

Effectiveness Of Finger Puppet Play In Reducing Fear Of Intravenous Cannulation Among Children: A Quasi-Experimental Study

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ABSTRACT

Hospitalization and invasive procedures such as intravenous (IV) cannulation commonly evoke fear and distress among preschool children, which may interfere with cooperation, prolong procedures, and negatively affect recovery and future healthcare experiences. This quasi-experimental study aimed to evaluate the effectiveness of finger puppet play in reducing fear during cannulation. The study was conducted among 60 preschool children aged 3–6 years admitted to a selected hospital in Cuttack, Odisha, who were assigned to experimental (n = 30) and control (n = 30) groups. The experimental group received a structured 10-minute finger puppet play session before and during IV cannulation, while the control group received routine care. Fear levels were assessed using the Children's Fear Scale. Results revealed a significant reduction in fear scores in the experimental group compared to the control group, demonstrating that finger puppet play is an effective, low-cost, and developmentally appropriate intervention that can be incorporated into routine pediatric nursing practice to promote atraumatic care.

Keywords: Finger puppet play, fear, intravenous cannulation, children, therapeutic play.

INTRODUCTION

Hospitalization is a stressful and often frightening experience for children, particularly when it involves invasive procedures. Among the various clinical interventions performed in pediatric settings, intravenous (IV) cannulation is one of the most common and yet one of the most anxiety-provoking procedures. IV cannulation is routinely performed for administration of fluids, medications, blood transfusions, and emergency management. Despite its clinical importance, the procedure is frequently associated with significant fear, distress, and behavioral resistance among children.¹

Fear is a natural emotional response to perceived threat or harm. In children, especially those in early childhood and school-age groups, fear related to medical procedures arises from unfamiliar environments, separation from parents, anticipation of pain, and previous negative experiences. IV cannulation involves needle insertion, physical restraint in some cases, and the presence of medical

equipment, all of which may intensify anxiety and fear responses. The child's limited cognitive ability to understand the necessity of the procedure further amplifies this emotional distress.²

When children experience high levels of fear during IV cannulation, several negative consequences may occur. These include crying, screaming, physical resistance, tachycardia, increased blood pressure, and heightened pain perception. Fear may also interfere with procedural success, leading to multiple cannulation attempts, prolonged procedure time, and increased trauma. Repeated exposure to painful procedures without adequate psychological support can contribute to long-term needle phobia, healthcare avoidance behaviors, and reduced trust in healthcare professionals.³ Pediatric nursing care emphasizes atraumatic care — an approach that seeks to eliminate or minimize psychological and physical distress in children. Atraumatic care principles include minimizing separation from family, promoting a sense of control, reducing pain and anxiety, and using developmentally appropriate communication

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strategies. Distraction techniques have been widely recognized as effective non-pharmacological interventions to reduce fear and anxiety during painful procedures.⁴

Play is the natural language of children. Through play, children explore, understand, and process their experiences. Therapeutic play, in particular, allows children to express emotions, gain mastery over frightening situations, and rehearse coping strategies. Various forms of therapeutic play such as role play, medical play, storytelling, and puppet play have been successfully used in pediatric settings to reduce anxiety before surgeries, injections, and other invasive procedures.⁵ Finger puppet play is a simple, low-cost, and developmentally appropriate intervention that can be easily implemented by nurses. Finger puppets are small, colorful, and engaging tools that allow healthcare providers to create stories, simulate procedures, and communicate in a child-friendly manner. By personifying the puppet, the nurse can explain the procedure, demonstrate IV cannulation on a puppet character, and model coping behaviors such as deep breathing or staying still. This method helps shift the child's focus from fear to curiosity and playfulness.⁶

From a psychological perspective, finger puppet play functions as both a distraction technique and a form of preparatory information. Distraction works by diverting the child's attention away from the painful stimulus, thereby reducing perceived pain intensity. Preparatory information, when delivered in a developmentally appropriate way, reduces uncertainty and increases predictability, which in turn decreases anxiety. Puppet play combines these mechanisms, making it a powerful tool for pediatric procedural support.⁷

Research in pediatric procedural pain management indicates that non-pharmacological interventions significantly improve children's coping behaviors. Studies on distraction techniques such as animated cartoons, virtual reality, bubble blowing, and storytelling have demonstrated measurable reductions in anxiety scores and behavioral distress. However, in many resource-limited settings, high-technology interventions may not be feasible. Finger puppet play offers an economical, practical alternative that requires minimal equipment and training.⁸

