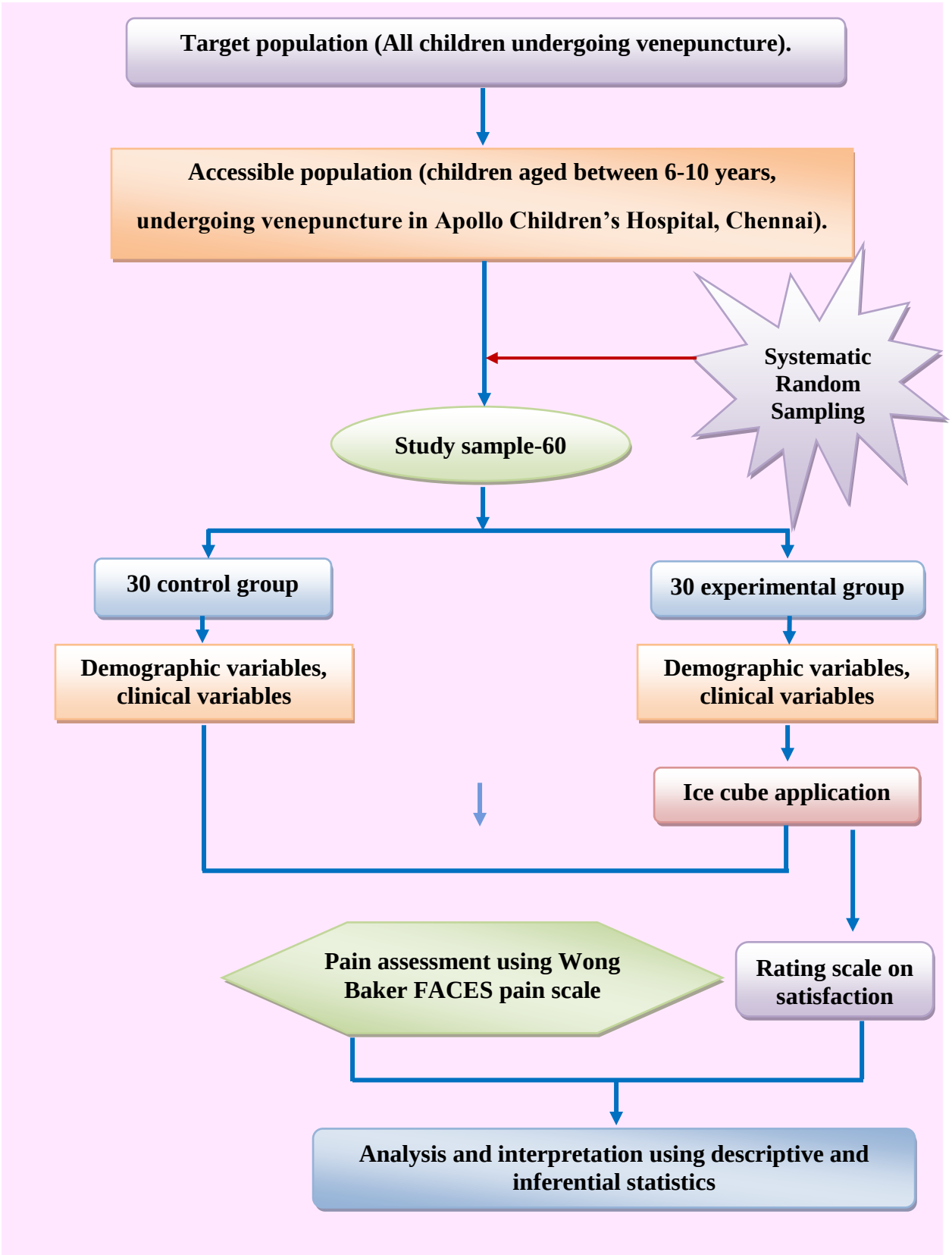

Fig: 2 Schematic Representation of the Research Methodology

Variables

Independent variable

The variable that is believed to cause or influence the dependent variable is the independent variable (Polit & Beck, 2008). In this study, the independent variable is ice cube application.

Dependent variable

The variable hypothesized to depend on or be caused by another variable is the dependent variable (Polit & Beck, 2008). In this study, the dependent variable is the level of pain perception in children during venepuncture.

Attribute variable

Variable that describes the study sample characteristics are termed as attribute variables (Polit & Beck, 2008). In this study, the attribute variables are the demographic variable and the clinical variable of the children.

Research Setting

Research setting is the physical location and conditions in which data collection takes place in study (Polit & Beck, 2008).

The present study was conducted at Apollo Children's Hospital, Chennai. It is an 80 bedded hospital under the administration of Apollo Main Hospital situated in Chennai. It is a multispecialty tertiary centre for paediatrics with facilities like Neonatal Intensive Care Unit, Pediatric Intensive Care Unit(PICU), Cardio-Thoracic Intensive Care Unit (CTICU), Pediatric Emergency Services and

subspecialties and is equipped with High Frequency oscillation ventilator,3D Echo Doppler, Computed Tomography and Magnetic Resonance Imaging. The researcher collected data from pediatric ward and blood collection room. Daily around 90-120 children's were undergoing venepuncture in the outpatient department (OPD). In OPD 6 Auxiliary nurse midwives are working. Majority of the venepuncture was performed by the nurse.

Population

Population is the entire set of individual or object having some common characteristics (Polit & Beck, 2008).

Target population is the aggregate of cases in which a researcher is interested and would like to generalize the study result (Polit & Beck, 2008). The target population in this study comprises of all children undergoing venepuncture procedure.

Accessible population is the aggregate of cases that conforms to designated criteria and that are accessible as subject for a study (Polit & Beck, 2008).The accessible population in this study were the children between the ages of 6-10 years, undergoing venepuncture in Apollo Children's Hospital, Chennai.

Sample

According to Polit & Beck 2008, the sample is a subset of the population selected to participate in a study. Sample consists of children undergoing venepuncture in Apollo children's hospital, Chennai who satisfy the inclusion criteria.

A sample size of 60 children who meet the inclusion criteria were chosen for the study, in that 30 were in control group and other 30 were in experimental group.

Sampling Technique

Sampling is the process of selecting a portion of the population to represent the entire population (Polit & Beck, 2008). The participants of the study were selected by systematic random sampling technique. 60 children undergoing venepuncture were selected and numbered as one and two. The children who are numbered as one was assigned to control group and two numbers to experimental group.

Sampling Criteria

Inclusion criteria

- Both male and female children between 6-10 years
- Children undergoing venepuncture in Apollo children's hospital Chennai.
- Care giver's who know English and Tamil

Exclusion criteria

- Children for whom venepuncture will be done as an emergency procedure.
- Mother's who are not willing to participate in the study.
- Children with developmental delay.

Selection and Development of Study Instruments

The study aimed at evaluating the effectiveness of ice cube application upon pain perception of children during venepuncture. Data collection instruments were developed through an extensive review of literature and consultation with experts.

The instruments used in this study were, Demographic variable Proforma, Clinical variable proforma, Wong Baker FACES Pain Rating Scale and Rating scale on satisfaction of the mother's regarding ice cube application during venepuncture.

Demographic variable proforma of children

Demographic variable proforma of children includes the age in years, gender, education of child, type of family, religion, area of residence, family monthly income, language, educational status of mother and father.

Clinical variable proforma of children

Clinical variable proforma for children includes history of previous hospitalization and venepuncture, diagnosis, duration of illness, type and size of needle used, indication for venepuncture, who performed venepuncture, information of venepuncture and use of any analgesics.

Wong Baker FACES Pain Rating Scale to assess the pain perception

Wong Baker FACES Pain Rating Scale is a subjective pain rating scale developed by Wong and Baker (1988). It consists of six cartoon FACES ranging from smiling face for "no pain" to tearful face for "worst pain". It can be used for

children as young as 3 years. The FACES provide three scales in one: facial expression, numbers, and words. The score ranging from 0 -no pain, 2 - hurts little bit, 4 - hurts little more 6- hurts even more, 8 - hurts whole lot, 10- hurts worst. The score interpretation is mentioned below,

Score	Level
0	No pain
2	Mild pain
4-6	Moderate pain
8-10	Severe pain

Rating scale on satisfaction of the mothers and children regarding ice cube application during venepuncture

The level of satisfaction of the mothers and children regarding ice cube application during venepuncture was measured by rating scale, which comprises of 3 categories: researcher's approach, ice cube application, effects of intervention in the child. Rating scale includes 12 items. The responses include highly satisfied, satisfied, dissatisfied, highly dissatisfied with the score 3, 2, 1, 0 respectively. The maximum score is 36.

Score	Percentage	Interpretation
<14	< 40%	Low satisfaction
15- 25	40-69%	Moderate satisfaction
26-36	>70%	High satisfaction

Psychometric Properties

Validity of study instruments

Content validity is the degree to which an item in an instrument adequately represents the universe of the content (Polit & Beck, 2008).

The tools were given for validation to 6 experts in the field of research and nursing. The valuators had suggested some modification in the demographic variable proforma and clinical variable proforma. The modifications and suggestions of experts were incorporated in the final preparation of the tool.

Reliability of the instruments

The reliability is the degree of consistency with which an instrument measures the attribute which is designed to measure (Polit & Beck, 2008). The reliability of the tool was tested using the split half method and found to be 0.8 by Pearson's corelation which indicates that the tool is highly reliable.

Pilot Study

Pilot study is a miniature version of actual study, in which the instrument is administered to the subject drawn from the sample population. It is a small scale version or trial run done in preparation for major study (Polit & Beck , 2008).

The purpose is to find out the feasibility and practicability of the study design. The pilot study was conducted among 12 children undergoing venepuncture in Apollo Children's Hospital, Chennai. The ice cube application upon pain perception during venepuncture was found to be feasible.

Intervention Protocol

In the experimental group, ice cube application was given at the site of venepuncture for a period of one minute. At the end of this period, venepuncture was performed and post assessment of pain perception was done immediately for one minute by using Wong Baker FACES Pain Rating Scale. The level of satisfaction of experimental group of children was assessed using satisfaction rating scale.

Protection of Human Rights

The study was conducted after the approval of the ethical committee, Apollo Hospitals, Chennai. Obtained permission from Principal, Apollo College of Nursing, HOD of Paediatric Nursing Department and Nursing Director of Apollo Children's Hospital where the study was conducted. The participants were explained about the study and verbal consent was obtained after providing assurance and developing confidence. Confidentiality of the data was maintained throughout the study.

Data Collection Procedure

Data collection is the gathering of information needed to address a research problem (Polit & Beck, 2008). The data was collected from 15-5-2013 to 15-6-2013 at Apollo Children's Hospital, Chennai, after obtaining the permission to conduct study from administrator and concerned authorities.

In this study, children who satisfied the inclusion criteria were selected randomly, and numbered as one and two. The children who were numbered as one

were assigned to control group and who were numbered as two were in experimental group. The researcher introduced herself to the parents of the children and obtained verbal consent for the study.

The researcher collected the demographic variables and the clinical variables by interviewing the children and their parents. . The children in the control group were assessed using Wong Baker FACES Pain Rating Scale for pain perception during and after venepuncture without any intervention. In the experimental group, ice cube application was given at the site of venepuncture for a period of one minute. At the end of this period, venepuncture was performed and assessment of pain perception was done during and immediately for one minute by using Wong Baker FACES Pain Rating Scale. The level of satisfaction of experimental group of children was assessed using satisfaction rating scale.

Problem Faced During Data Collection

The problem faced by the researcher during this study was that certain parents were not interested to participate in the study.

Plan for Data Analysis

Data analysis is a systematic organization and synthesis of research data and testing of research data and testing of research hypothesis by using the obtained data (Polit & Beck, 2008).The data analysis was carried out by descriptive statistics like frequency distribution, percentage, mean, standard deviation and inferential statistics like‘t’ test and chi-square.

Summary

This chapter dealt with the research methodology. It includes selection of research approach, research design, setting, population, sample, sampling technique, sampling criteria, selection and development of study instruments, validity and reliability of study instrument, pilot study, data collection procedure and plan for data analysis. In the following chapter, analysis is interpreted using descriptive and inferential statistics.

CHAPTER- IV

ANALYSIS AND INTERPRETATION

Data analysis is conducted to reduce, organize and give meaning to the data. The results obtained from data analysis require interpretation to be meaningful. Interpretation of data involves examining the results from data analysis forming conclusions, considering the implications for nursing, exploring the significance of the findings and suggesting further studies (Burns & Groove, 2007).

This chapter deals with analysis and interpretation of data collected on a number of issues from various sources. Statistics is a field of study concerned with techniques or methods of data collection, classification, summarizing, interpretation, drawing inferences, testing of hypothesis and making recommendations (Mahajan, 2004). Data was collected from 60 children undergoing venepuncture at Apollo children's hospital, Chennai, among them 30 were in control group and 30 in experimental group to determine the effectiveness of ice cube application prior to venepuncture. The data were analyzed according to the objectives and hypothesis of the study. Analysis of the data was compiled after all the data was transferred to the master coding sheet. The data were analyzed, tabulated and interpreted using appropriate descriptive and inferential statistics.

