

Therapeutic Play in Paediatric Oxygen Therapy: A Review of Its Effects on Fear, Anxiety, and Behaviour

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ABSTRACT

Background: Children undergoing oxygen-related respiratory treatments (nebulization, high-flow nasal cannula [HFNC], mask oxygen) frequently experience fear, procedure-related anxiety, and distress-driven behavioural problems. Non-pharmacological interventions, particularly therapeutic play, are widely used by paediatric nurses to reduce these negative responses.

Objective: To review and synthesize the evidence on the effect of therapeutic play on fear, anxiety, and behavioural responses in children undergoing oxygen therapy or inhalation treatments.

Methods: We performed a targeted literature search (PubMed, MEDLINE, CINAHL, Scopus and Google Scholar) for interventional and review studies addressing therapeutic play associated with inhalation or oxygen delivery in children. Key searches included terms such as “therapeutic play,” “nebulizer,” “high-flow nasal cannula,” “oxygen therapy,” “children,” “anxiety,” “fear,” and “behaviour.” We included randomized controlled trials (RCTs), quasi-experimental studies, and systematic reviews up to mid-2025. Evidence was synthesized narratively and key study characteristics tabulated.

Results: Several RCTs and quasi-experimental studies report that therapeutic play interventions — e.g., use of toy nebulizers/masks, dramatic therapeutic play, distraction cards, “pop-it” toys, and nurse-led play sessions — reduce procedure-related fear and anxiety and improve acceptance/adaptation to inhalation/oxygen devices. A 2023 RCT found significantly lower fear and anxiety and better mask acceptance when toy nebulizers and masks were used as therapeutic play. Recent 2024–2025 studies extend findings to HFNC and nurse-led play interventions showing reductions in state anxiety and improved behavioural responses. Systematic reviews/meta-analyses of therapeutic play in hospitalized children consistently report reductions in anxiety and improved coping and behaviour during medical procedures.

Conclusions: Therapeutic play is a low-risk, effective adjunct to usual care for reducing fear, anxiety and problematic behaviours in children receiving inhalation or oxygen therapies. While results are consistently favourable, heterogeneity in play methods, outcome measures and follow-up limits pooled effect estimation. Future multi-centre RCTs with standardized intervention protocols and validated anxiety/behaviour scales are recommended.

KEYWORDS: therapeutic play; paediatric; oxygen therapy; nebulizer; anxiety; fear; behaviour; inhalation therapy.

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INTRODUCTION

Oxygen therapy is one of the most frequently performed therapeutic interventions in paediatric healthcare settings. It is a life-saving treatment for children suffering from respiratory distress, pneumonia, asthma, bronchiolitis, and other acute or chronic respiratory conditions. Although the physiological benefits of oxygen therapy are well recognized, its administration often involves equipment such as face masks, nasal prongs, or high-flow nasal cannula that can be intimidating and distressing for young children. The unfamiliar environment of a hospital, coupled with the sight and sound of medical devices, contributes to high levels of fear, anxiety, and behavioural distress during oxygen administration. These emotional responses are not only distressing for the child and family but may also interfere with treatment adherence and the effectiveness of care. Children's reactions to hospitalization and medical procedures differ from those of adults because of their developmental stage, limited understanding of illness, and heightened sensitivity to environmental changes. For younger children, hospitalization may represent separation from parents, loss of control, and exposure to strange stimuli, all of which can provoke intense emotional

responses. During oxygen therapy, children may cry, resist wearing the mask or cannula, and show behavioural signs of fear or aggression. These behaviors can prolong the procedure, necessitate physical restraint, or compromise treatment outcomes. Moreover, repeated episodes of distress may have long-term consequences such as procedural anxiety, medical phobia, and avoidance behaviours in future healthcare interactions.

