

Play Intervention Applied to Hospitalized Children: Effects on Anxiety and Medical Fear

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ABSTRACT

OBJECTIVE: To ease the anxiety and medical fear before intravenous cannulation or blood collection procedures among hospitalized children.

METHODOLOGY: This study employed a pre-test, post-test quasi-experimental design during June to August 2023 from the hospital paediatric medicine ward. Sixty school-aged children (**aged 6-12**) were chosen through purposive sampling. The control group's data was collected first, followed by a play intervention for the experimental group. Both groups were similar in size. Baseline data on children and parents was gathered using the State-Trait Anxiety Inventory and the Children's Fear Scale.

RESULTS: The children participating in the intervention had a mean age of 9.23 ± 1.65 . Notably, a significant portion of both groups experienced respiratory illnesses, with a higher prevalence observed in the control group (33.3%) compared to the intervention group (26.6%). A three-day play intervention significantly improved outcomes for hospitalized children ($p < 0.001$). It helped them manage anxiety both in the general sense (trait anxiety) and specifically related to medical procedures ($p < 0.001$) such as inserting intravenous catheters (IVs) or drawing blood. The study also found a strong correlation between a child's overall anxiety level and their anxiety around medical procedures ($r = 0.49, p = 0.000$).

CONCLUSION: Play intervention had a positive impact on state anxiety, trait anxiety and fear about intravenous cannulation or blood collection procedures. Pediatric nurses and parents working together to incorporate play is one of the most important aspects of a child's hospitalization. This approach focuses on improving health outcomes by making play a part in the healing process.

KEYWORDS: State anxiety, Trait anxiety, Medical fear, Intravenous cannulation, Blood sample

INTRODUCTION

Being in the hospital can be scary and overwhelming for children¹. The unfamiliar sights, sounds, and routines, along with medical procedures they might not understand, can lead to a mix of emotions like anger, confusion, anxiety, and feeling of control². High stress levels can make it harder for children to manage medical treatments and can lead to resistance during procedures while they are in the hospital³; this can harm their physical and mental health⁴.

Engaging in games is critical for children's healthy mental and physical growth. It's also enshrined in law as a right they hold⁵. Furthermore, play serves as a vital communication tool during childhood⁶. Play is widely recognized as crucial for normal childhood growth and development⁷. Studies have shown that play interventions can benefit children in several ways⁸. They can help prepare children for hospitalization and upcoming procedures⁹, improve their understanding of what's happening¹⁰, and provide a distraction during painful procedures¹¹. Research is crucial to fully understanding the impact of hospital play interventions¹². Specifically, studies are needed to explore how play activities can effectively reduce the emotional stress experienced by children in hospitals¹³.

Florence Nightingale, a pioneer of modern nursing, recognized the importance of play for children's well-being even in a hospital setting. She believed healthcare providers should actively foster a therapeutic environment for young patients¹⁴. While Erik Erikson's work focused on child development stages, Florence Erikson, a nurse, pioneered research on play interventions for hospitalized children. Her studies showed that play helped children express their emotions about the hospital environment and cope with medical procedures^{16,17}. She discovered that when children are allowed to play with medical equipment, it makes it simpler to communicate their sentiments about being in the hospital¹⁸.

Researchers have explored using play interviews and dolls to help hospitalized children cope with invasive medical procedure¹⁹. Studies have also investigated anxiety levels in hospitalized children, finding that trait anxiety can manifest as daily hospitalization anxiety²⁰. Hospital environments can trigger temporary anxiety in patients, often referred to as state anxiety²¹. This is distinct from general anxiety levels (trait anxiety), and because the difference isn't consistently recognized, state anxiety in hospitals can go unaddressed²².

Children with higher levels of anxiety before hospitalization tend to experience more stress and have more difficulty coping. This is because they may perceive hospitalization as a more threatening experience²³. Studies have shown that hospital play interventions can help children cope with hospitalization by reducing fear, upset behaviors, and post-hospital adjustment problems. These interventions can also improve cooperation during a child's hospital stay²⁴.