Organization of the Findings

The findings of the study were organized and presented under the following headings

- Frequency and percentage distribution of demographic variables in the control and experimental group of children.
- Frequency and percentage distribution of clinical variables in the control and experimental group of children.
- Frequency and percentage distribution of pain perceived by children during venepuncture measured by Wong-Baker FACES pain rating scale in experimental and control group of children.
- Comparison of mean and standard deviation of pain perception by control and experimental group of children during venepuncture measured using Wong-Baker FACES pain rating scale.
- Frequency and percentage distribution of level of satisfaction of mothers and children on ice cube application during venepuncture in experimental group.
- Association between selected demographic variable and pain perception of children in control and experimental group using Wong- Baker FACES pain rating scale.
- Association between selected clinical variables and pain perception of children in control and experimental group using Wong- Baker FACES pain rating scale.

Table. 1

Frequency and Percentage Distribution of Demographic Variables in Control and Experimental Group of Children.

Demographic variables	Control group (n=30)		Experimental group(n=30)	
	n	p	n	p
Age of the child in years				
6- 7	10	33.3%	4	13.3%
7.1-8	9	30%	11	36.7%
8.1-9	4	13.3%	7	23.3%
9.1-10	7	23.3%	8	26.7%
Education of the child				
Lower primary	24	80%	26	86.7%
Upper primary	6	20%	4	13.3%
Type of family				
Nuclear	22	73.3%	28	93.3%
Joint	8	26.7%	2	6.7%
Extended	-		-	-
Religion				
Hindu	26	86.7%	24	80%
Muslim	3	10%	4	13.3%
Christian	1	3.3%	2	6.7%
Others specify?	-	-	-	-
Area of residence				
Urban	9	30%	10	33.3%
Sub urban	20	66.7%	20	66.7%
Rural	1	3.3%	-	-
Language				
Tamil	15	50%	5	16. 7%
English	2	6.7%	6	20%
Hindi	13	43.3%	19	63.3%
Others specify?	-	-	-	-
Educational status of the mother				
Non literate	-	-	-	-
Primary	1	3.3%	-	-
Secondary	7	23.3%	6	20%
Higher secondary	13	43.3%	12	40%
Diploma	8	26.7%	11	36.7%
Graduate and above	1	3.3%	1	3.3%

The above data reveals that majority of the children in control and experimental group were in lower primary class (80%, 86.7%), from nuclear family (73.3%, 93.3%) and Hindu by religion (86.7%, 80%). In experimental group most of the children were between the age group of 7-8yrs (36.7%). Majority of the children in control and experimental group were residing in suburban area (66.7%, 66.7%). Most of the mothers in control and experimental group had undergone higher secondary education (43.3%, 40%).

Fig.3 shows the percentage distribution of gender of children undergoing venepuncture. In experimental group majority of them were female whereas in control group most of them were male (53.3%, 53.3%).

Fig.4 depicts that most of the children had a family income of 15,001-20,000 in control and experimental group (56.7%, 63.3%)

Fig.5 shows that most of the fathers in control and experimental group had undergone diploma education (40%, 56.7%).

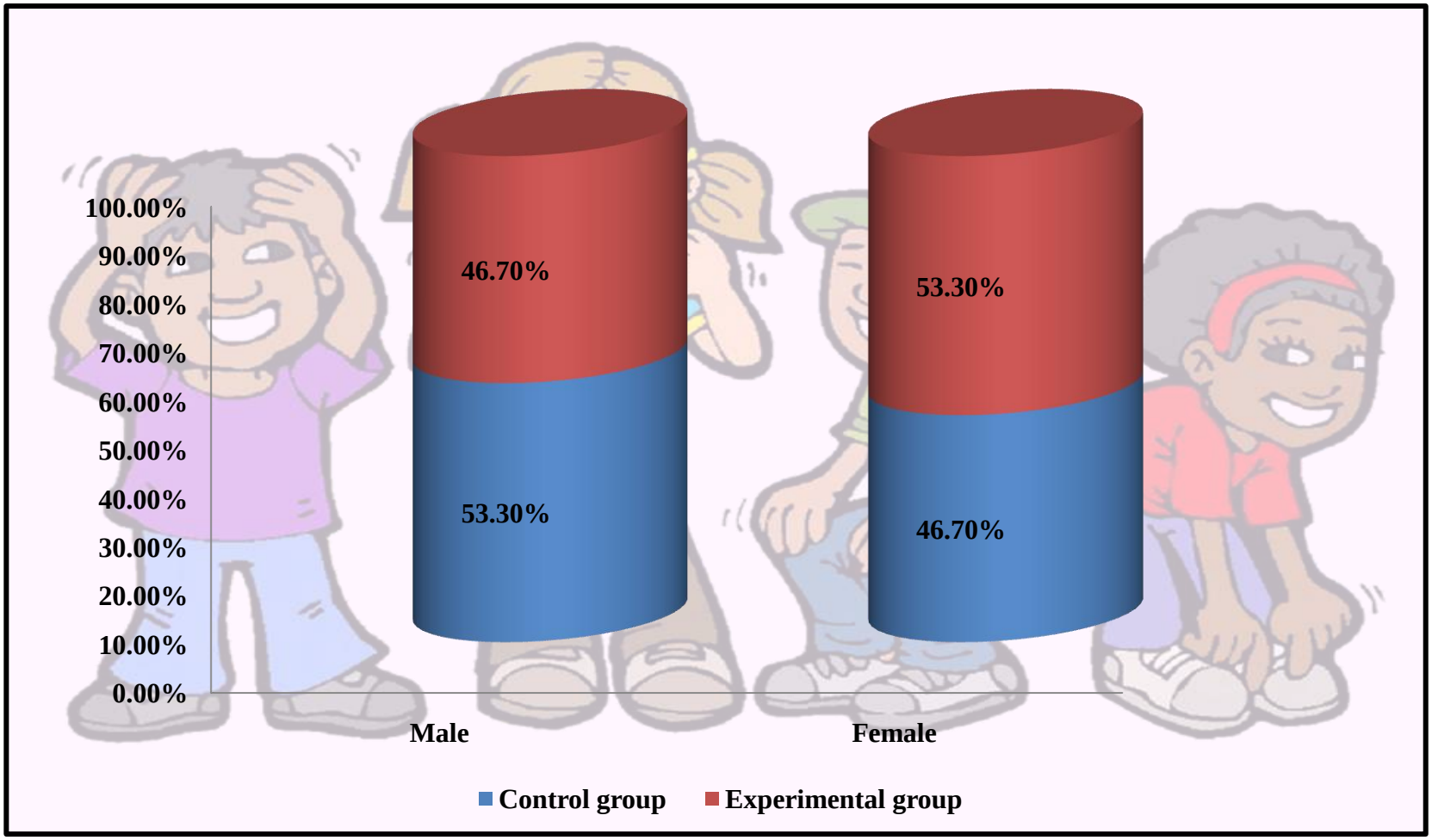

Fig: 3 Percentage distribution of gender of children undergoing venepuncture

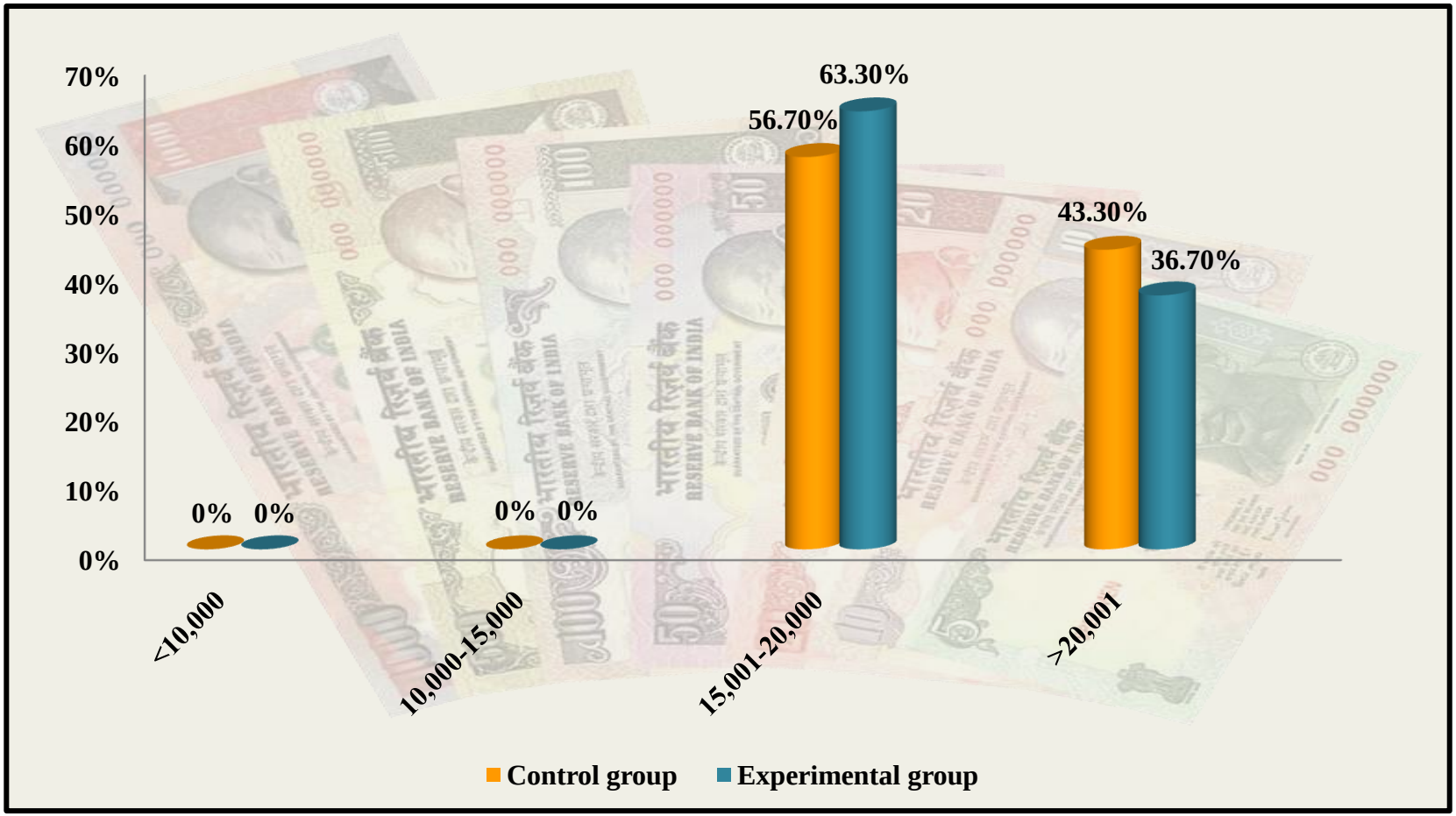

Fig: 4 Percentage distribution of Family Monthly Income in Control and Experimental Group of Children

