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Effectiveness of distraction technique on pain and cooperation level during venipuncture among school aged children

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Abstract
Background: Worldwide, children represent a higher proportion of the population, with children younger than age 15 accounting for 1.8 billion (28%) of the world's 6.4 billion persons. Venipuncture and other invasive procedures (blood draws, intramuscular injections, heel pricks) are the most commonly performed painful procedures in children during hospitalization. Venipuncture is a stressful and painful experience for children. Nurses are in a unique position to improve the management of children's pain; because they are often the professionals who have the most contact with an ill child.
Objectives: The main objective of the study was to evaluate the effectiveness of distraction technique on pain and cooperation level during venipuncture among school aged children.
Materials and Methods: True experimental – Post-test only design was employed. The study was conducted at pediatrics ward, Institute of Child Health and Research Centre, Government Rajaji Hospital, Madurai. A total of 60 subjects were selected using simple random sampling technique (30 in experimental group and 30 in control group). Children in the experimental group were displayed the cartoon movie on the laptop during the whole duration of the venipuncture. The usual standard technique was given for the children in control group. Numerical Pain Rating Scale was used for measurement of pain level and Cooperative Behavior Scale of Children in Venipuncture (CBSCV) was used to assess the cooperation level.
Findings: In the experimental group majority of the children 43% had no pain and 70% had good cooperation. Whereas, in control group children 53% had severe pain and 70% had no cooperation. The obtained 't' value for pain level 12.07 was significant at $p<0.001$ level. Similarly the obtained 't' value for cooperation level 11.67 was significant at $p<0.001$ level. The correlation between the pain level and cooperation level, in experimental group was 'r'= 0.62 significant at $p<0.001$ level and in control group was 'r'= 0.57 significant at $p<0.001$ level. So, there was highly positive correlation between the pain level and the cooperation level during venipuncture. The number of previous venipuncture was significantly associated with the pain and cooperation level of the children in the experimental and control group.
Conclusion: The study concluded that distraction technique was effective in reducing the pain and promoting the cooperation of school aged children during venipuncture. This distracting technique is highly recommended because it is effective, easy to carry out and inexpensive.

Keywords: Distraction technique, pain, cooperation level, venipuncture, school aged children

1. Introduction
The word pain is derived from the Latin word '*Poena'* which means punishment. The international association for the study of pain further states that, "pain is subjective. Each individual learns the application of the word through experiences related to it in early life." This definition emphasizes the individuality of each person's pain response and the importance of pain experiences, especially those in early life, in shaping that response. Thus, a child's experience during painful medical procedures plays a significant role in shaping that individuals pain response to future events [1]. Relief of pain is a basic need and right of all children. Management of pain in the child must be individualized. Age, sex, birth order, cultural background, parents, caregiver's response and past experiences affects the child's response. Nursing intervention can alleviate some of the fear and pain caused by painful procedures [2].
Distraction is a hypothesized effective strategy for decreasing procedural pain, fear, and distress among children by reducing the sensory and effective component of pain. Distraction alters nociceptive responses by triggering an internal mechanism of pain

inhibition. It is also a vehicle to modify how event is reported to reduce [4]. Distraction involves focusing patient's attention on something other than the pain. Distraction is thought to reduce the perception of pain by stimulating the descending control system, resulting in fewer painful stimuli being transmitted to the brain. The effectiveness of distraction depends on the patient's ability to receive and create sensory input other than pain [5].

2. Need for the study

Pain is one of the most frequent complaints presented in pediatrics settings. Hospitalization itself is very stressful place for children. Thus it is important for health care providers to follow a child centered or individual approach in the assessment and management of pain and painful procedures [3]. Ideally procedures should be done in a child-friendly environment, using appropriate non-pharmacologic interventions with routine pain assessment and reassessment. However, only 6% of pediatrics offices use pain control for shots and only 2.1% of an estimated 18 million venipuncture are performed each year with pain control [6].

In fact, children's most common pain experiences are medical pain, primarily needle pain (e.g., venipuncture, immunizations) [7]. Children experience needle pain soon after birth, beginning with heel sticks and immunizations, and continuing throughout childhood with additional immunizations and blood tests. Children will undergo approximately 28 intra-muscular immunization injections and possibly a number of venipuncture by the time they reach their sixth birthday (Center for Disease Control and Prevention [CDC], 2004) [10].

Yoo, H., Kim, S., Hur, K.H. and Kim, H.S. (2011) **c**onducted a study to identify the effects of an animation distraction intervention on pain response of preschoolers during venipuncture. This study was conducted in Korea. The results revealed that there were significant differences in self-reported pain response, and behavioral pain response between the experimental group and the control group. The researcher concluded that this intervention requires minimum effort and time and may be a cost-effective and convenient nursing intervention that could be used easily in clinical settings [11].

