Original Article

Effectiveness of Video-assisted Distraction Therapy on Childrens Pain Perceptions during Peripheral Venous Cannulation

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ABSTRACT

Background: Relief of pain is a basic need and right of all children; effective pain management requires health professionals to be able to apply several interventions to achieve optimal results. The current study aimed to discover the Effectiveness of Video-assisted Distraction Therapy on Children's Pain Perceptions during Peripheral Venous Cannulation in Pediatric Wards of Biratnagar, Nepal.

Method: A quasi-experimental study was conducted at Pediatric Wards of different hospitals in Biratnagar. Data collection was done from Feb 27, 2023, to April 28, 2023. Non-probability purposive sampling technique was adopted in selecting the desired sample size. Data was collected through an interview questionnaire and a standard observational checklist, the FLACC pain rating scale. The experimental group received video-assisted distraction therapy as an intervention, while the control group received routine intravenous care from the nurses.

Results: There is a significant difference between the pain perception score in the experimental and control group during peripheral venous cannulation ($p = <0.001$) during and after two minutes of cannulation. Similarly, the level of pain was also different in both groups, 42.5% of children in the experimental group perceived moderate pain, 37.5% perceived mild pain and 20% reported severe pain whereas 92.5% of respondents perceived severe pain and only 7.5% perceived moderate pain during peripheral venous cannulation.

Conclusions: Video-assisted Distraction Therapy was very efficient at distracting children from their pain during intravenous cannulation.

Keywords: Distraction Therapy; Pain Perceptions; Peripheral Venous Cannulation.

INTRODUCTION

All children experience pain after being poked with a needle, but how they react to it depends on their developmental stage and past experiences.[1] To introduce a temporary plastic tube into a vein, the patient's skin is punctured with a needle during this process.[2] Every child has the fundamental need and right to be free from pain, so medical practitioners must be willing to attempt a variety of approaches to get the best outcomes.[3,4] Anxiety, lowered pain tolerance, diminished analgesic effects for additional procedures, and avoidance of medical care are just a few of the severe repercussions that might result from a venipuncture.[5] Distraction techniques decrease the necessity for uncomfortable invasive procedures and give the chance to manage therapies in less time, in addition to reducing pain and anxiety during those interventions.[6-8] Distraction is a potent non-pharmacological strategy that is quick to learn, easy to use, and doesn't require any specialized training and has an impact on the body's physiological response to worry and panic, lowering breathing and heart rate and preventing vasovagal response.[9] Children's first exposure to healthcare services can be made positive by the use of a simple, affordable intervention.[10-12] The current study aimed to discover the Effectiveness of Video-assisted Distraction Therapy on Children's Pain Perceptions during Peripheral Venous Cannulation.

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METHODS

A quasi-experimental research design was used for conducting this study. The control group and experimental group were used and intervention was received by the experimental group only. There was no randomization. The post-test-only design was used for the study. The target population was children aged between two to seven years old undergoing peripheral venous cannulation. The study included two part of children in the control group and one part of children in the experimental group (2:1). The study was conducted at the emergency department of Koshi Hospital and Hamro Aspatal Pvt. Ltd of Biratnagar. The usual case-control ratio is 1:1.Increasing the ratio of controls to cases increases the precision and efficiency of the analysis but it also increases the cost to undertake the study. In this study 1:2 ratio of cases and control was allocated. The children were allocated to experimental groups 40 and 80 in the control group. Forty children were selected in the experimental group from Hamro Aspatal Pvt. Ltd, Biratnagar. Eighty children were selected in the control group from Koshi Hospital Biratnagar. Data was collected in the procedure room of the Emergency Department, and children from 2 to 7 years of age were included in the study, A Schematic Diagram of the Research Methodology is shown in Figure 1and instructions and a schedule for data collection was carried out as per the table shown in Table 1. Ethical Approval was obtained from the Ethical Review Board (ERB) of the Nepal Health Research Council (NHRC), Registration number was 63/2023. Informed consent was taken from the parent before the implementation of Peripheral Intravenous Cannulation. The purpose of the study was explained to the parents and the children. Written Permission before and after the study was taken from the administrative departments of respective Hospitals. The three sections of the data collection tool were as follows: sociodemographic characteristics made up the first part. Age, gender, birth order, place of residence, type of family, religion, occupation of the father and mother, level of education of the mother and father, and any previous hospitalizations within a year comprised the children's socio-demographic information. The assessment of children's discomfort by face, legs, activity cry, and the consoleability (FLACC) scale were all included in the second section.[13] Data was collected from February 27 to April 28, 2023.

