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### Effect of aquarium therapy on pain during intravenous cannulation among children

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#### Abstract

A quantitative research study with post-test only control group design was conducted at Paediatric Medicine ward of St. John's Medical College Hospital. 34 children were selected between the age group of 3-12 years through purposive sampling technique. At first the data were collected from the control group to avoid contamination. For control group routine procedure was done, during the procedure the video was taken by the investigator later it was scored by a second person. For experimental group prior to the I.V cannulation the investigator narrates the story regarding the aquarium by using an audio recorder according to the subjects language simultaneously intravenous cannulation was done at the same time the investigator had taken video and later it was the scored by a second person. The findings of the study reveal that Experimental group had significant reduction in pain in comparison to control group at  $p < 0.001$ . Hence providing aquarium therapy is an effective method to reduce pain during intravenous cannulation in children.

**Keywords:** Effect, pain, aquarium, IV cannulation

#### Introduction

Children are the most precious assets and they are our investment for the future. Statistics of world population by age and region 2019 shows that 26% of the world population is less than 18 years of age<sup>[1]</sup>. Being tender and vulnerable children who fall sick and undergo hospitalization experience pain and suffering much more than adults. Intravenous cannulation is one such painful procedure commonly experienced by every hospitalized child. The situation becomes frightening and creates a great deal of anxiety for the child. Obtaining a vascular access in children may require multiple attempts and can be stressful for the child, the family as well as the health care providers. For the purpose of relieving pain nurses can use different techniques including distraction like cartoon therapy, play therapy, music therapy, blowing bubbles, watching videos, kaleidoscope, hand held computer games, clown therapy and aquarium therapy<sup>[2]</sup>.

Aquarium therapy is one of the diversional therapies which is used to reduce pain experience in children. The fish tank with different varieties of fishes, plants, back ground sceneries with stones and bubbles which the child can watch and get interested in. Evidence shows that, it has a lot of benefits on both physical and psychological aspects of the individual. It also reduces pain, creates happiness, calmness and also induces sleep. There are not many studies directly related to aquarium therapy in children during intravenous cannulation. So the investigator is interested to study whether aquarium as a diversional therapy has any effect on experienced during intravenous cannulation.

Pain is an unpleasant sensory and emotional experiences associated with actual and potential tissue damage. The fear to painful procedure not only affects the physical condition but also the psychological condition of the children<sup>4</sup>. It is an art to make a companionship with children and divert their mind in a variety way. It will help the nurses to handle the children easily and also saving of the time of attention to pain relief. Diversional techniques should be tailored, depending on the age of the child. Aquarium is one of the effective techniques to divert the mind of the people especially in children. Children are having more interest to see the aquarium and they like to spend a lot of time in front the aquarium

Aquarium therapy is becoming an important diversional therapy so the researcher is interested to study about, how aquarium therapy will help to reduce the pain in children during the intravenous cannulation.<sup>6</sup> Because of the paucity of literature related to aquarium, the investigator added to the studies regarding diversional therapy and pain on cannulation<sup>[3]</sup>.

## Materials and Methods

**Research Approach:** Quantitative Research Approach

**Research Design:** Quasi Experimental (post-test only control group) design sampling technique: Purposive sampling technique

**Sample size:** (17 in each group)

**Setting of study:** Paediatric Medicine Ward of St. John's Medical College Hospital (SJMCH).

**Tool used for data collection:** Following tools were used for the data collection.

**Section A:** Demographic data: It consists of 6 items related to demographic data of participants.

**Section B:** Wong Baker's faces pain rating scale is used to assess the pain

## The procedure of data collection

Formal administrative permission was obtained from the concerned authority and ethical clearance from Institutional Ethics Committee to conduct the study. Written consent and assent were obtained from the parents and children above 7 years respectively. An interview schedule was conducted to elicit the baseline variables. At first, the data were collected from the control group to avoid contamination. For control group routine procedure was done, during the procedure the video was taken by the investigator later it was scored by a second person. For experimental group prior to the I.V cannulation the investigator narrates the story regarding the aquarium by using an audio recorder according to the subjects language simultaneously intravenous cannulation was done at the same time the investigator had taken video and later it was the scored by a second person.

