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Effect of Animation Distraction on Pain Response during Venepuncture among Children

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ABSTRACT

Introduction: Children are the most valuable resource, and childhood is the world of a miracle. Every child in a lifetime may face many illnesses and hospitalisation. Pain is a common problem faced by a hospitalised child. Venepuncture is an invasive procedure followed in the hospital, which may produce pain, fear, anxiety, and discomfort in children. The animation distraction is one of the cost-effective non-pharmacological methods which may distract the child during any procedure and reduce the pain stimuli.

Aim: To find the effect of animation distraction on pain response during venepuncture.

Materials and Methods: An evaluative research approach with a quasi-experimental (post-test only control group) design was adopted in the study. The sample comprised of 40 children (20 each in the control and experimental group) aged 4-12 years undergoing venepuncture was selected by using a non-probability purposive sampling technique. A small 5-20 minutes of animated videos based on the children's age and choice were displayed to the experimental group during the venepuncture procedure. Wong–Baker Faces Pain Rating Scale was used to assess the pain response after venepuncture in both the control and experimental group.

Results: The data was collected, recorded systematically, and analysed with descriptive and inferential statistics. The experimental group's mean post-test pain score (3.4±1.68) was lower than the control group (8.2±1.53) with $p<0.001$. Three-fourths of the control group (75%) had severe pain, whereas in the experimental group, none of the samples experienced severe pain, and 55% of the samples had moderate pain. Notably, 5% of the samples from the experimental group reported no pain during venepuncture. The calculated t-value $t(38)=9.79$ is greater than the table value $t(38)=2.02$ at 0.05 level of significance.

Conclusion: The animation distraction was highly effective in reducing the pain response in children during venepuncture.

Keywords: Child, Distractive therapy, Effectiveness, Invasive procedure, Phlebotomy

INTRODUCTION

In India, 39% (472 million) of the country's population are contributed by children under 18 years [1]. Childhood is an exquisite period where children should live free from fear and harm, engaging with school and play [2]; however, children are vulnerable to different forms of illness during childhood [3]. Illness and hospitalisation are both stressful and shatters a child's life; hence it can interfere with healthy development [4]. Children of different age groups react to hospitalisation and prolonged illness with various emotions like regression, separation anxiety, negativism, depression, phobia, and suppression or denial [4] and, somatic symptoms. Among the somatic symptoms, pain is one of the vital problems faced by a hospitalised child [5]. Pain in hospitalised children is attributed to the disease condition and/or therapeutic or diagnostic procedures. The effect of pain can worsen by fear, anxiety, and uncertainties.

Older children express their pain and sorrow by verbalisation, where the younger children express it by cry [6]. Pre-schoolers (3-6 years) and school-age (6-12 years) are very critical for the emotional and psychological development in children, and these are the time typically children visits hospitals more often and exhibit a high level of discomfort and negative emotion to painful procedures. This experience may develop a negative impact and increased sensitivity towards medical care among them, if not handled effectively [7]. Venepuncture is the most typical procedure in any illness and generates a painful experience [8]. Most children are frightened before and during venepuncture with the needle's sight; hence, they cry and refuse to cooperate [9]. Previous literature on venepuncture pain showed that 83% of preschool children and 51% of primary school children experienced a high level of distress during the procedure [10].

Currently, pain management mainly achieved by analgesic and sedative drugs, whereas it is proven that the emotion-based coping strategies alone or adjuvant to medication can provide an effective outcome [11]. Distraction is one of the simplest psychological measures, which aids to divert the child's attention from pain stimuli, thereby reducing pain and anxiety. According to level one meta-analysis evidence, distraction found to be very useful in managing pain among young children [12] and does not require any complicated technical components or expertise [11]. Distractions can be active or passive [13]. Animation or cartoon distraction is cost-effective and simple audio-visual distractive management for pain. This method can relieve the child's stress as well as the parents and nurses [8]. This method can be implemented in smaller health care delivery centre to sophisticated settings. Hence, the researchers intended to find the pain response during venepuncture and to assess the effectiveness of animation distraction on pain response among children.