The behavioral score (FLACC) in each category is graded on a scale of 0 to 10. From 0 to 1, children are relaxed and comfortable, from 3 to 6, they are in moderate pain, and from 7 to 10, they are in severe pain or discomfort, or both.[14] Excellent correlations for the blinded observers' total FLACC scores (r 0.8-0.883; P 0.001) provided evidence for test-retest reliability.[15] Data was analyzed based on research objectives, and research hypothesis. Data was analyzed by using descriptive statistics i.e. frequency, percentage, mean, range, standard deviation). Inferential statistics was used to compare the means between the two groups, and an independent t-test was used. Fisher exact test was used to test the association of selective demographic variables with the level of pain during and after two minutes of peripheral venous cannulation. The statistical package for social science (SPSS, Version 16) was used for data processing and statistical analysis. A p-value <0.05 was considered to be statistically significant.

RESULTS

The specific objectives of the study were to assess the level of pain perception among children in the experimental and control group during peripheral venous cannulation, to compare the effectiveness of video-assisted Distraction Therapy on children's pain perception in the experimental group and control group, and to find the association between the level of pain perception during peripheral venous cannulation with selective demographic variables in both experimental and control group. The demographic characteristics of respondents have shown that about 50% of respondents in the experimental group represent preschool and 43.75% of school age in the control group. Gender in both the experimental group and control group was comparable. In the control group, around seventy-three percent of children's father's occupation was labor background and in the experimental group, 50% of fathers were from a service background. Most of the respondent's mothers in both the experimental and control group were homemakers. The majority of the families were joint families and from urban areas.

Table 1. Socio-demographic Characteristics of Children.

Socio-demographic Characteristics	Experimental Group (n=40) number %		Control Group (n=90) Number %	
Age Group				
2-3 Year	15	37.5	23	28.75
4-5 Year	20	50	22	27.5
6-7 Year	5	12.5	35	43.75
Gender				
Male	16	40	48	60
Female	24	60	32	40
Religion				
Hindu	37	92.5	62	77.5
Others	3	7.5	18	22.5
Father's Occupation				
Farmer	9	22.5	5	6.2
Labor	5	12.5	58	72.5
Business	6	15	2	2.5
Service	20	50	15	18.8
Mother's Occupation				
House Maker	34	85	76	95
Service	6	15	4	5
Type of Family				
Nuclear	14	35	35	12
Joint	26	65	65	68
Residence				
Rural	13	32.5	36	45
Urban	27	67.5	44	55

Table no 1 has shown that 50% respondents in experimental group representing the preschool and 43.75% in the control group from school age. Seventy three percent children's father's occupation was labor background then others and in experimental group 50% father's from service background.

Table 2. Past History of Children on Hospitalization and Venipuncture.				
Variables	**Experimental Group (n=40) Frequency %**		**Control Group (n=80) Frequency %**	
Frequency of Hospitalization				
< 7 times	40	100	46	57.5
> 7 times	-	-	34	42.5
Duration of Hospitalization				
<7 days	23	57.5	20	25
> 7 days	17	42.5	60	75
Number of Venipuncture				
<7 times	38	95	41	51.2
> 7 times	2	5	39	48.8

Table no 2 depicts that all children were admitted to hospitals less than seven times in the experimental group, 57.5% of children were admitted to hospitals less than seven times, and 42.5% of respondents more than seven times in the control group. Most of the children in the experimental group had less than seven times venipuncture history but in the control group, the venipuncture history was both less than seven times and more than seven times (51.2%) and (48.8%).