## Results and Discussion

**Section I:** Distribution of baseline variables of both experimental and control groups.

**Table 1a:** Frequency, percentage, Chi-Square, and p-value of baseline variables in Experimental and Control groups according to Age, Gender, Duration of stay in the hospital, Number of Hospitalizations of the child, Relation of attendants, Previous cannulation.

S. No	Baseline data	Experimental Group (n=17)		Control Group (n=17)		Total		#/ Fisher's Exact statistics	P' value
		F	%	F	%	F	%		
1.	<b>Age</b>								
	a) 3-6 years	9	52.9%	7	41.2%	16	47.1%	0.729	0.903 (NS)
	b) 7 – 9 years	4	23.5%	4	23.5%	8	23.5%		
	c) 10 –12 years	4	23.5%	6	35.3%	10	29.4%		
<b>Gender</b>									
2.	a) Male	8	47.1%	9	52.9%	17	100%	0.118#	1 (NS)
	b) Female	9	52.9%	8	47.1%	17	100%		
3.	<b>Duration of the stay in the hospital</b>								
	a) 1 day	9	52.9%	13	76.5%	22	64.7%	2.061#	0422 (NS)
	b) 2days	2	11.8%	1	5.9%	3	8.8%		
	c) 3 days	0	0%	0	0%	0	0%		
d) >3 days	6	35.3%	3	17.6%	9	26.5%			
4.	<b>Number of hospitalisations of the child</b>								
	a) 1 time	10	58.8%	10	58.8%	20	58.8%	1.200#	0.753 (NS)
	b) 2 times	4	23.5%	4	23.5%	8	23.5%		
	c) 3 times	2	11.8%	3	17.6%	5	14.7%		
d) >3times	1	5.9%	0	0%	1	5.9%			
5.	<b>Relation of the attendants</b>								
	a) Mother	11	64.7%	13	76.5%	24	70.6%	0.729	0.838 (NS)
	b) Father	4	23.5%	3	17.6%	7	20.6%		
	c) Care takers	1	5.9%	0	0%	1	2.9%		
d) Others	1	5.9%	1	5.9%	2	5.9%			
6.	<b>Previous cannulation</b>								
	a) Yes	15	88.2%	12	70.6%	27	74.5%	2.615	0.225 (NS)
b) No	2	11.8%	5	29.4%	7	20.6%			

Table 1 shows that, most of 52.9% (9) of children were belong to the age group of 3-6 years in the experimental group whereas 47.2% (7) in the control group. Most 52.9% (9) of the subjects were males in the experimental group and 52.9% (9) were females in the control group. Most 52.9% (9) of children were first day of stay in the hospital in the experimental group whereas 76.5% (13) were in the control group. None of the samples had three days of stay in the hospital in both groups. Number of hospitalisation of the child for Most 58.8% (10) of the samples were first time hospitalized. Whereas 23.5% (4) of the samples in both experimental group and control group were second time hospitalized with 17.6% were belongs to three time hospitalized in control group and least there were

nobody was admitted more than three days of hospitalization in the control group whereas 5.9% (1) in experimental group. Most 76.5% (13) of the samples in the experimental group and 64.7% (11) in the control group were mother attendant. Most 88.2% (15) children in study and 70.6% (12) in control group were previously cannulized.

Homogeneity of the subjects were tested using Chi square / Fisher's Exact test and was found to be statistically non-significant. Therefore, it is concluded that there is no significant difference between experimental and control group in their baseline variables. Hence the groups are comparable.

