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**Is therapeutic play effective at reducing preoperative anxiety in
children age 4 through 12?**

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A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements For

The Degree of Master of Science

In

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Department of Physician Assistant Studies
Philadelphia College of Osteopathic Medicine
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ABSTRACT

OBJECTIVE: The objective of this selective EBM review is to determine whether or not therapeutic play is effective at reducing preoperative anxiety in children age 4 through 12.

STUDY DESIGN: Three single blind, randomized controlled trials that were published between 2008 and 2010 and published in the English language.

DATA SOURCES: Each of the three studies that evaluate the effectiveness of therapeutic play in pediatric populations were found using the PubMed database based on their relevance to the clinical question and their inclusion of patient oriented outcomes.

OUTCOMES MEASURED: These three articles compared anxiety and stress levels in preoperative therapeutic play and standard preoperative procedures with the Modified Yale Preoperative Anxiety Scale (m-YPAS), Chinese version of the State Anxiety Scale for Children (CSAS-C) and Preschool Behavior (Behar) Questionnaire.

RESULTS: All three studies found a significant decrease in the anxiety levels of children who were involved in preoperative therapeutic play when compared to those who underwent standard preoperative procedures. In the Athanassiadou et al. study, a p-value was not reported; however, the results were concluded to be statistically significant in showing that preoperative play led to lower anxiety levels in children.¹ In the Hosseinpour et al. study, it was demonstrated that preoperative play was successful at reducing anxiety levels in children with a statistically significant p-value of 0.001 generalizable to gender and age for the targeted population.² In the Li et al. study, the experimental had a mean anxiety level of 34.36 and a control mean anxiety level of 36.16 with a reported test statistic p-value of 0.002 indicating statistical significance.³

CONCLUSION: The results of these three studies comparing anxiety levels in children who received preoperative play with children who received standard preoperative procedure demonstrated that it is possible to reduce anxiety levels in children age 4 through 12 with intended intervention.

KEYWORDS: “therapeutic play” “preoperative play” “surgery”

INTRODUCTION

Preoperative anxiety is a state of worry or nervousness that occurs prior to surgical intervention. It is common for patients to be fearful and anxious in regards to medical and surgical procedures. Even though it is unknown which children will suffer from preoperative anxiety, it is suggested that risks are higher if they are older than 7 years old, have introverted personalities, were born to anxious parents, lack siblings, are without a preschool experience, or have previous negative experiences in the medical setting.⁴ Specifically for children, preoperative anxiety is thought to affect close to 60% of kids undergoing operative procedures.⁴ This is important because it can alter the operative and postoperative outcomes. For example, increased preoperative anxiety can lead to difficulties with anesthesia and recovery from the operation.⁴ As reported by the Open Anesthesia Organization, poor conduct can be seen up to one year following surgery in children who experience preoperative anxiety.⁴

In order to reduce or prevent this anxious state, therapeutic play can be utilized in the medical setting prior to surgery.⁵ Therapeutic play allows a child to be exposed to medical equipment and procedures in a playtime setting.⁵ Therefore, allowing children to familiarize themselves with their surroundings and even “practice” using the equipment on dolls and puppets to become more comfortable with the surgical setting.⁵ These programs are not considered to be an extreme cost.⁵ Although there is not specific information on the exact cost of a child life program, a majority of the funding comes from the hospital’s operations budget.⁵ However, donations also play a huge role in the offerings of these programs.⁵ Additional supplies and services are supplied through direct donations of supplies or through monetary donations that go to purchasing supplies.⁵ Therapeutic play programs are available in a majority of

pediatric hospitals around the United States and are accessible to all inpatient and outpatient children as well as their families.⁵

Standard preoperative procedures are the usual practice for preoperative care. This involves the patient being placed in a preoperative holding area. Here patients can receive information on their procedure and what is to be expected afterwards.⁶ Alternative measures that can be used for reducing preoperative anxiety include having the parents stay with the child, preoperative programs, and pharmacological management.⁴ Some common medical management options include Midazolam, Ketamine, Fentanyl, Dexmedetomidine, Clonidine.⁴

Therapeutic play is being introduced as a way to reduce anxiety in children undergoing medical/surgical procedures. It is suggested that preoperative play helps to reduce anxiety in children between the age of 4 and 12 years. This paper evaluates three randomized controlled trials that address the effectiveness of therapeutic play in reducing anxiety in children exposed to surgical settings.

OBJECTIVE

The objective of this selective EBM review is to determine whether or not therapeutic play is effective at reducing preoperative anxiety in children age 4 through 12.