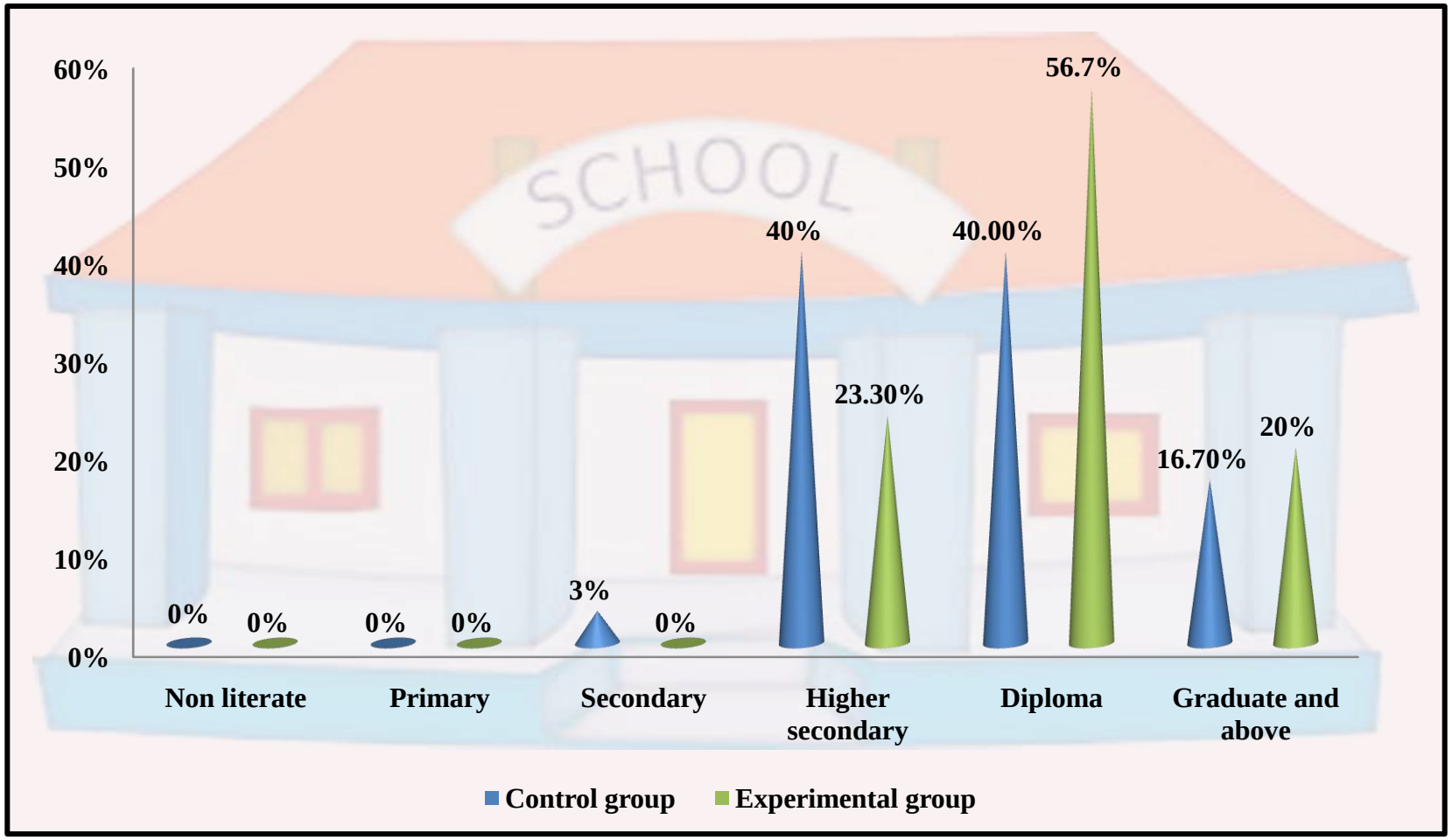

Fig: 5 Percentage distribution of educational status of father in control and experimental group of children

Table. 2

Frequency and Percentage Distribution of Clinical Variables in Control and Experimental Group of Children

Clinical Variables	Control Group (n=30)		Experimental Group (n=30)	
	n	p	n	p
Previous hospitalization				
Yes	9	30%	7	23.3%
No	21	70%	23	76.7%
Previous venepuncture				
Yes	9	30%	7	23.3%
No	21	70%	23	76.7%
Type of needle used for venepuncture				
Butterfly needle	17	56.7%	27	90%
Venflon	13	43.3%	3	10%
Size of intravenous cannula or needle				
20 G	-	-	-	-
21G	-	-	-	-
22G	13	43.3%	3	10%
23G	-	-	-	-
24G	17	56.7%	27	90%
Indication for venepuncture				
Intravenous injections	5	16.7%	1	3.3%
Administration of fluids	5	16.7%	1	3.3%
Blood collection	19	63.3%	28	93.3%
Administration of blood products	1	3.3%	-	-
Venepuncture performed by				
Nurse	28	93.3%	30	100%
Physician	2	6.7%	-	-
Technician	-	-	-	-
Did anybody inform you the details of venepuncture				
Yes	-	-	20	66.7%
No	30	100%	10	33.3%
Whether child is on any analgesic?				
Yes	-	-	-	-
No	30	100%	30	100%

The data presented in table 2 shows that majority of the children in control and experimental group had no previous history of hospitalization (70%, 76.7%) and no previous history of venepuncture (70%, 76.7%). Majority of the children in the control group and experimental group were undergoing venepuncture for blood collection (63.3%, 93.3%) and the venepuncture was performed by nurses (93.3%, 100%) with 24G (56.7%, 90%) butterfly needle (56.7%, 90%).

Fig.6 depicts that significant percentage of children in control and experimental group had gastrointestinal disorder (33.3%, 33.3%).

Fig.7 reveals that most of the children had illness for one week (63.3%, 56.7%) in control and experimental group respectively.

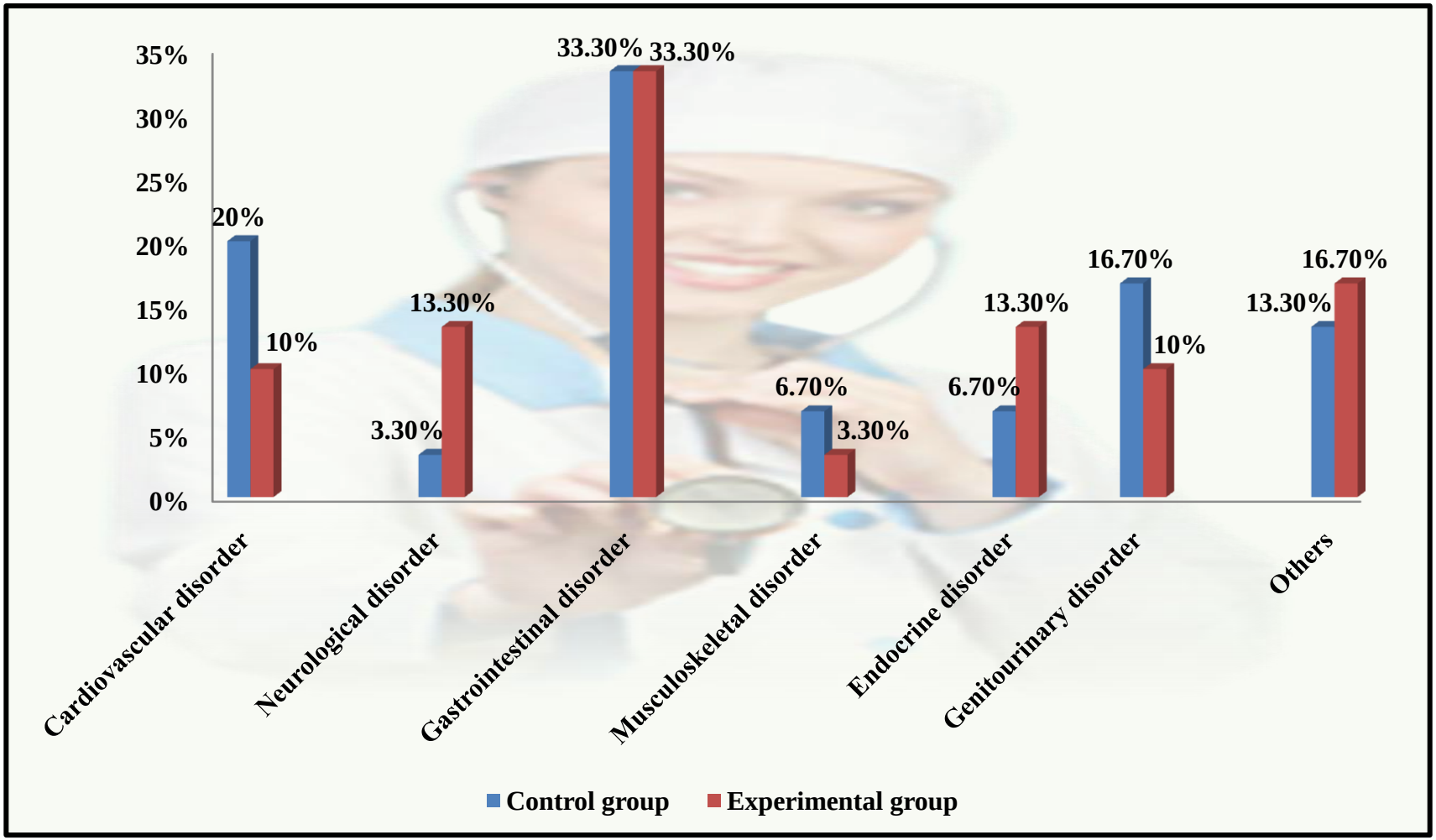

Fig: 6 Percentage distribution of diagnosis of Children undergoing venepuncture

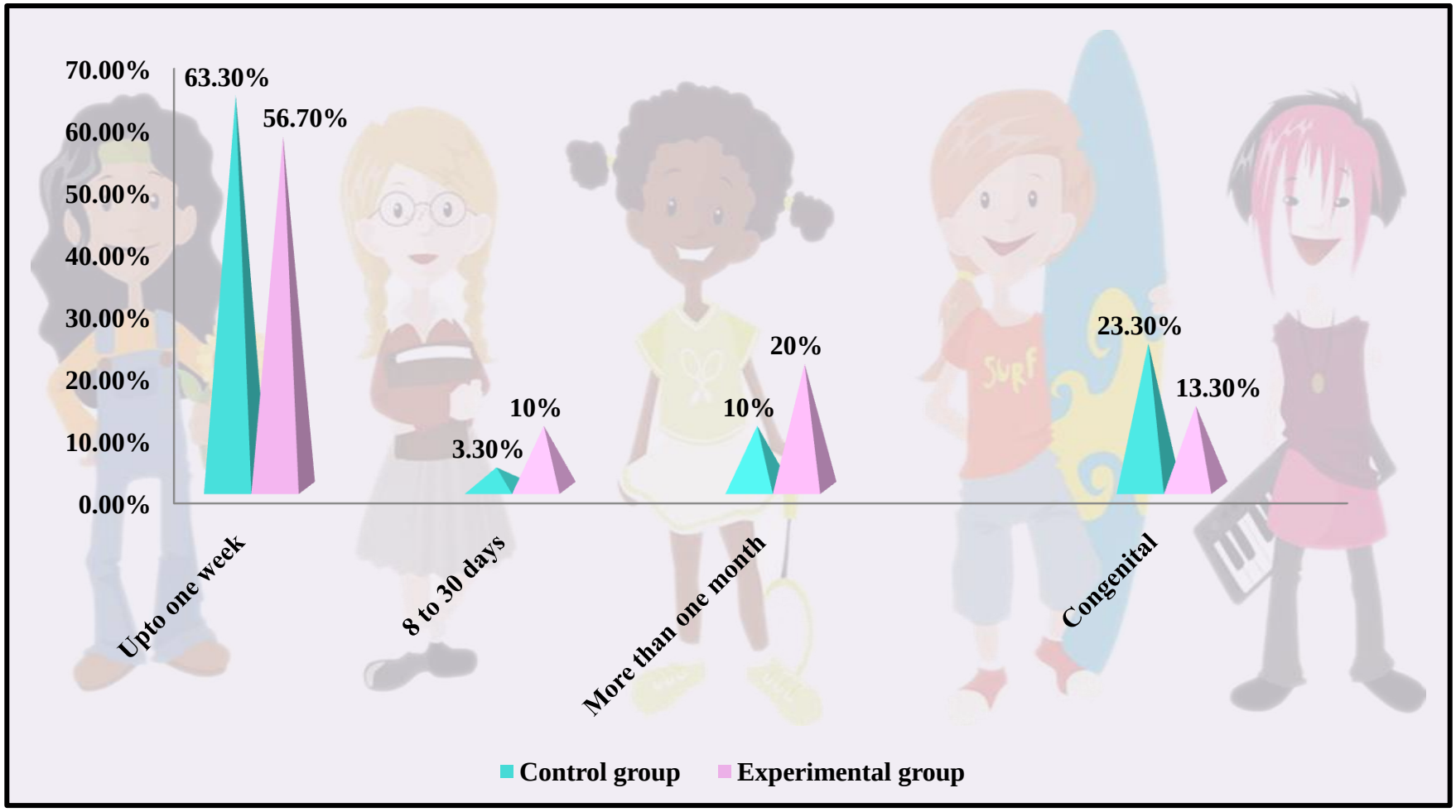

Fig: 7 Percentage distribution of duration of illness of Children undergoing venepuncture

Table. 3

Frequency and Percentage Distribution of Pain perception of the children during venepuncture by Wong Baker FACES Pain Rating Scale.

Pain perception	Control group (n=30)		Experimental group(n=30)	
	n	p	n	p
No pain	-	-	7	23.3%
Mild pain	1	3.3%	10	33.3%
Moderate pain	9	30%	13	43.3%
Severe pain	20	66.7%	-	-

The data presented in the table 3 reveals that majority of children in control group experienced severe pain during venepuncture (66.7%) whereas in experimental group had moderate pain (43.3%).

Table. 4

Comparison of Mean and Standard Deviation of Pain perception among Control and Experimental Group of Children Undergoing Venepuncture

Group	N	M	SD	t value
Control group	**30**	**7.7**	**2.11**	**10.70*** **
Experimental group	**30**	**2.7**	**1.45**	

***P<0.001

The data in table 4 depicts that the mean and standard deviation of control and experimental group of children is 7.7, 2.7, 2.11 and 1.45 respectively. The 't' value of 10.70 is highly significant at P< 0.001 level of significance.