Managing procedure-related anxiety in paediatric care has traditionally relied on pharmacological interventions such as sedatives or anxiolytics; however, these are not always appropriate or safe for all children. In recent years, there has been increasing recognition of the role of non-pharmacological, psychosocial interventions in reducing procedural anxiety and distress. Among these, **therapeutic play** has gained prominence as a nurse-led, evidence-based strategy that uses play as a medium to prepare, support, and comfort children undergoing medical treatments. Therapeutic play is not merely recreational—it is a structured and purposeful activity designed to help children express emotions, understand medical experiences, and gain a sense of mastery and control in the healthcare environment. Therapeutic play in paediatric settings can take various forms, including role-play, storytelling, puppet shows, drawing, or playing with toy medical equipment. For children receiving oxygen or inhalation therapy, therapeutic play may involve using a toy nebulizer or mask to demonstrate and rehearse the procedure in a safe, playful manner before the actual treatment. Through this process, the child becomes familiar with the equipment, reducing novelty and fear. When the nurse encourages the child to “treat” a doll or participate in the play scenario, the experience transforms from a frightening medical event into a familiar, manageable activity. This sense of predictability and control helps reduce anxiety and promotes cooperative behaviour during the actual procedure.

The theoretical foundation for therapeutic play lies in child development and psychological coping theories. According to Piaget’s theory of cognitive development, play enables children to assimilate new experiences into existing mental frameworks, facilitating understanding and adaptation. Similarly, Erikson’s psychosocial theory emphasizes play as a means of developing autonomy, initiative, and competence—qualities that are crucial when children face medical challenges. By integrating these principles, therapeutic play serves both developmental and therapeutic functions. It allows emotional expression, cognitive processing, and coping skill enhancement, helping the child navigate stressful medical situations more effectively. Research evidence over the past two decades supports the effectiveness of therapeutic play in reducing preoperative anxiety, procedural pain, and behavioural distress in hospitalized children. Studies have shown that nurse-led play interventions can significantly lower anxiety scores, improve cooperation, and enhance the overall hospital experience for children and their parents. However, despite the growing body of literature on therapeutic play in various paediatric contexts—such as preoperative preparation, venepuncture, and hospitalization—relatively fewer studies have focused specifically on oxygen therapy and inhalation treatments. This represents a critical gap because oxygen therapy is one of the most anxiety-provoking and frequently repeated procedures in paediatric care. Recent interventional studies have begun to address this gap. Randomized controlled trials using toy nebulizers and masks have demonstrated significant reductions in children’s fear and anxiety during inhalation therapy compared with standard care. Nurse-led therapeutic play programs that combine role-playing, demonstration, and sensory play have also been associated with improved behavioural adaptation and acceptance of oxygen therapy devices. Such findings highlight the potential of therapeutic play to serve as a cost-effective, non-invasive adjunct to standard oxygen therapy protocols in paediatric units. Given the importance of minimizing psychological trauma in hospitalized children, therapeutic play deserves greater emphasis in clinical practice and nursing education. Paediatric nurses, who often have the closest contact with young patients, are ideally positioned to implement and evaluate such interventions. However, despite the promising results, evidence remains scattered, and interventions vary widely in content, duration, and delivery methods. A systematic synthesis of current knowledge is therefore necessary to understand the scope, effectiveness, and practical implications of therapeutic play specifically in the context of paediatric oxygen therapy. This review aims to critically examine and synthesize available research on the effects of therapeutic play on fear, anxiety, and behavioural responses in children undergoing oxygen therapy. It seeks to highlight the mechanisms through which play facilitates emotional regulation, summarize empirical evidence from clinical trials and reviews, and identify gaps for future research. By consolidating current findings, this paper emphasizes the role of therapeutic play as an essential, evidence-based nursing intervention to enhance the emotional well-being and treatment experience of paediatric patients receiving oxygen therapy.

OBJECTIVES

1. To review and synthesize existing evidence on the effectiveness of therapeutic play interventions in reducing fear, anxiety, and behavioral distress among children undergoing oxygen or inhalation therapy.
2. To identify and describe various forms and techniques of therapeutic play (such as role-play, toy nebulizers, storytelling, or sensory play) applied in the context of pediatric oxygen therapy.
3. To examine the psychological and developmental mechanisms through which therapeutic play influences emotional and behavioral responses in children during medical procedures.
4. To evaluate the role of nurses and healthcare professionals in implementing therapeutic play as part of pediatric oxygen therapy and to explore its integration into routine clinical practice.
5. To identify research gaps and recommend future directions for developing standardized, evidence-based therapeutic play protocols for use in pediatric respiratory care.

