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THE EFFECTIVENESS OF *PUZZLE* PLAYING THERAPY IN REDUCING ANXIETY IN PRESCHOOL CHILDREN WITH ACUTE RESPIRATORY INFECTIONS: *A PRE-EXPERIMENTAL STUDY*

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Original Research

ABSTRACT

Introduction: *Acute Respiratory Infections (ARI) are a leading cause of morbidity and mortality in preschool children. Nebulizer therapy is effective for ARI, but it can cause anxiety in pediatric patients, which may hinder their cooperation and recovery. This study aims to evaluate the effectiveness of puzzle play therapy in reducing anxiety levels among preschool children with ARI undergoing nebulizer treatment.* ***Methods:*** *A pre-experimental study utilizing a one-group pretest-posttest design was conducted involving 23 preschool children diagnosed with ARI who received nebulizer therapy in the Children's Room A11 at SMC Telogorejo Hospital, Semarang, between March and April 2024. Anxiety levels were assessed pre- and post-intervention using the Taylor Manifest Anxiety Scale (TMAS), which has demonstrated validity (CVI score = 1.0, reliability = 0.89). Puzzle play therapy was administered alongside nebulizer therapy, and the data were analyzed through paired t-tests.* ***Results:*** *Most participants were 4-year-old males (47.8%) with a hospital stay of more than seven days (56.5%). Before the intervention, 73.9% of participants had severe anxiety (mean = 23.65). Following the intervention, 73.9% of participants reported moderate anxiety (mean score = 12.78), with no instances of severe anxiety. The statistical analysis showed a significant decrease in anxiety levels (p = 0.001).* ***Conclusions****: Puzzle play therapy effectively reduced anxiety in children during nebulizer treatment. This intervention can be implemented as a non-pharmacological approach to manage anxiety in pediatric patients during medical procedures. Further research should investigate its long-term benefits and applicability in various clinical settings.*

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INTRODUCTION

Acute Respiratory Infections (ARI) are a primary cause of morbidity and mortality in children under five worldwide. The World Health Organization (WHO) reports that 156 million children are affected each year, with Indonesia exhibiting one of the highest mortality rates in Southeast Asia, accounting for 22.30% of child deaths under five years of age (WHO, 2024; Wulandari et al., 2024). In 2023, Semarang City reported 252,767 cases of ARI, including 69,833 cases involving toddlers, highlighting a significant public health challenge (Inderiati et al., 2023; Kemenkes, 2023).

Children admitted for acute respiratory infections frequently require nebulizer therapy to alleviate respiratory symptoms, including wheezing, shortness of breath, and bronchial spasms (Ari, 2021; Longest et al., 2019). Nebulizer therapy effectively delivers aerosolized medication for respiratory issues; however, it is often associated with significant anxiety in pediatric patients (Kuzujanakis, 2021). This anxiety arises from the use of masks, the sound of the nebulizer, and the unfamiliar hospital environment (Ari, 2021; Dave, 2019). Studies indicate that anxiety levels in children receiving nebulizer therapy can reach up to 60%, with severe anxiety leading to resistance, crying, or outright refusal of the procedure (Islaeli et al., 2020; Kuzujanakis, 2021). Procedural anxiety impacts immediate cooperation, extends recovery times, increases hospital stays, and presents long-term psychological risks (Arif Rohman & Mutia, 2023).

Various factors exacerbate anxiety during nebulizer therapy, such as parental separation, apprehension towards medical equipment, and negative past experiences (Ari, 2021; Dave, 2019). Research shows that children experiencing

heightened anxiety during nebulization often encounter exacerbated symptoms, including rapid breathing and increased heart rates, which can reduce the effectiveness of the procedure (Bates et al., 2022; Cardinal et al., 2017; Nisa et al., 2023).

