



Effectiveness of cartoon video as a distraction strategy on pain perception during venepuncture among children

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Abstract

Pain is often a subjective sensation having physiological, psychological and emotional implications for an individual. In a hospital setting, children usually perceive unpredictable pain which is often procedure related that can impact both emotionally and psychologically. Perception of pain varies with multiple factors such as age, gender, intellectual level, personality, parental care and previous experience of painful procedure/ suppression of pain using pharmacologic and non-pharmacologic measures. Our study aimed to assess the effectiveness of animated cartoons as a distraction strategy to reduce behavioral response to pain perception among children undergoing venepuncture and to assess and compare pain perception in children with and without cartoon distraction. We had total of 60 children participated in the study group, we found that children who were distracted perceived less pain ($p < 0.001$), also the number of attempts required to do venepuncture also reduced significantly ($p < 0.001$). We concluded that, distraction technique is a simple yet effective tool in alleviating pain during venepuncture in preschool children. This technique can help in reduction of anxiety among children.

Keywords: cartoon video; distraction; venepuncture; children; pain perception

Introduction

Pain is often a subjective sensation having physiological, psychological and emotional implications for an individual [1]. In a hospital setting, children usually perceive unpredictable pain which is often procedure related that can impact both emotionally and psychologically [2]. Medical procedures along with causing pain they are associated with anxiety, fear, and behavioral distress for both children and their parents. Needles are among the most feared experiences of children [3]. Among all the needle procedures, venipuncture differs from other needle procedures such as immunization, that is venipuncture takes longer time, difficult venous access in some children, involves the use of tourniquets to find an appropriate vein and drawing of blood thereby making it more anxious for children [4].

Perception of pain varies with multiple factors such as age, gender, intellectual level, personality, parental care and previous experience of painful procedure/ suppression of pain using pharmacologic and non-

pharmacologic measures [5]. According to McGrath, the behavior of children during invasive procedures is widely individual and dependent on degree of perceived pain [5].

Anticipatory anxiety has a vital role in perception of pain, manifesting as behavioral distress and noncompliance that further intensifies their pain [6, 7]. Improper management of pain from venepuncture in children has greater intensity and duration of discomfort and

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phobias towards therapeutic or diagnostic procedures [8]. Reduction of procedural pain has a vital role in improving the performance of healthcare workers, treatment outcome and the overall satisfaction of the patients which is achieved using pharmacologic and non-pharmacologic methods [6].

Non pharmacological methods are used additionally as well as independently to pharmacological methods to relieve pain and discomfort [9]. Among all the non-pharmacological methods distraction is the most commonly used method for alleviation of procedural pain [10]. Distraction is a non-pharmacological intervention that diverts attention from a noxious stimulus through passively redirecting the subject's attention or by actively involving the subject in the performance of diversion task [11]. Other interventions include relaxation, hypnosis, modeling, desensitization, contingency management, selective attention, stress inoculation, cognitive restructuring, and coping skills training [12]. Visual and auditory distractions like animated videos is a non complicated, time saving and easy to administer technique that alleviates pain and distress in children during intravenous injection procedures as effective as common done psychological interventions [13].

Cartoon distraction works on principle of ACCEPTS that is distract with activities i.e. watching cartoon video, distract with contributing i.e. cartoon video take the attention away from own pain and concentrate on concern for someone else, distract with comparisons – cartoon video help to compare own situation with one that is much worse, distract with opposite emotions–cartoon video helps to promote the complete opposite emotion i.e. help in smile even distress situation, distract by pushing away i.e. cartoon video helps in pushing the distress situation away, distract by positive thought i.e. cartoon distraction helps in directing the concentration of child to more positive thoughts and distract with other sensation i.e. cartoon distraction has the ability to direct the emotions and break the connection between person and his/her emotional pain [14].

Aims of the study were the effectiveness of animated cartoons as a distraction strategy to reduce behavioral response to pain perception among children undergoing venipuncture was assessed. Pain perception in children with and without cartoon distraction was compared.

Methodology

This study was under taken with the objective to assess the effectiveness of animated cartoons as a distraction strategy to reduce behavioral response to pain

perception among children undergoing venipuncture and to assess and compare pain perception in children with and without cartoon distraction.