MATERIALS AND METHODS

The researchers adopted a quasi-experimental design with a post-test only control group method for the study. The study was conducted in the Regional Advanced Paediatric Care Centre (RAPCC), the district paediatric hospital at Mangalore, Karnataka. The total duration of the study was nearly two years from March 2015 to July 2016, where the data for the main study was collected in the month of December 2015. Non-probability, purposive sampling technique with the inclusion criteria was used to select 40 children undergoing venepuncture. The sample size for the study was decided based on the formula for interventional studies [14]; at a 95 % confidence interval and 80% power, and pilot study.

Inclusion Criteria: The inclusion criteria for the samples were children who are not on any current acute pain, no cognitive or severe physical disability, the ability to communicate and understand the pain response, children who are allowed by the parents to participate in the study and children who are available during the time of data collection.

Exclusion Criteria: The children brought for emergency critical care, handicapped, mentally challenged children and children who are on pain medication were excluded from the study. The chosen children were allocated to the control and experimental group (20 children in each).

Demographic proforma and Wong-Baker Faces pain rating scale [7,15] were the instruments used for the data collection. Demographic proforma comprises nine items: age in years, gender, type of family, birth order, living with, residence, number of previous venepuncture, duration of present admission in days, and type of illness.

Wong-Baker Faces pain rating scale is a globally used standardised pain assessment scale used to categorise the pain severity to find out the pain response among children undergoing venepuncture. The scale consists of ranked-choice: globally used where no pain was ranked as 0, mild pain as 2, moderate pain as 4 and 6 and severe pain as 8 and 10 scores, respectively.

Both the tools were given to nine experts from various departments to assess the content validity, and corrections were incorporated before finalising the tool. The content validity index for the demographic tool was 0.91. None of the experts given any modification for the Wong–Baker Faces Pain Rating Scale, considering it is a standardised and widely used scale in paediatric settings to assess the pain.

The study proposal was presented to the Institutional Review Board (IRB) for ethical consideration (Ref. No. CON/009/2015). The study was conducted after obtaining permission from the Medical Officer, Govt. District Hospital, Mangalore. Parental consent was obtained after explaining the purpose and procedure of the study in their vernacular language.

Baseline information was gathered by using a demographic questionnaire. Each child from the experimental group is directed to the intervention room after demographic profiling. An animated cartoon video of child's choice and age from the options of "Tom and Jerry" "Bal Ganesh Stories" "Chota Bheem stories", and Montessori Rhymes" were displayed for experimental group children for 20 minutes, starting five minutes before the venepuncture. The animation distraction continued throughout the procedure up to five minutes after the venepuncture. On the other hand, the routine measures (permitting a parent with children during the procedure) were carried out for the control group during and after the venepuncture. Both the groups were utilised similar gauge needles- 22 G (blue colour) for the procedure and two postgraduate doctors carried out the venepuncture in both the control as well as the experimental group.

STATISTICAL ANALYSIS

Wong-Baker Faces Pain rating scale was used to assess the postpain response from both the groups. The collected data were recorded systematically and analysed with descriptive and inferential statistics at a 5% level of significance based on the objectives and hypothesis. The demographic data were summarised with frequency, percentage, mean and Standard Deviation (SD). The effectiveness of animation distraction on pain response was estimated using an independent t-test [14]. Statistical Package for the Social Sciences (SPSS) version 23 is used for the data analysis.

RESULTS

I) Baseline characteristics of the sample

Out of 40 children, 35% of children were in the age group of 4-6 and 7-9 years in both experimental and control groups. The gender-wise distribution was equal (50% males and 50% females) in both groups. A 20% of children both in the experimental and control group were never experienced venepuncture previously. Currently, 45% in the experimental and 55% in the control group were hospitalised from 1-3 days. More than half of the children (65%) in the experimental group and (50%) in the control group were acutely ill. The homogeneity of the demographic variables of both groups was assessed using chi-square and likelihood ratio and found to be homogenous as all the variable showed p>0.05 [Table/Fig-1].