METHODS

This review adopted an integrative approach to summarize and synthesize available evidence on the effects of therapeutic play in reducing fear, anxiety, and behavioral distress among children undergoing oxygen or inhalation therapy. The review process followed key elements of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency and rigor in article selection and synthesis.

Search Strategy

An extensive electronic search was conducted across multiple scientific databases, including **PubMed, CINAHL, Scopus, MEDLINE, ScienceDirect, and Google Scholar**, to identify relevant studies published between **2010 and May 2025**. The search used a combination of Medical Subject Headings (MeSH) and free-text terms such as “*therapeutic play*,” “*play therapy*,” “*oxygen therapy*,” “*nebulization*,” “*high-flow nasal cannula*,” “*inhalation therapy*,” “*children*,” “*anxiety*,” “*fear*,” and “*behavior*.” Boolean operators “AND” and “OR” were applied to combine search terms appropriately. Additional sources were identified through manual screening of reference lists from selected articles and reviews.

Inclusion and Exclusion Criteria

Studies were included if they met the following criteria:

1. Involved **children aged 1–12 years** receiving oxygen therapy, nebulization, or related inhalation treatments;
2. Evaluated **therapeutic play or structured play-based interventions** conducted before or during therapy;
3. Reported outcomes related to **fear, anxiety, or behavioral responses**;
4. Were **randomized controlled trials (RCTs), quasi-experimental studies, or systematic reviews** published in English language

Studies were excluded if they were descriptive reports without measurable outcomes, involved adults or adolescents above 12 years, or focused on play interventions unrelated to oxygen or inhalation therapy.

Data Extraction and Synthesis

A data extraction form was developed to collect relevant information from each included study, including author(s), publication year, country, study design, sample size and age group, type and duration of therapeutic play intervention, comparison group, outcome measures, and main findings. Due to heterogeneity in interventions and measurement tools, a **narrative synthesis** approach was used instead of a meta-analysis. Findings were grouped under key thematic areas—effects on fear and anxiety, behavioral responses, and clinical implications.

Quality Appraisal

The methodological quality of included studies was assessed based on study design, sample adequacy, intervention clarity, and validity of outcome measures. Discrepancies in article selection or appraisal were resolved through consensus among reviewers to ensure reliability and accuracy.

RESULTS

RCTs and quasi-experimental trials

Toy nebulizer + mask therapeutic play (RCT, 2023): A randomized trial found that children who played with a toy nebulizer and mask prior to actual nebulized treatment had significantly lower fear and anxiety scores and greater acceptance of the therapeutic mask compared with controls ($p = 0.001$). The intervention also improved adaptation to treatment.

Pop-it / simple sensory play during inhalation: Several nursing-led experimental studies reported significant reductions in self-reported or observer-rated anxiety during inhalation therapy when simple interactive toys (e.g., pop-it) or distraction devices were used. These studies typically showed large, immediate reductions in observed distress during the procedure.

HFNC (High-flow nasal cannula) context (2025 study): A recent interventional study specifically examining children receiving HFNC reported that therapeutic play sessions were safe and associated with reduced fear, anxiety and improved behavioural responses during therapy; the authors recommended availability of play materials and routine use by paediatric nurses.

Nurse-led play interventions and multi-component sessions (2024–2025): Newer nurse-delivered structured play programs (45 min sessions, role-play with clinical toys, storytelling and modelling) have demonstrated reductions in both state and trait anxiety and improvements in cooperation during hospital treatments.

General hospitalized paediatric populations: Systematic reviews exploring therapeutic play for hospitalized children consistently conclude that therapeutic play reduces preoperative anxiety, procedural pain, and negative behavioural responses, and improves adaptation to hospital environments; however, reviews note heterogeneity of methods and small study sizes as limitations.

Area-specific syntheses (e.g., inhalation therapy): Although fewer in number, reviews and narrative syntheses focused on inhalation/oxygen or nebulizer contexts support trial findings that device-specific play (toy masks/nebulizers) improves device acceptance and lowers procedural fear.

