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Virtual reality on level of pain during Venipuncture among preschool children

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Abstract--Hospitalization is stressful condition for children of all age groups. Venipuncture is one of the common painful procedures performed in hospital. Inserting intravenous catheter is one of the most painful and frequent acts for children in hospitals, most children express this method as the most stressful and violent course of treatment. The present study attempts to assess the effectiveness of virtual reality on pain during venipuncture among preschool age children at selected hospital in Chennai. **METHODOLOGY** The research design used in this study was experimental post test only design and it was conducted in the paediatric general ward at Aiswarya hospital, Chennai. Samples were selected based on sample selection criteria, 60 samples were selected with lottery method with 30 experimental and 30 control group. The gadget virtual reality was administered for the experimental group, and the control group routine hospital care during the venipuncture the level of pain was assessed by using FLACC scale. **RESULTS** The findings revealed, The mean score value of level of pain for control group was 6.47 with standard deviation of 0.78 (3.17 ± 0.27) and the experimental group was 3.30 with 1.29 (3.30 ± 1.29). The t test value was 11.51 which indicated that there is a statistically significant difference between the experimental and control groups. Thus it indicates the effectiveness of virtual reality for reducing the level of pain during venipuncture among preschool age children.

Keywords---venipuncture, pain, preschooler, virtual reality.

Introduction

In 2010 the International Association for the Study of Pain (IASP) stated that pain is an unpleasant sensory and emotional experience associated with actual and potential damage. Children admitted to hospital often experience pain from various treatments and test, as well as from illness itself. A child's anxiety and fear of a procedure and actual pain experience during the procedure often are manifested by the child's distress behaviour such as crying, avoidance of action, regression and refusal to cooperate. The child's distress is upsetting not only for the child but also for the both parents and professionals. Walersteiner. R (2010) the incidence of pain during intravenous cannulation was 90-95% because; it is the most common invasive procedure for patients in the hospital. With the rising concept of evidence based nursing practice, complementary and alternative medicines are playing a vital role in reducing pain.

Virtual reality technology provides multi-sensory information that helps the person to become fully immersed in the simulated world. Users wear a head-mounted display helmet, which is a helmet that provides a stereo visual image, thereby creating a sense of space and depth. A motion tracker in the head-mounted display helmet measures the position of the head and adjusts the visual image accordingly. As a result, users feel as though they can look around and move through the simulated environment. Headphones provide sounds that further help the person to become immersed in the virtual world. Input devices such as joy sticks, wands and data gloves enable users to move through the simulated environment and to interact with virtual objects. The investigator during her clinical experience felt that children are often exposed to painful procedures on admission to hospital. One such common procedure is cannulation which is a very painful procedure for children. Thus, the investigator was interested to emphasize on the measure of pain relief by showing virtual reality to reduce pain among children during venipuncture. With this intention, the investigator has taken steps to find the effectiveness of virtual reality on pain reduction in children during venipuncture.

Statement of the problem

An experimental study to assess the effectiveness of virtual reality on pain during venipuncture among preschool age children at selected hospital in Chennai.

Objectives

- To assess the post test level of pain during venipuncture among preschool age children of experimental and control group.
- To assess the effectiveness of virtual reality on post test level of pain during venipuncture among preschool age children in experimental and control group.

- To associate the post test level of pain during venipuncture among preschool age children with their selected demographic variable of experimental and control group.

Operational definitions

Effectiveness

Refers to the extent to which the virtual reality has achieved the desired effects in reducing the pain during venipuncture among preschool age children.

Virtual Reality

A realistic three dimensional image or artificial environment that is created with a mixture of interactive hardware and software and presented to the preschool children during the venipuncture procedure for diverting their mind by creating the perception of being physically present in the non-physical world using head monitor display to stimulate visual and hearing senses thereby reducing pain stimulating venipuncture.

Pain

Refers to the subjective unpleasant feeling and discomfort experienced by the children as a result of intravenous venipuncture which is measured by FLACC pain scale

Venipuncture

Refers to a surgical puncture of a vein, especially for the withdrawal of blood or for administration of intravenous fluids or drugs.

Preschool age children

Refers to children between the ages of 3 - 6 years admitted in pediatric ward

Hypotheses

- **NH1:** There is no significant difference in the level of pain during venipuncture among preschool age children between experimental and control group.
- **NH2:** There is no significant association of level of pain during venipuncture among preschool age children with their selected demographic variables of experimental group and control group.

Research Methodology

Quantitative research approach was adopted for this study to accomplish the objectives of the study

Research design

True experimental- Post test only design

Variables

- **Independent Variable: virtual reality**
- **Dependent Variable:** pain during venipuncture.
- **Setting of the study:** Aiswarya Multi speciality paediatric Hospital, Chennai.

Population

- **Target population:** All the preschool age children (3-6 years) admitted in general ward of paediatric hospitals in Tamil Nadu.
- **Accessible population:** All the preschool age children (3-6 years) admitted in general ward of Aiswarya Hospital
- **Sampling Technique, Sample size:** Simple random sampling technique, 60 samples

Criteria for sampling technique

Inclusion criteria

The preschool age children

- between the age group of 3-6 years.
- with first time experience to venipuncture.
- who were admitted only in paediatric ward.
- who were cooperative.
- and parent who were willing to participate.