Demographic Variables		Experimental group (n=20)		Control group (n=20)		p-value
		f	%	f	%	
Age (Years)	4-6	7	35	7	35	1.00
	7-9	7	35	7	35	
	10-12	6	30	6	30	
Gender	Male	10	50	10	50	1.00
	Female	10	50	10	50	
Type of family	Nuclear	15	75	14	70	0.71
	Joint	5	25	6	30	
Birth order	First	10	50	11	55	0.09
	Second	6	30	9	45	
	Third	4	20	0	0	
Living with	Parents	19	95	20	100	0.24
	Grand parents	0	0	0	0	
	Hostel or separate	1	5	0	0	
Previous Venep-uncture	Never	4	20	4	20	0.75
	Once	4	20	4	20	
	Twice	2	10	3	15	
	More than twice	10	50	9	45	
Present admission (Days)	1-3	9	45	11	55	0.97
	4-5	6	30	7	35	
	>5	5	25	2	10	
Type of illness	Acute	13	65	10	50	0.45
	Chronic	7	35	10	50	

[Table/Fig-1]: Descriptive statistics of subjects based on demographic characteristics. Chi-square test was used.
f: frequency; p-values <0.05 considered as statistically significant

II) Level of pain response among the experimental and control group

Fifteen children among 20 samples from the control group experienced severe pain, and the remaining were expressed a moderate level of pain on Wong-Bakers Faces pain scale after venepuncture procedure. On the other hand, no child from the experimental group had complaints of severe pain. Eleven children felt a moderate level of pain, and the remaining conveyed a mild level of pain [Table/Fig-2]. The mean pain score among the control group 8.2±1.53 was more than double compared to the experimental group 3.4±1.68, p<0.001.

Pain score	Experiment group (n=20)		Control group (n=20)	
	f	%	f	%
No pain	1	5	0	-
Mild pain	8	40	0	-
Moderate pain	11	55	5	25
Severe pain	0	-	15	75

[Table/Fig-2]: Frequency distribution of the pain response in the experimental and control group.
N=40; f: frequency

III) Effectiveness of animation distraction on pain response during venepuncture procedure

The animation distraction made a significant difference in the mean pain score between the experimental and control groups (4.8, p<0.001). The calculated t-value t(38)=9.79 p<0.001 was greater than the table value t(38)=2.02 at 0.05 level of significance [Table/Fig-3].

Groups	Mean±SD	Mean %	MD	t value	p-value
Experimental (n=20)	3.4±1.68	34	4.8	9.79	<0.001
Control (n=20)	8.2±1.53	82			

[Table/Fig-3]: Effectiveness of animation distraction on pain response during venepuncture between the control and experimental group.
Independent t-test; N=40; MD: Mean difference; p-values <0.05 considered as statistically significant

DISCUSSION

The study findings revealed that the majority, 75% of the children expressed severe pain, and 25% had moderate pain in the control group, whereas in the experimental group, 55% of the samples had moderate pain, and also there were 5% of the sample with no pain. Previously mentioned results are concurrent with a study conducted among preschool children on pain response by Lobo MR and Umarani J where it showed that the majority (73%) from the group received cartoon distraction during venepuncture experienced only moderate pain [7]. However, the control group depicted that 93% were in severe pain during the procedure. The study results also consistent with another study conducted by Shaker NZ and Taha AA revealed that the highest percentage of (55%) samples from the experimental group had only mild discomfort whereas, in the control group, the highest percentage of children (56.7%) had severe pain and discomfort [16]. These study findings state that pain is a very distressful experience for children. Venepuncture is an unavoidable invasive procedure that results in transitory pain in many acute and chronic illnesses. Distractive methods using animation was depicted as one of the effective measures to overcome the transitory procedural pain.

The intervention group depicted a mean post-test score (3.4±1.68) which was lower than half the mean post-test score of the control group (8.2±1.53). The mean difference between the groups was 4.8 with p<0.001. Similarly, a study conducted by James J et al., articulated that the mean the post venepuncture pain score was 2.94±1.71 in experimental and 5.94±1.61 in routine care group [17]. Pain is the frequent complaint and hindering factor for effective identification and management of actual illness in peadiatric care settings. Tackling the pain can be successfully achieved by distraction methods as the child can be distracted faster comparing an adult. The current study finding strengthens this argument by revealing the mean difference (4.8, p<0.001) between routine and distraction methods.

A comparison between the mean scores of the control and the experimental groups was computed using an independent t-test. The calculated t-value t(38)=9.79, p<0.001 is greater than the table value t(38)=2.02 at 0.05 level of significance, showing that animation distraction was effective in reducing pain response during venepuncture among children in the experimental group. Earlier mentioned finding was consistent with another study conducted by Kaur B et al., [15]; it revealed that calculated t-value between mean distress scores of children with and without cartoon distraction at initiation t(29)=11.57 and 17.80, at 5 minutes t(29)=12.61 and 19.48 and termination t(29)=13.57 and 14.39. Current study findings agree upon by other experts in the subject area like Lobo MR and Umarani J, and Seoul by Yoo H et al., [7,18]. Effectiveness of the animation method as pain management is proven with a high significance (p<0.001) in the current result. Even though distraction methods are very effective and feasible many paediatric care settings are yet to utilise this sufficiently.