Table 3. Comparison between Experimental and Control Group Pain Perception during Cannulation				
Level of Pain	**Experimental Group (n=40) Number %**		**Control Group (n=80) Number %**	
Mild Discomfort	15	37.5	-	-
Moderate Pain	17	42.5	6	7.5
Severe Pain	8	20	74	92.5
Total	**40**	**100%**	**90**	**100%**

Table no 3 depicts that 42.5% of respondents in the experimental group perceived moderate pain, 37.5% perceived mild pain and 20% reported severe pain during peripheral venous cannulation whereas in the control group,92.5% of respondents perceived severe pain and only 7.5% has perceived moderate pain during peripheral venous cannulation.

Table 4. Comparison of Pain Score Between Experimental and Control Groups during Cannulation.					
Group	**Sample**	**Mean**	**SD**	**T Value**	***p*Value**
Experimental	40	2.82	0.74		
				-11.80	0.001*
Control	80	3.92	0.26		

**** <0.05 level of significance***

Table no 4 illustrates the comparison of pain scores between the experimental and control group during cannulation, we can see that the mean value of pain is high in the control group than in the experimental group, the independent t-test value is -11.80 and the p-value is 0.001, which is less than 0.05 level of significance and there is a significant difference between the pain perception in experimental and control group.

Table 5. Association between Socio-demographic Characteristics and Level of Pain in Experimental Group.

Socio-demographic Characteristics	Level of Pain Mild Discomfort		Moderate Pain		Severe pain		*P*_value
	No	%	No	%	No	%	
Age Group							
Toddler	4	26.7	7	46.7	4	26.7	0.834
Preschool	9	45.0	8	40.0	3	15.0	
School-age	2	40	2	40	1	20	
Gender							
Male	5	31.2	9	56.2	2	12.5	0.331
Female	10	41.7	8	33.3	6	25.0	
Duration of Hospitalization							
< 7 days	12	52.2	8	34.8	3	13.0	0.075
> 7 days	3	17.6	9	52.9	5	29.4	
Frequency of Venipuncture							
< 7 times	15	39.5	17	44.7	6	15.8	**0.015***
>7 times	-		-	-	2	100	

** <0.05 level of significance*

Table number 5 shows that there was significant association between the number of venipuncture less than 7 times and the level of pain in experimental group (*p-value=0.015)* and about 95% children stayed in hospital less than seven days also.

Table 6. Association between Socio-demographic Characteristics and Level of Pain in Control Group.

Socio-demographic Characteristics	Level of Pain Moderate Pain		Severe pain		*P*_value
	No	%	No	%	
Age Group					
Toddler	-	-	23	100	
Preschool	1	4.5	21	95.5	0.107
Sschool age	5	14.28	30	85.72	
Gender					
Male	4	8.33	44	91.66	0.544
Female	2	6.25	30	93.75	
Number Hospital Stay					
< 7 days	-	-	46	100	**0.004***
> 7 days	6	17.64	28	82.36	
Duration Hospitalization					
< 7 days	-	-	41	100	0.328
> 7 days	6	10	54	90	
Frequency Venipuncture					
< 7 times	-	-	41	100	**0.011***
>7 times	6	15.39	33	84.61	

**** <0.05 level of significance***

Table 6 has shown that there was a significant association between the number of hospital stays less than seven times, and the number of venipuncture less than seven times (p=0.021, p=0.004,p=0.011) with level of pain.