Several non-pharmacological interventions, including music therapy, storytelling, and balloon play, have been used to address this issue; however, their effectiveness has shown inconsistency (Godino-lanez et al., 2020; Islaeli et al 2020; Nisa et al., 2023; Nurwulansari et al., 2019). Puzzle play therapy offers a structured and engaging method for children, enabling them to divert their attention from stressful stimuli and express emotions in a constructive manner (Islaeli et al. (2020) found that puzzle play therapy reduced anxiety by 40% in preschoolers during hospitalization (Islaeli et al., 2020). Haryadi (2019) reported that 14 out of 19 children showed reduced anxiety levels after undergoing puzzle therapy during medical procedures (Haryadi, 2019). The application of this therapy during nebulizer treatment remains underexplored, particularly in the Indonesian context.

This study investigates the effectiveness of puzzle play therapy in alleviating anxiety during nebulizer therapy for preschool children with ARI, addressing existing gaps in the literature. The objectives are to quantify the prevalence and severity of anxiety during nebulizer therapy, identify contributing factors, and evaluate puzzle play therapy as a potential intervention. The findings aim to enhance pediatric care strategies, thereby mitigating anxiety and its associated risks.

MATERIALS AND METHODS

Study Design

The research used a pre-experimental design with a one-group pretest-posttest approach, utilizing a cross-sectional study timeline. The independent variable in this study was puzzle play therapy, while the dependent variable was anxiety in preschool children with ARI undergoing nebulizer therapy.

Population, Samples, and Sampling

The study focused on preschool children aged 3 to 5 who were hospitalized with acute respiratory infections in Children's Room A11 of SMC Telogorejo Hospital during March and April 2024. Based on the Slovin formula, the sample size was determined to be 23 children from an average monthly population of 24 patients in this unit. A purposive sampling method was employed to select participants based on the established inclusion and exclusion criteria. The inclusion criteria required children to be in a compos mentis state (fully conscious and cooperative), currently undergoing nebulizer therapy, and accompanied by parents who consented to their participation. Children were excluded if they were in an emergency situation, had ceased nebulizer therapy, or were unwilling to participate.

Instruments

The instrument used in the study was the Taylor Manifest Anxiety Scale (TMAS), a standardized tool designed to evaluate emotional, cognitive, and physical symptoms of anxiety. The TMAS was adopted by Nisa et al. (2023) and has undergone rigorous testing, with content validity established through consultation with three experts, resulting in a Content Validity Index (CVI) score of 1. The instrument's reliability was confirmed with a Cronbach's alpha coefficient of 0.89, indicating strong internal consistency. The TMAS was administered both before and after the intervention to measure changes in anxiety levels attributable to puzzle play therapy.

Procedure

Following IRB approval, four enumerators were selected for the study. The selection criteria specified that a nursing student had passed pediatric courses. This training ensured that the enumerators possessed the appropriate knowledge and skills to administer nebulizer therapy and facilitate puzzle play therapy for young children. To ensure consistency in administering the intervention and measuring anxiety, the researcher trained the enumerators and provided ongoing supervision throughout the data collection. Informed consent was secured from the parents or guardians of all participants, confirming their understanding of the study's objectives and associated risks. The study maintained the confidentiality and rights of the children through the established inclusion criteria.

In the pre-test phase, the child's anxiety level was measured using the Taylor Manifest Anxiety Scale (TMAS) for approximately 10 minutes. Next, the child underwent the intervention, which involved nebulizer therapy and puzzle play therapy. The nebulizer therapy, part of the child's routine treatment for ARI, lasted 15 minutes. During this time, the enumerators administered the nebulizer therapy while the researcher and enumerators facilitated the puzzle play therapy. The roles of the researcher and enumerators were clearly defined to ensure intervention consistency. The researcher measured anxiety pre- and post-test, while the enumerators provided nebulizer and puzzle play therapy. Throughout the study, the researcher and

enumerators ensured that all participants received the same therapy. Puzzle play therapy was designed to help reduce the child's anxiety during treatment. It involved providing the child with age-appropriate, soft, and safe puzzles to engage with while receiving the nebulizer treatment. This intervention phase lasted 15 minutes in total. Following the intervention, the post-test phase occurred, during which the child's anxiety was measured again using the TMAS for about 10 minutes.