Fig. 8 depicts that majority of the mothers and children were highly satisfied (87%) with ice cube application during venepuncture.

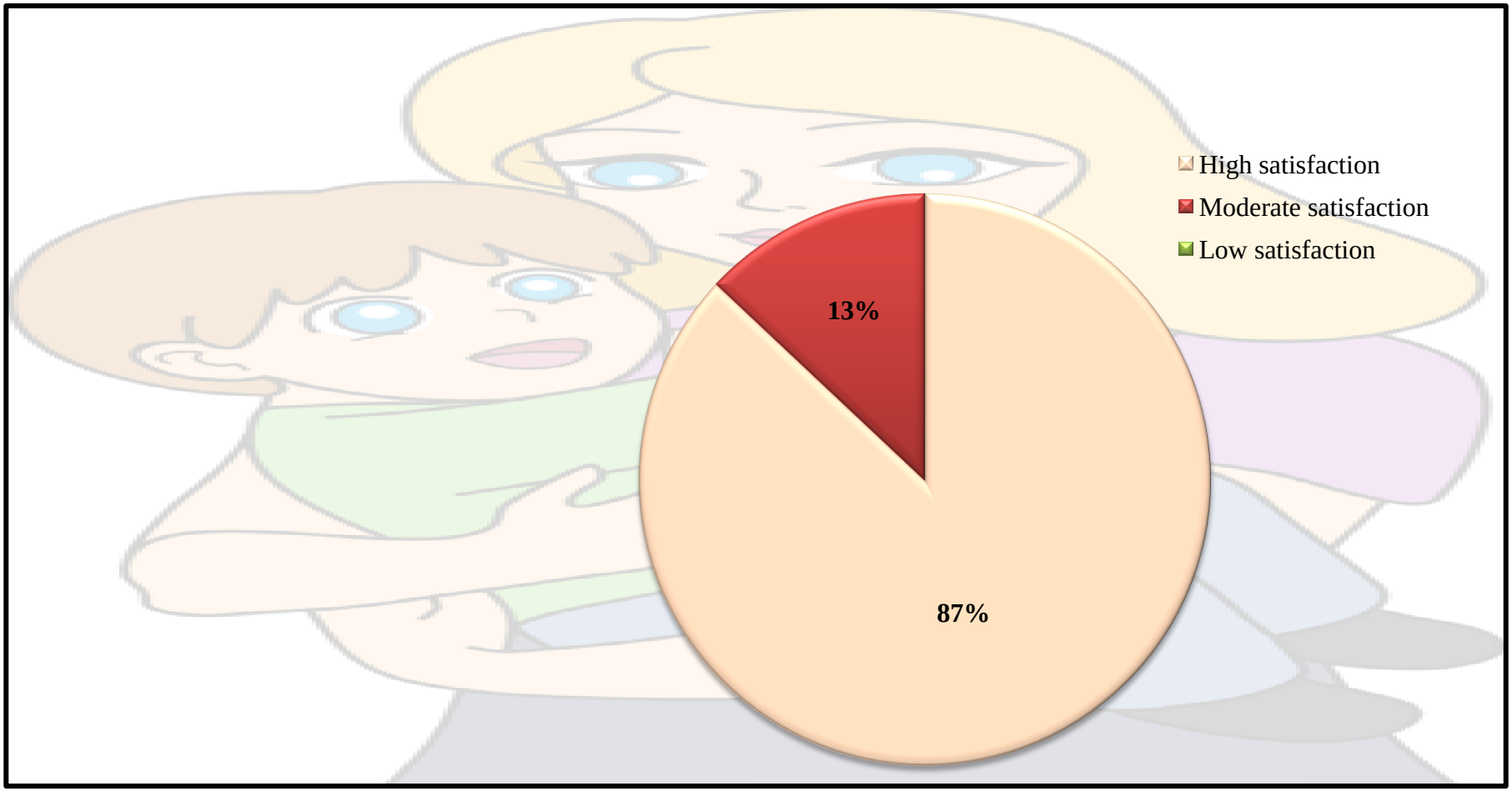

Fig: 8 Percentage distribution of level of satisfaction of mothers and children in experimental group on ice cube application during venepuncture

Table .5

Association between Selected Demographic Variables and Pain perception of Children in Control and Experimental Group Using Wong Baker FACES Pain Rating Scale

Demographic variables	Control group Pain coping score		χ^2	Experimental group		χ^2
	Up to mean N	Above mean N		Upto mean N	Above mean N	
Age of the child in years						
≤ 8	2	17	18.59***	2	12	15.93***
>8	10	1	df=1	14	2	df=1
Gender of the child						
Male	4	12	0.918	7	7	0.476
Female	6	8	df=1	10	6	df=1
Education of the child						
Lower primary	4	19	11.16***	8	10	2.595
Upper primary	6	1	df=1	9	3	df=1
Type of family						
Nuclear	8	14	0.145	15	13	1.098
Joint	2	6	df=1	2	0	df=1
Religion						
Hindu	9	19	0.274	13	11	0.0923
Others	1	1	df=1	4	2	df=1

***p<0.001

Table 5 shows that there was a significant association between age of the child and pain perception in control and experimental group. The educational level of the child and pain perception was also significantly associated in the control group and there was no significant association between other demographic variable and pain perception in control and experimental group.

Table. 6

Association between Selected Clinical Variables and Pain perception of Children in Control and Experimental Group Using Wong Baker FACES.

Clinical variables	Control group Pain coping score		χ^2	Experimental group		χ^2
	Up to mean N	Above mean N		Upto mean N	Above mean N	
Previous hospitalization						
Yes	4	5	0.535	4	3	0.0014
No	6	15	df=1	13	10	df=1
Previous venepuncture						
Yes	4	5	0.535	4	3	0.0014
No	6	15	df=1	13	10	df=1
Type of needle used for venepuncture						
Butterfly needle	6	11	0.068	14	13	2.171
Venflon	4	9	df=1	3	0	df=1
Size of intravenous cannula or needle						
≤22 G	4	9	0.068	3	0	2.171
>22 G	6	11	df=1	14	13	df=1

From the Table 6, it could be inferred that there was no significant association between any of the clinical variables and pain perception in both control and experimental group.

Summary

This chapter dealt with the analysis and interpretation of the data obtained by researcher. The analysis of the data using descriptive and inferential statistics clearly revealed the effectiveness of ice cube application during venepuncture and satisfaction of mothers and children regarding the intervention. In the following chapter interpretation of the study findings are discussed in detail.

CHAPTER V

DISCUSSION

Statement of the Problem

An Experimental Study to Assess the Effectiveness of Ice Cube Application upon Pain Perception of Children Undergoing Venepuncture at Selected Hospitals, Chennai.

Objectives of the Study

1. To determine the level of pain perceived by control and experimental group of children during venepuncture.
2. To determine the effectiveness of ice cube application by comparing the pain perception among control and experimental group of children during venepuncture.
3. To determine the association between selected demographic variables and pain perception among control and experimental group of children during venepuncture.
4. To determine the association between selected clinical variables and pain perception among control and experimental group of children during venepuncture.
5. To determine the level of satisfaction of mothers and children regarding ice cube application in experimental group of children during venepuncture.

The present study was conducted at Apollo Children's hospital. The sample size was 60 in that 30 in control group and 30 in experimental group. The Wong Baker's FACES Pain Scale and rating scale for level of satisfaction were the tools used to collect data, after establishing validity and reliability. The effectiveness of ice cube application was assessed upon pain perception of children during venepuncture. The main data collection was done after determining the feasibility and practicability through pilot study. The data was tabulated and analyzed by using descriptive and inferential statistics.

Demographic variables distribution

The demographic data reveals that majority of the children in control and experimental group were in lower primary class (80%, 86.7%). In experimental group most of the children were in the age group of 7-8yrs (36.7%) and in the control group majority of the children were in the age group of 6-7yrs (33.3%). Bournaki (1994) conducted a study to describe the relationship between children's age, gender, exposure to past painful experiences, temperament, fears, and child-rearing practices on their pain responses to a venepuncture. The findings revealed that age, threshold, and distractibility were found to be important variables in explaining children's pain responses. So the pain management interventions should consider the multidimensionality of pain, children's age and temperament.

The study reveals that majority of the children in control and experimental group (73.3%, 93.3%) are from nuclear family. Nowadays, due to the technological development and increased literacy level most of them were employed in technical jobs. So they migrate to various areas and live as a nuclear family. Irrespective of the type of family, the care givers are aware of the health

needs of their children. In experimental group majority of them were female whereas in control group most of them were males (53.3%, 53.3%). Filling (2000) says that females have a lower pain threshold and lower pain tolerance than males. Increasing awareness among providers is paramount to minimizing potential gender bias in clinical pain management.

India is a Hindu dominant country, the study finding also says that majority of children were Hindu by religion in control and experimental group. (86.7%, 80%). The migration from rural to urban increased for employment. Thus most of the fathers in control and experimental group had undergone diploma education (40%, 56.7%). It indicates that the public are aware of the importance of education.

Clinical variables distribution

Children continue to find venepuncture as one of the most frightening aspects of coming to hospital. Incorporating effective psychological techniques routinely to avoid conflict, reduce unnecessary anticipation, and promote effective coping strategies. Majority of the children in the control and experimental group had no previous history of hospitalization (70%, 76.7%) and no previous history of venepuncture (70%, 76.7%). Several researchers have reported that children's exposure to past painful procedures is inversely related to their behavioral responses to venepuncture (Jacobson, 1990).

Majority of the children in the control and experimental group underwent venepuncture for blood collection (63.3%, 93.3%). With 24G (56.7%, 90%) butterfly needle (56.7%, 90%). The above findings indicated that 24G needle was

commonly used for venepuncture in practice for blood collection among children at Apollo Children's Hospital Chennai. In 2006 Giuseppe conducted a study to assess the influence of needle size used to collect venous blood on the measurement of 14 common analysis including free hemoglobin, protein bound substances and electrolytes and found that 23G needles if handled correctly, will not introduce any statistically or clinically significant error to the measurement results compared to a 21G needle. There is compelling evidence that hospitalized children continue to experience unnecessary pain. So the effective pain management strategy is important to reduce the venepuncture related pain.

The first objective of the study was to assess the level of pain perceived during venepuncture by control and experimental group of children

Majority of children in the control group experienced severe pain during venepuncture (66.7%) whereas in experimental group had moderate pain (43.3%). Venepuncture is one of the commonly experienced procedures by children and 50% of children experience significant level of distress during venepuncture. Venepuncture differs from other needle insertion procedure like immunization as venepuncture is longer, involves other medical equipment such as tourniquets to find an appropriate vein and drawing of blood thereby making it more anxiety provoking in children(James , 2012). Physicians and nurses dealing with the health of children are responsible for the alleviation of their pain (Merskey, 1999). This could be attributed to the effectiveness of ice cube application in reducing pain during venepuncture.

The use of cold application prior to venepuncture can be considered as an easy and effective intervention in reducing venepuncture-related pain. Hence all the pediatric nurses should practice the use of non pharmacological methods like ice application for reducing pain and gaining cooperation from the children during the procedure.

The second objective of the study was to determine the effectiveness of ice cube application by comparing the pain perception of control and experimental group of children during venepuncture.

The effectiveness of ice cube application upon pain perception among the experimental group of children during venepuncture was assessed statistically using the independent‘t’ test. The mean and standard deviation of pain score was lower in experimental group (M=2.7, SD= 1.45) of who received ice cube application before venepuncture when compared to the control group of children (M=7.7, SD=2.11). The difference was statistically significant at P<0.001, the‘t’ value is 10.70. The result could be attributed to the effectiveness of ice cube application upon pain perception of children during venepuncture.

A quasi experimental study to assess the effectiveness of ice pack application at the site prior to venepuncture on intensity of pain was conducted by Navjot (2012). Total 100 children between the age of 3-7 years were selected by purposive sampling. 50 children each in control and experimental group were assigned. The study results showed that statistically significant reduction in pain during venepuncture in experimental group. It was concluded that ice pack application is a safe, cheap, easy and effective method to reduce pain during venepuncture among children.

The researcher concludes that the findings must be disseminated so that evidence based knowledge can be utilized in the clinical setting to reduce the pain perception of children during venepuncture.

The third objective of the study was to find out the association between selected demographic variables and pain perception during venepuncture in the control and experimental group of children.

Chi-square test was used to find out the association between the selected demographic variable and the pain perception of children. There was significant association between the age of the child and pain perception in control and experimental group ($p<0.001$). Between 4% and 17% of school-age children rated their pain intensity to a venepuncture as severe and 38% of children ages 3 to 10 had to be physically restrained during a venepuncture (Harrison, 1991). The findings revealed that age was found to be important variable in explaining children's pain responses. The educational level of the child and pain perception was also significantly associated in the control group ($p<0.001$).

