Effectiveness of pop-it therapeutic play on children's anxiety during inhalation therapy in children's wards

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Abstract

Hospitalized children receive anxiety-triggering medical procedures, such as inhalation therapy. One non-pharmacological intervention that can be provided to reduce children's anxiety is pop-it therapeutic play. This study aimed to measure the effectiveness of pop-it therapeutic play on children's levels of anxiety during inhalation therapy in children's wards. This study used a randomized control trial involving 66 children aged 1–12 years who received inhalation therapy and were treated in the children's ward from three hospitals in North Sulawesi. The respondents were divided into intervention and control groups, with 33 respondents for each group. The samples were selected using simple random sampling. Anxiety level was assessed using the Visual Facial Anxiety Scale. The findings showed that playing pop-it effectively reduced children's anxiety levels during inhalation therapy, with a p value of 0.000 ($\alpha < 0.05$). Therefore, playing pop-it is the right solution for children who receive inhalation therapy and is recommended as an alternative toy in hospitals. This finding can be applied in children who receive inhalation therapy because it is easy to do, efficient and effective controlling the children's anxiety.

Introduction

Hospitalization is an emotionally disturbing, stressful, and threatening experience for children.[1] Hospitalization is a process that requires children to stay in a hospital for planned or emergency reasons, therapies, medical procedures, and treatment until they recover and are allowed to go home.[2] Data showed that child hospitalization in 2020 was 3.94%, which was 3.84% higher compared with that in 2019.[3] One of the most frequent causes of hospitalization in children and even death is Acute Respiratory Infection (ARI).[4]

ARI is easily transmitted and usually causes symptoms of cough, runny nose, and fever; it is also the most frequent cause of infant mortality in developing countries.[5] In Indonesia, based on the results of the 2018 Basic Health Research, the national prevalence of ARI based on the diagnosis of health workers and symptoms was 9.3% in 35 provinces.[6] The most common treatment for ARI is inhalation therapy using a nebulizer. However, this method has several disadvantages that increase anxiety and discomfort in children, such as the use of a face mask, device noise, and even oxygen grid noise.[7] Inhalation therapy is the treatment of mucolytics and bronchodilators in the form of inhalation, which loosens the secretions in the respiratory tract that can cause respiratory tract obstruction.[8] Inhalational therapy, today, happens to be the mainstay of treatment in Obstructive Airway Diseases (OADs),

such as asthma, Chronic Obstructive Pulmonary Disease (COPD), and is also in the present, used in a variety of other pulmonary and even non-pulmonary disorders.[9] Although this therapy is commonly used in children and is painless, the use of a mask and steam during nebulizer therapy can cause discomfort and trigger anxiety in children.[10]

Anxiety usually arises in situations that make a person feel threatened by an impending danger; however, anxiety is not specific and becomes highly comprehensive, abstract, and difficult for children to define.[11] Anxiety is difficult to identify; it also requires certain treatments and strategies to evaluate the signs and symptoms of children.[12] Anxiety in children makes them refuse the medical procedure and treatment, which, if not addressed as early as possible, affects the length of stay and worsens their condition.[13] Therapeutic play can be the right solution to reduce anxiety in children during medical procedures and treatment. Playing can prevent fear, anxiety, anger, and hostility. Playing can be an effective coping mechanism for reducing anxiety.[14]

Therapeutic play is an activity that can help change children's problematic behavior, stimulate their growth and development, make them cooperative, and accelerate their recovery process.[15] Playing is an activity that children love to do because it is a good medium for them to learn to communicate, recognize their surroundings, and improve their mental and social well-being.[16]

Pop-it therapeutic play is an activity that uses pop-it toys to provide comfort and train children's motor, sensory, and cognitive performance during their growth process. Pop-it is a toy made of silicone in the form of bubbles that can be squeezed. Pop-it has various and unique shapes, colors, and sizes. This toy is not only entertaining but also trains the children's motor and sensory performance. Pop-it has become the most popular toy among children since becoming viral on TikTok. Almost every child in the city and region has this toy at home, and some of them have more than one toy and collect it. The method used in pop-it therapeutic play is the distraction method, which distracts children from inhalation therapy procedure. Providing pop-it therapeutic play interventions will divert the child's attention from inhalation therapy procedures and focus on play activities, so that children will be cooperative during inhalation therapy.