Hospitalization can be a highly stressful experience for children, leading to anxiety, fear, and emotional distress. Mitigating this psychological stress is crucial for promoting well-being and optimizing recovery. Evidence-based practices (EBPs) offer a structured approach to achieving this goal. However, the successful implementation of EBPs hinges on rigorous empirical research. The objective of the current study is to investigate the association between hospitalization and both state and trait anxiety, as well as medical fear among medical illness children.

METHODOLOGY

The researcher and nurse research assistant adopted the non-randomized purposive sampling technique to recruit the first thirty participants from the control group and observe the standardized care provided in the hospital. A play intervention was structured for another thirty participants after the completion of the control group. The study included hospitalized children aged 6–12 years, including those hospitalized for medical illnesses including respiratory, gastrointestinal, genitourinary, endocrine, hematological, and musculoskeletal disorders. A minimum of three days of hospitalization and an age-appropriate grade are required to respond to the questionnaire with parents. Those who had any physical or psychological conditions such as mental retardation, blindness, deafness, or mental illness, like children with behavioral problems or critical illnesses admitted to pediatric intensive care units with the need for special care, were not included in the study.

Setting

The study was conducted in play and treatment rooms of pediatric wards at Yenepoya Medical College Hospital, Karnataka, India.

Description of the intervention

Hospitalized children were recruited from the paediatric medicine ward for three days of hospitalization from June to August 2023.

The researcher structured play sessions as follows:

Picture book: This play was administered within one hour of hospitalization through pictures of the pediatric ward, including the physical setup, facilities available, ward routines, personnel working in the ward, their responsibilities, and hospital policy. This play session helped to orient and make the child and parents understand hospital policy, routine, and medical procedures, as well as to provide children with a²⁵ sense of control over threatening events and help to clarify their misconceptions.

Distraction play: A buzzy device is used as a distraction technique during IV cannula insertion or blood collection procedures. It is a vibrating reusable plastic device that looks like a bumblebee. It provides vibration and cold therapy and diverges during intravenous cannula insertion. It is placed 5–10 cm away from the proximal to the dorsum of the IV insertion hand site. The researcher allowed the parents and child to hold the device before placing the system at the site²⁶. Children were encouraged to concentrate on the sensation of a buzzy device instead of looking at the cannula.

Age-appropriate puzzle: This play session was planned for two days on days two and three of hospitalization, with an interval of 30-45 minutes. Age-appropriate puzzles like E-Jigsaw puzzles are provided through computer tablets. The children are encouraged to choose the puzzles of their interest and solve them. It was carried out when children were free from any medical procedure or treatment. It helped to improve problem-solving skills, increase focus, and divert energy positivity during hospitalization anxiety and fear.

Play for health promotion: A board game designed to teach concepts regarding healthy diet, sleep and rest, exercise and activity, dental problems, injury prevention, and anticipatory guidance to school-age children and their parents. This play session with parents and child for 15 minutes helped them understand their role in health promotion and positively affect health behaviour of school-age children.

Data collection: Children's state, trait anxiety and medical fear were assessed before and after the introduction of a play intervention during a three-day hospitalization. The data collection included demographic characteristics of the child, including age, gender, class of study, diagnosis, and procedure undergone. Parent characteristics include age, relationship with the child, previous history of hospitalization, education, and employment status. **Strait Trait Anxiety Inventory:** It comprises 20 state and trait anxiety statements⁶. This scale ranks each answer using three points (1, 2, or 3). Possible scores on the STAIC S-Anxiety and T-Anxiety subcategories range from 20 (lowest) to 60 (highest)⁸. The **Child Medical Fear Scale (CMFS)** is a 17-item self-report tool that assesses a child's anxieties related to medical experiences. Each question uses a 3-point scale where higher scores indicate greater fear. Scores range from 0 to a maximum of 51, with lower scores reflecting less fear of medical settings and higher scores suggesting greater fear. The **Children's Fear Scale (CFS)** utilizes six images depicting varying degrees of fear. This approach allows children to easily communicate their anxiety by selecting the face that best reflects their feelings. The first face shows no fear. The next one displays a hint of apprehension, which gradually intensifies until we reach the face on the far right, contorted in utter terror.

