

THE EFFECTS OF PREOPERATIVE EDUCATION ON STRESS IN THE
PEDIATRIC POPULATION

by

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Abstract

The purpose of this research was to critically analyze relevant literature regarding the effects of preoperative education on levels of stress in the pediatric population. The goal of this research is to review and analyze the available literature to determine best practice as it relates to educating the pediatric preoperative patient in order to relieve stress. Research was retrieved from Cumulative Index to Nursing and Allied Health Literature, PsycINFO, and MEDLINE-EBSCOhost databases using keywords pediatric, preoperative, anxiety, stress, fear, children, hospitalized child, education, play therapy, and surgery. Inclusion criteria included research that focused on relieving anxiety or stress in the pediatric surgical patient. Seven research-based articles were found that met the inclusion criteria. Findings indicate surgery is stressful in pediatric patients at all developmental stages. Preoperative education was found to reduce this stress. Verbal, written, and visual means of education all led to a decrease in stress prior to surgery. More research is needed to determine the best developmentally appropriate educational program to relieve stress in the pediatric patient.

Dedication

To my family- thank you for getting me here and making this all possible.

To Erik- thank you for keeping me calm and motivated through this whole process.

I love you all.

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Introduction

Surgery can be a stressful and anxiety-ridden experience for many individuals. The stress caused by such an event can further be escalated by the patient's lack of knowledge surrounding the surgical experience. This would include specific information about the procedure and general information about what will happen before, during and after surgery. Fear of the unknown can potentially be more stressful than the actual procedure itself. This fear and lack of knowledge has led to an incidence of 60% of children having some form of anxiety before surgery (Brophy & Erikson, 1990). Studies have shown that certain children are at an increased risk for having anxiety before surgery. Some risks factors include children who are older than seven years of age, previous traumatizing surgical experiences, parents who experience anxiety, children with no siblings and children who are considered shy (Kain et al., 1996). Even though risk factors include children specifically over the age of seven, many professionals, including nursing psychology, agree that all children, regardless of age, should receive preoperative education (Justus et al., 2006).

The effects of stress on adults include increased heart rate, increased blood pressure and decreased wound healing (Forshee, 2008), but can have additional effects on the pediatric population (Li, 2008). Research by Thompson and Vernon (1993) found that children experience psychological upset by surgery that can last for weeks. If left unattended, stress can lead to more serious psychological conditions, such as anxiety (Forshee, 2008). Anxiety is a state of uneasiness that usually contains psychologic and physical elements (Lehne, 2007). Generally, anxiety is a feeling that occurs normally across the lifespan. Intervention becomes necessary

when anxiety interferes with the advancement of a procedure, or interferes with healing or education (Lehne, 2007).

Children often are not given education directly, but rather the parent or care-giver is expected to fulfill the role of educator once information has been directed towards them. Nurses that practice this type of education are putting their pediatric patients at risk for unnecessary anxiety (Li & Lopez, 2008). Parents have reported feeling as though they are the surrogate information provider for their children, rather than the nurse giving their child developmentally appropriate information directly (Smith & Callery, 2004). Children who are able to communicate can verbalize what they believe they should know, and are able to verbalize what methods they believe would best facilitate their learning (Smith & Callery, 2004).

Unfortunately, not all preoperative education is effective. Sometimes patients do not get all the information they need, and sometimes the information provided is not fully understood. Because of this, patients are not getting the information needed prior to surgery, which leads to an increase in preoperative and postoperative anxiety (Brewer et al., 2006). Preoperative education is often not individualized to the patient's developmental or cognitive level (Smith & Callery, 2004).

Children go through developmental stages as they age that dictates specific teaching approaches in order to ensure the most appropriate mode of education delivery. Piaget describes these stages as, "sensorimotor, preoperational, concrete operational and formal operational (London et al., 2007, p. 892)." These stages have certain characteristics that are common throughout the defined age group. Piaget's theory focuses on a child's maturation level, which can be influenced by their environment. Use of these theorists' stages can help direct the mode,

form, and content of preoperative education to what is most developmentally and age appropriate.