The distraction technique diverts the client's attention from harmful stimulation; thus, they become relaxed, calm, and comfortable in their activities. The benefit of the distraction technique is that it provides a sense of comfort, relaxation, and a pleasant situation.[17] The distraction technique consists of visual, intellectual, auditory, and breathing distractions. The concept of distraction, which is both active and passive distraction, is an important part of therapeutic play. Therapeutic play can distract children with an interesting media and is convenient for them; thus, their attention can be diverted from pain, anxiety, fear, and stress caused by medical procedures or the hospital environment during hospitalization.[18]

This study used Kolcaba's theory of comfort to provide the intervention of playing pop-it for children during inhalation therapy. This theory explains eight main concepts that aim to provide comfort to service recipients with appropriate interventions.[19] In this theory, Kolcaba stated that nursing services are services for a sense of comfort that continues to develop from stressful conditions to health services that cannot be achieved with existing facilities.[20] Therefore, the implementation of Kolcaba's theory in child nursing care can provide comfort for children to avoid anxiety.

Anxiety caused by inhalation therapy is common; therefore, any therapeutic play intervention must be conducted.[21] Considering that a new type of toy (pop-it), which has received numerous attention, is liked by children and has never been researched before, the author was interested in studying the effectiveness of pop-it therapeutic play on children's inhalation therapy-induced anxiety. This study aimed to measure the effectiveness of playing pop-it on the anxiety levels of children receiving inhalation therapy. In addition, the author wanted to identify the differences in anxiety levels between the two groups and the relationship of demographic characteristics (age, sex, and inhalation experience) to children's anxiety.

Materials and Methods

The study used a randomized-controlled trial with a pre–post test control group design (Tables 1 and 2). The researcher selected respondents who fulfilled the inclusion and exclusion criteria, then the researcher introduced themselves to the selected respondents and caregivers. The researcher explained the research procedures and asked for the caregivers' consent to involve their children in the study by signing an informed consent. The independent variable in this study is pop-it therapeutic play, and the dependent variable is anxiety level. Pop-it therapeutic play is led by a nurse by giving instructions to the child for example "squeeze the red bubble" then the child squeezes the pop-it bubble according to the instructions given by the nurse. The nurse gave a wide variety of playing techniques according to the children's ages, such as getting to know colors, getting to know shapes or animals, learning to count, and pop-it bubble speed competitions.

The study involved 66 samples that met the inclusion criteria: children who were treated in the children's ward and received inhalation therapy, children aged 1–12 years, children without any cognitive impairment and upper limb mobility problems, children who could play pop-it, and children who were accompanied by their parents/family and who received approval from them. All respondents were randomly divided into the intervention group and the control group by using a simple random sampling method, and 33 respondents were included in each group. The process of

Table 1. Distribution of respondent characteristics based on sex and inhalation experience.

Characteristics	Intervention Group		Control Group	
	n	%	*n*	%
Sex				
Male	20	60.6	17	51.5
Female	13	39.4	16	48.5
Total	33	100	33	100
Inhalation experience				
Yes	17	51.5	15	45.5
No	16	48.5	18	54.5
Total	33	100	33	100

grouping applied the blinding method; hence, the respondents had no idea whether they were in the intervention or control group (Figure 1). The 66 respondents who were randomly selected, no respondents withdrew from the intervention or control groups in this study.

Data were collected using the Visual Facial Anxiety Scale, which has been tested for its validity and reliability in the previous study.[22] The data collection process started with the pre-test of anxiety level assessment conducted in the intervention and control groups during the installation of the inhalation therapy equipment in the form of a mask that already contained the drugs and was connected to a nebulizer. After the pre-test was completed, the respondents in the direct intervention group were given a pop-it therapeutic play intervention during the inhalation procedure which lasted about 15-20 minutes and the control group was given standard care during the inhalation therapy procedure. After 5 minutes, the post-test was carried out. To maintain the objectivity of the assessment, the research assistants, who had been declared eligible after going through the interpreter reliability test, performed the pre-test and post-test. Univariate analysis was used on the variables of age, sex, inhalation experience, and anxiety level to descriptively analyze the research variables by calculating the central tendency for numerical data and frequency distribution for categorical data. Bivariate analysis used the Wilcoxon test for paired group data analysis, and the Mann–Whitney test was used for unpaired group data analysis. Meanwhile, the correlation analysis between confounding variables and anxiety level used the Spearman correlation test. This study did not use multiple regression analysis tests to determine the influence the confounding variables had on the interventions given. This study obtained ethical approval from the Ethics Committee, Faculty of Nursing Universitas Indonesia (number: Ket-45/UN2.F12.D1.2.1/PPM.00.02/2022). The data were collected from three hospitals, namely, RSUD Talaud, RSUD Manembo-nembo Bitung, and RSUD Prof Dr. R. D. Kandou, for 3 months (April–June 2022).