METHODS

This review utilized three single blind randomized controlled trials. The studies were directed to look at children between the ages of 4 and 12 undergoing elective surgery. The goal of these three studies was to analyze the effects of preoperative play in comparison with standard preoperative intervention. In the Athanassiadou et al. study, the therapeutic play included puppet therapy one day prior to surgery and psychologist structured puppet play.¹ This was compared to the control group which underwent standard admittance procedures.¹ In the Hosseinpour et al.

study, the children in the experimental group received preoperative therapeutic play for thirty minutes while the control group received standard preoperative procedure with thirty minutes in the waiting hall.² Additionally, in the Li et al. study, the intervention included therapeutic play one week before surgery, a tour of the operating room, demonstration with a doll, and freedom to explore the medical equipment.³ The control group received an information session and a video on operative procedures.³ These two interventions were compared by measuring the reduction in anxiety as reported by the children, their parents, or both.

The articles were found by searching specific keywords. In order to find these studies, the keywords “therapeutic play,” “preoperative,” and “surgery” were used. Each of the three randomized controlled trials analyzed in this systematic review were published in the English language. They were all found in peer-reviewed journals on the PubMed database. These articles were chosen based on the based on their relevance to the clinical question and their inclusion of patient oriented outcomes.

The inclusion criteria for these articles included studies that were published no earlier than 1999 and conducted as a randomized controlled trial. The studies were targeted towards a pediatric age group who were undergoing elective surgery. The major exclusion criterion was that adult populations would not be included in this systemic review. Throughout each article there was additional exclusion criteria established by the authors including children with any one of the following: previous operations, cognitive disabilities, learning disabilities, developmental delays, or psychiatric conditions. The goal of this systemic review was to focus on patient oriented outcomes; therefore, articles with disease oriented outcome measures were excluded. These articles used p-values as the main indicator for statistical significance, with the Hosseinpour et al. study additionally using NNT and ARR.

Table 1 - Demographics & Characteristics of included studies

Study	Type	# of Patients	Age (years)	Inclusion Criteria	Exclusion Criteria	W/D	Intervention
Athanassiadou ¹ (2009)	Single Blind RCT	91	4-10 years	Undergoing elective ENT surgery and accompanying parent	N/A	0	Psychologist structured puppet play one day prior to surgery, counseling for parent one day prior to surgery
Hosseinpour ² (2010)	Single Blind RCT	200	> 4 years	Undergoing elective surgery	Previous operations, prolonged illnesses, developmental delays, psychiatric conditions	0	Preoperative therapeutic play for 30 minutes
Li ³ (2008)	Single Blind RCT	203	7-12 years	Undergoing elective surgery, ability to speak Chinese and Cantonese	Previous operations, cognitive disabilities, learning disabilities	0	Preoperative play 1 week prior to surgery, tour of the operating room, demonstration on a doll, freedom to explore medical equipment

OUTCOMES MEASURED

The outcome measured in these studies was a reduction in anxiety levels with the use of therapeutic play as opposed to standard preoperative procedure. In the Athanassiadou et al. study, the Preschool Behavior (Behar) Questionnaire was used to assess the outcomes with the

addition of the observation of hyperactive behavior, aggression, anxious behavior, and changes in concentration. The Hosseinpour et al. study used the Modified Yale Preoperative Anxiety Scale (m-YPAS) to measure the outcomes. This tool assessed the children in five different categories: state of arousal, vocalization, use of parents, activity, and emotional expression. Additionally, the Li et al. study used the Chinese version of the State Anxiety Scale for Children (CSAS-C) in which the children responded to 20 questions about how they were feeling. These outcomes from the intervention group were compared to the control group by using p-values to determine statistical significance.

RESULTS

This systemic review was designed to analyze three randomized controlled trials that determined the efficacy of preoperative therapeutic play in the reduction of anxiety in children undergoing elective surgery. In the three studies, the experimental group was assigned some form of therapeutic play prior to surgery while the control group received some form of standard preoperative intervention. Each study measured anxiety levels prior to the operation through the use of a variety of different scales. There was no participant withdrawal documented in any of the three studies.

The Athanassiadou et al. study was conducted on 91 children between the ages of four and ten undergoing elective ear, nose or throat (ENT) surgery who presented with their mother.¹ There was no particular exclusion criteria documented for this study.¹ This study population was broken down into two subgroups: preschool aged (four to six years) and school aged (seven to ten years).¹ The data was analyzed by looking at the experimental therapeutic play group and the control group using standard preoperative intervention.¹ In this randomized controlled trial, the experimenters evaluated the children for a change in anxiety level and behavior in the

preoperative and postoperative periods.¹ The experimenters concluded that there was a significant change in the Behar and Rutter scales in the preoperative experimental group; however, the baseline data was not provided in order to determine the actual significance.¹