**Section B:** Comparison of pain scores of children during IV cannulation in both experimental and control group

**Table 2a:** Range, mean, SD, Mean%, Mean difference, t statistic and p' value Table N=34

	Maximum score	Range	Mean	SD	Mean%	Mean difference	T' Statistic	P' value
Experimental Group	10	2-8	4.94	2.015	61.7%	2.59	-3.815	<0.001*
Control Group	10	2-10	7.53	1.940	75%			

\*Significant at <0.001 level

Table 2a shows that the mean pain score in the control group (7.53) is higher than that of the experimental group (4.94). The difference was tested with t 'test and the value of 't' was -3.815 which is significant at  $p<0.001$  level.

Hence the research hypothesis (H1) is accepted, it can be said that aquarium therapy is an effective method to reduce pain during intravenous cannulation in children.

**Table 2b:** scoring of pain level according to categories in both group

		Group		Total N=34	
		Experimental	Control		
Score	Mild Pain 0-2	Count	3	0	3
		% Within group	17.6%	0.0%	8.8%
	Moderate Pain 4-6	Count	11	6	17
		% Within group	64.7%	35.3%	50%
	Severe Pain 8-10	Count	3	11	14
		% Within group	17.6%	64.7%	41.2%
Total	Count	17	17	34	
	% Within group	100%	100%	100%	

Table 2b shows that in the experimental group, most 64.7% (11) has moderate pain whereas in the control group 64.7% (11) has severe pain.

**Section C:** Association of pain scores with selected baseline variables between both group.

**Table 3:** Frequency, percentage, chi-square\Fisher's exact value and P 'value of pain score with baseline.

SL No:	Baseline Data	Experimental Group (N=17)							Control Group (N=17) N=34							P value	
		Frequency			Percentage			#Fisher's exact test	P'' value	Frequency			Percentage				#/ Fisher's exact test
		Mild	Moderate	Severe	Mild	Moderate	Severe			Mild	Moderate	Severe	mild	Moderate	Severe		
1.	<b>Age</b>																
	3-6 years	0	7	2	33%	45.5%	100%	6.113	0.098 NS	0	2	5	0%	33.3%	45.5%	0.981	0.678 NS
	7-9 years	1	3	0	33%	4.1%	0%			0	1	3	0%	16.7%	27.3%		
	10-12 years	2	1	1	33%	45.5%	0%			0	3	3	0%	50.0%	27.3%		
2.	<b>Gender</b>																
	Male	1	7	0	33.3%	63.3%	0%	3.744	0.251 NS	2	7	0	33.3%	63.6%	0%	1.431	0.335 NS
	Female	2	4	3	66.7%	36.4%	100%			4	4	0	66.7%	36.4%	0%		
3.	<b>Duration of stay in the hospital</b>																
	a) 1 day	1	5	3	33%	45.5%	100%	4.579	0.355 NS	0	3	10	0%	50%	90.9%	0.335#	0.099 NS
	b) 2day	1	1	0	33%	4.1%	0%			0	1	0	0%	16.7%	0%		
	c) 3 days	1	5	0	33%	45.5%	0%			0	2	1	0%	33.3%	9.1%		
	d) >3 days	0	0	0	0%	0%	0%			0	0	0	0%	0%	0%		
4.	<b>Number of hospitalisations of the child</b>																
	a) 1time	2	6	2	66.7%	54.5%	66.7%	3.180	1 NS	4	6	0	66.7%	54.5%	0%	0.507	1NS
	b) 2 times	1	2	1	33.3%	18.2%	33.3%			1	3	0	16.7%	27.3%	0%		
	c) 3 times	0	2	0	0%	18.2%	0%			1	2	0	16.7%	18.2%	0%		
	d) >3times	0	1	0	0%	9.1%	0%								0%		
5.	<b>Relation of the attendants</b>																
	a) Mother	3	6	2	100%	54.5%	66.7%	3.974	0.904NS	0	4	9	0%	66.7%	81.8%	1.953	0.688NS
	b) Father	0	3	1	0%	27.3%	33.3%			0	2	1	0%	33.3%	9.1%		
	c) Care takers	0	1	0	0%	9.1%	0%			0	0	0	0%	0%	0%		
	d) Others	0	1	0	0%	9.1%	0%			0	0	1	0%	33.3%	9.1%		
6.	<b>Previous Cannulation</b>																
	a) Yes	21	11	2	66.7%	100%	66.7%	4.156	0.110NS	0	2	9	0%	33.3%	81.2%	3.996	0.109NS
	b) No		0	1	33.3%	0%	33.3%			0	4	2	0%	66.7%	18.2%		

NS- non significant

Table 3 shows that there is no significant association between pains with selected baseline variable.