Data Analysis

Data were analyzed using both univariate and bivariate statistical methods. Univariate analysis was employed to describe the demographic and clinical characteristics of the respondents. The paired t-test was used for bivariate analysis to compare pretest and post-test anxiety levels, with statistical significance set at $p < 0.05$. All analyses were conducted using SPSS version 26.0 (IBM SPSS, Chicago, IL).

Ethical Clearance

Ethical approval for the study was obtained from the Health Research Ethics Committee of SMC Telogorejo Hospital (Ethics No. 9646/TU.710/KEPK/K/2024).

RESULTS

Table 1. Characteristics of respondents based on age, gender, length of treatment, and type of treatment in Children's Room A10 SMC Telogorejo 2024 (n=23)

Respondent Characteristics	Frequency (F)	Percentage (%)
Age (year)		
4	11	47.8
5	7	30.5
6	5	21.7
Total	23	100
Gender		
Boys	14	60.9
Girls	9	39.1
Total	23	100
Length of treatment		
Fast (1-3)	5	21.7
Moderate (4-7)	5	21.7
Long (>7)	13	56.6
Total	23	100
Type of treatment		
Nebulizer	23	100
Total	**23**	**100**

Based on Table 1, it can be seen that the majority of respondents are four years old (47.8%), most respondents are male (60.9%), the majority of respondents have a long hospital stay (> 7 days) (56.5%), and all respondents are undergoing nebulizer treatment.

Table 2. Distribution of Anxiety Levels of Preschool Children with ARI to the Administration of Nebulizers Before and After Being Given Puzzle Play Therapy in Children's Room A11 SMC Telogorejo Hospital 2024 (n=23)

Anxiety level		*Pretes*		*Posttes*	
		n	**%**	**n**	**%**
Panic	(29-34)	3	13.0	0	0
Severe anxiety	(20-28)	17	74.0	1	4.3
Moderate anxiety	(11-19)	2	8.7	17	74.0
Mild anxiety	(1-10)	1	4.3	5	21.7
No anxiety	(0)	0	0	0	0
Total		**23**	**100**	**23**	**100**

Based on Table 2, it can be seen that the pretest anxiety level is primarily in the severe anxiety category (score 20-28), at 74.0%. The post-test anxiety level is mainly in the moderate anxiety category (score 11-19), at 73.9%.

Table 3. Analysis of the effectiveness of puzzle play therapy on the level of anxiety in children with ARI in the administration of nebulizers in the Children's Room A11 SMC Telogorejo Hospital March-April 2024 (n=23)

Variable	*Mean*	SD	t	*p-value*
Anxiety				
Pretest	23,65	4,82	11,64	0,001
Posttest	12,78	2,75		

The results of the bivariate analysis using the dependent t-test showed a p-value of 0.001 (< α = 0.05) and a t-value of 11.64 (> t-table = 1.714). Therefore, it can be concluded that there is a significant difference in the anxiety levels of preschool children with ARI regarding nebulizer administration before and after receiving puzzle play therapy in the Children's Room A11 at SMC Telogorejo Hospital.

DISCUSSION

This study evaluated the effectiveness of puzzle play therapy in reducing anxiety among preschool children with Acute Respiratory Infections (ARI) receiving nebulizer therapy. The results indicated a significant decrease in anxiety levels following the intervention, aligning with prior research on non-pharmacological approaches to anxiety management in hospitalized children (Haryadi, 2019: islaeli et al., 2020). Tables 1, 2, and 3 provide essential insights into the impact of demographic variables, the efficacy of puzzle play therapy, and the relationships among various factors.