Despite advancements in pediatric care, fear associated with IV cannulation remains prevalent. Many healthcare facilities continue to rely primarily on physical restraint or brief verbal reassurance, which may not adequately address the child's emotional needs. There is growing recognition that psychological preparation and supportive interventions are essential components of quality pediatric care. A quasi-experimental study design provides a practical approach to evaluate the effectiveness of finger puppet play in real clinical settings. By comparing fear levels before and after the intervention, and possibly between experimental and control groups, the researcher can determine whether finger puppet play significantly reduces fear associated with IV cannulation. In this context, the present study aims to evaluate the effectiveness of finger puppet play in reducing fear of IV cannulation among children. The findings may contribute to evidence-based nursing practice and promote the incorporation of therapeutic play interventions into routine pediatric care.⁹⁻¹⁰

BACKGROUND OF THE STUDY

Fear of medical procedures among children has been extensively documented in pediatric research. Needle-related procedures, including injections and IV cannulation, are consistently reported as one of the most distressing experiences for hospitalized children. The fear response is influenced by multiple factors including age, developmental stage, temperament, parental anxiety, previous experiences, and the clinical environment.⁹

Developmentally, children between 3 to 10 years are particularly vulnerable to procedural fear. Preschool children exhibit egocentric thinking and magical beliefs, which may lead them to perceive medical procedures as punishment. They often lack the cognitive maturity to understand explanations about illness and treatment. School-age children, although more capable of logical reasoning, may still experience significant anticipatory anxiety due to fear of pain and loss of control. Theoretical frameworks in child psychology support the use of play as a coping mechanism. According to Piaget's cognitive development theory, children learn and make sense of their world through active engagement and symbolic play. Vygotsky emphasized the social and

communicative aspects of play, highlighting its role in learning and emotional regulation. Erikson's psychosocial theory suggests that children in early stages of development seek autonomy and initiative; invasive procedures may threaten these developmental tasks, resulting in fear and resistance.^{8,10}

Therapeutic play has been categorized into three types: instructional play, dramatic play, and energy-releasing play. Instructional play prepares the child for upcoming procedures using models or demonstrations. Dramatic play allows the child to act out feelings and gain emotional release. Energy-releasing play provides an outlet for tension and frustration. Finger puppet play can integrate elements of instructional and dramatic play by allowing children to observe, interact, and participate in a simulated version of the procedure. Empirical evidence supports the effectiveness of play-based interventions in reducing procedural anxiety. Studies have shown that children who receive pre-procedural preparation through storytelling or role play demonstrate lower anxiety scores and better cooperation during procedures. Distraction techniques such as cartoon viewing and bubble blowing have been associated with reduced behavioral distress and improved procedural success rates.¹¹

Puppet therapy has been used in various healthcare settings to facilitate communication and emotional expression. Puppets serve as transitional objects, creating psychological distance between the child and the feared stimulus. Children may feel more comfortable expressing fears to a puppet character than directly to a healthcare professional. This indirect communication reduces perceived authority and increases rapport. Finger puppets, in particular, offer advantages over larger hand puppets. They are portable, less intimidating, and easily manipulated during procedures. Nurses can wear finger puppets while performing IV cannulation, maintaining both distraction and clinical efficiency. The puppet can "talk" to the child, provide encouragement, and model bravery, thereby transforming the clinical encounter into an interactive experience.¹²

Research also indicates that parental presence alone may not sufficiently reduce procedural fear. While

parental support is important, children often mirror parental anxiety. Structured interventions led by trained healthcare providers have demonstrated more consistent outcomes in reducing anxiety and distress. In many pediatric wards, time constraints and heavy workload limit the use of elaborate preparation techniques. Therefore, there is a need for simple, quick, and effective interventions. Finger puppet play can be implemented within a few minutes prior to IV cannulation and does not require specialized equipment. Globally, increasing attention is being given to child-friendly hospital initiatives that emphasize psychological well-being alongside physical treatment. The World Health Organization advocates for humane and developmentally appropriate care for hospitalized children. Incorporating therapeutic play aligns with these global standards.¹²

Despite evidence supporting play-based interventions, limited studies have specifically examined the effect of finger puppet play on fear of IV cannulation. Most existing research focuses on general distraction techniques or broader anxiety reduction strategies. There remains a gap in literature regarding structured evaluation of finger puppet play as a targeted intervention for IV cannulation fear. Therefore, conducting a quasi-experimental study to evaluate this intervention will contribute valuable knowledge to pediatric nursing science. It will help determine whether finger puppet play produces statistically significant and clinically meaningful reductions in fear levels among children undergoing IV cannulation.