Data analysis

The researchers employed descriptive statistics to profile the children and parents in the study. They utilized the chi-square test for homogeneity to assess if the intervention and control groups were similar in composition. The researchers employed non-parametric tests to analyze their data. The Friedman Rank ANOVA was used to determine differences in state anxiety, trait anxiety, and medical fear among the study groups. The Mann-Whitney U test compared these measures between the intervention and control groups. Dunn's test with Bonferroni's correction was employed to identify specific group mean differences.

Ethical consideration: Written approval for the study was obtained from the ethical committee of the Yenepoya, which is deemed to be a university in India. Consent from all the parents and permission from the children were obtained before data collection. The nature and purpose of the study were explained to the participants through a participant information sheet, and written informed consent was obtained from all participants. Participation in the study was voluntary, and participants were informed of their right not to participate if they did not want to participate and the right to withdraw from the study at any point.

RESULTS

The demographic characteristics of the sixty participants' mean children age was 9.23 ± 1.65 . In the intervention, the majority (46.7%) were females; in the control group, 50% were males, and the other half were females. Most (40%) of the children in the control group were in grade 5. In contrast, the intervention group had more children (20%) across grades 2, 3, and 4. The majority of children in both the intervention group (26.6%) and the control group (33.3%) were diagnosed with RTI. The majority of children in both the intervention group (76.7%) and the control group (90%) underwent an IV cannulation procedure. The demographic characteristics of parents showed the majority (40%) of the parents in the intervention group are 26–30 years old and 31–35 years old, whereas the majority (40%) in the control group are 26–30 years old. The mean age of parents is 31.18 ± 4.39 . Most parents in the intervention (90%) and control groups (100%) were mothers. The majority (73.3%) and (60%) were in both groups and experienced family members hospitalization. In the intervention group, the majority (46.6%) are educated at the primary level, whereas the majority (33.3%) in the control group are educated at the primary and high school levels. Most parents in the intervention (50%) and control group (43.3%) were housewives.

Table I shows the group mean score of state anxiety of children in the control group on Day 1 (51.23 ± 3.22), Day 2 (49.13 ± 3.13), and Day 3 (36.27 ± 2.93), and intervention group Day 1 (53.90 ± 1.53), Day 2 (35.97 ± 2.28), and Day 3 (21.47 ± 2.11). The Friedman test value of state anxiety in the control and intervention groups showed that the difference was statistically significant ($p < 0.001$). The mean scores of trait anxiety of children in the control group (40.77 ± 2.32), Day 2 (40.47 ± 2.31), and Day 3 (39.87 ± 2.38) and the intervention group (40.77 ± 2.32), Day 2 (40.47 ± 2.31), and Day 3 (39.87 ± 2.38). The Friedman test value of trait anxiety in the control group showed no statistical significance ($p = 0.29$), whereas in the intervention group, it was statistically significant ($p < 0.001$). A between intervention and control group.

Table II shows the mean score change of state anxiety of the control and intervention group on Day 1 (51.23 ± 3.22) and (53.9 ± 1.54), Day 2 (49.13 ± 3.14) and (35.97 ± 2.28) and Day 3 (36.27 ± 2.94) and (21.47 ± 2.11). The Mann-Whitney test shows that there is a significant difference between state anxiety in both groups on Day 1 ($p = 0.000$), Day 2 ($p = 0.001$), and Day 3 ($p = 0.001$). A mean score change of trait-anxiety of the control and intervention group on Day 1, (40.77 ± 2.33) and (46.27 ± 3.02), Day 2 (40.47 ± 2.32) and (40.47 ± 3.05), and Day 3 (39.87 ± 2.39) and (21.3 ± 0.84). A post hoc analysis of state and trait anxiety showed significant changes in the mean difference scores over different time points in both groups ($p < 0.05$).

A pre- and post-test comparison of the medical fear of children within the groups is shown in **Table III**. The mean score of medical fear of children is both in the control group Day 1 (45.17 ± 1.85), Day 2 (46.70 ± 3.32), and D3 (44.47 ± 2.30), and in the intervention group Day 1 (45.70 ± 1.66), D2 (32.47 ± 2.54), and D3 (19.97 ± 0.96). The Friedman test value of medical fear for both the control and intervention groups showed the difference is statistically significant ($p = 0.001$) and ($p < 0.001$).