Exclusion criteria

The children who were

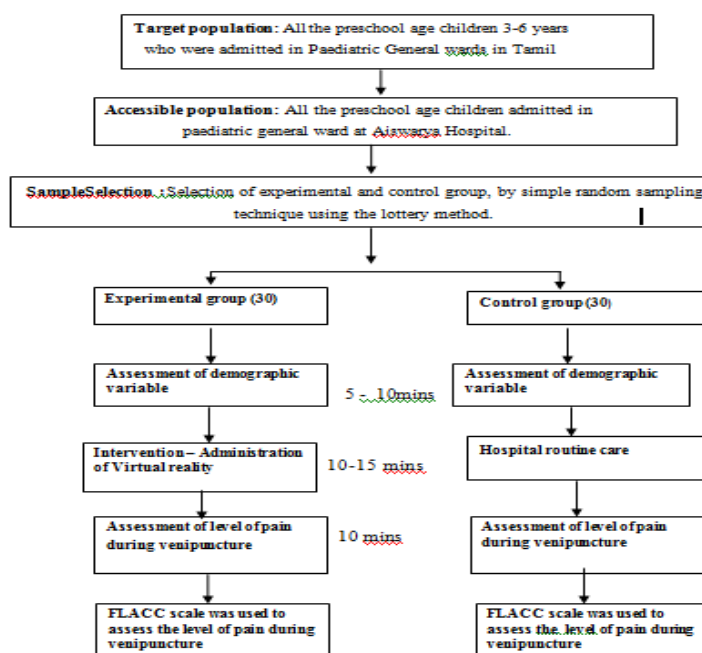
- critically ill.
- physically handicapped.
- posted for surgery
- The children who wore eye glasses.
- The children who had taken pain medication in last 8 hours.

Description of tool

- **Part 1:-** Demographic variables which included in the study was the age, sex, father education, mother education, father occupation, mother occupation, family income, type of family and birth order of child.

- **Part 2:-** Standardised pain assessment scale based FLACC scale which was used to assess the level of pain among preschool age children during venipuncture.

Data collection procedure



Intervention – Virtual Reality

A realistic three dimensional image or artificial environment that is created with a mixture of interactive hardware and software and presented to the preschool children during the venipuncture procedure for diverting their mind by creating the perception of being physically present in the non-physical world using head monitor display to stimulate visual and hearing senses thereby reducing pain stimulating venipuncture. The animated cartoon videos were downloaded from the you tube in the android mobiles. The android mobile was fixed to the head mounted display of the virtual reality gadget. The head mount device was fixed nicely to the eyes and forehead of the child. The necessary steps were taken to make the face visible and the videos were played during the venipuncture for 5-10 minutes.

Results and Discussion

The first objective was to assess the level of pain during venipuncture among preschool age children in experimental and control group.

Table 1
Frequency and percentage distribution of level of pain during venipuncture
among preschool age children in the experimental and control group

N= 60

Level of pain	Experimental group		Control group	
	No	%	No	%
Relaxed and comfortable	0	0.00%	0	0.00%
Mild discomfort	17	56.67%	0	0.00%
Moderate pain	13	43.33%	18	60.00%
Severe pain or discomfort or both	0	0.00%	12	40.00%

The findings revealed that the level of pain in the experimental group revealed that 17 (56.67%) of them had mild discomfort, 13 (43.33%) of them had moderate pain and none of them are relaxed and comfortable and None of them had Severe pain or discomfort during venipuncture whereas in control group 18 (60.00%) of them had moderate pain, 12 (40.00%) of them had Severe pain or discomfort or both and none of them had mild discomfort, relaxed and comfortable.

The second objective was to assess the effectiveness of virtual reality on pain during venipuncture among preschool age children in experimental and control group.

Table 2
Effectiveness of virtual reality on pain during venipuncture among preschool age
children in the experimental and control group

N=60

Level of Pain	N	Mean	S.D	df	Independent t test
Control	30	6.47	0.78	59	t=11.51
Experiment	30	3.30	1.29		S***

***p<0.001, S – Significant

The effectiveness of virtual reality on pain during venipuncture among preschool age children in the experimental and control group. The mean score value of level of pain for control group was 6.47 with standard deviation of 0.78 (3.17 ± 0.27) and the experimental group was 3.30 with 1.29 (3.30 ± 1.29). The t test value was 11.51 which indicated that there is a statistically significant difference between the experimental and control groups. Thus it indicates the effectiveness of virtual reality for reducing the level of pain during venipuncture among preschool age children. Therefore, the hypothesis H_{01} stated earlier that "There is no significant difference in the level of pain during venipuncture among preschool age children between experimental and control group" was not accepted.

The third objective was to associate the level of pain during venipuncture among preschool age children with their selected demographic variable of experimental and control group. The findings revealed that a statistically significant association was found in experimental group between the age, sex, type of family and birth order of child ($P < 0.05$). The finding indicated that the father education, mother

education, father occupation, mother occupation, monthly income were not significantly associated with the level of pain in experimental group. The findings revealed that all demographic variables of control group were not significantly associated with the level of pain. Hence the hypothesis NH₂ stated earlier that “there is no significant association in level of pain during venipuncture among preschool age children with their selected demographic variables of experimental group” was accepted.

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