

Comparative evaluation of the impact of two different distraction strategies as a non-pharmacological anxiolytic among hospitalized children.

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Abstract

Background: Non-pharmacological anxiolytic distraction methods are extensively supported for their role in reducing anxiety; stress in hospitalized children. However, there is limited scientific evidence identifying the most suitable distraction strategy, especially in an Indian set-up.

Objective: To perform a comparative evaluation of the impact of two different distraction strategies as a non-pharmacological anxiolytic among hospitalized children.

Methodology: In this prospective study, 120 hospitalized children of either sex, satisfying the inclusion criteria were included. Three different treatment groups created: animated cartoon video group (ACV/ n = 40), distraction card therapy (DCT/ n= 40) and control group (n= 40). ACV and DCT was administered for 20 minutes in their respective groups during the vital signs' procedure, and anxiety was assessed before, during and after the 5 min of procedure by using modified child faces anxiety scale (Wong-Baker FACES). The routine procedure was done on control group without giving them the intervention. $P < 0.05$ was considered significant.

Results: Most patients were in the age group of 3-6 years, with a male predominance (53.75%) (Male: Female=0.67:0.57). Significant difference was noted in the post-test anxiety scale test score between ACV and control group, DCT and control group ($p < 0.001$), with high post-test score noted in the control group. Slightly high mean test score noted in the DCT group (6.8) than ACV group (5.5), but non-significant. Majority of children in the age group of 3-6 years had moderate anxiety levels in the ACV group ($p = 0.01408$) and DCT group ($p = 0.0316$) indicating their significant association with age group.

Conclusion: ACV is a more effective non-pharmacological intervention than DCT, for decreasing the anxiety levels in paediatric inpatients.

Keywords: Anxiety, Anxiety disorder, Child, Test anxiety scale, Vital signs.

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Introduction

Hospitalization can engender notable stress and anxiety among large pediatric population and thus is an important public health issue [1]. Various medical procedures, especially the one involving a needle, are the one of the most common sources of anxiety, stress and pain among children [2].

Distress among children due to short term hospitalization could compromise the completion of their desired medical procedure. On the other hand, stress related with long-term hospitalization of children could cause aggression and regression in behaviour, non-cooperation and delay in recovering from the procedure [3,4]. Depending on their age, sex, level of development, temperament, cause of hospitalization, sociocultural factors, and past pain experiences, the response of a child to anxiety and stress might vary [5,6]. Pain management includes pharmacological and non-pharmacological approaches. Non-pharmacological approaches include distraction activities such as singing, reading, or playing a game. The benefits of using non-pharmacological methods include decreased pain, distress, and anxiety reported by the parent, child, and/or observer. Pain management includes pharmacological and non-pharmacological approaches. Non-pharmacological approaches

include distraction activities such as singing, reading, or playing a game. The benefits of using non-pharmacological methods include decreased pain, distress, and anxiety reported by the parent, child, and/or observer. Anxiety and stress associated with hospitalization could be managed by two approaches: pharmacological and non-pharmacological [7]. Pharmacological approach involves the utilization of drugs to relieve stress, anxiety and pain. However, pharmacological approaches have certain disadvantages that limit their long-term usage, viz. the potential development of hyperalgesia and tolerance, possible central nervous system (CNS) and gastrointestinal side effects in small children, high cost, etc. [8]. Non-pharmacological approaches include various distraction activities for the children and thus are cost-effective and safe. They help in decreasing distress, pain and anxiety reported by the child during hospitalization [9].

Distraction is the most commonly used non-pharmacological method used for stress and pain relief in hospitalized children. It is an attempt that focuses on diverting the attention of children on any other stimulant so as to reduce and control the level of stress [10]. It works on the principle of limited ability of the brain to focus its attention on stimulation. Various ways

are followed for performing distraction method viz. party blowers, watching cartoons, audio-visual games, distraction cards, listening to short stories etc. [11]

Studies related to comparison of two or more non-pharmacological techniques for anxiety and stress management among hospitalized patients are rarely published and in published ones also the distraction methods are not significantly compared, especially in Indian set up [12,13]. To fill this lacuna, we performed a comparative evaluation of the impact of two different distraction strategies as a non-pharmacological anxiolytic among hospitalized children.