Perception of pain in pediatrics is complex, and entails physiological, psychological, behavioral, and developmental factors. School children are able to communicate verbally the pain they experience. They can indicate the location and intensity of the pain. Health care practices can have an impact both on pain onset and its relief [8]. Challenges to the nurses who provide their care, co- operation of children during painful invasive procedures is very important. It is reported that anxiety in children can increase their subjective perception of pain, but it can be reduced if their attention is focused on a pleasant activity. It has been demonstrated that distraction – a simple and easily applicable technique – relieves pain in children during venipuncture procedures [9].

Thus, the investigator is interested to emphasize on the measure of pain relief by distraction to reduce pain and improve the cooperation among children during venipuncture. With this intention, the investigator has taken steps to evaluate the effectiveness of distraction technique on pain and cooperation level during venipuncture among painful stimuli are processed. When an individual is distracted, regional cerebral blood flow associated with processing a painful school aged children.

3. Statement of the problem

"A study to evaluate the effectiveness of distraction technique on pain and cooperation level during venipuncture among school aged children in pediatrics ward, Government Rajaji Hospital, Madurai."

4. Objectives

1. To assess the pain level and cooperation level during venipuncture among children in experimental group and control group.
2. To compare the pain level and cooperation level during venipuncture between children in experimental group and control group.
3. To correlate between the pain level and cooperation level among children in experimental group and control group.
4. To associate between the selected baseline variables and the pain level, cooperation level among children in experimental group.

5. Hypotheses

H_1: There will be significant difference in the pain level and cooperation level during venipuncture among children in experimental group and control group.

H_2: There will be significant correlation between the pain level and cooperation level during venipuncture among children in experimental group and control group.

H_3: There will be significant association between selected baseline variables and the pain level, cooperation level during venipuncture among children in experimental group.

6. Operational definitions

Effectiveness

It refers to the ability of distraction technique upon pain level as evidenced by the numerical pain rating scale scores and the cooperation level of the children by Cooperative Behaviour Scale of Children in Venipuncture (CBSCV).

Distraction technique

It refers to the cartoon movie displayed on a monitor for diverting the child's attention from painful experience during venipuncture.

Pain level

It refers to the feeling of hurt experienced by the children during venipuncture measured by the numerical pain rating scale.

Cooperation level

It refers to the behaviour of the children during venipuncture which is observed by Cooperative Behaviour Scale of Children in Venipuncture (CBSCV).

Venipuncture

It refers to insertion of venflon for medication administration and intravenous infusion.

School aged children

It refers to children between 7-9 years of age who are admitted in the Government Rajaji Hospital, Madurai.

Pediatrics ward
It refers to the pediatrics medical ward of Institute of Child Health and Research Centre, Government Rajaji Hospital, Madurai.

7. Materials and methods

Research approach
Quantitative approach was used for this study

Research design
The research design selected for the present study was True Experimental Study – Post-test only design.

R [Randomization]	Group	Intervention	Post test
	Experimental group	X[Distraction]	O1
	Control group	-	O1

Variables
- Dependent variable: pain level and cooperation level
- Independent variable: distraction technique
- Baseline variables: age, gender, birth order, nutritional status, previous hospitalization, previous venipuncture, duration of hospitalization, size of venflon, site of insertion, care giver present with the child.

Setting of the study
The research setting was at Institute of Child Health and Research Centre, Government Rajaji Hospital, Madurai.

Population
Target population was school aged children who were undergoing venipuncture.

Sample
School aged children who were undergoing venipuncture in pediatrics ward at ICH, GRH, Madurai and who fulfilled the inclusion criteria.

Sample size
The total sample size was 60 (30 in experimental group and 30 in control group).

Sampling technique
In this study Probability sampling - Simple Random Sampling Technique (Lottery method) with non-replacement method was used. The odd and even numbers were given to the samples. From this with the use of lottery method the odd numbers were considered as control group. And even numbers were considered as experimental group.

Sampling criteria
Inclusion criteria
- Children within the age group of 7-12years.
- Children who were undergoing venipuncture.
- Children who were willing to participate in the study.
- Children with no current acute pain.

Exclusion criteria
- Children who were critically and chronically ill.
- Children who were mentally retarded.
- Children who were with severe physical disability and neurological deficit.
- Children who received pain reducing medication.

Description of the research tool
The tool consisted of three sections;

Section I
It consisted of 10 items about baseline variables like age, gender, birth order, nutritional status, previous hospitalization, previous venipuncture, duration of hospitalization, size of venflon, site of insertion, care giver present with the child during venipuncture.