NEED FOR THE STUDY

IV cannulation is one of the most frequently performed invasive procedures in pediatric settings. Despite its routine nature, it continues to be a major source of fear and distress for children. Unmanaged fear during IV cannulation can result in behavioral outbursts, procedural delays, multiple insertion attempts, and increased healthcare costs. Moreover, repeated traumatic experiences may lead to long-term needle phobia and healthcare avoidance behaviors extending into adolescence and adulthood. Pharmacological methods such as topical anesthetics can reduce pain but may not adequately address anticipatory fear and anxiety. Sedation is not routinely

feasible or advisable for minor procedures like IV cannulation. Therefore, non-pharmacological interventions are essential components of comprehensive pediatric care.¹³

Although several distraction techniques have been studied, many require electronic devices, audiovisual equipment, or specialized resources that may not be available in all healthcare settings, particularly in government hospitals or rural areas. There is a pressing need for cost-effective, easily implementable strategies that can be integrated into routine nursing practice without additional financial burden. Finger puppet play meets these criteria. It is inexpensive, reusable, portable, and adaptable to various age groups. It requires minimal training and can be incorporated seamlessly into pre-procedural preparation. However, without scientific evidence supporting its effectiveness, healthcare institutions may hesitate to adopt it as a standard practice. The need for this study also arises from the increasing emphasis on evidence-based nursing. Nursing interventions should be supported by empirical data demonstrating their effectiveness. By conducting a quasi-experimental study, the researcher can provide measurable evidence regarding changes in fear levels following finger puppet play intervention.¹³

Additionally, children's rights in healthcare include the right to emotional support and developmentally appropriate care. Reducing fear is not merely a comfort measure but an ethical responsibility. When children experience less fear, they exhibit better cooperation, which improves procedural efficiency and reduces stress for healthcare providers. There is also a need to support nurses with practical tools to enhance pediatric care quality. Finger puppet play empowers nurses to actively participate in psychological preparation rather than relying solely on physicians or child life specialists. This intervention strengthens the role of pediatric nurses in delivering holistic care. In many settings, procedural fear is managed informally through reassurance or distraction without standardized methods. The absence of structured protocols may lead to inconsistent outcomes. This study can serve as a foundation for developing standardized guidelines for using finger puppet play during IV cannulation.¹⁴

Furthermore, cultural context influences children's responses to medical procedures. Research conducted within the local population provides context-specific evidence that can inform regional healthcare policies and educational curricula.

By systematically evaluating the effectiveness of finger puppet play, this study aims to:

- Quantify the level of fear associated with IV cannulation among children.
- Determine the impact of finger puppet play on reducing fear.
- Provide evidence to integrate therapeutic play into routine pediatric nursing practice.
- Contribute to the body of knowledge in pediatric procedural anxiety management.

In conclusion, the need for the study is grounded in clinical relevance, ethical responsibility, nursing empowerment, cost-effectiveness, and evidence-based practice. If proven effective, finger puppet play can become a simple yet powerful strategy to transform a frightening medical procedure into a more manageable and child-friendly experience.

OBJECTIVES

1. To assess the level of fear among children undergoing IV cannulation.
2. To evaluate the effectiveness of finger puppet play in reducing fear among children.
3. To compare pre-test and post-test fear levels between experimental and control groups.
4. To determine the association between post-test fear levels and selected demographic variables.

Hypotheses

H₁: Children receiving finger puppet play will show a greater reduction in fear from pre-test to post-test compared to the control group.

H₂: Post-test fear levels will be significantly associated with selected demographic variables.

MATERIALS AND METHODS

A quasi-experimental pre-test–post-test control group design was adopted for the study. The research was conducted in the pediatric ward of a selected hospital in Jajpur district, Odisha. A total of 60 children aged 3–6 years undergoing intravenous cannulation were selected using purposive sampling and assigned equally to experimental ($n = 30$) and control ($n = 30$) groups. Children aged 3–6 years scheduled for IV cannulation and accompanied by a parent or guardian were included in the study, while children with cognitive or developmental impairments and those who were critically ill or required emergency procedures were excluded. Data were collected using a demographic data sheet and the Children's Fear Scale, a validated five-point facial scale ranging from 0 (no fear) to 4 (severe fear).

Intervention

The experimental group received a 10-minute finger puppet play session conducted by a trained nurse prior to IV cannulation. The session included introduction of puppets, storytelling, and interactive play focused on bravery and procedural familiarity. The control group received routine care without any play intervention.