Pamphlets are often written using advanced vocabulary and medical jargon that would not be familiar or make sense to a child. Children aged birth to two would benefit from materials that involve a few of the five senses: hearing, sight, sound, touch, and taste (London et al., 2007). Age's two to seven need materials that are simple to understand that does not make complex analogies, or involve the use of perspectives other than the child's. A child during this stage is also very egocentric and material should focus on making them the center of attention (London et al., 2007). From age seven to eleven children have a sense of reasoning and can understand cause and effect relationships. Education for children in this age group should include demonstration and explanation (London et al., 2007). The last stage, ages eleven to adulthood, have the widest range of educational options available. Conceptual ideas, models, abstract thoughts and demonstration can be used to enhance educational delivery to children in this age group (London et al., 2007).

Erikson also developed a theory of psychosocial development. Much like Piaget, specific age ranges and criteria are associated with each stage. Erikson's stages of psychosocial development are more geared toward social issues, while Piaget's stages are more geared toward actions and when different types of logic are formed (London et al., 2007). Erikson believed that there were two options to resolving a crisis, and depending on which path was chosen, the outcome would either be healthy or not. A child's needs being met would be a healthy outcome, while a child's needs not being met would constitute an unhealthy outcome (London et al., 2007).

Erikson's theory has more stages than Piaget's theory. Erikson's first stage is trust versus mistrust, which ranges from birth to age one. During this time, the child learns who can be trusted and who cannot. Generally, those who are trusted are those seen as primary care givers and those who offer food, cleaning, and comfort. If the child learns that these needs cannot be met, then they learn that others cannot be trusted (London et al., 2007). During this stage it is important to be seen as a trusting individual in order to deliver education effectively. The second stage is autonomy versus shame and doubt, spanning ages one to three. This is a very independent stage in a toddler's life. If a child is constantly punished or criticized during this time, they learn to doubt themselves and learn shame. If they are praised, they learn autonomy and to do for themselves (London et al., 2007). Education delivery in this stage should focus on letting the child do activities for themselves. The next stage is initiative versus guilt, and includes the ages from three to six. During this time children are very busy. If they are praised for engaging in new activities, and having new thoughts, then they will learn initiative. On the contrary, if they are constantly punished, they will feel guilt (London et al., 2007). While asking questions during education in this stage, make sure to praise the child for correct answers so they gain confidence. Age's six to twelve encompass the next stage, which is the industry versus inferiority stage. Pride in accomplishments takes precedence in this stage. If children are set to an unfair standard in this stage, and feel as if they cannot perform, they will ultimately learn to believe they are inferior (London et al., 2007). Praise is also essential in this stage during education reinforcement. The final developmental stage in Erikson's theory is the stage for adolescents, which is the identity versus role confusion stage, which includes ages twelve to eighteen. At this time adolescents are confused about who they are, and are trying to find a role

that suits their life. If an adolescent feels that they ultimately have no role, they will have role confusion (London et al., 2007). Making the child feel as though they are an important part of education in this stage is significant.

Furthermore, learning styles vary from patient to patient, and this should be taken into consideration. Tactics such as multimodal approaches can involve drawing, therapeutic play, lecture, written material, and/or video in order for a child to understand their preoperative education.

Background

Early research involving education directed at the pediatric patient was conducted by Visintainer and Wolfer (1975). These researchers studied different techniques for psychological preparations to decrease stress in children prior to elective surgery. This is the earliest article on ways to decrease stress related to preoperative education. A randomized, 4-group experimental design was used. Eighty-four children aged 3 to 12 who were admitted to the hospital for and elective tonsillectomy participated in the study. Inclusion criteria were: no previous hospitalizations within the past year, English-speaking, free from chronic disease, and no medical or psychological conditions. Children in each of the four experimental groups received one of the following interventions: single-session preparation (n=21), consistent supportive care treatment (n=21), stress-point preparation (n=21), or control (n=21). Single-session preparation consisted of one 45-minute teaching session after the child had been admitted. Consistent supportive care consisted of the nurse providing reassurance to the child, but not reinforcing specific responses or expectations. Stress-point preparation aimed to minimize sources of stress and assist the child with developmentally appropriate coping techniques. Children in the control group received routine nursing care. Outcomes were measured using the Manifest Upset Scale and the Cooperation Scale. The Manifest Upset Scale measured the degree of upset by the amount of energy expended. The Cooperation Scale was a 5-point Likert-type scale, with 1 being total cooperation and 5 being extreme resistance. Results of the study indicated preparation and support increases cooperation and decreases stress among children. Stress-point preparation ($P < 0.01$) had the most significant decrease in stress when compared to the control group. While

results were not significant, children in the other experimental groups had lower stress scores than those in the control group.

