



Effectiveness of Video-Assisted Distraction Technique in Reduction of Pain Among Preschool Children Undergoing Vein Puncture

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Abstract

Introduction: Vein puncture is an invasive but common procedure for children, often accompanied by pain, fear and anxiety and refuse to cooperate. Distraction technique is one of the non-pharmacological methods of controlling pain. The objective of this study was to find the effectiveness of video assisted distraction technique in reduction of pain among preschooler children.

Methods: Quasi experimental study was conducted in Bharatpur Hospital, Chitwan, Nepal. 108 preschooler children consisting of 54 children in each experimental and control group selected by non-probability purposive sampling technique were enrolled in the study. Structured pain scale was used to collect data in both groups. Animated cartoon video was shown only to experimental group five minutes prior to until the vein puncture was over. Data analysis was done using descriptive statistics and inferential statistical tests.

Results: In experimental group, 59.2% had moderate pain whereas 68.5% in control group had severe pain. The pain score of experimental group was significantly lower than that of control group at $p = 0.05$ with the mean value of experimental and control group 6.85 ± 0.79 and 7.25 ± 0.87 respectively.

Conclusions: Distraction is an effective technique for children undergoing vein puncture in order to alleviate pain level during vein puncture.

Introduction

Pain is a complex, subjective experience that entails of physiological, sensory, emotional, cognitive and behavioral components.¹ Pain is associated with heightened levels of distress and anxiety during procedures, which can result in negative long-term emotional outcomes.² Vein puncture is a common procedure used for cannulation and puncturing the vein for drawing blood for laboratory investigations.³ Painful experiences in early childhood, their frequency and recall can retain the negative effects.⁴

Children aged four to six years report higher pain as well as greater fear and phobia with the same stimulus than older children aged seven years or older.⁵ For reduction of pain and distress in order to give the children a sense of relief over the situation, non-pharmacological methods are widely accepted.⁶ Distraction is the most commonly used method for procedural pain and distress. It is a non-pharmacological intervention aimed to reduce procedural pain in children.⁷ Distraction is often defined as a strategy, whether cognitive or behavioral, that draws a child's attention away from noxious pain

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stimuli.⁸

The use of non-pharmacological procedures is economical as well as less health hazardous.⁹ Most of the children experience significant levels of distress during vein puncture.¹⁰ Vein puncture differs from other needle procedures such as immunization, as vein puncture takes longer duration, and drawing of blood thereby making the patient more anxiety provoking for children.¹¹ It has been revealed that venous blood sampling was ranked fourth among 16 painful procedures.¹² In order to decrease painful experience during procedures, distraction techniques in the form of play, games, video cased recorder, television can be used.^{13,14} Distraction techniques efficacy needs more research and knowledge.¹⁵ Therefore the objective of this study was to assess the effectiveness of video assisted distraction technique in reduction of pain among preschool children undergoing vein puncture.

Methods

Quasi experimental design was used to find out the effectiveness of video assisted distraction technique in reduction of pain among Preschool children undergoing vein puncture in Bharatpur Hospital, Chitwan, Nepal. Non probability purposive sampling technique was used for the selection of preschool children admitted to Paediatric ward. Study period was from October 19, 2020 to December 5, 2020. Sample size was calculated by taking the prevalence rate of 56.7%,¹ resulting in each for experimental group 54 and control group 54. Total sample size was 108 preschool children aged between three to six years. Ethical approval from the Institutional Review Committee (IRC) of Tribhuvan University, Institute of Medicine, was taken. Administrative approval for data collection was taken from Bharatpur Hospital. Written informed consent was obtained from the parents. The instrument was developed as a structured interview schedule. The research instrument was divided into two parts according to study variables. Part I consisted of questions related to socio-demographic characteristics of a parents and sociodemographic characteristics of the children. Part II consisted of Faces, Legs, Activity, Cry, Consolability (FLACC) tool which was develop by Merkel, Lewis & Malviya.¹⁶ This tool observes five aspects of change in children's behavior. Each of the behavior are score as 0, 1 or 2. Therefore the total score ranges between 0 - 10 and the FLACC interpretation is done as; 0 - No pain, 1 - 3 mild pain, 4 - 6 moderate pain, 7 - 10 severe pain. Data was collected from face to face interview was taken three

to five minutes to access the socio-demographic information from the parents and the level of pain was observed using FLACC pain scale during entire process of vein puncture. The average time taken to complete the intervention for one participant was approximately 20 to 25 minutes. Experienced hospital staff working in paediatric ward more than six months performed the venipuncture. In experimental group, the researcher showed the animated Nepali language video Meena cartoon by tablet to the child, five minutes prior to the venipuncture. The level of pain was observed by the researcher using FLACC pain scale during venipuncture. In control group, venipuncture was done as hospital routine procedure and the level of pain was observed by the researcher using FLACC pain scale. The procedure was conducted in separate times for experimental and control group. The coded data was analyzed by using Statistical Package for Social Science (SPSS) version 16. Descriptive statistics, inferential statistics was used.