Table 3 shows that there is no significant association between pain with selected baseline variables such as, relation of the attendants, previous Cannulation in both experimental and Control group. Hence the research hypothesis (H2) is rejected, at 0.05 level of significance.

**Discussion**

Discussion related to description of baseline variables of children during intravenous cannulation both experimental and control group.

In the present study, 34children belonged to the age group of 3- 12 years and underwent IV cannulation in the paediatric medicine ward. In the present study majority of

the children (47.1%) belonged to the age group of 3-6 years in both groups. These findings were supported by a study done in Bangalore that also involved majority of children (51.7%) in the age group of 3-6 years in both groups.

In the current study, in terms of gender, majority (47.1%) children were males in the experimental group and (52.9%) in the control group were females. These findings are similar to a study conducted in the Puducherry, where majority of the children (50%) were males experimental group and (45%) were females. While considering the presence of attendants most of the children (70.6%) had the mother as an attendant in both groups. Study findings showed that majority of subjects (50.5%) had mother attendant in both groups.

The present study showed that most of the children (79.4%) had previous experience of cannulation. Similar study conducted in Uttarakhand showed that (75.36%) had previous hospitalization. These findings were similar to the current study.

While discussing on duration of stay in the hospital, most (64.7%) of the children were in the 1<sup>st</sup> day of stay in the hospital and number of hospitalisations of the children most (58.8%) of them were first time hospitalised. There was no supporting study found regarding these variables for the association.

To determine the homogeneity of two group variables, Chi square / Fisher's Exact test was used and homogeneity was found to be statically non-significant. Therefore, it was concluded that there is no significant difference between experimental and control group in their baseline variables, hence both groups are comparable.

#### **Comparison of pain scores of children during intravenous cannulation both experimental and control group**

In the present study aquarium was used as a method to reduce pain among children during IV cannulation because of its simple method of administration and acceptability by the paediatric population.

The analysis of present study results reveals that the mean pain score of the experimental group is lower than the mean pain score of control group. The statistically significant difference was tested with T' test statistics and the value of independent t' test was -3.813 and which was found to be significant at  $p < 0.001$  level. In the present study found that there is significant difference in the pain level in the both group (64.7%) had moderate pain in the experimental and (64.7%) had severe pain in the control group.

No studies were found where aquarium was used as a distraction therapy. However, the findings of the current study was supported by the current evidence that different diversional methods such as cartoon therapy, play therapy, music therapy, blowing bubbles, watching videos, kaleidoscope, hand held computer games, clown therapy, enhances positive procedure related outcomes and is an effective method to block's attention from painful procedures. Similar studies conducted in Kochi to assess effectiveness of cartoon-based video have been done in the same context to reduce pain associated with IV cannulation, all of which have reported a significant reduction in pain compared to the control group in children [15, 17, 19, 21]. The result of the present study was in accordance with the previous findings, which proved aquarium as an effective method for pediatric IV cannulation.

These findings were supported by a study conducted in Uttarakhand revealed that the effectiveness of diversional activity on pain. The mean post interventional pain score

and standard deviation of children in experimental group was 4.5 whereas in control group it was 9.1 and t' value 5.54 which was found to be statistically significant at  $p < 0.05$  level of significance [17].

Another similar study conducted in Puducherry to assess the effectiveness of Buzzy during IV cannulation also showed that mean pain score in the experimental group was 2.6 and in the control group 7.6 standard deviation 5 and t' value 6.01. There is a significant difference in the mean average pain score which was found to be statistically significant at  $p < 0.001$  level [18].