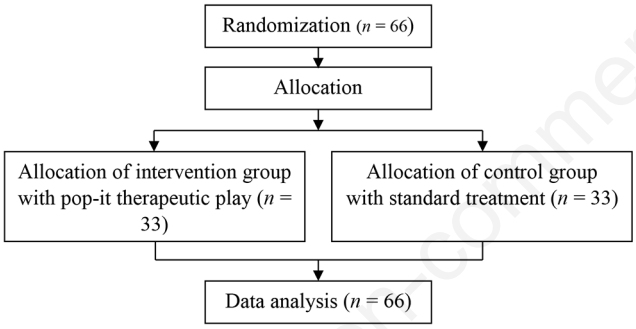

Figure 1. Respondent selection flowchart.

Results

The mean ages of the respondents in this study were 4.30 (1–12) and 3.61 (1–12) years in the intervention and control groups, respectively, with a median value of 3 in both groups. The standard deviations in the intervention and control groups were 2,974 with 95% CI 3.33–5.26 and 2.850 with 95% CI 2.56–4.62, respectively.

Table 1 presents that this study was dominated by male, with 37 respondents; the intervention group and the control group had 20 respondents (60.6%) and 17 respondents (51.5%), respectively. Meanwhile, 13 (39.4%) and 16 (48.5%) women were in the intervention and control groups, respectively. In terms of inhalation experience, the intervention group had 17 respondents (51.5%) with inhalation experience and 16 respondents (45.5%) without any inhalation experience. In contrast, the control group had 15 respondents (45.5%) with inhalation experience and 18 respondents (54.5%) without any inhalation experience.

The description of respondents' anxiety levels (as seen in Table 2) during pre-test in the intervention group had the same category as when the post-test was conducted, namely, the respondents experienced mild to mild moderate levels of anxiety. Some respondents showed no anxiety, and severe anxiety (highest level) was not experienced by any respondents. Table 2 shows the differences in the frequency and percentage of anxiety levels during the pre-test and post-test in the intervention group, especially the increase in the number of children (23 respondents) who had not experienced anxiety during the post-test. This condition may occur due to the intervention of pop-it therapeutic play.

The anxiety level experienced by respondents in the control group had different categories, in which during the pre-test, the respondents experienced mild to moderate anxiety levels, whereas after the post-test, some respondents experienced moderate to moderate high anxiety levels. Table 2 shows the differences in the frequency and percentage of respondents' anxiety levels during the pre-test and after the post-test. The number of respondents (10

Table 2. Distribution of respondents' characteristics based on anxiety level.

Group	Level of Anxiety	Pre-test		Post-test	
		n	%	*n*	%
Intervention	None	3	9.1	23	69.7
	Mild	14	42.4	6	18.2
	Mild Moderate	11	33.3	1	3.0
	Moderate	4	12.1	2	6.1
	Moderate High	1	3.0	1	3.0
	Highest	0	0	0	
Control	None	6	18.2	3	9.1
	Mild	12	36.4	11	33.3
	Mild Moderate	9	27.3	7	21.2
	Moderate	6	18.2	10	30.3
	Moderate High	0	0	2	6.1
	Highest	0	0	0	0
Total		66	100	66	100

respondents) who experienced moderate levels of anxiety increased, and 2 respondents experienced moderate high level of anxiety, which was not previously found during the pre-test. Table 2 also shows the decrease in the number of respondents who experienced no anxiety during the post-test. This finding indicates that 3 respondents who experienced no anxiety during the pre-test also became anxious because of the inhalation procedure. This condition may occur because the respondents in the control group only received standard treatment instead of pop-it therapeutic play intervention.

Table 3 shows the significant correlation between pop-it therapeutic play and children's anxiety levels during inhalation therapy (mean = 22.68; p = 0.000). The level of anxiety during the post-test or after the intervention of pop-it therapeutic play decreased as the number of respondents who experienced no anxiety during inhalation therapy increased. A significant correlation was also observed in the control group between standard treatment and the anxiety level of children receiving inhalation therapy because their level of anxiety increased during the post-test. The number of respondents who experienced moderate and moderate high levels of anxiety increased (mean = 21.63; P = 0.005). Meanwhile, the statistical test between groups showed a significant correlation between pop-it therapeutic play and children's levels of anxiety (mean = 67; p = 0.005). This finding indicates that playing pop-it is effective in reducing children's anxiety during inhalation therapy.

Table 4 shows a significant correlation between age and level of anxiety (p = 0.000; r = −0.572), indicating that the relationship between age and anxiety level was significant and moderate but not unidirectional. In summary, the older the child, the lower their anxiety levels during the inhalation therapy. Regarding sex characteristics, an insignificant, weak, and unidirectional relationship with anxiety levels was observed (p = 0.226; r = 0.094), indicating that sex had not affected the increase or decrease in anxiety levels in children receiving inhalation therapy. Furthermore, inhalation experience also had an insignificant relationship with the level of anxiety (p = 0.291; r = 0.069), indicating that the children's inhalation experience had not affected the increase or decrease in their level of anxiety during inhalation therapy.