Table IV depicts pre- and post-test comparisons between the groups. The mean scores of both groups were Day 1 (45.17 ± 1.86) and (45.7 ± 1.66), Day 2 (46.7 ± 3.32) and (32.47 ± 2.54), and Day 3 (44.47 ± 2.3) and (19.97 ± 0.96). The Mann-Whitney test shows that there is a significant difference between the medical fear of both groups on Day 2 ($p < 0.001$) and Day 3 ($p < 0.001$). A post hoc analysis of medical fear showed significant changes in the mean difference scores over different time points in both groups ($p < 0.05$).

Figure 1 Correlation between Trait anxiety with medical fear suggesting a slight tendency for medical fear to increase with higher trait anxiety. Negative correlation between state anxiety and medical fear suggesting a slight decrease in state anxiety with increased medical fear in **Figure 2**, Whereas in **Figure 3** showed strength of the correlation is negative between state and trait anxiety suggesting a trait anxiety increases, state anxiety tends to decrease slightly.

Table I: Pre and post-tests comparison of state-trait anxiety of children within the groups n=30+30

Study group	STAI-C	Days	Mean± SD	Range	IQR	F test (ANOVA)	p-value
Control	State	D1	51.23±3.22	44-56	4.75	55.52	<0.001***
		D2	49.13±3.13	42-55	4		
		D3	36.27±2.93	31-41	3		
	Trait	D1	40.77±2.32	37-44	4	2.47	0.29
		D2	40.47±2.31	36-44	3.75		
		D3	39.87±2.38	35-44	4		
Intervention	State	D1	53.90±1.53	51-57	2	60	<0.001***
		D2	35.97±2.28	31-40	1.75		
		D3	21.47±2.11	20-31	2		
	Trait	D1	40.77±2.32	39-50	4.75	60	<0.001***
		D2	40.47±2.31	35-46	3.75		
		D3	39.87±2.38	20-23	1		

*STAI-C=State –Trait Anxiety inventory of children, IQR=Intra quartile range, SD= Standard deviation, F test= Friedman Rank ANOVA, ***Very highly significant (p<0.001)*

Table II: Pre and post-tests comparison of state-trait anxiety of children between the group n=30+30

STAI-C	Group	Days	Mean±SD	Range	IQR	M Test	p-value
State	Control	D1	51.23±3.2 2	44-56	4.75	-3.39	0.000***
	Intervention		53.9±1.54	51-57	2		
	Control	D2	49.13±3.1 4	42-55	4	-6.67	<0.001***
	Intervention		35.97±2.2 8	31-40	1.75		
	Control	D3	36.27±2.9 4	31-41	3	-6.68	<0.001***
	Intervention		21.47±2.1 1	20-31	2		
Trait	Control	D1	40.77±2.3 3	37-44	4	-5.46	<0.001***
	Intervention		46.27±3.0 2	39-50	4.75		
	Control	D 2	40.47±2.3 2	36-44	3.75	-0.02	0.97
	Intervention		40.47±3.0 5	35-46	3.75		
	Control	D3	39.87±2.3 9	35-44	4	-6.73	<0.001***
	Intervention		21.3±0.84	20-23	1		

*D: Days, STAI-C=State –Trait Anxiety inventory of children, IQR=Intra quartile range, SD= Standard deviation, M test= Mann Whitney U test, ***Very highly significant (p<0.001)*

Table III: Pre and post-tests comparison of medical fear of children within the groups
n=30+30

Study group	Days	Mean±SD	Range	IQR	F test (ANOVA)	p-value
Control	D1	45.17±1.85	42-48	3	13.68	0.001**
	D2	46.70±3.32	44-63	2		
	D3	44.47±2.30	40-48	3.75		
Intervention	D1	45.70±1.66	41-48	2	60	<0.001***
	D2	32.47±2.54	27-37	3.75		
	D3	19.97±0.96	18-22	2		

*IQR=Intra quartile range, SD= Standard deviation, F test= Friedman Rank ANOVA, ** highly significant (p=0.001), ***Very highly significant (p<0.001).*