Section II
It consisted of Numerical Pain Rating Scale. An 11-point numeric scale (NRS 11) with 0 representing one pain extreme ("no pain") and 10 representing the other pain extreme ("worst pain imaginable") was used. The score of the pain response was graded as follows:

Score	Interpretation
0	No pain
1-3	Mild pain
4-6	Moderate pain
7-10	Severe pain

Section- III
Cooperative Behaviour Scale of Children in Venipuncture (CBSCV) tool was used to assess child cooperation using behaviour during venipuncture, graded from 0-2 according to the behaviour of the child.

Score	Interpretation
0	Good cooperation
1	Fair cooperation
2	Non cooperation

Validity of the tool
The content validity of the tool was ascertained by the expert's opinion in the field of pediatrics.

Reliability of the tool
The reliability of the tool Numerical Pain Rating Scale was established by test-retest method. The reliability score was r= 0.88. And the inter-rater reliability coefficients for Cooperative Behaviour Scale of Children in Venipuncture (CBSCV) were found to be high, with value r = 0.75. Hence the tool was considered highly reliable.

Data analysis
Descriptive and inferential statistics were used for data analysis. Frequency, percentage distribution, means and standard deviation was used in descriptive statistics. Unpaired 't' test, Karl Pearson's Correlation and Chi-square test was used in inferential statistics.

Ethical consideration
The proposed study was conducted after obtaining ethical clearance from Ethical Committee, MMC, Madurai. Both verbal and written consent was obtained from all the study subjects.

8. Major findings of the study

- In experimental group majority of children37% were in the age group of 7 years and 9 years, in control group majority of them 57% were in the age group of 7 years

and 23% were in the age group of 9 years.

- With regard to gender, in experimental group majority of them 60% were males and 40% were females. Where as in control group 53% were males and 47% were females.
- Most of the children in the experimental group 53% and in control group 43% were second child.
- In both groups, majority of the children (50% - experimental group; 47% - control group) were in Degree II nutritional status.
- With regard to number of previous hospitalization, in experimental group 43% were not hospitalized previously and in control group 53% were not hospitalized previously.
- Majority of the children in experimental group34% were not previously venipuncture and in control group 30% were not previously venipuncture and 30% were venipuncture 1-2 times.
- Most of the children, in experimental group 37% were hospitalized for 1- 3 days and 37% were hospitalized for 4-6days and in control group 53% were hospitalized for 1- 3 days.
- In both groups, majority of the children, in experimental group 77% and in control group 66% were inserted 22 gauge venflon.
- With regard to site of insertion, in experimental group 53% were inserted in veins of forearm and in control group 57% were inserted in veins of hand.
- Most of the children in the experimental group 70% and in control group 53% were present along with mother during venipuncture.
- Regarding the pain level, in the experimental group majority of the children 43% had no pain and 40% had mild pain during venipuncture. In control group 53% of the children had severe pain and 47% of children had moderate pain during venipuncture.
- Regarding the cooperation level, majority of the children in the experimental group 70% had good cooperation and in control group 70% had no cooperation during venipuncture.
- The pain level of the children revealed that the control group mean (6.77) was higher than the experimental group mean (1.53). The cooperation level of the children revealed that the control group mean (1.7) was higher than the experimental group mean (0.3).

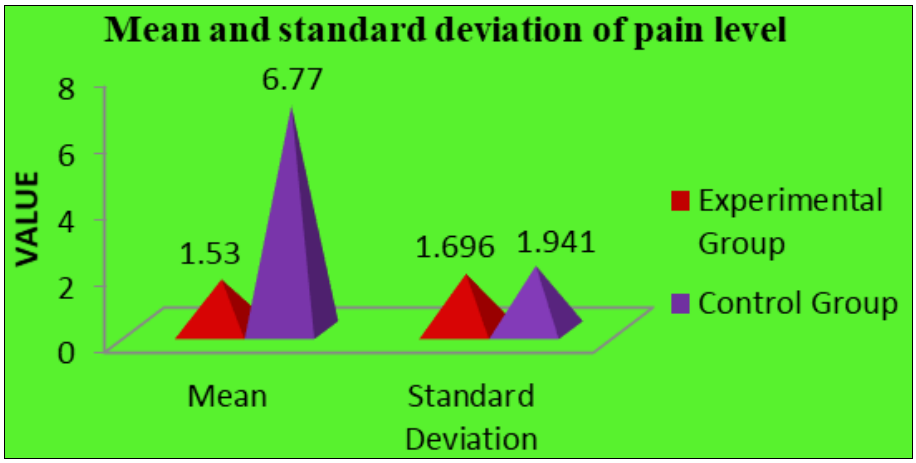

Fig 1: Mean and standard deviation of pain level during venipuncture among children in experimental and control group.