There was no significant association between other demographic variables and pain perception in control and experimental group. Irrespective of the demographic variables, all the children in the experimental group had the same pain perception. This shows that pain experience is not influenced by any of the factors like gender, type of family, family income and educational status of parents. So all the children require pain reduction interventions during venepuncture.

The fourth objective of the study was to find out the association between selected clinical variables and pain perception during venepuncture in the control and experimental group of children.

There was no significant association between any clinical variables and pain perception in both the control and experimental group. Needle insertion for venipuncture or intravenous cannulation is a painful, frightening, distressful procedure for children. So previous experience of venepuncture or hospitalization were not associated with pain perception of children during venepuncture.

The study findings emphasizes that clinical variables have no influence over the pain of children undergoing venepuncture and necessitates provision of external agent in reducing the pain of children undergoing venepuncture.

The fifth objective of the study was to determine the level of satisfaction of mother and children regarding ice cube application during venepuncture in the experimental group

Majority of the mother and children were highly satisfied (87%) with ice cube application during venepuncture and none of them were dissatisfied with the intervention. It indicates that the mothers were also under stress and anxious regarding the painful experience of children undergoing venepuncture. Thus the effective pain management measures help the mothers to have the higher satisfaction level. The study findings interprets that ice cube application was highly effective in reducing the pain of children undergoing venepuncture. Researcher concludes that ice cube application can be followed as a non pharmacological pain intervention during venepuncture for children in the hospital as it is simple, safe, cost effective and easier to administer

Summary

This chapter dealt with the objectives of the study, major finding such as the demographic variable and clinical variable of children, mean and standard deviation of pain score in control and experimental group of children, association between the selected demographic and clinical variable and the pain perception in children and level of satisfaction of mother and children on ice cube application during venepuncture.

CHAPTER VI

SUMMARY, CONCLUSION, IMPLICATION AND RECOMMENDATION

The heart of the research project lies in reporting the findings. This is the most creative and demanding part of the study. This chapter gives a brief account of present study including the conclusion drawn from the findings, nursing implication of the study and recommendations. The present study was intended to analyze the effectiveness of ice cube application upon pain in children undergoing venepuncture.

Summary

"An Experimental Study to Assess the Effectiveness of Ice Cube Application upon Pain Perception of Children Undergoing Venepuncture at Selected Hospitals, Chennai."

Objectives of the Study

1. To determine the level of pain perceived by control and experimental group of children during venepuncture.
2. To determine the effectiveness of ice cube application by comparing the pain perception among control and experimental group of children during venepuncture.
3. To determine the association between selected demographic variables and pain perception among control and experimental group of children during venepuncture.

4. To determine the association between selected clinical variables and pain perception among control and experimental group of children during venepuncture.
5. To determine the level of satisfaction of mothers and children regarding ice cube application in experimental group of children during venepuncture.

Null Hypothesis

H01 There will be no significant difference in pain perception during venepuncture among control and experimental group of children.

H02 There will be no significant association between selected demographic variable and pain perception during venepuncture among the control and experimental group of children.

H03 There will be no significant association between selected clinical variable and pain perception during venepuncture among the control and experimental group of children.

The conceptual framework of the study was based on "Gate Control theory of Pain" given by Melzack and Wall which was modified for the present study.An experimental research approach with post test only design was used to achieve the objectives of the study. The present study was conducted in Apollo Children's Hospital, Chennai. A sample size of 60 children who met the inclusion criteria were chosen for this study of which 30 were taken for the control group and 30 for the experimental group through systematic random sampling. The study variables were the pain perception of children undergoing venepuncture and ice cube application during venepuncture.

An extensive review of literature and guidance by experts formed the foundation to the development of the tools for the study. The investigator used Demographic variables proforma, Clinical variables proforma, Wong-Baker FACES Pain Rating Scale and Rating Scale on the level of satisfaction about ice cube application during venepuncture to assess the outcome. The data collection tools were validated and the reliability was established. After the pilot study, the data for the main study was collected using interview method.

The Major Findings of the Study

Demographic variables of children

Majority of the children in the control and experimental groups are in lower primary class (80%, 86.7%), from nuclear family (73.3%, 93.3%) and were Hindu by religion (86.7%, 80%). In experimental group most of the children were between the age group of 7-8yrs (36.7%). Majority of the children in control and experimental group were residing in suburban area (66.7%, 66.7%). Most of the mothers in control and experimental group had undergone higher secondary education (43.3%, 40%). Whereas the fathers in control and experimental group had undergone diploma education (40%, 56.7%).

Clinical variables of children

Majority of the children in the control and experimental group had no previous history of hospitalization (70%, 76.7%) and no previous history of venepuncture (70%, 76.7%). Significant percentage of children in the control and the experimental groups had gastrointestinal disorder (33.3%, 33.3%) with illness lasting for one week (63.3%, 56.7%).

Majority of the children in control and experimental group were undergoing venepuncture for blood collection (63.3%, 93.3%) and the venepuncture was performed by nurses (93.3%, 100%) with 24G (56.7%, 90%) butterfly needle (56.7%, 90%).

Comparing of mean and standard deviation of pain perception by control and experimental group of children

The mean and standard deviation of control and experimental group of children is 7.7, 2.7, 2.11 and 1.45 respectively. The‘t’ value of 10.70 is highly significant at P< 0.001 level of significance. Thus the null hypothesis H01there will be no significant difference in pain perception during venepuncture among control and experimental group of children was rejected.

Association between the selected demographic variable and pain perception of children in control group and experimental group using Wong-Baker FACES Pain scale.

There was significant association ($p<0.001$) between the age of the child and pain perception in control and experimental group. The educational level of the child and pain perception was also significantly associated in the control group and there was no significant association between other demographic variable and pain perception in control and experimental group. Hence, the null hypothesis H_{02} was partially rejected with regard to the age of the child and education of the child and partially retained with regard to other demographic variables in control and experimental group of children.

Association between the selected clinical variable and pain perception of children in control group and experimental group using Wong- Baker FACES Pain scale

There was no significant association between any clinical variable and pain perception in both control and experimental group. So the null hypothesis H03 **"**There will be no significant association between selected clinical variable and pain perception during venepuncture in the control and experimental group of children" emphasizes that clinical variables have no influence over the pain of children undergoing venepuncture and necessitates provision of external agent in reducing the pain of children undergoing venepuncture. This study demonstrated that ice cube application can help in reducing the pain of children undergoing venepuncture.

Level of satisfaction of mothers and children on ice cube application to children during venepuncture in experimental group of children

Majority of the mother and children were highly satisfied (87%) with ice cube application during venepuncture. This interprets that ice cube application was highly effective in reducing the pain of children undergoing venepuncture.

Conclusion

The venepuncture is a stressful event for children, it is necessary to provide pharmacological or non pharmacological intervention to reduce the pain and discomfort in children. The findings of the study indicated that the ice cube application is simple, safe, cost effective and easy to administer than any other

pharmacological pain intervention. So it must be incorporated in clinical setting as a pain intervention measures.

Implications

The findings of the study have implications in the different branches of nursing profession that is nursing practice, nursing education, nursing administration and nursing research. By assessing the effectiveness of ice cube application during venepuncture, we get a clear picture regarding different steps to be taken in all fields, to improve the standards of nursing profession.

Nursing practice

Venepuncture is a significant source of pediatric pain and distress. So pain management strategy must be identified by the health personnel to promote optimal pain relief. As it was identified from the study findings the ice cube application was an effective pain management during venepuncture, the nurses can use this simple intervention to relieve pain during venepuncture in children and promote comfort for them.

Nursing education

Care of children has been included since the beginning years of nursing education. The focus on measures nursing education must focus on innovation to enhance nursing care. With emerging health care trends, policies should be established in the nursing institutions to help students to improve their knowledge about pain management in children during painful procedures.

Nursing administration

With advanced technology and over growing challenges of health care needs, the colleges and hospital administrators, have a responsibility to provide nurses, nurse educators with continuing opportunities on newer economical trends in pain management in children during venepuncture. This will enable the nurses to update their knowledge and acquire special skills in the use of simple intervention like ice cube application for the management of pain during venepuncture. Nurse administrators can arrange conferences, in service education and workshop to encourage staff nurse to learn about various alternative and complimentary therapies used as pain relief strategies.

Nursing research

As evidence based practice is the recent trend in nursing care, there is a need for extensive and intensive research in this area to generate more specific data base. Nurse researcher should challenge to perform scientific work and take part in assessment, applications, evaluation of a child during venepuncture. Researchers must focus on various aspects and develop appropriate tools for pain assessments in children during venepuncture. It opens the large avenue for research.We should encourage further researches on effectiveness of ice cube application upon pain during venepuncture with various populations.

Dissemination of the findings of evidence based practice through conferences, seminars, publications in national and international nursing journals and World Wide Web will benefit a wider community. More theories can be generated based on the research findings.

Recommendations

- The study can be conducted on larger sample to generalize the results.
- The study can be conducted in different settings
- The study can be conducted for pain management during other invasive procedures.
- A comparative study can be conducted to evaluate the effectiveness of various other interventions to reduce pain.
- The study can be conducted among children of different age groups.
- A comparative study can be conducted to assess the effectiveness of ice cube application with other intervention like Emla cream application during venepuncture.

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APPENDIX I

LETTER SEEKING PERMISSION TO CONDUCT THE STUDY

Apollo College of Nursing
(A unit of Apollo Hospitals Educational Trust)
(Recognised by the Indian Nursing Council and Affiliated to the Tamil Nadu Dr. M.G.R. Medical University, Chennai)

CO/0222/13 ***02.05.2013***

To

The Director
Apollo Childrens Hospital
No.15, Shafi Mohamed Road
Greams Road
Chennai – 600 006.

Respected Sir / Madam,

Sub: To request permission for research study- Reg.

Greetings! As a part of the curriculum requirement our 2nd year M. Sc. (N) student Ms.Megha Susan Thomas has selected the following title for her research study.

"An experimental study to assess the effectiveness of the ice cube application upon pain perception of children undergoing venipuncture at selected hospitals, Chennai".

So I kindly request your good selves to permit her to conduct study in your esteemed institution

Thanking You,

Dr.LATHA VENKATESAN
PRINCIPAL

Regd. Office : 21, Greams Lane Off, Greams Road, Chennai - 600 006. Ph. : +91-44-2829 3333, 2829 0200 Website : www.apollohospitalseducation.com
Unit Office : Vanagaram to Ambattur Main Road, Ayanambakkam, Chennai - 600 095. Phone : 044 - 2653 4387 Fax : 044 - 2653 4923 / 2653 4386

APPENDIX II

LETTER PERMITTING TO CONDUCT STUDY

Apollo College of Nursing
(A unit of Apollo Hospitals Educational Trust)
(Recognised by the Indian Nursing Council and Affiliated to the Tamil Nadu Dr. M.G.R. Medical University, Chennai)

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So I kindly request your good selves to permit her to conduct study in your esteemed institution

Thanking You,

Dr.LATHA VENKATESAN
PRINCIPAL

2/5/13

Regd. Office : 21, Greams Lane Off, Greams Road, Chennai - 600 006. Ph. : +91-44-2829 3333, 2829 0200 Website : www.apollohospitalseducation.com
Unit Office : Vanagaram to Ambattur Main Road, Ayanambakkam, Chennai - 600 095. Phone : 044 - 2653 4387 Fax : 044 - 2653 4923 / 2653 4386

APPENDIX III

ETHICAL COMMITTEE CLEARANCE LETTER

Ethics Committee

Apollo HOSPITALS
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After due ethical and scientific consideration, the Ethics Committee has approved the above presentation submitted by you.

The EC review and approval of the report is only to meet the academic requirement and will not amount to any approval of the conclusions / recommendations as conclusive, deserving adoption and implementation, in any form, in any healthcare institution.

The Ethics Committee is constituted and works as per ICH-GCP, ICMR and revised Schedule Y guidelines.

With Regards,

Date:
15/5/13

Dr. Rema Menon,
Ethics Committee-Member Secretary,
Apollo Hospitals, Chennai,
Tamil Nadu, India.

Dr. REMA MENON
MEMBER SECRETARY
ETHICS COMMITTEE, APOLLO HOSPITALS
APOLLO HOSPITALS ENTERPRISE LIMITED
CHENNAI-600 006, TAMILNADU

Apollo Hospitals Enterprise Limited
21, Greams Lane, Off Greams Road, Chennai - 600 006
Tel : 91 - 44 - 2829 1618, 2829 3333, 91 - 44 - 2829 5465 Extn : 5045 / 6641
Fax : 91 - 44 - 2829 1618 / 4449 E - Mail : ecapollochennai@gmail.com

Ethics Committee

15 May 2013

To,
Ms. Megha Susan Thomas
2nd Year M.SC (Nursing),
Department of Pediatric Nursing,
Apollo College of Nursing, Chennai.

Ref: A study to assess the effectiveness of ice cube application upon pain perception of children undergoing venepuncture at selected hospitals, Chennai.