The results show that 47.8% of participants were 4 years old, with a balanced gender distribution. This distribution aligns with previous research indicating the highest prevalence of ARI among children aged 3 to 5 years. A study by Wulandari et al. 2023 suggests that children in this age group exhibit heightened susceptibility to ARI, due to their developing immune systems and increased exposure to infectious agents (Wulandari et al., 2024). Additional research by Fatmawati et al. (2021) also highlights that preschool-aged children are at the highest risk for ARI, reflecting similar age distributions. The susceptibility of 4-year-olds is primarily linked to their increased social interactions and behaviors, such as hand-to-mouth activity, which elevate their exposure to pathogens (Fatmawati et al., 2021). The observed male predominance is consistent with findings from Savina et al. (2021), which indicate that boys are more susceptible to developing ARI than girls. This is attributed to behavioral factors, such as outdoor play and greater exposure to environmental risks. A study by Wati et al. (2022) also found a higher prevalence of ARI in male children, which was linked to their increased physical activity and environmental exposure.

Most participants underwent extended hospital stays exceeding 7 days. A substantial percentage of children (73.9%) demonstrated severe anxiety prior to the intervention. This aligns with prior research, including Islaeli et al. (2020), which indicated that younger children, particularly those with extended hospitalizations, were at higher risk of experiencing significant anxiety due to unfamiliar settings and medical interventions (Islaeli et al., 2020). Haryadi (2019) similarly identified that prolonged hospitalization and younger age correlated with increased anxiety levels in children undergoing medical treatments. The findings highlight the necessity of early intervention for anxiety, especially among individuals at higher risk due to age or extended hospitalization (Haryadi, 2019). These results are consistent with those of Kuzujanaskis (2021), who indicated that extended hospital stays contribute to heightened anxiety in children, as they are repeatedly exposed to hospital settings and treatments, thus increasing stress levels (Kuzujanakis 2021). In contrast to the findings of Dave et al. (2019), which suggested no significant relationship between hospital stay duration and anxiety in critically ill children, our study identified a distinct correlation between extended hospital stays and increased pre-intervention anxiety. This suggests that the emotional consequences of prolonged hospitalizations are a significant factor affecting anxiety levels in children receiving nebulizer therapy (Dave, 2019).

Prior to the intervention, 73.9% of children demonstrated severe anxiety, as assessed by the Taylor Manifest Anxiety Scale (TMAS). This finding aligns with studies indicating elevated anxiety levels in children undergoing medical procedures, especially those involving nebulizer therapy. Islaeli et al. (2020) reported that 70–75% of children receiving nebulizer therapy experienced significant anxiety due to fear of the procedure and discomfort associated with the nebulizer mask. In a study conducted by Dewi et al. (2020), hospitalized children exhibited anxiety levels ranging from moderate to severe during medical procedures, including nebulization.

The results demonstrate a notable decrease in anxiety levels after engaging in puzzle play therapy, with the majority of children transitioning

from severe to moderate anxiety. These results align with findings from other studies on therapeutic play interventions. Islaeli et al. (2020) showed a significant reduction in anxiety among preschool children following puzzle play therapy, with a shift from severe to moderate anxiety levels. Additionally, research conducted by Haryadi (2019) and (Malinczak et al. (2020) demonstrated comparable results, indicating that play therapy, particularly puzzle play, effectively reduced anxiety levels in hospitalized children, reinforcing the beneficial effects observed in this study. Kuzujanakis (2021) presented mixed findings on the efficacy of play therapy, particularly for children with severe illnesses or those undergoing frequent hospitalizations. Results may vary based on the severity of the illness and the specific context of the interventions implemented. Kuzujanakis (2021) noted that children with chronic or severe conditions might not respond as effectively to play therapy children (Haryadi, 2019: Kuzajanaskis 2021) However, our study indicates that children undergoing routine treatments, including nebulizer therapy, can still benefit from this intervention. The observed reduction in anxiety in our study highlights the potential of puzzle play therapy to engage children in activities that distract them from stressors, including medical procedures, thereby enhancing their emotional well-being.