Methods and Materials

Study design

This multicentre, prospective, cross-sectional, evaluative and descriptive study was conducted in the Department of Paediatrics, at selected five tertiary care hospitals in Kolhapur, (Maharashtra) over a period of one month (15/02/2020 up to 15/03/2020), with the institutional ethics committee approval (DYPMCK/266/2020/IEC). Written informed consent was obtained from the parents of all the children included in the study.

Sample size

The sample size calculation was based on T-Test and following formula was used [14]:

$$n = \frac{[Z_{\alpha} + Z_{\beta}]^2}{E^2} * 2 * \sigma^2$$

Where, $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (e.g., for a confidence level of 95%, α is 0.05 and the critical value is 1.96), Z_{β} is the critical value of the Normal distribution at β (e.g., for a power of 80%, β is 0.20 and the critical value is 0.84), σ^2 is the population variance, and E is the effect size.

Here we take, $Z_{\alpha/2} = 1.96$; $Z_{\beta} = 0.84$; $\sigma^2 = 0.07$; $E = 0.10$

Applying these values in the formula, we get $n = 109$. The approximate sample size was taken as, $n = 120$.

Selection criteria

One hundred and twenty children of either sex aged between 3-12 years, admitted in the pediatric ward of the study hospitals, whose parents were willing to give consent and who were able to understand Marathi, Hindi or English, were included in the study. Children, who were critically ill, treated as outpatients, had vision and hearing issues (blind and deaf), on anxiety reducing drugs, were excluded from the study.

Study assessment tool

Selection and development of the tool was done based on the study, after an extensive review of literature; referring the books and journal as well as discussion with the guide and experts. Questionnaire on selected socio demographic data and Modified Child Faces Anxiety Scale was used to evaluate the effectiveness of two different distraction strategies on anxiety level of hospitalized children of pediatric ward of selected hospitals. The tool consisted of following sections:

Section A: Selected socio demographic data

It consisted of ten items for obtaining information about the selected background factors such as age in year, gender, habitat, no of sibling, age of mother, age of father, etc.

Section B: Modified child faces anxiety scale (Wong-Baker FACES) [15].

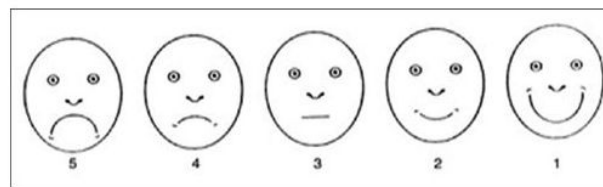


Figure 1. Modified child faces anxiety scale (Wong-Baker FACES) 1= Relaxed / Not worried; 2= Very slightly worried; 3= fairly worried; 4= Worried a lot; 5= Very worried.

The interpretation of total anxiety scale score (before, during and after the procedure) was performed on following basis:

- Mild anxiety - (0-5)
- Moderate anxiety - (6-10)
- Severe anxiety - (11-15)

Validity of tool

The tool was validated by 14 experts among which 9 were specialized in Child Health Nursing, 2 were statisticians and 3 were Head of the Departments of Pediatric Department of tertiary care study hospital. After considering the suggestion of the guide, certain modifications were done in the tool and the tool was modified and finalized. The percentage of agreement between content validations was 98%. The content validity index (CVI) across the experts rating for relevance for each item was calculated. A CVI score of 0.80 indicates good content validity. The CVI for total instrument was found 0.99.

Data collection

The pre-assessment was done by using selected socio-demographic data. Anxiety was assessed by using modified child faces anxiety scale in ACV, DCT and control groups. ACV and DCT was administered for 20 minutes in their respective groups during the vital signs' procedure, and anxiety was assessed before, during and after the 5 min of procedure by using modified child faces anxiety scale (Wong-Baker FACES) (Wong-Baker FACES Foundation, 2016).¹⁵ The routine procedure was done on control group without giving

them the intervention and anxiety was assessed before during and after the 5 min of vital sign procedure by the same scale.