A study, cartoon based diversional therapy conducted in Bangalore revealed that the mean post interventional pain score and standard deviation of children in experimental group was 2.60 +1.9 whereas in control group it was 3.17+-2.79 and t' value 2.79 which was found to be statistically significant at  $p < 0.05$  level of significance [19].

The findings were supported by a study conducted in Coimbatore to assess the effectiveness of computer based diversional therapy which showed that the level of pain scores regarding pain during venipuncture procedures among preschool children was 14.78 in experimental group and 18.82 in control group respectively. The mean difference was 4.04. The experimental groups mean level of pain score is lower than the control group. The independent t' value was 5.5. This was significant at  $p < 0.001$  level [22].

Hence the research hypothesis (H1) is accepted, it can be said that aquarium therapy is an effective diversional technique to reduce pain during intravenous cannulation in children. Henceforth it is recommended that the choice of selecting the right intervention should be based on research evidences.

#### **Association of pain scores with selected baseline variables.**

Association of pain scores with selected baseline variables showed that there is no significant association between pain among children during intravenous cannulation in both the groups with selected baseline variables.

The findings of the present study is supported by similar findings in a study conducted in Puducherry to assess the effectiveness of buzzy, to determine the association of age, sex, Number of hospitalisation of the child, previous cannulation with level of pain was found to be statistically non-significant at  $p < 0.05$  level of significance [18].

A study conducted in Bangalore to assess the effect of cartoon based diversional therapy, to determine the association of Duration of stay in the hospital, previous cannulation, Relation of the attendants, with level of pain was found to be statistically non-significant at  $p < 0.05$  level of significance [19].

A study conducted in Uttarakhand to assess effectiveness of diversional therapy showed there was no significant association between post interventional, previous experience of cannulation, presence of care giver at  $p < 0.05$  level of significance [17].

The findings of the study on association helped the investigator to identify that pain perception is a subjective feeling and is perceived differently in different manner by different people. Hence the Hypothesis two is rejected.

#### **Conclusion**

The overall finding of the present study concluded that aquarium therapy is an effective diversional method to reduce the pain during intravenous cannulation. The present study also concluded that aquarium therapy is an effective, easy, economical, non-pharmacological method to reduce

pain during intravenous cannulation in children. Hence the aquarium therapy is one of the diversional strategies significantly effective in reducing pain during intravenous cannulation. There are many studies related to aquarium therapy in adult in different areas of health care settings but there is no study done related to in children.