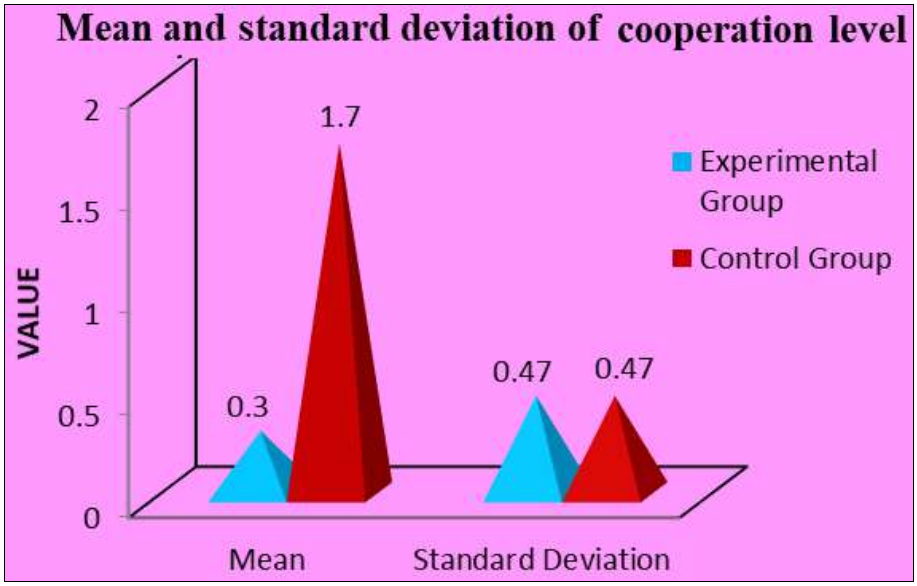

Fig 2: Mean and standard deviation of cooperation level during venipuncture among children in experimental and control group

1. The obtained 't' value for pain level was 12.07, at p<0.001 level. Similarly the obtained 't' value for cooperation level was 11.67, at p<0.001 level. These findings concluded that the children in experimental

group had experienced less pain and was more cooperative than the children in control group. So, the distraction technique had effect on reducing the pain level and improving the cooperation level during venipuncture. Thus the H_1: There will be significant difference in the pain level and cooperation level during venipuncture among children in control and experimental group was detained in this study.

2. The correlation between the pain level and cooperation level, in experimental group was 'r'= 0.62 at $p<0.001$ level and in control group was 'r'= 0.57 at $p<0.001$ level. So, there was highly positive correlation between the pain level and the cooperation level during venipuncture. Thus the H_2: There will be significant correlation between the pain level and cooperation level during venipuncture among children in control group and experimental group was detained in this study.
3. The study results depicted that the number of previous venipuncture ($\chi 2 = 30.72$) at $p<0.001$ was significantly associated with the pain level of the children in the experimental group.
4. The study results also depicted that the number of previous venipuncture ($\chi 2 = 10.14$) at $p<0.05$ was significantly associated with the cooperation level of the children in the experimental group. Thus the H_3: There will be significant association between selected baseline variables and the pain level, cooperation level during venipuncture among children in experimental group was detained in this study.

9. Conclusion

The results of this study revealed that the children who received distraction technique during venipuncture had a statistically significant reduction in pain and improved cooperation. Distraction technique was demonstrated to be effective in reducing the pain and promoting the cooperation of school aged children during venipuncture. This distracting technique is highly recommended because it is effective, easy to carry out and inexpensive.

10. Recommendations

- The study can be replicated with large samples in different settings to validate and generalize the findings.
- The study can be conducted on the other age groups and can be compared with other interventions.
- Studies can be conducted regarding the knowledge and practice of distraction technique among health team members.
- Studies can be conducted to assess the parental emotional response during children's painful procedures.
- Studies can be conducted to search for any differences between acute and chronic patients.
- Similar studies can be conducted with adult and old age people.

11. Nursing implications

- Distraction technique during venipuncture is to be implemented in day to day practice. It is cost effective and easy to perform.
- Nurses may have a variety of distracters available on hand since children may pay more attention to one particular device than the other.
- Orientation programme and in-service education programs for the nurse's regards the importance of non-pharmacological measures on pain reduction.
- The nurse researcher should motivate the clinical nurses to apply the research findings in practice. And follow the evidence based practice in order to bring a quality nursing care.
- Large scale studies can be conducted in consideration of other contributing variables.

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