Limitation(s)

Pain is a subjective feeling; the inclusion of physical and physiological parameters and pain scale reading may help improve generalisability. Increasing the sample size may also help in the generalisability of the study result. Using the same person for venepuncture for all the samples can contribute more strength to the results.

CONCLUSION(S)

Illness and hospitalisation are inevitable in any child's life. Pain is a vital element of these two scenarios. Effective non-pharmacological measures can result in a happy stay during hospitalisation for a child who experienced pain; In-turn will help to provide high quality care. The findings provide a strong foundation to implement these non-pharmacological therapies as a routine in the care of children during a painful procedure.

REFERENCES

[1] Realising Children's Rights in India. Available at: https://www.humanium.org/en /india/
[2] Childhood defined. Available at :https://www.unicef.org/sowc05/english/childhood defined.html
[3] Handa K. Pediatric nursing for B.Sc Nursing students As per INC syllabus. 1st edition. Lotus publication. 2018, Pp. 62.
[4] Manoj Yadav, A text book of child health nursing with procedure, 1st ediotion, Pee Vee publication, 2013, Pp. 57.
[5] Cummings EA, Reid GJ, Finley GA, McGrath PJ, Ritchie JA. Prevalence and source of pain in pediatric in patients. Pain. 1996;68(1):25-31.
[6] Silva MS, Pinto MA, Gomes LM, Barbosa TL. Pain in hospitalised children: Nursing team perception. Revista Dor. 2011;12(4):314-20.
[7] Lobo MR, Umarani J. Cartoon distraction reduces venepuncture pain among preschooler–A Quasi Experimental study. Medical Science. 2013;2(6).
[8] James SR, Ashwill JW. Nursing care of children, principles and practice. 3rdedition, Elsevier publication, pp: 291, 395-396, 406.
[9] Goodenough B, Thomas W, Champion GD, Perrott D, Taplin JE, von Baeyer CL, et al. Unravelling age effects and sex differences in needle pain: Ratings of sensory intensity and unpleasantness of venepuncture pain by children and their parents. Pain. 1999;80(1-2):179-90.
[10] Davit CJ, Hundley RJ, Bacic JD, Hanson EM. A pilot study to improve venepuncture compliance in children and adolescents with autism spectrum disorders. J Dev Behav Pediatr. 2011;32(7):521-25.
[11] Landier W, Alice MT. Use of complementary and alternative medical interventions for the management of procedure-related pain, anxiety, and distress in pediatric oncology: An integrative review. Journal of Pediatric Nursing. 2010;25(6):566-79.
[12] Sikorova L, Hrazdilova P. The effect of psychological intervention on perceived pain in children undergoing venipuncture. Biomedical Papers of the Medical Faculty of Palacky University in Olomouc. 2011;155(2):149-54.
[13] Wiederhold MD, Wiederhold BK. Virtual reality and interactive stimulation for pain distraction. American Academy of Pain Medicine. 2007;8(3):182-88.
[14] Sharma DS. Nursing research and statistics, published by Adivision of reed Elsevier India Pvt. Ltd. 2nd Edition. Page no. 2014:227-37, 310.
[15] Kaur B, Sarin J, Kumar Y. Effectiveness of cartoon distraction on pain perception and distress in children during intravenous injection. IOSR Journal of Nursing and Health Science. 2014;3(3):08-15.
[16] Shaker NZ, Taha AA. Effectiveness of distraction therapy on children's pain perceptions during peripheral venous cannulation at pediatric teaching hospital in Erbil City. Erbil Journal of Nursing and Midwifery. 2018;1(2):75-84.
[17] James J, Ghai S, Rao KL, Sharma N. Effectiveness of" Animated Cartoons" as a distraction strategy on behavioural response to pain perception among children undergoing venepuncture. Nurs Midwifery Res J. 2012;8(3):198-207.
[18] Yoo H, Kim S, Hur HK, Kim HS. The effects of an animation distraction intervention on pain response of preschool children during venepuncture. Applied Nursing Research. 2011;24(2):94-100.

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