Table IV: Pre and post-tests comparison of medical fear of children between the groups
n=30+30

Study Groups	Days	Mean± SD	Range	IQR	MWU test	p-value
Control	D1	45.17±1.86	42-48	3	-1.18	0.23
Intervention		45.7±1.66	41-48	2		
Control	D2	46.7±3.32	44-63	2	-6.68	<0.001***
Intervention		32.47±2.54	27-37	3.75		
Control	D3	44.47±2.3	40-48	3	-6.70	<0.001***
Intervention		19.97±0.96	18-22	2		

*IQR=Intra quartile range, SD= Standard deviation, MWU test= Mann Whiteny U test, ***Very highly significant (p<0.001)*

Figure 1: Scatter plot diagram shows a correlation between Trait anxiety and medical fear (n=30+30)

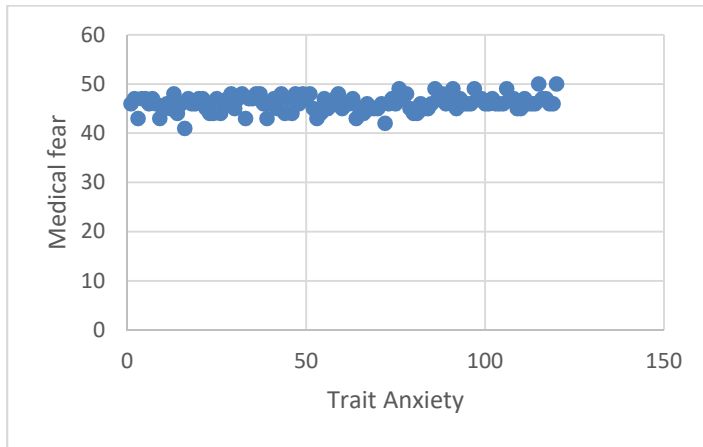


Figure 2: Scatter plot diagram shows the correlation of Strait –anxiety and medical fear (n=30+30)

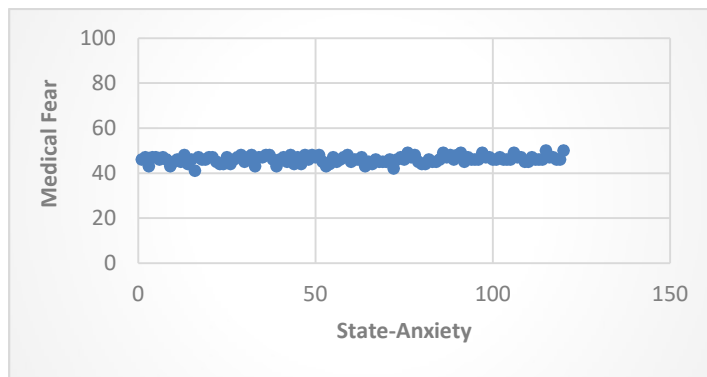
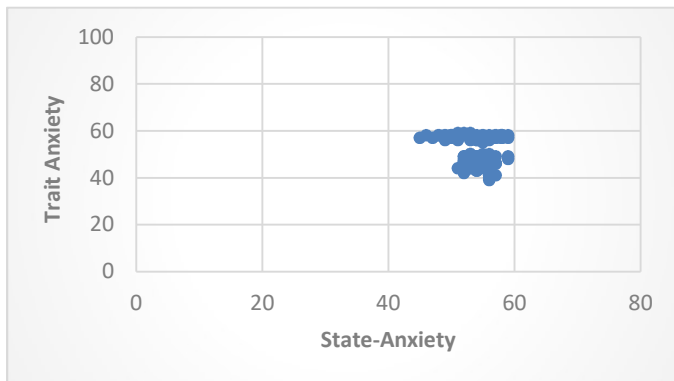


Figure 3: Scatter plot diagram shows the correlation of trait anxiety with strait anxiety (n=30+30)



DISCUSSION

The study's main finding was that nurse-led play interventions reduced anxiety and fear among hospitalized children. Overall, children who experienced intervention significantly helped to overcome state and trait anxiety and medical fear. This study further explained how play interventions were designed based on the current trend and understanding of the hospital routine and guidelines. Four packages of play intervention were well designed, and obtained expert advice before implementation. Intervention initiated immediate admission of the children to the hospital along with their parents. The study-related play intervention carried out a toy library, which is formed from a variety of toys made of appropriate materials for the hospital environment for children aged from three months to 15 years, by **Potasz C et al.**^{13,26} As suitable to the current study by **Wong CL et al.**¹⁴ play interventions as carried out with preparation and distraction play to reduce psychological parameters have proven significant to reduce.