Sub: Approval of the above referenced project and its related documents.

Dear Ms. Megha Susan Thomas,

Ethics Committee-Apollo Hospitals has received the following document submitted by you related to the conduct of the above-referenced study.

- Project proposal.
- Informed consent form.

The Ethics Committee-Apollo Hospitals reviewed and discussed the Project proposal documents submitted by you related to the conduct of the above referenced Project at its meeting held on 14 May 2013.
The following Ethics Committee Members were present at the meeting held on 14 May 2013

Name	Profession	Position in the committee
Dr. Rema Menon	Clinician	Member Secretary
Dr. P. Nalini Rao	Social Worker	Chairperson
Dr. Renuka Singh	Consultant Clinical Pharmacologist	Basic Medical Scientist
Dr. Krishna Kumar	Clinician-Medical Superintendent	EC -Member
Miss. N. Suseela	Retired English Teacher	Layperson
Ms. Maimoona Badsha	Lawyer	Lawyer
Dr. Vijayakumar	Clinician	EC-Member

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APPENDIX – IV

REQUEST FOR CONTENT VALIDITY LETTER REQUESTING OPINIONS AND SUGGESTIONS OF EXPERTS FOR ESTABLISHING CONTENT VALIDITY OF RESEARCH

From
Ms. Megha Susan Thomas
M.Sc., (Nursing) II Year,
Apollo College of Nursing,
Chennai-95.

To
Through Proper channel
Dr. Latha Venkatesan
Principal,
Apollo College of Nursing.

Sub: Request for opinions and suggestions of experts for content validity of Research tool.

Respected Sir/ Madam

Greetings! As a part of the Curriculum Requirement the following research title is selected for the study.

"An Experimental Study to Assess the Effectiveness of Ice Cube Application upon Pain Perception of Children Undergoing Venepuncture at Selected Hospitals, Chennai."

I will be highly privileged to have your valuable suggestions with regard to the establishment of Content Validity of Research tool. So, I request you to validate my Research tool and give suggestions about the tool.

Thanking You,

Yours Sincerely,

(Ms. Megha Susan Thomas)

APPENDIX - V

LIST OF EXPERTS FOR CONTENT VALIDITY

1. Dr. Latha Venkatesan, M.Sc (N)., M.Phil(N)., Ph.D(N)
Principal and Professor,
Apollo college of Nursing,
Chennai-95.

2. Dr. Deepa Elizabeth Mathew, MBBS., DCH., MRCPCH
Pediatric consultant
Apollo Speciality Hospital, vanagram
Chennai-95.

3. Prof. Lizy Sonia, A., M.Sc. (N)., Ph.D(N)
Vice Principal & Professor in Nursing,
HOD of Medical Surgical Nursing,
Apollo College of Nursing,
Chennai-95.

4. Prof. K.Vijayalakshmi,M.Sc.(N)., Ph.D(N).,M.A.Psychology
HOD, Department of Mental Health Nursing,
Apollo College of Nursing, Chennai.

5. Prof.Nesa Sathya Satchi,M.Sc(N)., Ph.D(N)
HOD of Child Health Nursing Dept
Apollo College of Nursing,
Chennai-95.

6. Prof.G. Shobana, M.Sc(N)., Ph.D(N)
HOD of Community Health Nursing Dept
Apollo College of Nursing,
Chennai-95.

7. Mrs. Jamuna Rani.,M.Sc.(N).,
Reader,
Department of Child Health Nursing,
Apollo College of Nursing, Chennai.

APPENDIX – VI

CONTENT VALIDITY CERTIFICATE

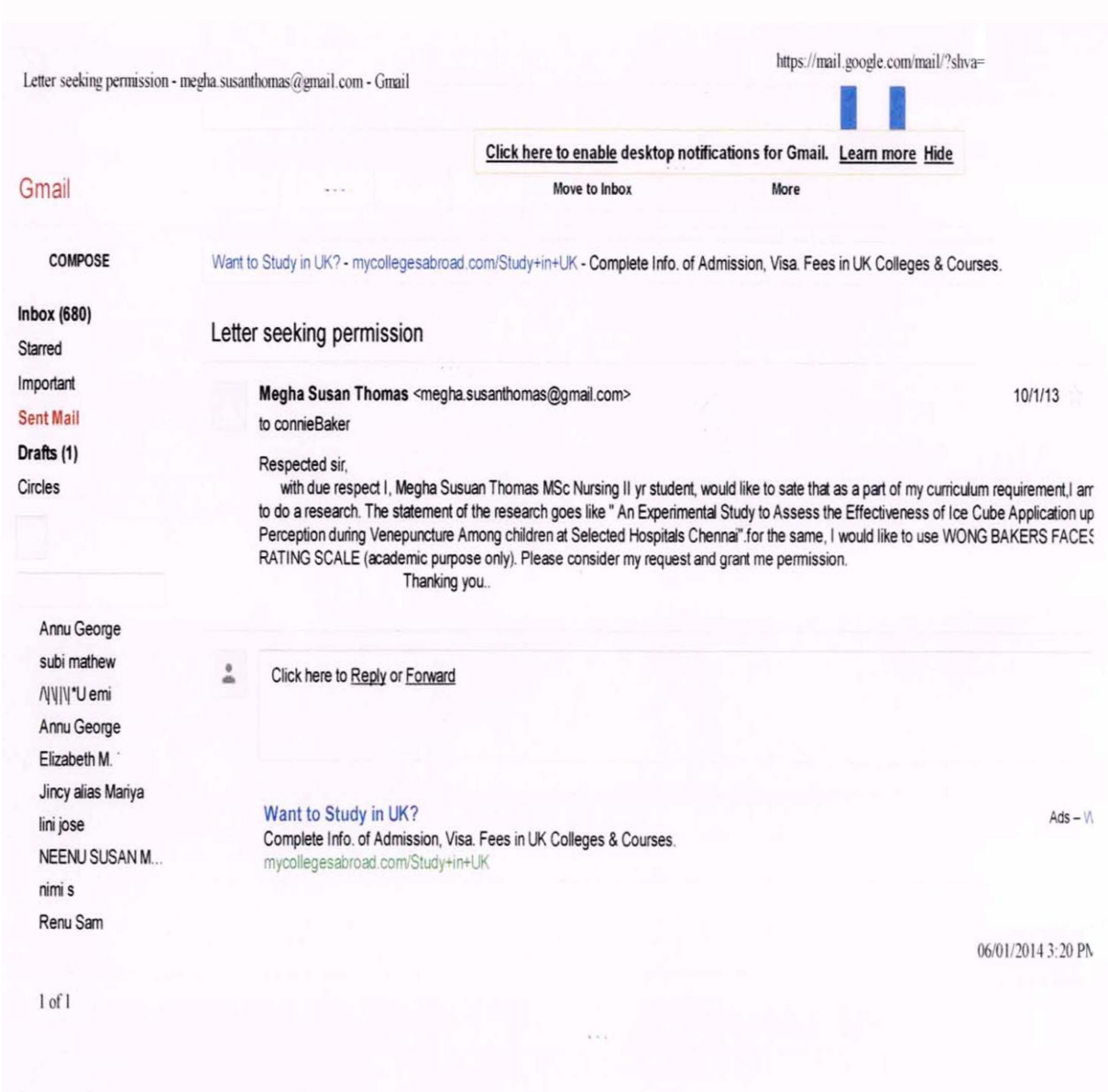
I hereby certify that I have validated the research tool and interventional programme of Ms. Megha Susan Thomas, M.Sc (Nursing) II year student who is undertaking research study on "An Experimental Study to Assess the Effectiveness of Ice Cube Application upon Pain Perception of Children Undergoing Venepuncture at Selected Hospitals, Chennai."

Signature of Expert

Name and designation

APPENDIX – VII

LETTER SEEKING PERMISSION TO USE THE TOOL



Letter seeking permission - megha.susanthomas@gmail.com - Gmail

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1 of 1

Letter seeking permission

Megha Susan Thomas <megha.susanthomas@gmail.com> 10/1/13
to connieBaker

Respected sir,
with due respect I, Megha Susuan Thomas MSc Nursing II yr student, would like to sate that as a part of my curriculum requirement,I am to do a research. The statement of the research goes like " An Experimental Study to Assess the Effectiveness of Ice Cube Application up Perception during Venepuncture Among children at Selected Hospitals Chennai".for the same, I would like to use WONG BAKERS FACES RATING SCALE (academic purpose only). Please consider my request and grant me permission.
Thanking you..

Click here to Reply or Forward

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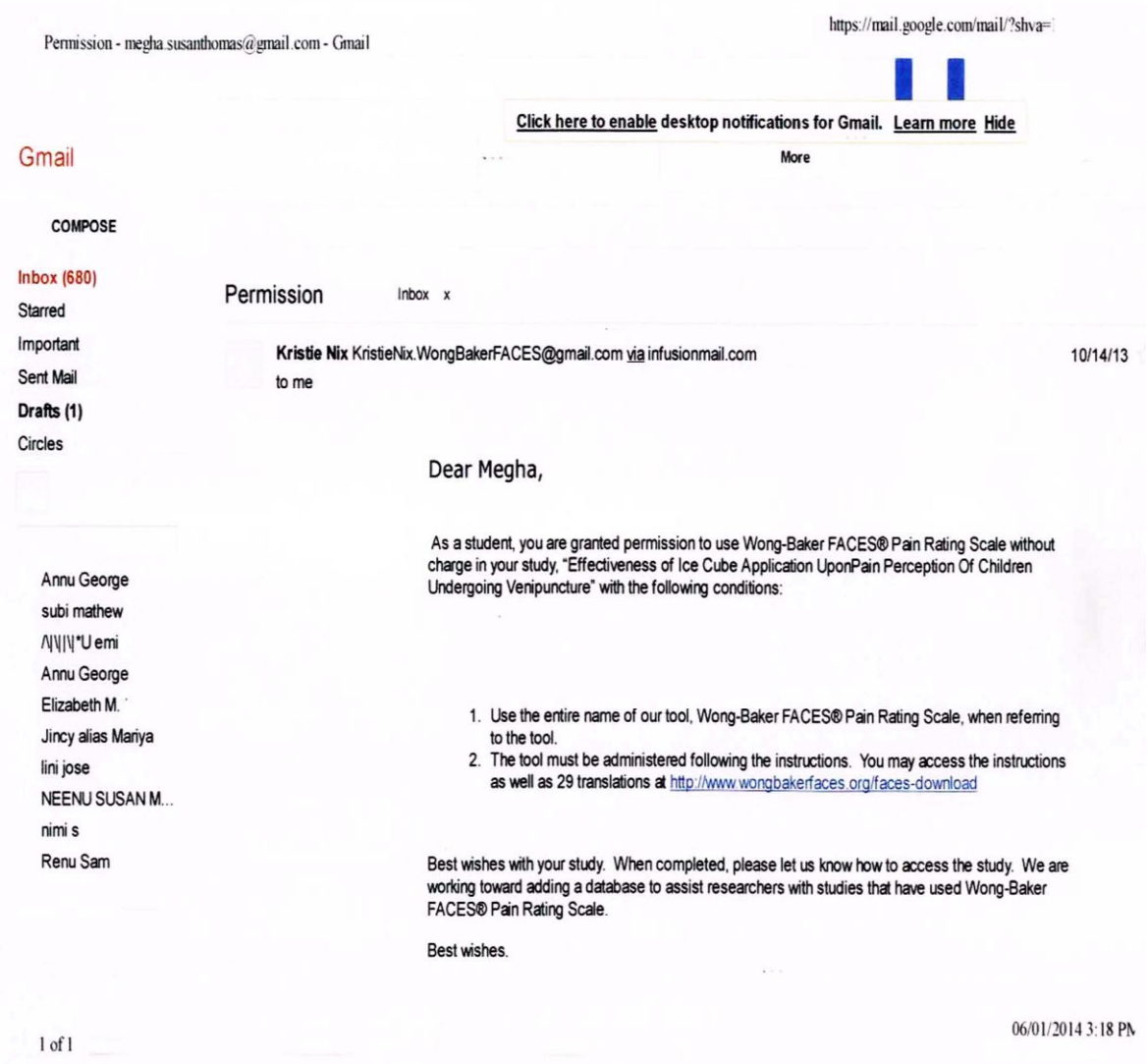
APPENDIX – VIII

LETTER PERMITTING TO USE THE TOOL



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Permission Inbox x

Kristie Nix KristieNix.WongBakerFACES@gmail.com via infusionmail.com 10/14/13
to me

Dear Megha,

As a student, you are granted permission to use Wong-Baker FACES® Pain Rating Scale without charge in your study, "Effectiveness of Ice Cube Application UponPain Perception Of Children Undergoing Venipuncture" with the following conditions:

1. Use the entire name of our tool, Wong-Baker FACES® Pain Rating Scale, when referring to the tool.
2. The tool must be administered following the instructions. You may access the instructions as well as 29 translations at http://www.wongbakerfaces.org/faces-download

Best wishes with your study. When completed, please let us know how to access the study. We are working toward adding a database to assist researchers with studies that have used Wong-Baker FACES® Pain Rating Scale.