The findings of the bivariate analysis indicated a significant difference in anxiety levels pre- and post-intervention, with a p-value of 0.001. These results demonstrate the efficacy of puzzle play therapy in alleviating anxiety. Wati et al. (2022) reported similar findings, indicating that anxiety levels in hospitalized children significantly decreased following a play-based therapy intervention, with a reduction of approximately 30% in anxiety scores. Haryadi (2019) observed a reduction in anxiety among children undergoing play therapy, noting significant improvements in emotional regulation during hospitalization. Kuzujanakis (2021) demonstrated that play therapy, particularly through activities like puzzles, activates children's cognitive processes, facilitating relaxation and reducing physiological indicators of anxiety, including elevated heart rate and blood pressure. Puzzle-solving promotes cognitive engagement, enabling children to divert their attention from the nebulizer and its discomfort, thereby reducing anxiety.

The significant reduction in anxiety following puzzle play therapy can be attributed to several factors. Puzzles serve as a distraction from nebulizer therapy, allowing children to focus on an enjoyable and engaging activity. The tactile and visual elements of puzzles activate the parasympathetic nervous system, counteracting the physiological stress response induced by the nebulizer procedure (Bouras et al., 2023). Additionally, puzzle play can foster a sense of control, especially for children undergoing medical procedures that may induce feelings of powerlessness. Research indicates that allowing children to exert control over certain aspects of their experience can significantly decrease anxiety levels. Solving puzzles provides children with a sense of accomplishment, aiding in emotional regulation and mitigating the effects of stressful medical interventions.

CONCLUSION

This study demonstrates that puzzle play therapy significantly alleviates anxiety in preschool children with Acute Respiratory Infections (ARI) undergoing nebulizer therapy. Therapeutic play appears to reduce anxiety in pediatric patients during medical procedures. This study highlights the importance of play-based therapies in clinical settings, particularly for children undergoing stressful procedures, showing a decrease in anxiety levels. Given these positive findings, healthcare practitioners should consider integrating puzzle play therapy into standard pediatric care for children undergoing nebulizer therapy and other medical treatments. Future studies should examine the long-term effects of puzzle play therapy and evaluate its effectiveness across a broader range of medical interventions.

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AUTHORS' CONTRIBUTIONS

Umi Sofiatun: Conceptualization, Methodology, Data Collection, Writing – original draft.
Nafisatun Nisa: Supervision, Formal Analysis, Writing – review & editing, Validation.
Siti Lestari: Investigation, Resources, Writing – review & editing.
All authors have read and approved the final version of the manuscript and consent to its submission to the *Journal of Vocational Nursing*.

CONFLICT OF INTEREST

The authors declare no conflict of interest related to this study.

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REFERENCES

Ari, A. (2021). A path to successful patient outcomes through aerosol drug delivery to children: a narrative review. *Ann Transl Med*, *9*(7), 593. https://doi.org/10.21037/atm-20-1682

Arif Rohman, M., & Mutia, F. (2023). *Growth And Development Of Preschool-Aged Children*. Probolinggo: Eureka Media Aksara.

Bates, R. A., Militello, L., Barker, E., Villasanti, H. G., & Schmeer, K. (2022). Early childhood stress responses to psychosocial stressors: The state of the science. *Dev Psychobiol*, *64*(7), e22320. https://doi.org/10.1002/dev.22320

Bouras, N. N., Mack, N. R., & Gao, W.-J. (2023). Prefrontal modulation of anxiety through a lens of noradrenergic signaling [Review]. *Frontiers in Systems Neuroscience*, *17*. https://doi.org/10.3389/fnsys.2023.1173326