Mechanism and Effect of Therapeutic Play

Therapeutic play exerts its beneficial effects on children undergoing oxygen therapy through multiple **psychological, behavioral, and developmental mechanisms**. These mechanisms work synergistically to reduce fear and anxiety, improve cooperation, and promote adaptive behaviors during medical procedures.

Familiarization and Desensitization

One of the primary mechanisms of therapeutic play is **familiarization** with medical equipment. When children are introduced to toy versions of oxygen masks, nebulizers, or nasal cannula during play sessions, they are able to explore, handle, and manipulate the objects in a safe, non-threatening context. This **gradual exposure** helps to reduce novelty and fear associated with the actual equipment. Through imitation and practice, the child becomes desensitized to the medical device, leading to better acceptance and cooperation during real therapy.

2. Sense of Control and Mastery

Hospitalization and medical procedures often create a sense of helplessness in children. Therapeutic play restores a **sense of autonomy and control** by allowing children to “pretend” to be caregivers, nurses, or doctors. When children apply a mask to a doll or operate a toy nebulizer, they shift from being passive recipients of care to active participants. This **role reversal** enhances their feelings of mastery and competence, thereby reducing anxiety and increasing compliance with treatment.

3. Emotional Expression and Coping

Play serves as a natural medium for emotional expression in childhood. Through dramatic play, storytelling, or drawing, children can **externalize their fears and frustrations** related to medical experiences. By re-enacting the procedure in play, they process emotions cognitively and emotionally, leading to psychological relief. Therapeutic play also teaches **coping strategies** such as deep breathing, distraction, or positive self-talk—that can be applied during real treatment sessions.

4. Distraction and Cognitive Engagement

During oxygen administration, therapeutic play acts as an effective **distraction technique** by shifting the child’s attention away from unpleasant sensations, such as the sound of the nebulizer or the feeling of the mask. Engaging cognitive and sensory resources in play activities reduces the perception of discomfort and anxiety. Studies have shown that children who engage in play interventions exhibit lower physiological markers of stress, such as heart rate and crying duration.

5. Behavioural and Therapeutic Outcomes

Collectively, these mechanisms translate into tangible **clinical benefits**. Research indicates that children exposed to therapeutic play during oxygen or inhalation therapy display **lower fear and anxiety scores, better cooperation, reduced resistance behaviours, and higher treatment completion rates**. The intervention also improves nurse–child interaction, enhances trust, and contributes to a more positive hospital experience. Thus, therapeutic play functions as a holistic, developmentally appropriate, and evidence-based strategy to support emotional well-being and treatment adherence in paediatric oxygen therapy.

Outcomes and Measures Used

Studies evaluating the effects of therapeutic play in paediatric oxygen therapy have focused primarily on **psychological and behavioural outcomes**, including fear, anxiety, cooperation, and adaptation during treatment. A wide range of **standardized assessment tools, observational checklists, and physiological indicators** have been used to measure these outcomes, reflecting the multidimensional impact of therapeutic play on children’s emotional and behavioural states.

1. Fear and Anxiety

Fear and anxiety are the most frequently assessed outcomes in research on therapeutic play. Various validated scales have been used to quantify changes in children’s emotional responses before and after the intervention.

- The **Children’s Fear Scale (CFS)** and **Modified Yale Preoperative Anxiety Scale (mYPAS)** are among the commonly used instruments for visual and behavioral assessment of fear and anxiety levels.
- Some studies have utilized **self-report questionnaires** such as the **State-Trait Anxiety Inventory for Children (STAIC)**, suitable for older children capable of self-expression.
- For younger children, **observer-rated behavioral anxiety scales** completed by nurses or parents have been applied to capture non-verbal signs of distress such as crying, restlessness, and facial tension.

Findings consistently indicate that children exposed to therapeutic play especially those who engage with toy nebulizers or mask demonstrations show **significant reductions in anxiety and fear scores** compared with those receiving standard care.

2. Behavioural Responses and Cooperation

Behavioural outcomes have been measured using structured observation tools such as the **Observational Scale of Behavioural Distress (OSBD)** or researcher-developed checklists assessing **cooperation, resistance, crying, and avoidance behaviours** during oxygen or inhalation therapy. Children who participated in therapeutic play sessions were found to demonstrate **better acceptance of oxygen masks, fewer crying episodes, and greater willingness to participate** in therapy procedures. These behavioural improvements are critical for ensuring effective oxygen delivery and minimizing treatment interruptions.