Statistical analysis

Software R version 3.6.0. was employed to analyse the data. The categorical variables were presented as frequency and percentages. Other data was presented as mean \pm standard deviation (SD). Unpaired t test was used to compare the effectiveness and Mann-Whitney-U test was performed to determine association. Qualitative variables were analysed using chi-square test of independence. Data was considered statistically significant when $P \leq 0.05$.

Table 1: Comparison between post-test anxiety score in ACV and control group.

Group	Post-test anxiety score			p-value ^U
	Mean	Standard Deviation	Median	
ACV	5.5	2.81	4	9.18E-10
Control	11.13	3.12	12	

ACV: animated cartoon video; U: Mann-Whitney-U Test

A highly significant difference was noted in the post-test anxiety scale test score between ACV and control group ($p < 0.001$), with high post-test score noted in the control group as

compared to ACV group (Table 1). This stipulates that the children in ACV group had mild anxiety level as compared to control group which showed severe anxiety levels.

Table 2: Comparison between post-test anxiety score in DCT and control group.

Group	Post-test anxiety score			p- value ^U
	Mean	Standard Deviation	Median	
DCT	6.8	3.16	7	0.000000359
Control	11.13	3.12	12	

DCT, distraction card therapy; U: Mann-Whitney-U Test

A highly significant difference was noted in the total anxiety scale test score between DCT and control group ($p < 0.001$), with high mean test score noted in the control group as compared to DCT group (Table 2). This stipulates that the

children in DCT group had moderate anxiety level as compared to control group which showed severe anxiety levels.

Table 3: Comparison between post-test anxiety score in DCT and ACV group.

Group	Post-test anxiety score			p- value ^U
	Mean	Standard Deviation	Median	
ACV	5.5	2.81	4	0.05325
DCT	6.8	3.16	7	

ACV: animated cartoon video; DCT, distraction card therapy; U: Mann-Whitney-U Test

No significant difference was noted in the total anxiety scale test score between DCT and ACV group ($p > 0.05$), with slightly high mean test score noted in the DCT group as compared to ACV group (Table 3). This stipulates that some

children in ACV group had mild anxiety level as compared to DCT group which showed moderate anxiety levels but the difference was insignificant.

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Table 4: Association between ACV post-test anxiety score and age group.

ACV post-test anxiety score interpretation	Age group (in years)		p – value ^c
	3 to 6 (N=20) n (%)	6 to 12 (N=20) n (%)	
Mild	5 (25)	14 (70)	0.01408
Moderate	14 (70)	5 (25)	
Severe	1 (5)	1 (5)	

ACV: animated cartoon video; c: chi-square Test; n (%), number (percentage)

A significant association was noted between different age groups and their ACV anxiety post-test score ($p < 0.05$) as majority of children in the age group of 3-6 years had moderate

anxiety levels and majority of children in the age group of 6-12 years had mild anxiety levels (Table 4).

Table 5: Association between DCT post-test anxiety score and age group.

DCT Post-test anxiety score interpretation	Age group (in years)		p – value ^c
	3 to 6 (N=20) n (%)	6 to 12 (N=20) n (%)	
Mild	8 (40)	6 (30)	0.0316
Moderate	10 (50)	9 (45)	
Severe	2 (10)	5 (25)	

c: chi-square Test; DCT, distraction card therapy; n (%), number (percentage)

A significant association was noted between different age groups and their DCT anxiety test score ($p < 0.05$) as majority of children in the age group of 3-6 years as well as 6-12 years

had moderate anxiety levels (Table 5). This stipulates that the toddlers and young children, both are more prone to anxiety and comparatively less affected by DCT intervention.

Table 6: Multiple comparison of anxiety test score between groups.

Comparison groups	p – valued
ACV - CG	< 0.0001 *
ACV - DCT	0.1033
CG - DCT	< 0.0001 *

ACV: animated cartoon video; CG, control group; DCT, distraction card therapy; d, Dunn-test; *, significant

A significant difference was noted between anxiety test score of ACV and CG as well as between DCT and CG ($p < 0.001$) (Table 6). This indicates that as compared to control group, both ACV and DCT intervention groups showed improved anxiety scores.