Another study published in the same year examined the effectiveness of a peer modeling film on decreasing anxiety prior to elective surgery (Melamed & Siegel, 1975). This study was the earliest to explore the effects of a peer modeling film. Sixty children aged 4 to 12 who were admitted to the hospital for elective surgery participated in the study. The subjects were assigned to either the experimental (n=30) or the control group (n=30), with care to ensure that the groups were similar in age, sex, race and type of operation. All groups received standard preoperative education prior to surgery. Participants in the experimental group were shown a short film of a child similar to their age, undergoing a hernia operation. The film depicted the hospital, procedure, and what could be expected throughout the hospital stay. Participants in the control group were shown a similar length film, unrelated to hospitalization, about a preadolescent boy's journey through nature. Outcomes were measured based on Trait Anxiety Scale, behavior problems, Situational State Anxiety Scale, palmar sweat index, and Hospital Fears Scale. Subjects in the experimental group showed statistically lower sweat gland activity ($P < 0.05$), fewer self-reported medical concerns ($P < 0.05$) and fewer anxiety related behaviors ($P < 0.01$), when compared to the control group.

These studies were the first to examine the impact of preparing pediatric patients for the surgical experience. These researchers realized the surgical experience caused anxiety and stress for the pediatric patient, and the potential for education to decrease these phenomena. Based on these studies, researchers continued to examine the effects of different methods of education on several age groups, whose results are reported here.

Problem

Stress is a physiological and psychological state in which a person experiences a stressor or external stimulus that is above their coping abilities, and leads to changes in emotional, behavioral and cognitive states (Forshee, 2008). Surgery can be a stressful and anxiety causing experience for many individuals. The reason that surgery is stressful is because many are afraid of the unknown and feel they have no control over their procedures (Schallom, 2009). This psychological stressor can manifest itself with physiological symptoms. These symptoms include increased heart rate, increased blood pressure, increased blood glucose, dilated pupils, and bronchodilation (Hall, 2009). Because stress causes a multisystem response, it deserves attention in an attempt to prevent or minimize the effects.

Unfortunately, the more anxious or stressed a patient becomes, the less likely they are to understand or be able to pay attention to education given to them. This stress can lead to a lack of knowledge in the patient (Hall, 2009). Due to this inability to pay attention, education is best delivered earlier, and in a calm environment, than the chaos right before surgery.

Children have varying levels of understanding about their bodies related to sickness and illness (London et al., 2007). Furthermore, being hospitalized as a child no matter the age is stressful (London et al., 2007). Educating a patient thoroughly using developmentally appropriate content and delivery methods, is the key to a successful and positive surgical experience (Schallom, 2009).

Purpose

The purpose of this thesis is to provide a comprehensive review of research findings about stress and anxiety related to the surgical experience and various educational interventions

to reduce these phenomena. This thesis aims to promote further research and development of age appropriate educational interventions for pediatric patients preparing for surgery. Additionally, multidisciplinary and multimodal approaches in preoperative education among pediatric patients will be explored.

Method

A synthesis of the current research related to preoperative education, stress and pediatrics was conducted for this thesis. Ages of participants were limited to the range of two to seventeen. Search terms included pediatric, preoperative, anxiety, stress, fear, children, hospitalized child, education, play therapy, and surgery. A review of the research was performed from interdisciplinary databases which include Cumulative Index of Nursing and Allied Health (CINAHL), MEDLINE, and PsycINFO. Inclusion criteria for this thesis consisted of research focused on anxiety or stress related to surgery in the pediatric patient population, preoperative education, peer reviewed articles after 1990, and those written in the English language.

Findings

Durst (1990) studied the effect of a preoperative videotape on children's behavior. Fifty-nine children aged 2 to 10 who were admitted for same day surgery participated in the study. The subjects were assigned to either experimental (n=29) or the control group (n=30). Each of the groups received standard preoperative teaching, according to the center's standards. In addition to this preparation, the experimental group received a seven minute teaching video that depicted children of the same age, demonstrating adequate coping mechanisms. Behaviors were observed and rated by Operating Room (OR) nurses. The behaviors could be recorded as negative or positive. Positive behaviors included actions such as smiling, holding a toy, not being fidgety, and spontaneous talking. Negative behaviors included fidgeting, frowning, closing the eyes, and crying. The OR nurse observers were trained to be able to recognize these behaviors. P-values were not given in the results of the study, because statistics were not run. However, the researcher concluded that this study did not yield the same results that previous studies had. There was no difference in behaviors between the experimental and control group.