Discussion

A play therapy is considered as one of treatments to cope with anxiety in children. Children can distract the pain on the play activities and relaxation.[23] This study identified the characteristics of the respondents, namely, age, sex, previous inhalation experience, and level of anxiety. This study analyzed the level of anxiety before and after the intervention in both the control and intervention groups to measure the effectiveness of pop-it therapeutic play on children's anxiety during inhalation therapy. Furthermore, this study examined the correlation between respondent characteristics and the level of anxiety. The respondents were 1–12 years old, dominated by males, and many of them had never undergone inhalation therapy. Differences in the frequency and percentage of anxiety levels were found in the intervention and control groups during the pre-test and post-test. In the intervention group, the number of respondents with decreased levels of anxiety was higher than those with increased anxiety levels.

Based on the results of the data analysis on anxiety levels in the intervention group, the children's anxiety levels after the intervention of pop-it therapeutic play during inhalation therapy decreased. Meanwhile, in the control group, the level of anxiety after inhalation therapy using standard procedures increased. The statistical test between groups explained that a significant correlation was found between playing pop-it and children's anxiety levels during inhalation therapy. In other words, pop-it therapeutic play was effective in reducing the anxiety levels of children receiving inhalation therapy.

Age also showed a significant correlation with the children's anxiety levels during inhalation therapy; the older the age, the more they can control and reduce their anxiety. Meanwhile, sex showed no significant correlation with the children's anxiety level, showing that both boys and girls had no correlation with an increase or decrease in anxiety levels due to inhalation therapy procedures. Furthermore, previous inhalation experience also showed no significant correlation with the level of anxiety; therefore, the increase or decrease in children's anxiety levels was not affected by their previous inhalation experience.

This study also applied the Kolcaba theory of comfort. This theory has eight main concepts: health care needs, comfort intervention, intervening variables, comfort, health-seeking behaviors, institutional integrity, best practice, and best police.[24] The main concepts of Kolcaba's theory in this study were applied in the intervention of pop-it therapeutic play in 66 respondents and were successfully conducted and enjoyed by the children during inhalation therapy; thus, the children could control and even reduce their anxiety. The distraction method in pop-it therapeutic play successfully diverted the children's attention to the toy; thus, they felt comfortable in accordance with the goals of Kolcaba's theory. According to Kolcaba, nurses

Table 3. Comparative analysis of anxiety levels.

Variable	Group	*n*	Mean Rank	p-value
Level of Anxiety	Intervention	33	22.68	0.000*
	Control	33	21.63	0.005*
	Between Groups	66	67	0.005**

*Wilcoxon, **Mann Whitney <0.05.

Table 4. Correlation between children's characteristics and level of anxiety.

Characteristics	*n*	r	p-value
Age	66	−0.572	0.000*
Sex	66	0.094	0.226*
Inhalation Experience	66	0.069	0.291*

*Spearman <0.05.

play an important role in providing comfort to clients and their families during hospitalization. Therefore, any innovation in the form of independent nurse interventions, such as therapeutic play, is necessary to create a sense of comfort, especially for children. The application of Kolcaba's theory in this study helped the researcher achieve the research objective of reducing the level of anxiety (comfort) in children receiving inhalation therapy.

The implications of this study for pediatric nurses, that is, the results of this study, can be a source of the latest information for nurses in providing therapeutic play activities, as well as a reference in the application of nursing care to children who experienced anxiety during inhalation therapy and become a reference for increasing knowledge, skills, and care for pediatric nurses in nursing practice. This study also has implications for health care facilities by providing an overview of the effectiveness of pop-it therapeutic play on children's anxiety levels during inhalation therapy. Therefore, all health care facilities in every setting, from primary to secondary to tertiary health care services that serve child care, must implement child-friendly care services by providing play facilities, one of which is the pop-it toy, which has been proven to be therapeutic. Meanwhile, the implication of the research for the community is that the results of this study can become the latest reference for parents in providing play media for children. Children will acquire many benefits from pop-it toys. The results of this study will be the latest source of information for parents whose children often experience anxiety; thus, they can independently help their children control their anxiety by providing play activities, such as pop-it therapeutic play.

Conclusions

Pop-it therapeutic play is a non-pharmacological nursing intervention that is effective in reducing the anxiety level in children during inhalation therapy, with a p value of 0.000 ($\alpha < 0.05$). Pop-it therapeutic play can also be recommended as a game that can stimulate children's growth and development so that caregivers and children can do it at home. The limitation of this study is that the researcher did not run a multiple regression analysis test to determine the effect of confounding variables on the interventions given. Therefore, future research may explore more confounding variables that affect children's anxiety levels such as length of stay, parental assistance and children's coping mechanisms.

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