Best wishes.

1 of 1 06/01/2014 3:18 PM

APPENDIX - IX

RESEARCH PARTICIPANT CONSENT FORM

Dear participant,

I am a M.Sc., Nursing student of Apollo College of Nursing, Chennai. As part of my study, a research on "An Experimental Study to Assess the Effectiveness of Ice Cube Application upon Pain Perception of Children Undergoing Venepuncture at Selected Hospitals, Chennai." is selected to be conducted. The findings of the study will be helpful in reducing the pain perception of children during venepuncture.

I hereby seek your consent and co-operation to participate your child in the study. Please be frank and honest in your responses. The information collected will be kept confidential and anonymity will be maintained.

Signature of the researcher

I ……. hereby consent to participate my child in the study.

Place:

Date:

Signature of the parent

APPENDIX – X

CERTIFICATE FOR ENGLISH EDITING

CERTIFICATE FOR ENGLISH EDITING

TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation **"An Experimental Study to Assess the Effectiveness of Ice Cube Application upon Pain Perception of Children Undergoing Venepuncture at Selected Hospitals, Chennai."** by Ms. Megha Susan Thomas, M.Sc (N), II year student, Apollo College of Nursing was edited for English language appropriateness.

Signature

Prof. George.K.Peter
Principal
St. Mary's College
Manarcaud

Associate Professor in Engl

APPENDIX - XI

PLAGIARISM ORIGINALITY REPORT

Plagiarism Detector - Originality Report

Plagiarism Detector Project: [http://plagiarism-detector.com] Application core verrsion: 557

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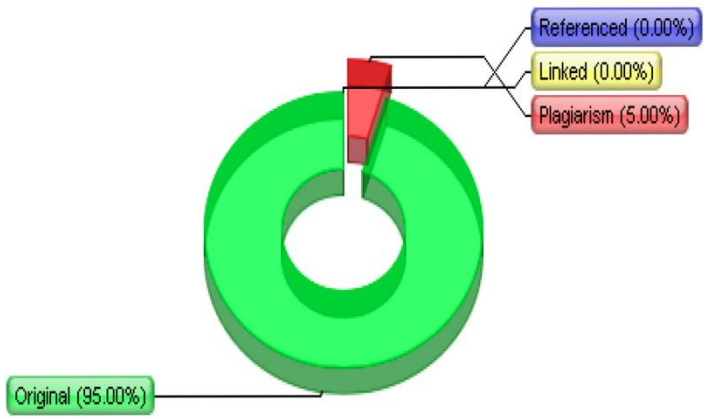
Plagiarism Detection Chart:



Referenced 0% / Linked 0%

Original - 95% / 5% - Plagiarism

APPENDIX XII

DEMOGRAPHIC VARIABLE PROFORMA

Purposes

This proforma is used by the researcher to measure the demographic variables of children.

Instructions

The researcher will collect the information by interviewing the mother and by reviewing hospital record. The information collected will be kept confidential and will be used for research purpose only.

Sample number: ☐ **Hospital number:** ☐

1. **Age of the child in years**

   1.1 6-7 ☐

   1.2 7.1-8 ☐

   1.3 8.1-9 ☐

   1.4 9.1-10 ☐

2. **Gender of the child**

   2.1 Male ☐

   2.2 Female ☐

3. **Educational level of the child**

   3.1 Lower primary ☐

   3.2 Upper primary ☐

4. Type of family

4.1 Nuclear ☐

4.2 Joint ☐

4.3 Extended ☐

5. Religion

5.1 Hindu ☐

5.2 Muslim ☐

5.3 Christian ☐

5.4 Others, specify--------- ☐

6. Area of residence

6.1 Urban ☐

6.2 Sub urban ☐

6.3 Rural ☐

7. Family income per month in rupees

7.1 <10,000 ☐

7.2 10,001-15,000 ☐

7.3 15,001-20,000 ☐

7.4 >20,001 ☐

8. Language

8.1 Tamil ☐

8.2 English ☐

8.3 Hindi ☐

8.4 Others, specify--------- ☐

9. Educational status of mother

9.1 Non literate ☐

9.2 Primary ☐

9.3 Secondary ☐

9.4 Higher secondary ☐

9.5 Diploma ☐

9.6 Graduate and above ☐

10. Educational status of father

10.1 Non literate ☐

10.2 Primary ☐

10.3 Secondary ☐

10.4 Higher secondary ☐

10.5 Diploma ☐

10.6 Graduate and above ☐

APPENDIX XIII

PROFORMA FOR CLINICAL VARIABLES

Purpose

This proforma is used by the researcher to measure the clinical variables of children.

Instructions

The researcher collects the information from the parents through interview and by referring hospital records. The responses will be kept confidential and used for research purpose only.

1. **History of previous hospitalization**

   1.1 Yes ☐

   1.2 No ☐

2. **History of previous venepuncture**

   2.1 Yes ☐

   2.2 No ☐

3. **Diagnosis**

   3.1 Cardiovascular disorder ☐

   3.2 Neurological disorder ☐

   3.3 Gastrointestinal disorder ☐

   3.4 Musculoskeletal disorder ☐

   3.5 Endocrine disorder ☐

3.6 Genitourinary disorder ☐

3.7 Others -------- specify ☐

4. Duration of present illness

4.1 Upto one week ☐

4.2 8 to 30 days ☐

4.3 More than one month ☐

4.4 Congenital ☐

5. Type of needle used for venepuncture

5.1 Butterfly needle ☐

5.2 Venflon ☐

6. Size of intravenous cannula or needle

6.1 20 G ☐

6.2 21 G ☐

6.3 22 G ☐

6.4 23 G ☐

6.5 24 G ☐

7. Indication for venepuncture

7.1 Intravenous injections ☐

7.2 Administration of intravenous fluids ☐

7.3 Blood collection ☐

7.4 Administration of blood products ☐

8. Venepuncture performed by

8.1 Nurse ☐

8.2 Physician ☐

8.3 Technician ☐

9. Did anybody inform you the details of venepuncture?

9.1 Yes ☐

9.2 No ☐

If yes ------ who?

10. Whether child is on any analgesics?

10.1 Yes ☐

10.2 No ☐

If yes, name of the analgesic ----------

APPENDIX-XIV

WONG BAKER FACES PAIN RATING SCALE

Purpose

This is a standardized scale used to measure the pain perception of children during venepuncture. It will be assessed by the researcher.

Instruction

The researcher observes and documents the pain perception of the child during venepuncture. By comparing with the FACES and interpreting as words to describe the pain intensity.

Score	Interpretation
0	No hurt
2	Hurts little bit
4	Hurts little more
6	Hurts even more
8	Hurts whole lot
10	Hurts worst

Score Interpretation

0	**-**	**No pain**
2	**-**	**Mild pain**
4-6	**-**	**Moderate pain**
8-10	**-**	**Severe pain**

BLUE PRINT OF RATING SCALE ON LEVEL OF SATISFACTION OF MOTHERS AND CHILDREN REGARDING ICE CUBE APPLICATION DURING VENEPUNCTURE

Sl.No	Content	Items	Total items	Percentage
1.	Researcher's approach	1,2,3,4	4	33.33%
2.	Ice cube application	5,6,7,8	4	33.33%
3.	Effects of intervention in the child	9,10,11,12	4	33.33%
Total			**12**	**100%**

APPENDIX XV

RATING SCALE ON LEVEL OF SATISFACTION OF MOTHERS AND CHILDREN REGARDING ICE CUBE APPLICATION DURING VENEPUNCTURE

Purpose

The rating scale is used by the researcher after venepuncture to assess the level of satisfaction of mothers and children on ice cube application during venepuncture and its effectiveness.

Instruction

The rating scale consists of 12 items. The researcher collects the response from mothers and children through interview. The responses will be kept confidential. The responses range from highly satisfied to highly dissatisfied with scores 3, 2, 1, 0 respectively.

Sl. No.	Questions	Highly satisfied	Satisfied	Dissatisfied	Highly dissatisfied
1.	The information about ice cube application given by the researcher				
2.	The approach of researcher				
3.	The presence of researcher during and after the procedure				
4.	The communication skill of researcher				
5.	Method of ice cube application				
6.	The duration of ice cube application				
7.	The technique of ice cube				

	application				
8.	The effect of ice cube application				
9.	Child's coping ability to pain perception during venepuncture				
10.	Comfort level of the child				
11.	The co-operation of the child with health personnel for venepuncture after ice cube application.				
12.	Child appears relaxed during and after therapy				

Scoring key

Highly satisfied 3

Satisfied 2

Dissatisfied 1

Highly dissatisfied 0

Score Interpretation

Score	Percentage	Interpretation
<14	<40%	Low satisfaction
15-25	40-69%	Moderate satisfaction
26-36	>70%	High satisfaction

APPENDIX XVI

ITEM WISE FREQUENCY AND PERCENTAGE DISTRIBUTION OF LEVEL OF SATISFACTION OF MOTHER AND CHILDREN REGARDING ICE CUBE APPLICATION DURING VENEPUNCTURE IN EXPERIMENTAL GROUP

Items	Highly satisfied		Satisfied		Dissatisfied		Highly dissatisfied	
	n	p	n	p	n	p	n	p
1.The information about ice application given by the researcher	20	66.7%	10	33.3%	-	-	-	-
2.The approach of researcher	26	86.7%	4	13.3%	-	-	-	-
3.The presence of researcher during and after the procedure	26	86.7%	4	13.3%	-	-	-	-
4.The communication skill of researcher	22	73.3%	8	26.7%	-	-	-	-
5.Method of ice cube application	19	63.3%	11	36.7%	-	-	-	-
6.The duration of ice cube application	12	40%	18	60%	-	-	-	-
7.The technique of ice cube application	19	63.3%	11	36.7%	-	-	-	-
8.The effect of ice cube application	23	76.7%	7	23.3%	-	-	-	-
9.Child's coping ability to pain perception during venepuncture	21	70%	9	30%	-	-	-	-
10.Comfort level of the child	20	66.7%	10	33.3%	-	-	-	-
11. The cooperation of the child with health personnel for venepuncture after ice cube application.	19	63.3%	11	36.7%	-	-	-	-
12. child appears relaxed during and after therapy	21	70%	9	30%	-	-	-	-

APPENDIX - XVII

DATA CODE SHEET

DEMOGRAPHIC VARIABLE PROFORMA

1. **AGE: Age of the child in years**
   - 1.1 6-7
   - 1.2 7.1-8
   - 1.3 8.1-9
   - 1.4 9.1-10
2. **GEN: Gender of the child**
   - 2.1 Male
   - 2.2 Female
3. **EDU: Educational level of the child**
   - 3.1 Lower primary
   - 3.2 Upper primary
4. **FAM: Type of family**
   - 4.1 Nuclear
   - 4.2 Joint
   - 4.3 Extended
5. **REL: Religion**
   - 5.1 Hindu
   - 5.2 Muslim
   - 5.3 Christian
   - 5.4 Others, specify---------
6. **RES: Area of residence**
   - 6.1 Urban
   - 6.2 Sub urban
   - 6.3 Rural

7. INC: Family income per month in rupees

7.1 <10,000

7.2 10,001-15,000

7.3 15,001-20,000

7.4 >20,001

8. LAN: Language

8.1 Tamil

8.2 English

8.3 Hindi

8.4 Others, specify---------

9. EDM: Educational status of mother

9.1 Non literate

9.2 Primary

9.3 Secondary

9.4 Higher secondary

9.5 Diploma

9.6 Graduate and above

10. EDF: Educational status of father

10.1 Non literate

10.2 Primary

10.3 Secondary

10.4 Higher secondary

10.5 Diploma

10.6 Graduate and above

DATA CODE SHEET

CLINICAL VARIABLE PROFORMA

1. **PRH: History of previous hospitalization**

   1.1 Yes

   1.2 No

2. **PRV: History of previous venepuncture**

   2.1 Yes

   2.2 No

3. **DIA: Diagnosis**

   3.1 Cardiovascular disorder

   3.2 Neurological disorder

   3.3 Gastrointestinal disorder

   3.4 Musculoskeletal disorder

   3.5 Endocrine disorder

   3.6 Genitourinary disorder

   3.7 Others -------- specify

4. **DUR: Duration of present illness**

   4.1 Upto one week

   4.2 8 to 30 days

   4.4 More than one month

   4.4 Congenital

5. **NDL: Type of needle used for venepuncture**

   5.1 Butterfly needle

   5.2 Venflon

6. SIZ: Size of intravenous cannula or needle

6.1 20 G

6.2 21 G

6.3 22 G

6.4 23 G

6.5 24 G

7. INV: Indication for venepuncture

7.1 Intravenous injections

7.2 Administration of intravenous fluids

7.3 Blood collection

7.4 Administration of blood products

8. VPP: Venepuncture performed by

8.1 Nurse

8.2 Physician

8.3 Technician

9. IDV: Did anybody inform you the details of venepuncture?

9.1 Yes

9.2 No

If yes ------ who?