DISCUSSION

The study has illustrated the children's past history, all children were admitted in hospitals less than seven times in experimental group. In contrast, 57.5% children were admitted in hospital less than seven times and 42.5% respondents more than seven times in control group. Regarding the duration, 57.5% children were stayed in hospitals less than seven days and 42.5% more than seven days in experimental group. On the other hand only 25% had stayed in hospital for less than seven days and majority of children had the history of hospitalization more than seven days with repeated hospitalization. In regard to number of venipuncture, most of children in experimental group had less than seven times venipuncture history but in control group, the venipuncture history was comparable in both less than seven days (51.2%) and more than seven days (48.8%). The majority of children had a history of prior hospitalization and cannulation, according to a study done at the pediatric teaching hospital in Erbil City.[16] According to a similar study, 42 (56%) of the children had previously been hospitalized; of these, 32 (43.3) had previously undergone IV cannulation, and 29 (72.5) of them had undergone the procedure more than once.[17]

The study has depicted that 42.5% respondents in experimental group has perceived moderate pain, 37.5% perceived mild pain and 20% reported severe pain during peripheral venous cannulation whereas 92.5% respondents perceived severe pain and only 7.5% has perceived moderate pain during peripheral venous cannulation. This has indicated that the children in experimental group perceive less pain with distraction therapy then in control with routine care during peripheral venous cannulation. Every preschooler in the control group experienced more acute discomfort during intravenous cannulation than the experimental group did.[17]According to some study findings, watching cartoons may be effective not only for quick interventions involving needles, such as blood-drawing and vascular access as well as vaccinations, but may not be effective for more involved procedures, like changing burn dressings, which cause more intense pain.[18,19] Pediatric nursing refers to the specialized nursing care given to children during health and disease. Pain is a negative sensory and emotional sensation linked to both existing and potential damage.[20] Another study found that the control group experienced moderate to severe pain more frequently than the group that watched videos for diversion. The majority of the children in the intervention group were distracted by a video or animation on their tablet or TV and unresponsive during the cannulation operation, which made it effective at relieving pain by distracting the kids.[21] According to similar research, during venous cannulation, children in the experimental group experienced less overall discomfort than children in the control group, with a mean difference of 2.31 units, a median of 2.5 units, and a mode of 5 units.[22, 23]

The study also has shown the level of pain between experimental and control group after two minutes of peripheral venous cannulation. In experimental group, 72.5% children perceive mild discomfort, 22.5% children perceive moderate pain and 5% perceive severe pain. In contrast to experimental group, 72.5% children still perceive moderate pain, 18.8% perceive severe pain and 8.8% perceive mild discomfort after two minutes of cannulation. The results show that the control group felt more pain than the experimental group. In comparison of pain score between experimental and control group during cannulation, here we can see that the mean value of pain is high in control group than in experimental group, independent t test value is -11.80 and the p value is 0.001, which is less than 0.05 level of significance and there is significant difference between the pain perception in experimental and control group which suggest that the pain perception in experimental group is low than control group. It indicates that video-assisted distraction therapy is very highly effective method to divert the pain perception during cannulation in children.[24,25] According to a study carried out in a few prestigious hospitals in India, there was a substantial difference in the post-test degree of pain between the two groups, with the p-value of pain between the two groups being 0.01, which is statistically significant at the p0.05 level.[1] In line with this, a different study found that the experimental group's mean pain score was 4.6 while the control group's was 7.7, with a mean difference of 3.2 which is significant at the 0.05 level of significance.[1] Another study with similar results indicated at the 0.001 level, the children getting distraction therapy during IV cannulations experienced less discomfort (mean=3.9, SD=1.28) than the control group receiving standard care (mean=8.7, SD=1.0).[26] The study has shown no significant association of sociodemographic variables with level of pain according to a study done in a few hospitals in India, there was no correlation between demographic factors and pain levels.[27]

CONCLUSIONS

Every youngster who undergoes an intrusive operation like a venipuncture experiences stressful and unpleasant bodily and psychological effects. According to the study, video-assisted Distraction Therapy was very efficient at distracting children from their pain during intravenous cannulation. The research has also demonstrated that children experience pain independent of their age, gender, caste, religion, occupation, or other demographic factors. The experimental group and the control group experienced pain differently. It is an easy and affordable method to reduce pain and obtain children's cooperation is to employ a cartoon distraction film to divert their attention during a painful process.

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CONFLICT OF INTEREST

There are no conflicts of interest.

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