Results

Table 1. Characteristics of children among experimental and control groups (N = 108)

Characteristics	Experimental (N = 54) No. (%)	Control (N = 54) No. (%)	Total (N = 108) No. (%)
Age in years			
3	14 (26.0)	20 (37.1)	34 (31.5)
4	13 (24.0)	18 (33.3)	31 (28.7)
5	12 (22.2)	6 (11.1)	18 (16.7)
6	15 (27.8)	10 (18.5)	25 (23.1)
Sex			
Male	35 (64.8)	34 (63.0)	69 (63.9)
Female	19 (35.2)	20 (37.0)	39 (36.1)
Birth order			
First	25 (46.3)	31 (57.4)	56 (51.9)
Second or more	29 (53.7)	23 (42.6)	52(48.1)
Previous hospitalization			
Yes	24 (44.4)	21 (38.9)	45 (41.7)
No	30 (55.6)	33 (61.1)	63 (58.3)
Experience of venipuncture			
Yes	20 (37.0)	18 (33.3)	38 (35.2)
No	34 (63.0)	36 (66.7)	70 (64.8)

Table 1 reveals that more than one fourth of children (27.8%) were from the age group of six years in experimental group whereas more than one third of them (37.1%) were from the age group of three years in control group. More than half of the children (64.8%) in experimental and 63.0% in control group were males. In case of birth order more than half (55.6) were second or more in experimental group and more than half (57.4 %) in control group were first

Table 2. Socio-demographic characteristics of the parents (N = 108)

Characteristics	Experimental (N = 54)	Control (N = 54)	Total (N = 108)
	No (%)	No (%)	No (%)
Religion			
Hindu	44 (81.5)	42 (77.8)	86 (79.6)
Buddhist	7(13.0)	10 (18.5)	17 (15.7)
Christians	0 (0.0)	2 (3.7)	2 (1.9)
Muslim	3 (5.5)	0 (0.0)	3 (2.8)
Ethnic Group			
Brahmin / Chettri	18 (33.3)	31 (57.4)	49 (45.4)
Janajati	29 (53.7)	22 (40.7)	51 (47.2)
Dalit	7 (13.0)	1 (1.9)	8 (7.4)
Type of Family			
Nuclear	25 (46.3)	32 (59.3)	57 (52.8)
Joint	29 (53.7)	22 (40.7)	51 (47.2)

Table 3. Level of pain among experimental and control groups (N = 108)

Level of pain	Experimental (N = 54) No. (%)	Control (N = 54) No (%)
No pain (0)	0 (0.0)	0 (0.0)
Mild pain (1 - 3)	8 (14.8)	0 (0.0)
Moderate pain (4 - 6)	32 (59.2)	17 (31.5)
Severe pain (7 - 10)	14 (26.0)	37 (68.5)

Table 4. FLACC Score of children (N = 108)

FLACC Activity	Score	Experimental	Control
		(N = 54) No (%)	(N = 54) No (%)
Face	No particular expression or smile	10 (18.5)	0 (0.0)
	Occasional grimace or frown, withdrawn, uninterested	34 (63.0)	35 (64.8)
	Frequent to constant quivering chin, clenched jaw	10 (18.5)	19 (35.2)
Legs	Normal position or relaxed	4 (7.4)	0 (0.0)
	Uneasy, restless, tense	34 (63.0)	14 (26.0)
	Kicking or legs drawn up	16 (29.6)	40 (74.0)
Activity	Lying quietly, normal position, moves easily	1 (1.8)	0 (0.0)
	Squirming, shifting, back and forth, tense	34 (63.0)	31 (57.4)
	Arched, rigid or jerking	19 (35.2)	23 (42.6)
Cry	No cry (awake or asleep)	6 (11.1)	0 (0.0)
	Moans or whimpers, occasional complaint	22 (40.7)	9 (16.7)
	Crying steadily, sobor screams, frequent complaints	26 (48.2)	45 (83.3)

Table 5. Comparison of pain scores (N = 108)

Comparison of Pain Score	Pain Score Mean \pm SD	p-value
Experimental	6.85 \pm 0.79	.012*
Control	7.25 \pm 0.87	

* significance level at 0.05 by using independent t test.

Table 6. Differences in pain scores expressed in different body parts (N = 108)

Different Body Parts	Pain Score Experimental Mean \pm SD	Control Mean \pm SD	P-value
Face	1.48 \pm 0.53	1.33 \pm 0.47	.034*
Legs	1.31 \pm 0.51	1.62 \pm 0.49	.002*
Activity	1.41 \pm 0.49	1.48 \pm 0.50	.443
Cry	1.61 \pm 0.49	1.81 \pm 0.39	.002*
Consolability	1.16 \pm 0.42	1.09 \pm 0.48	.324

*significant level ($p < 0.05$) by using independent t test.