Cardinal, F. G., Arroyo, G. M., Magbanua, S., & Sajnani, A. K. (2017). Measurement of Anxiety in 3-9 Year Old Children Receiving Nursing Intervention. *J Caring Sci*, *6*(4), 293-302. https://doi.org/10.15171/jcs.2017.028

Dave, N. M. (2019). Premedication and Induction of Anaesthesia in paediatric patients. *Indian Journal of Anaesthesia*, *63*(9), 713-720. https://doi.org/10.4103/ija.IJA_491_19

Fathmawati, F., Rauf, S., & Indraswari, B. W. (2021). Factors related with the incidence of acute respiratory infections in toddlers in Sleman, Yogyakarta, Indonesia: Evidence from the Sleman Health and Demographic Surveillance System. *PLoS One*, *16*(9), e0257881. https://doi.org/10.1371/journal.pone.0257881

Godino-Ianez, M. J., Martos-Cabrera, M. B., Suleiman-Martos, N., Gomez-Urquiza, J. L., Vargas-Roman, K., Membrive-Jimenez, M. J., & Albendin-Garcia, L. (2020). Play Therapy as an Intervention in Hospitalized Children: A Systematic Review. *Healthcare (Basel)*, *8*(3). 239. https://doi.org/10.3390/healthcare8030239

Haryadi. (2019). Pengaruh Terapi Bermain Puzzle Terhadap Tingkat Kecemasan Hospitalisasi pada Anak Usia Pra Sekolah (3-6 Tahun) di RSUD Dr. Harjono abupaten Ponorogo. https://doi.org/10.33846/2trik9414

Inderiati, D., Rachmawaty, T., & Amaniah Anhar, C. (2023). Identification of Acute Respiratory Infection Patients Using RP2 Nested Multiplex PCR Test in Jakarta, Indonesia. *Medical Laboratory Technology Journal*, *9*(1), 53-62. https://doi.org/10.31964/mltj.v8i2.519

Islaeli, I., Yati, M., Islamiyah, & Fadmi, F. R. (2020). The effect of play puzzle therapy on anxiety of children on preschooler in Kota Kendari hospital. *Enfermería Clínica*, *30*, 103-105. https://doi.org/https://doi.org/10.1016/j.enfcli.2019.11.032

Kemenkes. (2023). *Indonesia Health Profile 2023*. (https://www.kemkes.go.id/id/profil-kesehatan-indonesia-2023).

Kuzujanakis, M. (2021). Anxiety in today's children and young adults. *Gifted Education International*, *37*(1), 54-66. https://doi.org/10.1177/0261429420934445

Longest, W., Spence, B., & Hindle, M. (2019). Devices for Improved Delivery of Nebulized Pharmaceutical Aerosols to the Lungs. *J Aerosol Med Pulm Drug Deliv*, *32*(5), 317-339. https://doi.org/10.1089/jamp.2018.1508

Nisa, N., Mariyam, & Yosafianti, P. V. (2023). The Effect of Building Block Therapeutic Play Program on Preschooler's Anxiety Levels in Indonesia. In *Proceedings of the 1st Lawang Sewu International Symposium 2022 on Health Sciences (LSISHS 2022)* (pp. 306-314). https://doi.org/10.2991/978-94-6463-132-6_35

Nurwulansari, N., Ashar, M. U., Huriati, H., & Syarif, S. (2019). The Effect of Constructive Play Therapy on Anxiety Levels of Preschool Children Due to Hospitalization. *Journal of Health Science and Prevention*, *3*(3S), 72-78. https://doi.org/10.29080/jhsp.v3i3S.282

WHO. (2024). World Health Statistics 2024: Monitoring Health for the SDGs, Sustainable Development Goals. https://doi.org/9789240094703

Wulandari, R. A., Fauzia, S., & Kurniasari, F. (2024). Investigations on the risk factors of Acute Respiratory Infections (ARIs) among under-five children in Depok City, Indonesia. *Ann Ig*, *36*(1), 15-25. https://doi.org/10.7416/ai.2023.2580