The play intervention in the present study explored anxiety in terms of state and trait anxiety. Separately, other studies explained anxiety as having similar components while explaining the reduction of hospitalization anxiety^{13,15}. The present study, which demonstrated several children, indicated that state anxiety scores within the group were significantly reduced from Day 1 to Day 3 in both groups. A randomized control trial conducted by **Goktas N et al.**^{15,27} found that patients who received intervention experienced lower anxiety and medical fear following the invasive procedure compared to the control group. Interestingly, all three distraction techniques appeared equally effective in reducing medical fear. However, the virtual reality application emerged as the most successful method for alleviating anxiety^{5,28}.

Other similar studies supported that therapeutic play reduced anxiety levels with mean differences between the intervention and control groups by **Liu MC et al.**¹⁶. An intervention and control group study of²¹ state and trait anxiety found a significant difference between the state anxiety of both groups from Day 1 to Day 3. In contrast, trait anxiety was significant on Day 1 and Day 3. Some research suggests a possible link between the number of hospital admissions and increased anxiety or more robust fear responses in children²⁹. Subsequent analysis revealed significant changes in mean differences between state and trait anxiety, as well as medical fear, across different time points for both groups.

Studies show that play interventions can effectively reduce anxiety and fear in hospitalized Indian children. Play also fosters socialization, a crucial element for healthy childhood development. Playing during hospitalization can be a powerful tool for children. It can boost their ability to cope with the experience, lessening anxiety and fear around medical procedures. This, in turn, can lead to a smoother psychosocial adjustment throughout their hospital stay. Playing is as natural and essential to children as flying is to birds, and swimming is to fish.¹⁷ Implementing nurse-led play programs can enhance pediatric nurses' capacity to develop new knowledge and gather evidence on the significance of play in the hospital setting³⁰. This approach offers significant possibilities for improving care practices. Nurse-led play interventions have the potential to be broadly applicable across all childhood age groups, even in diverse cultural contexts and settings. Hospitals in India should recognize the value of play therapy in promoting children's mental health. Integrating play therapists into staff teams and incorporating play interventions into standard procedures could significantly benefit young patients. This approach would provide a safe space for children to express themselves and cope with the challenges of hospitalization.

Limitation

The study has some limitations. Randomized controlled trials are a gold standard for evaluating the effectiveness of interventions, including those that utilize play. This method ensures a strong foundation for comparing groups receiving the play intervention with those who don't. Due to the general ward setting of the pediatric ward, the play was designed for school-age children with medical conditions such as respiratory, gastrointestinal, genitourinary, endocrine, hematological, and musculoskeletal disorders, which made it challenging to adopt the randomization. A quasi-experimental design was chosen to address the limitations of generalizability. Purposive sampling was employed for recruitment, acknowledging that this approach restricts the applicability of the study's findings. The play intervention was provided for only three days with observation of anxiety and medical fear, which may not have been long enough to identify the effects of the play intervention on their medical fear. In line with current healthcare trends favoring shorter hospital stays, many medical cases undergo short-term hospitalization, meaning children can often be discharged home within three days.

CONCLUSION

The results of the study highlighted the significance of a nurse-led play intervention, found to be an effective intervention for children to deal with state and trait anxiety and medical fear of hospitalization. Since some unexpected results were found regarding trait anxiety, more studies are necessary to address the trait anxiety of hospitalized children. Pediatric nurses and parents recognize play's crucial role in children's development. They advocate for incorporating playtime even during illnesses.

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AUTHOR CONTRIBUTION

Benazeera : Writing original draft and data collection

Aranha PR: Writing original draft and supervision of research.

Yashaswini: Conceptualization of research

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