10. ANL: Whether child is on any analgesics?

10.1 Yes

10.2 No

If yes, name of the analgesic ----------

APPENDIX - XVIII

MASTER CODE SHEET											
CONTROL GROUP											
DEMOGRAPHIC VARIABLES											PAIN LEVEL
Sl. No.	AGE	GEN	EDU	FAM	REL	RES	INC	LAN	EDM	EDF	SCORE
1	1.4	2.1	3.2	4.2	5.1	6.2	7.3	8.3	9.4	10.4	6
2	1.4	2.2	3.2	4.1	5.1	6.3	7.4	8.3	9.2	10.3	4
3	1.1	2.1	3.1	4.1	5.1	6.1	7.4	8.1	9.4	10.5	10
4	1.4	2.1	3.2	4.1	5.1	6.2	7.3	8.1	9.3	10.4	6
5	1.1	2.2	3.1	4.1	5.1	6.2	7.3	8.3	9.3	10.4	10
6	1.2	2.2	3.1	4.2	5.2	6.2	7.3	8.1	9.3	10.5	8
7	1.1	2.2	3.1	4.1	5.1	6.2	7.3	8.1	9.4	10.4	8
8	1.4	2.2	3.2	4.1	5.1	6.2	7.3	8.1	9.3	10.4	6
9	1.1	2.2	3.1	4.1	5.1	6.1	7.4	8.3	9.4	10.5	10
10	1.2	2.1	3.1	4.2	5.1	6.2	7.3	8.1	9.4	10.4	8
11	1.4	2.2	3.1	4.1	5.1	6.2	7.4	8.3	9.5	10.5	2
12	1.3	2.1	3.1	4.1	5.2	6.1	7.4	8.2	9.5	10.5	6
13	1.1	2.1	3.1	4.2	5.1	6.2	7.3	8.3	9.3	10.4	10
14	1.2	2.2	3.1	4.1	5.1	6.2	7.3	8.3	9.4	10.4	8
15	1.4	2.2	3.2	4.1	5.1	6.1	7.4	8.1	9.5	10.6	6
16	1.3	2.1	3.1	4.1	5.1	6.2	7.3	8.1	9.4	10.5	6
17	1.1	2.1	3.1	4.1	5.1	6.2	7.3	8.1	9.5	10.5	10
18	1.2	2.2	3.1	4.2	5.1	6.2	7.3	8.3	9.4	10.4	8
19	1.3	2.1	3.1	4.1	5.1	6.1	7.4	8.3	9.4	10.5	8
20	1.1	2.1	3.1	4.2	5.1	6.2	7.3	8.1	9.5	10.5	10
21	1.2	2.1	3.1	4.1	5.1	6.1	7.4	8.1	9.5	10.6	8
22	1.2	2.1	3.1	4.1	5.1	6.2	7.4	8.1	9.6	10.6	8
23	1.2	2.1	3.1	4.1	5.1	6.1	7.4	8.3	9.5	10.6	8
24	1.1	2.2	3.1	4.1	5.1	6.1	7.4	8.1	9.4	10.5	10
25	1.2	2.1	3.1	4.2	5.1	6.1	7.4	8.1	9.4	10.5	8
26	1.2	2.1	3.1	4.1	5.1	6.2	7.3	8.3	9.3	10.4	10
27	1.1	2.1	3.1	4.1	5.2	6.2	7.3	8.3	9.3	10.4	10
28	1.4	2.2	3.2	4.2	5.3	6.2	7.3	8.1	9.4	10.4	4
29	1.1	2.2	3.1	4.1	5.1	6.2	7.3	8.3	9.4	10.5	10
30	1.3	2.2	3.1	4.1	5.1	6.2	7.4	8.2	9.5	10.6	6

EXPERIMENTAL GROUP											
DEMOGRAPHIC VARIABLES											PAIN LEVEL
Sl. No.	AGE	GEN	EDU	FAM	REL	RES	INC	LAN	EDM	EDF	SCORE
1	1.2	2.2	3.1	4.1	5.1	6.2	7.3	8.3	9.4	10.5	4
2	1.2	2.1	3.1	4.1	5.1	6.1	7.4	8.1	9.5	10.5	4
3	1.3	2.1	3.1	4.1	5.1	6.2	7.3	8.3	9.3	10.4	6
4	1.3	2.2	3.2	4.2	5.1	6.2	7.3	8.3	9.4	10.4	2
5	1.3	2.1	3.1	4.1	5.2	6.2	7.3	8.3	9.3	10.4	0
6	1.3	2.2	3.1	4.1	5.1	6.1	7.4	8.2	9.4	10.5	2
7	1.4	2.1	3.1	4.1	5.1	6.2	7.3	8.3	9.3	10.4	2
8	1.2	2.2	3.1	4.1	5.1	6.2	7.3	8.3	9.4	10.5	4
9	1.4	2.1	3.1	4.1	5.1	6.2	7.4	8.3	9.5	10.5	2
10	1.1	2.2	3.1	4.1	5.1	6.2	7.3	8.1	9.3	10.4	4
11	1.4	2.2	3.2	4.1	5.1	6.2	7.3	8.3	9.4	10.5	0
12	1.2	2.1	3.1	4.1	5.3	6.1	7.4	8.2	9.6	10.6	4
13	1.4	2.1	3.1	4.1	5.1	6.1	7.4	8.3	9.5	10.6	0
14	1.4	2.2	3.2	4.2	5.3	6.2	7.3	8.1	9.4	10.5	0
15	1.3	2.2	3.1	4.1	5.2	6.1	7.4	8.2	9.4	10.6	2
16	1.1	2.1	3.1	4.1	5.1	6.2	7.3	8.3	9.4	10.5	6
17	1.3	2.1	3.1	4.1	5.1	6.2	7.3	8.3	9.3	10.4	2
18	1.1	2.1	3.1	4.1	5.1	6.1	7.4	8.3	9.5	10.5	4
19	1.2	2.2	3.1	4.1	5.1	6.1	7.4	8.2	9.5	10.6	4
20	1.3	2.2	3.1	4.1	5.1	6.2	7.3	8.3	9.4	10.5	0
21	1.2	2.2	3.1	4.1	5.2	6.1	7.4	8.2	9.5	10.6	6
22	1.4	2.1	3.1	4.1	5.1	6.2	7.3	8.3	9.3	10.4	2
23	1.2	2.2	3.1	4.1	5.2	6.2	7.3	8.1	9.4	10.5	0
24	1.2	2.1	3.1	4.1	5.1	6.1	7.3	8.3	9.4	10.5	4
25	1.2	2.2	3.1	4.1	5.1	6.2	7.4	8.3	9.5	10.5	2
26	1.4	2.2	3.2	4.1	5.1	6.1	7.4	8.2	9.5	10.6	0
27	1.2	2.2	3.1	4.1	5.1	6.2	7.3	8.3	9.5	10.5	2
28	1.1	2.1	3.1	4.1	5.1	6.2	7.3	8.3	9.5	10.5	6
29	1.4	2.1	3.1	4.1	5.1	6.2	7.3	8.1	9.4	10.5	2
30	1.2	2.2	3.1	4.1	5.1	6.2	7.3	8.3	9.5	10.5	4

CONTROL GROUP										
CLINICAL VARIABLES										
Sl. No.	PRH	PRV	DIA	DUR	NDL	SIZ	INV	VPP	IDV	ANL
1	1.2	2.2	3.7	4.1	5.1	6.5	7.3	8.1	9.2	10.2
2	1.2	2.2	3.7	4.1	5.1	6.5	7.3	8.1	9.2	10.2
3	1.2	2.2	3.6	4.1	5.1	6.5	7.3	8.1	9.2	10.2
4	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2
5	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2
6	1.1	2.2	3.1	4.4	5.2	6.3	7.1	8.1	9.2	10.2
7	1.1	2.1	3.1	4.4	5.2	6.3	7.1	8.1	9.2	10.2
8	1.1	2.1	3.1	4.4	5.1	6.5	7.3	8.1	9.2	10.2
9	1.2	2.2	3.6	4.1	5.1	6.5	7.3	8.1	9.2	10.2
10	1.1	2.1	3.1	4.4	5.1	6.5	7.3	8.1	9.2	10.2
11	1.2	2.2	3.5	4.2	5.1	6.5	7.3	8.1	9.2	10.2
12	1.1	2.1	3.2	4.3	5.2	6.3	7.1	8.1	9.2	10.2
13	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2
14	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2
15	1.2	2.2	3.4	4.1	5.2	6.3	7.2	8.1	9.2	10.2
16	1.1	2.1	3.7	4.4	5.2	6.3	7.4	8.2	9.2	10.2
17	1.2	2.2	3.7	4.1	5.2	6.3	7.2	8.2	9.2	10.2
18	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2
19	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2
20	1.1	2.1	3.5	4.3	5.2	6.3	7.1	8.1	9.2	10.2
21	1.1	2.1	3.1	4.4	5.2	6.3	7.1	8.1	9.2	10.2
22	1.2	2.2	3.6	4.3	5.2	6.3	7.2	8.1	9.2	10.2
23	1.2	2.2	3.6	4.1	5.2	6.3	7.2	8.1	9.2	10.2
24	1.2	2.2	3.4	4.1	5.1	6.5	7.3	8.1	9.2	10.2
25	1.2	2.2	3.3	4.1	5.2	6.3	7.2	8.1	9.2	10.2
26	1.2	2.2	3.6	4.1	5.1	6.5	7.3	8.1	9.2	10.2
27	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2
28	1.1	2.1	3.1	4.4	5.2	6.3	7.3	8.1	9.2	10.2
29	1.2	2.2	3.3	4.1	5.2	6.3	7.3	8.1	9.2	10.2
30	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2

EXPERIMENTAL GROUP											
CLINICAL VARIABLES											SATISFACTION
Sl. No	PRH	PRV	DIA	DUR	NDL	SIZ	INV	VPP	IDV	ANL	
1	1.2	2.2	3.7	4.1	5.1	6.5	7.3	8.1	9.2	10.2	33
2	1.2	2.2	3.7	4.1	5.1	6.5	7.3	8.1	9.2	10.2	34
3	1.2	2.2	3.5	4.3	5.1	6.5	7.3	8.1	9.2	10.2	25
4	1.1	2.1	3.2	4.3	5.1	6.5	7.3	8.1	9.1	10.2	32
5	1.2	2.2	3.5	4.3	5.2	6.3	7.3	8.1	9.1	10.2	33
6	1.2	2.2	3.7	4.1	5.1	6.5	7.3	8.1	9.1	10.2	34
7	1.2	2.2	3.5	4.3	5.1	6.5	7.3	8.1	9.1	10.2	34
8	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2	33
9	1.2	2.2	3.3	4.2	5.1	6.5	7.3	8.1	9.1	10.2	35
10	1.1	2.1	3.1	4.4	5.1	6.5	7.3	8.1	9.1	10.2	34
11	1.2	2.2	3.5	4.2	5.1	6.5	7.3	8.1	9.2	10.2	25
12	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.1	10.2	34
13	1.1	2.1	3.2	4.4	5.1	6.5	7.3	8.1	9.2	10.2	24
14	1.1	2.1	3.1	4.4	5.2	6.3	7.1	8.1	9.1	10.2	32
15	1.2	2.2	3.2	4.3	5.1	6.5	7.3	8.1	9.1	10.2	36
16	1.1	2.1	3.2	4.3	5.1	6.5	7.3	8.1	9.1	10.2	33
17	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2	35
18	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2	33
19	1.2	2.2	3.7	4.1	5.1	6.5	7.3	8.1	9.1	10.2	33
20	1.2	2.2	3.7	4.1	5.1	6.5	7.3	8.1	9.1	10.2	33
21	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.1	10.2	25
22	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.2	10.2	33
23	1.1	2.1	3.1	4.4	5.2	6.3	7.2	8.1	9.1	10.2	34
24	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.1	10.2	32
25	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.1	10.2	34
26	1.2	2.2	3.3	4.1	5.1	6.5	7.3	8.1	9.1	10.2	33
27	1.2	2.2	3.6	4.1	5.1	6.5	7.3	8.1	9.2	10.2	33
28	1.2	2.2	3.6	4.1	5.1	6.5	7.3	8.1	9.1	10.2	34
29	1.2	2.2	3.4	4.2	5.1	6.5	7.3	8.1	9.1	10.2	33
30	1.1	2.1	3.6	4.1	5.1	6.5	7.3	8.1	9.1	10.2	32

APPENDIX – XIX

PHOTOGRAPHS DURING THE STUDY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