The Hosseinpour et al study was conducted on 200 children over the age of four who were undergoing elective surgery.² Children were excluded if they had previously undergone any type of surgery, had learning or cognitive dysfunctions, or had prolonged medical conditions.² The study population was broken down into an experimental preoperative play group of 100 participants and a control group of 100 participants undergoing standard preoperative intervention.² With the use of the modified Yale Preoperative Anxiety Scale (mYPAS), the researchers were able to measure anxiety through five categories: activity, vocalization, emotional expressivity, state of arousal, and use of parents.² As displayed in Table 2, there were statistically significant p-values noted in each of the five categories.² Children in the experimental group were more likely to show activity and vocalize (comment, ask questions).² Specifically, 52% of the experimental group displayed happiness representing the experimental event rate (EER) as compared with only 8% representing the control event rate (CER).² This parallels to a relative risk reduction (RRR) of 5.5, an absolute risk reduction (ARR) of 0.44, and a number needed to treat (NNT) of 3 (Table 3). Therefore, only three patients would need to be treated with therapeutic play in order for one additional patient to have a reduction in anxiety. Additionally, the children in the experimental group were more likely to be alert and had a better state of arousal than the control group.² Whereas the control group was more likely to cry, show distress, and rely on their parents.² In particular, 34% of children in the experimental group were able to play independently representing the experimental event rate (EER) whereas, only 14% of the control group were able to play independently, representing the control event rate (CER).²

This parallels to a relative risk reduction (RRR) of 1.42, an absolute risk reduction (ARR) of 0.2, and a number needed to treat (NNT) of 5 (Table 3). Therefore, only five patients would need to be treated with therapeutic play in order for one additional patient to experience a reduction in anxiety.

Table 2- Significant Results from mYPAS²

mYPAS category	Activity	Vocalization	Emotional Expressivity	State of Arousal	Use of Parents
p-value	0.001	0.001	0.001	0.001	0.001

Table 3- Calculations for Treatment from Hosseinpour et al²

	CER	EER	RRR	ARR	NNT
Preoperative Emotional Expressivity of Happiness	0.08	0.52	5.5	0.44	3
Ability to play independently without the use of parents	0.14	0.34	1.42	0.2	5

The Li et al study was conducted on 203 children between the ages of seven and twelve undergoing elective surgery who were accompanied by either one of their parents.³ Children were only included in the study if they were capable of speaking Chinese and Cantonese and excluded if they had previously undergone any type of surgery or had learning or cognitive dysfunctions.³ The participants were separated with 106 children in the control group and 97 children in the experimental group.³ As demonstrated in Table 4, there was a mean difference of 4.24 between the preoperative anxiety levels of the experimental and control groups with statistical significance represented by a t-value of 3.6 and a p-value of 0.001.³ The experiment concluded that there was a significant difference in the anxiety levels of children who received therapeutic play with those who received standard intervention.³

Table 4- Treatment Effects of Preoperative Play as conducted by Li et al.³

	Mean	Standard Deviation	t-value	p-value
Preoperative Anxiety State of Experimental Group	34.36	8.08	3.6	0.001
Preoperative Anxiety State of Control Group	38.60	8.52		

Each of these studies was conducted on children who were admitted to a surgical unit for an elective surgical procedure.^{1,2,3} None of the studies reported any problems with compliance indicating that no one withdrew from the trials.^{1,2,3} There were no adverse affects noted with the therapeutic play intervention.^{1,2,3} Additionally, there were no difficulties related to tolerability of the intervention reported in any of the three randomized controlled trials.^{1,2,3}

DISCUSSION

According to the results of the three randomized controlled trials analyzed in this review, it appears that preoperative therapeutic play is effective at decreasing anxiety levels in children. The Athanassiadou et al. study reported a significant difference in the preoperative anxiety but did not report a significant p-value.¹ However, the Hosseinpour et al. and Li et al. studies both reported significant findings with p-values less than 0.05.^{2,3} There were no significant outliers noted in any of the studies.^{1,2,3}

Even though the findings of these studies were pretty substantial, there are some limitations of the randomized controlled trials based on the way they were conducted. Although unavoidable, the studies could not be double blinded because the children ultimately needed to be aware that they were receiving therapeutic play. Additionally, the study size in each of the

three studies was relatively small and could have been more significant if the same results were produced with a larger patient population.

Therapeutic play is used throughout many children's hospitals.⁵ However, with the findings found in the three studies used in this review, as well as studies that may be conducted in the future, therapeutic play can become more of a standard of care for pediatric preoperative patients.⁵ Since it is already available in a majority of hospitals, it would not require a great deal of resources for it to be provided in the preoperative setting.⁵ This therapy is offered through the hospital operation budget as well as community donations and is therefore not accounted for by insurance.⁵ Considering the fact that the intervention is only therapeutic play, there are no associated risks with this "procedure."⁵ This type of therapy is used for inpatient and outpatient children in addition to their families.⁵ It is offered to any child in the hospital with a variety of injuries and illness.⁵

CONCLUSION

Based on the findings presented in the trials analyzed in this systemic review, preoperative therapeutic play is considered effective in reducing anxiety in children age four through twelve. Even though the results in the Athanassiadou et al. study were considered significant, the data remains unpublished to support this claim. Specific data displaying a reduction in anxiety in the experimental group as compared to the control group would have been more supporting towards the hypothesis. Further research should be aimed towards demonstrating the benefit of preoperative play in reducing anxiety and the correlation with postoperative outcomes. By proving the benefit of this intervention, it will hopefully become more widely used in practice.

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