Lizasoain and Polaino (1995) studied the effects of a psychopedagogical program on children before hospitalization. Psychopedagogical programs can be described as those that combine both branches of study: Psychology and Pedagogy. Pedagogy is the study of the process of teaching. Forty children aged 8 to 12 who were admitted to the hospital participated in the study. The patients were divided into either the experimental (n=20) or the control group (n=20). Each group consisted of 10 males and 10 females. Diagnoses and reasons for hospitalization varied. Both groups received routine preoperative education delivered by a nurse. The intervention consisted of a tour of the facility on the first day of hospitalization. During the tour,

the parents were given the European Charter of Rights of the Hospitalized Child. Parents were informed that their anxiety levels could directly affect the anxiety levels of their children. The children were allowed and encouraged to ask questions during this tour. The focus of the intervention group was to develop and facilitate a cohesive family coping process. In addition to the tour, the children were also given 3 interventions: relaxation, guided imagery, and social behavior training. The purposes of these interventions were to make the child more aware of their needs and behaviors. Doctors and nurses were blinded to the group assignment of those they were caring for. Anxiety was measured using the State Trait Anxiety Inventory for Children. Values were recorded prior to surgery and after surgery. Subjects in the experimental group had statistically lower rates of anxiety ($P < 0.01$) than those in the control group.

Felder-Puig et al. (2002) studied the effectiveness of a children's book on decreasing anxiety in children undergoing surgery. Four-hundred children aged 2 to 10 undergoing elective tonsillectomy and adenoidectomy surgery, and their mothers', were included in the study. Families were either assigned to the experimental ($n=240$) or control group ($n=160$). Both groups received routine hospital admission education prior to surgery. In addition to this education, the experimental group received a children's book entitled Rabbit Maurice. The book depicts a rabbit who is hospitalized for a tonsillectomy and adenoidectomy. The book was developed by a multidisciplinary group of professionals including psychologists and pediatricians. The book was evaluated for developmental appropriateness. There are 12 scenes depicted in the book, illustrating scenes related to the hospital stay, including: examination, packing for the hospital, admission, nursing staff, and the operating room experience. Anxiety was measured using the State Trait Anxiety Inventory and self-report measures of anxiety by the mother. Values were

recorded prior to and after surgery. Results indicated significantly lower anxiety scores in the experimental group ($P < 0.01$), for the children as well as their mothers.

Brewer et al. (2006) performed a study to determine if a child prepared for surgery by a child life specialist experienced less anxiety than those who received routine care. Child-life specialists are professionals educated in child development that work in the health care setting to alleviate stress and anxiety in children. A double-blind intervention design was used for the study consisting of 142 children, aged 5 to 11 years old and undergoing elective otolaryngology surgery. All patients received standard preoperative information and teaching by the staff nurses. The control group ($n=62$) was escorted to the waiting room after the information session where there were diversionary activities. The intervention group ($n=80$) received a formal preoperative preparation by the child life specialist in addition to the standard teaching. Outcomes were measured using the Child Drawing: Hospital (CD:H) instrument. This instrument consists of a blank, white, 8 ½ x 11 inch sheet of paper and a box with eight crayons (red, purple, blue, green, yellow, orange, black and brown). The child is asked to draw a picture of a person in the hospital upon admission and postoperatively. The drawing is then scored in three parts. Part A assessed general anxiety and consisted of 14 items such as position of person, facial expression, etc. These items were given a score from 1-10. Part B assessed higher levels of anxiety. Omission of body parts or distorted figures was given additional points. Part C allowed the rater to assign an overall rating to the picture. A lower score indicates low anxiety, while a higher score indicates higher anxiety. While results were not statistically significant, scores for the children in the experimental group were consistently lower than those in the control group.