Discussion

Hospitalized children routinely confront anxiety and fear, especially while encountering a medical procedure. Therefore, reducing preprocedural anxiety among such children is essential to improve outcomes for both children and their parents.¹⁴ Non-pharmacological approaches are such approaches which are utilized to reduce preprocedural anxiety in children.⁹ Hence, the present study performed a comparative evaluation of the impact of two different non-pharmacological

anxiolytic distraction strategies viz. ACV and DCT among hospitalized children.

A significantly high post-test anxiety score was noted in the control group as compared to ACV intervention group in the present study. This is in accordance with the study conducted by Maharjan et al (2017),¹³ as the post-test anxiety and pain score were more in the control group (9.43) as compared to experimental (ACV) group (6.63) which was significant ($p < .038$).¹³ Among various non-pharmacological therapies, animated cartoon videos help children in focusing their attention to other stimuli and thus could be an effective therapy for reducing anxiety and any pain before or during any medical procedure [16].

When compared with the DCT intervention group, the control group showed significantly high post-test anxiety score as was

shown with ACV group. Similar results were observed by Sahiner and Bal (2016) in their study on non-pharmacological intervention with distraction card therapy. In their study the distraction card group had lower pain levels (2.33 ± 3.24) as compared to the control group (4.53 ± 3.23) showing significant difference ($p < 0.047$) [17]. The argument for the pain and anxiety reducing effects of distraction therapy via cards is the hypothesis targeting the limited ability of the brain to focus attention on stimulation [18]. If resources of attention are redirected to focus on a diverting task, then the brain gets diverted from anxiety or pain stimulation. It has also been advocated that distraction amends agonizing and anxiety responses by stimulating an internal pain suppressing system [19, 20].

Some children in ACV group had mild anxiety level as compared to DCT group which showed moderate anxiety levels but the difference was insignificant. This is in accordance with the study findings by Oliveira et al (2017) as the audio-visual distraction was significantly better effective than the card distraction therapy for reducing the stress and anxiety level due to fear of pain among children undergoing surgical treatment ($p < 0.048$).²¹ Audio-visual distraction viz. animated cartoon videos are noted to reduce the impression of pain intensity among children during painful acute procedures in routine clinical practice due to attractive visual and audio coordination which helps in diverting children brain towards a good stimulus [22].

Different age groups of children and their ACV and DCT post-test anxiety scores showed significant association with each other as toddlers and very young children (3-6 years) were noted to be more prone to anxiety and comparatively less affected by DCT than ACV intervention. While the children in the age group between 6 to 12 years were more positively affected by both the non-pharmacological interventions. This is in line with the study findings by Aydin et al (2017) which showed association between age group and various non-pharmacological interventions which was also significant ($p < 0.032$).¹⁸ During the preschool period (3-6 years), children are full of imaginative thinking and curiosity. They usually consider all objects to be alive which leads to the development of their self-centered perspective. Due to their undeveloped sense of body integration at this age, children might fear any clinical intervention, medications or injections. This factor, as well as castration anxiety, make them initially repulsive towards any intervention (Sahiner and Bal, 2016).¹⁷ Further, the rightful selection of a distraction that positively attracts a child's attention and is also age appropriate, is very important [12].

The presented study is, however, subject to some limitations. The comparison between pre-test and post-test anxiety score was not performed. Further, there was no subgroup analysis based on the type of treatment which the children were undergoing due to hospitalization, which could have highlighted that whether it was more or less affected by the intervention. Future studies are obligatory to do additional research for investigating the effect of non-pharmacological interventions on children with specific medical conditions.

Conclusion

The present study further contributes to the literature regarding the effects of two important non-pharmacological interventions viz. ACT and DCT for anxiety management among hospitalized children. The comparative analysis indicate that ACT is a more powerful and effective non-pharmacological intervention as compared to DCT, for decreasing the anxiety levels in paediatric inpatients.

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