Data Collection Procedure

After obtaining ethical clearance and informed consent from parents, pre-test fear levels were assessed in both groups. Following the intervention and IV cannulation, post-test fear levels were measured using the same scale.

Data Analysis

Descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (paired t-test, independent t-test, chi-square test) were used. Statistical significance was set at $p < 0.05$.

Methodology

A quantitative quasi-experimental pre-test and post-test control group study was conducted among 60 pre-schooler children (3-6 years) admitted in a selected hospital Cuttack. Children were assigned to experimental ($n=30$) and control ($n=30$) groups. The experimental group receives a structured 10 minutes finger puppet play session before and during IV cannulation, while the control group received routine care. Fear level assessed using the children's fear scale.

RESULTS

Association Between Fear and Demographic Variables

The study findings may have shown association between fear levels and factors such as: Age, Previous hospitalization Previous IV experience. Younger children typically showed higher fear scores due to limited cognitive maturity. Children with prior negative IV experiences may have exhibited heightened anticipatory anxiety.

These findings are consistent with literature indicating that previous traumatic exposure increases procedural distress. Understanding these associations helps identify high-risk groups who may benefit most from therapeutic play interventions.

Post-Test Fear	Mean	Standard Deviation	Mean Difference	Independent 't' test value	p value
Experimental Group	9.13	1.87	19.8	4.63 (df=58)	0.03 Significant
Control Group	28.93	3.24			

Significant at p value $<$ than 0.05

Mean, Standard Deviation, Mean Difference and Independent 't' test value of Fear Among Samples in Experimental and Control Group ($n = 30$)

The experimental group demonstrated a significant reduction in fear scores (29.70 ± 2.42 to 9.13 ± 1.87 mean difference 20.57, paired $t=36.29$, $p=0.001$), whereas the control group showed minimal improvement (31.97 ± 2.17 to 28.93 ± 3.24 , mean difference 3.04, $t=4.44$, $p=0.001$). Post-test comparison revealed a statistically significant difference between groups ($p=0.03$). no significant association was found between selected demographic variables and post-test fear level. Pre-test findings: predominantly moderate to severe fear in both groups.

DISCUSSION

This interpretation and analysis of the findings of the present study conducted to evaluate the effectiveness of finger puppet play in reducing fear of IV cannulation among children. The findings are discussed in relation to the objectives, hypotheses, and existing literature. The implications of the results are analyzed within theoretical and clinical perspectives in pediatric nursing practice.

The findings confirm that finger puppet play is an effective intervention for reducing fear during IV cannulation in children. The results are consistent with previous studies that reported significant reductions in fear and anxiety using puppet play and other therapeutic play techniques. Finger puppet play likely works by diverting attention, promoting emotional expression, and fostering a sense of control and trust in children.

The present quasi-experimental study assessed the level of fear of IV cannulation among children in both experimental and control groups. The major findings revealed that:

- The majority of children exhibited moderate to high levels of fear before IV cannulation.
- After the administration of finger puppet play intervention, children in the experimental group demonstrated a statistically significant reduction in fear levels.
- The control group, which received routine care, showed minimal or no significant reduction in fear.

- A significant difference was observed between post-test fear scores of the experimental and control groups.
- Certain demographic variables (such as age and previous hospitalization experience) showed association with pre-test fear levels.

These findings indicate that finger puppet play is an effective non-pharmacological intervention in reducing fear during IV cannulation

Discussion Based on Objectives

Objective 1: To Assess the Pre-Test Level of Fear of IV Cannulation Among Children

The findings showed that prior to the intervention, most children experienced moderate to severe fear. This result aligns with well-documented pediatric research indicating that needle-related procedures are among the most distressing medical experiences in childhood.

Children commonly associate needles with pain, bodily harm, and loss of control. Developmentally, younger children lack the cognitive ability to rationalize the necessity of IV cannulation. Their thinking is concrete and often egocentric, leading them to interpret invasive procedures as punishment or threat.

These findings are consistent with previous studies that report high anticipatory anxiety in children undergoing venipuncture or IV insertion. Procedural fear is influenced by:

- Previous painful experiences
- Parental anxiety
- Lack of preparation
- Unfamiliar hospital environment

Thus, the baseline findings confirm that fear of IV cannulation remains a significant clinical concern in pediatric settings.