Li and Lopez (2008) studied the effectiveness of play therapy prior to surgery. A randomized two group design was used for the study consisting of 203 children aged 7 to 12 scheduled for elective day surgery. Children were assigned to an experimental (n=97) or control group (n=106). The control group received routine information prior to surgery. This included a group educational session and a video depicting a family going through the hospital admission and surgery process. The experimental group received therapeutic play 1 week prior to scheduled operation. The play intervention was geared toward the developmental stage of the children participating. A tour was given of the entire hospital area related to surgery. Once in the operating room, the children were allowed to explore all of the tools, encouraged to ask questions, and were able to perform similar tasks and procedures on a doll. The therapeutic play intervention lasted approximately 1 hour. Anxiety was measured using the State Anxiety Scale for Children. Values were recorded prior to surgery and after surgery. Results showed that participants in the experimental intervention group had statistically significant lower anxiety scores in preoperative ($P<0.01$) and postoperative ($P<0.02$) time frames.

O'Conner-Von (2008) performed a study to determine if an internet method of preparation would benefit children undergoing tonsillectomy. A randomized two group design was used for the study consisting of 69 adolescents aged 10 to 16 scheduled for an elective tonsillectomy. For this study, the participants had to possess computer skills and have access to the internet. The intervention group (n=35) was the internet preparation program. This program was developed by the researcher, a clinical nurse specialist with 25 years of surgical experience, and was titled "*Tonsils!*" Other personnel with input into the program included: child life specialist, patient and parent education specialist, middle-school teacher, and 40 adolescents

aged 10 to 16. This team of professionals and adolescents helped review the script and determined appropriateness of the content. The control group (n=34) consisted of standard hospital preparation. Developmentally appropriate information was given to the control group by a Registered Nurse (RN) and a Child Life Specialist. The patient also had the opportunity to take a tour of the hospital. Outcome measure tools included the State Trait Anxiety Inventory for Children, the Knowledge Questionnaire, and a pain intensity scale. While there were no differences between groups, the overall trend was a decrease in anxiety and pain in all participants who received some sort of education before surgery, either by the RN (control group) or the internet program (experimental group).

Wakimizu et al. (2009) conducted a study to determine if an at-home psychological preoperative preparation program can reduce anxiety in Japanese children before surgery. A two group randomized design was used for the study consisting of 158 children aged 3 to 6 scheduled for herniorrhaphy. Children were assigned to either an experimental (n=77) or control (n=81) group. The medical staff was blinded to group assignment. Both groups were given standard hospital education. The intervention group viewed a video one week prior to surgery. This peer-modeling video depicts a 5-year-old boy who is hospitalized for the same surgery as the children in the intervention group. The video depicts 12 scenes throughout the hospital stay including packing for the hospital, admission, meeting the medical staff, and the surgery experience. After viewing, the children were allowed to take home a personal copy of the video along with a booklet, to view and reference as many times as they wanted. Results were measured using the Wong-Baker FACES Rating Scale and the State Trait Anxiety Inventory. Values were recorded

prior to and after surgery. Results indicate that the experimental group had a significantly lower anxiety ($P < 0.02$) than those in the control group postoperatively.

Discussion

This integrated review of literature was conducted with the purpose of examining current research related to the use of preoperative education and its effect on anxiety in the pediatric population. Interventions such as psychological preparation, play therapy, peer-modeling video tapes, use of a Child Life Specialist, and an internet program have been examined to determine their effectiveness in reducing anxiety in preoperative pediatric patients. The results of these studies indicate that the majority of these interventions are successful in reducing preoperative anxiety in children. Six of the seven articles reviewed showed a positive outcome from education, with either statistical or clinical significance.

Psychological Preparation

Two studies demonstrated the effectiveness of a psychological preparation program prior to surgery. Lizasonain and Polaino (1995) studied the effects of a psychopedagogical program before hospitalization, while a more recent study by Wakimizu et al. (2009) focused on Japanese children and an at-home program. Both studies found decreased levels of anxiety in the experimental group when compared to the control group.

This research suggests that this method of preparation is appropriate for the age groups studied. For implementation, this method of preparation would be the most cost effective, while having the most time constraint. While no tactile materials are needed, time has to be devoted to each stress relieving session. This intervention would be best implemented in an elective surgery, where the child has time to identify stressors, and learn proper coping mechanisms.

Play Therapy

Only one study examined the benefits of play therapy to decrease anxiety in the pediatric patient prior to surgery. Li and Lopez (2008) focused on play therapy as an intervention to reduce anxiety. Results concluded that use of this intervention decreased anxiety significantly among the children in the experimental group. Even though the study took place in a Chinese hospital, the intervention used appeared culturally similar to interventions that might be used in the United States, with the exception of language differences.