Table 7: Association between level of pain and selected characteristics of children (N = 108)

Characteristics	Level of pain					
	Mild-Moderate	Severe	p-value	Mild-Moderate	Severe	p-value
	No. (%)	No. (%)		No. (%)	No. (%)	
Experimental			Control			
Age of Child						
3 - 4 Years	21 (52.5)	5 (35.7)	0.279	3 (17.6)	24 (64.8)	0.001*
5 - 6 Years	19 (47.5)	9 (64.3)		14 (82.4)	13 (35.2)	
Sex						
Male	24 (60.0)	10 (71.4)	0.446	8 (47.0)	19 (51.3)	0.770
Female	16 (40.0)	4 (28.6)		9 (53.0)	18 (48.7)	
Birth order						
First	18 (45.0)	8 (57.1)	0.434	12 (70.6)	15 (40.5)	0.062
Second or more	22 (55.0)	6 (42.9)		5 (29.4)	22 (59.5)	
Previous hospitalization						
Yes	17 (42.5)	4 (28.6)	0.358	5 (29.4)	19 (51.4)	0.132
No	23 (57.5)	10 (71.4)		12 (70.6)	18 (48.6)	
Experience to venipuncture						
Yes	14 (35.0)	14 (35.0)	0.661	4 (23.5)	16 (43.2)	0.164
No	26 (65.0)	26 (65.0)		13 (76.5)	21 (56.8)	

significant level $p < 0.05$ by using Fisher Exact Test

Discussion

In the present study, more than half (59.2%) children under experimental group experienced moderate pain, one fourth (26.0%) experienced severe pain and 14.8% had mild pain. In the control group, more than two third (68.5%) had severe pain, around one third (31.5%) experienced moderate pain and no child was there with no pain. This finding was well supported by similar studies from our neighboring country India.^{1,4,5,11}

This study reveals that exposure to animated cartoon had significant role in reducing pain. Pain was significantly lower in experimental group than control group ($p < 0.05$) with mean \pm SD value 6.85 ± 0.79 and 7.25 ± 0.87 respectively. This result is similar to the study by Miguez-Navarro et al in Madrid, Spain which showed significantly lower pain score at ($p < 0.001$) in 3 - 5 age group with mean 3.38 ± 2.01 in video distraction group and 6.52 ± 2.69 in control group.¹⁰ Similarly, Maharjan et al and James et al also reported similar findings with significantly less pain ($p < 0.05$) felt by the children with video distraction.^{1,11} Similarly, other studies from Iran, and Italy also have noted similar results like the present study.^{17,18}

The study revealed that on observation of face, more than half (63.0%) in experimental and 64.8% in control had occasional grimace or frown, withdrawn, uninterested. On observation of legs, more than half (63.0%) in experimental group were found to be uneasy, restless, tense while in control group, majority (74.0%) were found kicking legs or drawn up. Similarly, on activity both in experimental and control group, more than half (63.0%) children were squirming, shifting back and forth, tense. Almost all the children in control group (83.3%) and more than half in experimental group (48.2%) were found to be Crying steadily, sobor screams, frequent complaints. Regarding consolability, majority of children in experimental (74.1%) and control 75.9% were reassured by occasional touching, hugging and talking with the child.

The study also noted significant difference in mean pain score for face (1.48 ± 0.53 in experimental and 1.33 ± 0.47 in control groups), legs (1.31 ± 0.51 in experimental and 1.62 ± 0.49 in control groups) and cry (1.61 ± 0.49 in experimental and 1.81 ± 0.39 in control groups) while there was no significant difference in mean pain score for activity and consolability. The study also demonstrated that pain was significantly lower in children aged 5 - 6 years than

in children aged 3 - 4 year at control group. This finding is also supported by other study by James et al.¹¹ The present research showed no significant difference between level of pain and sex in both experimental and control groups. This finding is supported by another similar study from India.¹³ Similarly Miguez-Navarro et al showed there was no significant association between level of pain and previous hospitalization like this study.¹⁰

It is expected that the present study would be helpful for concerned authority, curriculum committee and other stakeholders to develop a new strategy regarding non-pharmacological pain management for children during painful procedures. However, the present study does have some limitations. This is a quasi-experimental study, conducted in a single centre with relatively small sample size, Hence, the present study findings need to be further corroborated with further, larger, multi-centric randomized controlled trials in the future.

Conclusions

The use of video distraction technique is significantly effective to decrease the pain perception in preschool children undergoing venipuncture. There is significantly lower pain perception in older children than that of younger ones when there is no intervention.

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