Study design

This is a cross sectional study conducted in Adichunchanagiri Institute of Medical Sciences (AIMS), Mandya, Karnataka, which is a tertiary care teaching hospital from February 2022 to June 2022. Ethical committee approval was taken before conducting the study.

All children aged between 3-6 years who were conscious, alert, hemodynamically stable, scheduled for venepuncture were included. Children who were critically ill and intellectually challenged were excluded.

This study had total of 60 children. They were divided into two groups namely an intervention group and a control group consisting of 30 children each using nonprobability purposive sampling technique. A sample size of 60 with 95% confidence level and 80% power was suggested by the mean and standard deviation formula based on previous studies, where $1-\alpha/2$ and $1-\beta$ represented type 1 error and power of the study respectively. Hence, the sample size of 30 was selected in each group to enhance the validity of the observations made. The intervention group was shown cartoon video during venepuncture while the control group did not receive any such treatment during the invasive procedure of venepuncture.

Data collection and procedure pain was depicted by Revised Face, Legs, Activity, Cry and Consolability (r-FLACC) (Table 1) scores and the effectiveness of the treatment was evaluated in terms of abatement of pain response demonstrated by children after the intervention, as measured by rFLACC scale (Table 1) [15].

The r-FLACC scale (Table 1) assesses pain across five paradigms of observation i.e. face, legs, activity, crying and consolability with a higher score representative of increased severity of pain. Each of these five variables has three scores, 0, 1 and 2. Overall pain score of 0 indicates relaxed and comfortable status of the child, 1-3 indicates mild discomfort, 4-6 implies moderate pain whereas scores between 7-10 denote severe pain or discomfort or both.

The protocol followed began with the researchers introducing themselves to the children and parents, explaining the purpose and procedure of the study, obtaining formal written consent of parents. Cartoon

animations were played during venepuncture and subsequent pain responses of children were noted by

the researcher. Phlebotomist, observer and procedure room remained same for all the study subjects.

Table 1: r-FLACC (revised FLACC) pain rating scale for children.

	0	1	2
Face	No expression or smile	Occasional grimace or frown, withdrawn, disinterested; appears sad or worried	Frequent to constant frown, clenched jaw, quivering chin; distressed looking face; expression of fright or panic
Legs	Normal position or relaxed; usual muscle tone and motion to arms and legs	Uneasy, restless, tense; occasional tremors	Kicking, or legs drawn up; marked increase in spasticity; constant tremors or jerking
Activity	Lying quietly, normal position, moves easily; regular rhythmic breaths (respiration)	Squirming, shifting back and forth, tense or guarded movements; mildly agitated (head back and forth, aggression); shallow, splinting breaths (respirations); occasional sighs	Arches, rigid, or jerking; severe agitation; head banging; shivering (not rigors); breath holding, gasping, or sharp intake of breaths; severe splinting
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaint; occasional verbal outburst or grunt	Crying steadily, screams or sobs, frequent complaints; repeated outbursts; constant grunting
Consolability	Content, relaxed	Reassured by occasional touching, hugging, or "talking to"; Can be distracted	Difficult to console or comfort; pushing away caregiver; resisting care or comfort measures

Medical history of participants encompassing records of previous hospitalization, previous exposure to painful procedures, site and number of venepuncture attempted were inquired and noted on a Demographic Proforma sheet along with demographic characteristics such as age and gender.

Results

The study was conducted on 60 children undergoing venepuncture. They were divided in to experimental

group (children who were distracted with cartoon video) and control group (children who were not distracted with cartoon video) comprising 30 children in each group. Majority of the children were aged 3 years, 21 children (35%). No gender wise predominance was noted. There was equal distribution of study subjects who had previous exposure to venepuncture and also previous hospitalization, among both experimental and control group (Table 2).

Table 2: Various parameters compared with distraction group and no distraction group.