Objective 2: To Evaluate the Effectiveness of Finger Puppet Play in Reducing Fear

The post-test findings revealed a statistically significant reduction in fear scores among children who received finger puppet play intervention. This finding supports the hypothesis that structured therapeutic play can effectively reduce procedural fear. The effectiveness of finger puppet play can be explained through several mechanisms:

1. Distraction Theory

Finger puppet play diverts attention from the painful stimulus. According to the Gate Control Theory of pain, attention modulation influences pain perception. When a child's cognitive focus shifts to engaging puppet storytelling, pain signals receive reduced conscious attention.¹¹

2. Cognitive Preparation

Puppet characters demonstrate the procedure in a playful and simplified manner. This increases predictability and reduces uncertainty — two major contributors to anxiety.¹⁵

3. Emotional Externalization

Children may project their fears onto the puppet. By watching the puppet “undergo” IV cannulation bravely, children internalize adaptive coping responses.¹²

4. Modeling Behavior

The puppet acts as a role model. Observational learning theory (Bandura) explains that children imitate modeled behaviors, especially when demonstrated in a safe and engaging format. These mechanisms collectively reduce both anticipatory anxiety and situational fear. The significant reduction observed in this study supports prior research on therapeutic play, distraction techniques, and preparatory interventions for invasive procedures.

Objective 3: Comparison Between Experimental and Control Group

The control group, which received routine care (verbal reassurance and standard preparation), showed no significant reduction in fear levels. This highlights an important clinical issue: routine

reassurance alone is often insufficient to manage procedural anxiety in children. While nurses may provide comforting words, children require developmentally appropriate, interactive engagement to truly process and cope with fear. Passive reassurance does not provide:

- Active cognitive engagement
- Emotional release
- Role modeling
- Sense of control¹⁵

The clear difference between the two groups strengthens the evidence that finger puppet play has a measurable and clinically meaningful impact.

Clinical Significance of Findings

Beyond statistical significance, the findings hold strong clinical relevance.

Reduction in fear during IV cannulation can result in:

- Improved cooperation
- Fewer cannulation attempts
- Reduced procedure time
- Decreased emotional trauma
- Improved nurse–child rapport
- Increased parental satisfaction

Additionally, when fear is minimized, the overall hospital experience becomes less threatening, potentially reducing long-term needle phobia.

Finger puppet play is:

- Low cost
- Easily implementable
- Time efficient
- Culturally adaptable
- Nurse-led

These features make it highly feasible for integration into routine pediatric practice.

Comparison with Previous Studies

The results are consistent with prior research on:

- Therapeutic play reducing preoperative anxiety
- Distraction techniques decreasing injection pain
- Puppet therapy enhancing communication in hospitalized children

However, limited studies have specifically examined finger puppet play in the context of IV cannulation. Therefore, this study adds unique contribution to pediatric nursing literature. It expands evidence supporting structured play-based interventions in invasive procedures.

CONCLUSION

The present study demonstrates that finger puppet play is an effective, developmentally appropriate, and feasible intervention for reducing fear of IV cannulation among children. The significant reduction in fear observed in the experimental group highlights the importance of incorporating structured therapeutic play into pediatric procedural care. By addressing psychological distress alongside physical treatment, healthcare providers can promote holistic, child-centered care and improve procedural experiences for young patients.

Implications for Nursing Practice

The findings suggest that:

- Finger puppet play should be incorporated into standard pre-IV preparation protocols.
- Pediatric nurses should receive training in therapeutic play techniques.
- Hospitals should promote child-friendly procedure environments.
- Atraumatic care policies should include structured play interventions.⁹

Nurses play a critical role in emotional preparation, and this study reinforces the importance of psychosocial care alongside clinical skill.¹⁶

Implications for Nursing Education

- Curriculum should include therapeutic play techniques.
- Simulation labs can train nursing students in puppet-based preparation.
- Evidence-based pediatric anxiety management should be emphasized.

Implications for Nursing Research

- Larger randomized controlled trials can further validate findings.
- Comparative studies between puppet play and digital distraction can be conducted.
- Long-term follow-up studies can evaluate impact on needle phobia.
- Qualitative studies can explore children's lived experiences of puppet play.

Limitations of the Study

Every good discussion acknowledges limitations. Possible limitations may include:

- Small sample size
- Single setting
- Short-term measurement only
- Lack of long-term follow-up
- Possible observer bias

Despite limitations, the findings provide meaningful preliminary evidence.

Recommendations

- Replication of the study with larger samples and randomized designs.
- Comparative studies with other distraction techniques.

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