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### Reference

1. <https://www.statista.com>stastitics>.
2. Kou HC, Pan HH, Queedy DK, Tsaoy. Distraction Based Interventions For Children Undergoing Venipuncture Procedures. A randomised control study. *clin Nurs Res*. 2018;27(4):467-82.
3. Pokhaker O. The Aquarium Therapy: Positive effect of fish-Keeping on Health and Life. *International journal of Life Sciences research*. 2015 Jun;3(2):46-59.
4. Merkel S. FLACC Scale. A behavioural scale post operative pain in young children. *Paediatric Nurse*. 1997;23(3):293-297.
5. <https:// www.ncbi.nlm.nih.gov>pmc>
6. Stephen B, *et al.* Walls & Melzack's Text book of pain. 6<sup>th</sup> edition. New Delhi: Elsever publication, 2018, 8-10.
7. Clements H. *etl.* The effect of interacting with fish in aquarium on human health and well-being: A systematic review. *PLOS/ ONE*. 2019;14(7):1-36.
8. Melzack R, Wall P. Pain Mechanisms; A New Theory. *Science*. 1965;150(3699):171-179.
9. Cabalant N, Ajan F, Sevil. The effectiveness of external cold and vibration for procedural pain relief during peripheral intravenous cannulation in paediatric patients. 2015;6(1):33-39.
10. Farion KJ, *et al.* The effect of Vapocoolant spray on pain due to intravenous cannulation in children A randomised control trial. *Canadian medical association journal*. 2018 Jul;9(1):31-36.
11. Satchi NS, Perdita MH, Sankar J. Pain Perception of Children during Venipuncture. *International Journal of Advance Research, Ideas and Innovations in Technology*. 2017;3(6):1006-1008.
12. Bisogni S, *et al.* Perception of venipuncture pain in children suffering from chronic diseases. *Biomed central*. 2014;7(1):735-739.
13. Movahedi AF, *et al.* Effect of local refrigeration prior to venipuncture on pain related responses in school age children. 2007 Feb;24(2):51-55.
14. Cabalant N, Ajan F, Sevil. The effectiveness of external cold and vibration for procedural pain relief during peripheral intravenous cannulation in paediatric patients. 2015;6(1):33-39.
15. Chitra P, Sinu MS, Simon V. Effective of distraction technique on pain relief during intravenous cannulation among school children in selected paediatric ward at AIMS Kochi, Pondicherry. *Journal of Nurs*: 2014 Apr;7(1):29-33.
16. Hasanpour M, Tootoonchi, Yadegarfar G. The effects of two non-pharmacologic pain management methods for intra muscular injection pain for children Iran. *Article in acute pain*. 2006;8(1):7-12.
17. Singh S, *et al.* Effectiveness of diversional activity on pain and anxiety during venipuncture among children in a selected hospital Dehradun, Uttarakhand. *Paediatric and Therapeutic*. 2017;7(4):2161-0665.
18. Chandrakala S, Sumathy P, Dr. Renuka K. The effectiveness of buzzy techniques on pain relief during intravenous cannulation among children admitted in paediatric ward at MGMCRI, Puducherry. *International journal of Applied Research*. 2019;5(6):404-407.
19. Shrestha R, Jeneta BJ. A study to evaluate the effectiveness of cartoon based diversional therapy on pain during intravenous medication among preschooler in selected hospital Bangalore. *IJHSR Internal Journal of Health Sciences and Research*. 2018;8(11):185-193.
20. Lal MK, MC Clelland J, Phillip'S J, Taub NA, Beattie RM. Comparison of EMLA cream vs placebo in children receiving distraction therapy for venipuncture. *Acta Paediatrica*. 2001;90(2):154-159.
21. Vessy JA, Carlson, Mc Gil J. Use of distraction with children during an acute pain experience. *Nursing research*. 1994;43(6):369-37.
22. Nagomi D. A study to evaluate the effectiveness of cartoon movie on pain perception among schoolers undergoing IV cannulation in selected hospital at Coimbatore. Unpublished masters in nursing dissertation submitted to Dr. M. G. R. Medical University, Chennai; c2012.
23. Cohen JE LL. A comparison of distraction strategies for venipuncture distress in children. *J Pediatr Psychol*. 2005;30(5):387-96.
24. Kim Cavender, *et al.* Parents' Positioning and Distracting Children during Venipuncture. *Journal of holistic nursing*. 2004 Mar;22(1):32-56.
25. Gamze Inan, Sevil Inal. Turkish children loved distraction: using kaleidoscope to reduce perceived pain during venipuncture. 2009 Aug;18(15):2180-6.
26. Francesca Anastasia. Interactive music as a treatment for pain and stress in children during venipuncture: a randomized prospective study. 2007 Nov;28(5):399-403.
27. Biermeie AW, *et al.* Effects of Distraction on Pain, Fear, and Distress during Venous Port Access and Venipuncture in Children and Adolescents with Cancer. 2007 Jan;24(1):8-19.
28. Girgin BA. Reducing Pain and Fear in Children During Venipuncture: A Randomized Controlled Study. 2019 Sep;21(3):276-282.
29. Ozkan TK. The Effect of Virtual Reality and Kaleidoscope on Pain and Anxiety Levels During Venipuncture in Children. November 2020;35(2):206-211.
30. Canbulat-Şahiner N, Demirgöz-Bal M. The effects of three different distraction methods on pain and anxiety in children. 2015;20(3):277-285.
31. Sahiner NC. Efficacy on procedural pain and anxiety of distraction method by applying distraction cards and kaleidoscope in children. *Asian Nursing Research*. 2014;8:23-28.