Variable	Category	With distraction		Without distraction		P-value
		Count (n=30)	%	Count (n=30)	%	
Age (Completed years)	3	7	23.3%	14	46.7%	0.21
	4	9	30.0%	4	13.3%	
	5	9	30.0%	7	23.3%	
	6	5	16.7%	5	16.7%	
Gender	Male	14	46.7%	16	53.3%	0.79
	Female	16	53.3%	14	46.7%	
Previous hospitalization	Yes	20	66.7%	18	60.0%	0.79
	No	10	33.3%	12	40.0%	
Previous exposure	Yes	16	53.3%	15	50.0%	1
	No	14	46.7%	15	50.0%	
Venesection site	Cephalic	10	33.3%	12	40.0%	0.49
	Dorsal	20	66.7%	17	56.7%	
	Radial	0	0%	1	3.3%	

On applying gr-FLACC pain scale (Table 1) to grade severity of pain we did not find any of our children to have mild pain both in experimental and as well as control group. 76.7% of children who were distracted by cartoon experienced moderate pain while 23.3% of children in the same group had severe pain. Among children who

In our study we also noted that children who belonged to experimental group i.e., those who were distracted by showing cartoon video required, majority (80%) of them needed only single attempt compared to non-distracted children where only 30% of the children

did not receive cartoon as distraction 16.7% experienced moderate pain and 83.3% experienced severe pain. This observation was statistically significant with a p value of <0.001, indicating that distraction technique reduces pain perception (Table 3).

required single attempt for successful venepuncture attempts which was significant statistically with a p value <0.001, indicating that distraction technique can reduce the number of attempts taken for venepuncture (Table 4).

Table 3: Comparison of pain severity among two groups.

Variable	Category	With distraction		Without distraction		P-value
		Count	%	Count	%	
Score	Moderate pain	23	76.7%	5	16.7%	<0.001
	Severe pain	7	23.3%	25	83.3%	

Table 4: Comparison of attempts taken for venepuncture among two groups.

Variable	Category	With distraction		Without distraction		P-value
		Count (n=30)	%	Count (n=30)	%	
Attempts	1	24	80.0%	9	30.0%	<0.001
	2	6	20.0%	21	70.0%	

Discussion

Coping mechanisms for pain develop with age and experience. However, in the case of young children who are exposed to invasive procedures like venepuncture but are too young to exhibit behavioral and cognitive coping mechanisms, distraction technique is better suited [15]. Cartoon animation videos shown during venepuncture were found to be highly effective in alleviating pain response among pre-schoolers. Pain was independent of the array of variables scrutinized as potential indicators of pain.

Similar studies were conducted at various places, in our study we divided the study subjects into experimental and control groups equally but we found there was no gender predilection but in study done by Chavan et al [16] found to slight female preponderance while study done by Devi et al [17] had male preponderance.

The study done by Chavan et al [16] found that in the experimental group 70% of subjects recorded moderate pain and 30% recorded severe pain. While in the control group 6.7% subjects recorded moderate pain and 93.3% recorded severe pain (p-value < 0.001). Similar study done by Devi et al [17] found that in the experimental group 6.25% subjects recorded mild pain, 56.25%

subjects recorded moderate pain and 37.5% recorded severe pain. While in the control group 12.5% subjects recorded moderate pain and 87.5% recorded severe pain (p-value < 0.05). Similar study done by Maharjan et al [1] found that in the experimental group 56.7% subjects recorded moderate pain and 43.3% recorded severe pain whilst in the control group all children experienced severe pain [1]. In our study we found that in the experimental group 76.7% of subjects recorded moderate pain and 23.3% recorded severe pain. While in the control group 16.7% subjects recorded moderate pain and 83.3% recorded severe pain (p-value < 0.001). Indicating that distraction technique is an effective tool in reducing pain perceived during venepuncture in preschool children.

When we applied distraction techniques by showing them cartoon videos number of attempts was to do venepuncture was less compared to control group. While no such difference was noted in studies done by Chavan et al [16] and Devi et al [17].

A study by Noel et al [18] presents a contradictory finding where distraction strategy played a role in 5-10 year olds forming accurate memories of the experience but was not found to influence feelings of fear, anxiety and distress among them. The distraction strategy employed

in the latter study consisted of nonprocedural talk. This indicates that not all distraction strategies have a similar effect and mechanism of functioning. Therefore, selection of distraction tools should be contingent upon the age, interests, and levels of engagement offered by them to the children [18].

Limitations

This study was done on small sample size of 60 children. Studies can be done for other minor procedures like intramuscular injections and wound dressing. Studies can be done using other distraction techniques like music therapy, playing video games and storytelling.

Conclusion

Distraction technique is a simple yet effective tool in alleviating pain during venepuncture in preschool children. This technique can help in reduction of anxiety among children. Similar studies with more samples for a longer period of time would be pertinent in making broad generalization of the findings.

Conflicts of interest

Authors declare no conflicts of interest.

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