3. Physiological and Secondary Measures

In addition to psychological and behavioural assessments, several studies incorporated **physiological indicators** of anxiety, such as **heart rate, respiratory rate, and oxygen saturation levels**, recorded before, during, and after intervention. Reductions in heart rate and normalization of breathing patterns were observed in children exposed to play-based interventions, reinforcing the calming effect of therapeutic play.

4. Parental and Nurse Observations

Some studies also included **parental satisfaction and nurse-rated assessments** of child cooperation and emotional stability as secondary outcomes. These qualitative measures provided valuable insights into the practical feasibility and perceived benefits of integrating therapeutic play in clinical routines. Overall, the diversity of measurement tools highlights the comprehensive effect of therapeutic play on **emotional, behavioural, and physiological domains**, confirming its value as a holistic, child-centered nursing intervention during paediatric oxygen therapy.

DISCUSSION

The findings of this review demonstrate that therapeutic play is an effective, evidence-based intervention for reducing fear, anxiety, and negative behavioural responses among children undergoing oxygen therapy and inhalation treatments. Across multiple randomized controlled and quasi-experimental studies, children who engaged in therapeutic play prior to or during oxygen therapy consistently exhibited **lower anxiety and fear scores, improved cooperation, and better acceptance of medical devices** compared to those who received standard care. These outcomes reinforce the role of play not merely as entertainment but as a therapeutic modality that supports psychological well-being and procedural compliance in paediatric healthcare. Therapeutic play addresses several key challenges inherent in paediatric oxygen therapy. The use of face masks, nasal prongs, or nebulizers can provoke distress and non-compliance due to the unfamiliar sounds and sensations associated with these devices. By allowing children to interact with toy nebulizers, masks, or other play materials, nurses create a **familiar and non-threatening environment** that transforms the child's perception of treatment. This process helps desensitize the child to medical equipment, reduces anticipatory anxiety, and promotes adaptive coping strategies. The evidence suggests that play interventions tailored to specific procedures such as mask play before nebulization are particularly effective in improving cooperation and treatment tolerance.

From a nursing perspective, therapeutic play also strengthens the **nurse child parent relationship**, which is crucial for holistic paediatric care. When nurses engage children through play, they establish trust and empathy, enabling smoother communication and emotional support throughout the treatment process. Furthermore, therapeutic play aligns with the principles of **family-centred and atraumatic care**, emphasizing emotional comfort, developmental support, and minimal psychological harm during hospitalization. Physiological indicators such as **heart rate and respiratory rate** also provide objective evidence of reduced anxiety following play interventions. These findings highlight the biopsychosocial nature of therapeutic play, in which psychological comfort translates into measurable physiological stability. Reduced distress can also indirectly enhance the efficiency of oxygen therapy by ensuring proper mask fitting, sustained cooperation, and uninterrupted oxygen flow.

Despite these promising findings, the review also identifies important **limitations** in existing research. Studies vary widely in sample size, intervention duration, play techniques, and outcome measures, making direct comparison difficult. Many investigations are single-centred and lack long-term follow-up, limiting generalizability and understanding of sustained psychological benefits. Additionally, standardized guidelines for implementing therapeutic play in oxygen therapy are still lacking, and nurses may differ in training and confidence to conduct structured play interventions effectively. Future research should focus on developing **standardized, evidence-based protocols** for therapeutic play in paediatric respiratory care, incorporating validated anxiety and behavioural scales. Large-scale, multicentre randomized trials with clear operational definitions of play interventions are needed to establish stronger evidence. Moreover, integrating therapeutic play into nursing curricula and routine paediatric care policies could enhance its adoption and sustainability.

In conclusion, therapeutic play emerges as a safe, cost-effective, and developmentally appropriate intervention that can significantly alleviate fear and anxiety, improve cooperation, and enhance the overall treatment experience for children receiving oxygen therapy. Its integration into paediatric nursing practice represents a critical step toward holistic, compassionate, and child-centred healthcare.

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