Despite the cultural difference, the research study suggests that this method of preparation was appropriate for the studied age group. However, no other age groups were tested. Older children may not benefit from this intervention as much as a younger child, due to their developmental stage. Younger children need to use their five senses to understand information, which is included in play therapy.

Peer-Modeling Video/Book

Two studies examined the effects of a peer-modeling video or a book on anxiety in children having surgery. Durst (1990) uses a video tape of a similar-aged child and Felder-Puig et al. (2002) uses a children's book to help relieve anxiety in children having surgery. Results of these studies are mixed, with Felder-Puig et al. (2002) finding significantly less anxiety in the experimental group. Durst (1990) was unable to reach similar conclusions, not finding significant differences between groups. Wakimizu et al. (2009) used a peer-modeling video similar to the book intervention in Felder-Puig et al. (2002) and achieved significant results.

Both of these study samples include children aged 2-10, which represents the youngest samples in this literature review. These results suggest that this method of education delivery is

best suited for younger children. Children are afraid of what is unknown to them, so by showing them a child in their same developmental stage, undergoing the same procedure, they are able to identify with the video and relieve their anxiety. This form of education is useful for hospitals that have a strict budget. The use of one video can be used to educate many children, and can even be used in a group setting. Also, when using a video, educators do not have to worry if the child's reading comprehension is allowing for adequate educational delivery.

Child Life Specialist

Brewer et al. (2006) concluded that in addition to standard preoperative teaching by a staff nurse, a Child Life Specialist helped to reduce anxiety further. Results for this study weren't statistically significant, however they are clinically significant. Those who received time with the Child Life Specialist had lower anxiety scores than those who only received generalized preoperative education.

While the research concluded that the values were not statistically significant, a Child Life Specialist has value in educating children. Child Life Specialists have to be educated in developmental stages and understand what interventions are developmentally appropriate for each stage. Incorporating a Child Life Specialist into routine hospital education can further enhance the delivery of the material. This is a cost effective way to deliver education, since it does not necessarily require the use of outside resources and materials.

Internet Preparation

O'Conner-Vonn (2008) was the only researcher to evaluate the effectiveness of an internet preparation method. While this study did not have statistically significant results, the

researcher concluded that some sort of education was better than no education at all in reducing stress and anxiety in the preoperative patient.

With the advancement of technology, the internet is a great resource for preoperative teaching. Using the internet also frees up distance and timing restraints, and allows the participant to view the material whenever is convenient. For those who don't have access to the internet or a computer at home, many public libraries and schools offer the service free of charge. Many schools are incorporating the use of computers into the standard curriculum. Therefore, school-aged children are often familiar with navigating the internet and working with a computer. This familiarity can help to deliver the education in a more efficient manner. Research suggests that this form of education is best suited for older children, from middle school to high school, because of the cognitive requirements (O'Conner-Von, 2008).

Limitations

Seven articles fit the inclusion criteria for this critical analysis of the literature. Two research studies examining the stress and anxiety in children prior to surgery are over 30 years old and are not included in the findings, however they are important to consider and are therefore described in the background. Sample sizes were somewhat small for most of the studies. Of the seven studies included in the review, three had sample sizes smaller than 100 participants. Larger sample sizes might have yielded more significant and reliable results. Also, the age brackets for the majority of the studies were not consistent with developmental stages. Each study chose to bracket the age groups differently. The following brackets were used: 2-10, 3-6, 5-11, 7-12, 8-12 and 10-16. With such large age ranges in most of the studies, children in different developmental stages are participating in the same intervention. This would likely lead to some children getting an intervention that is less than ideal for their developmental stage. In order to make the intervention more developmentally appropriate, each study should have focused on individuals at a specific developmental stage, instead of overlapping developmental stages within the study.

Five of the seven research studies included at least one method of self-report measure in their data collection. The most common of these was the State-Trait Anxiety Inventory. Self-report can be flawed by relying on the participant, instead of relying on actual measureable outcomes (Elgar et al., 2005). Patients are not always able to recall information correctly, especially in the adolescent stage (Elgar et al., 2005). Similar methods for data collection were used across the studies. Consideration should be taken with newer studies in the scales and data collection methods used, to make certain they are using reliable and valid measures.

Two of the studies were conducted in countries other than the United States. Variations exist in the health care systems, beliefs and cultures of other countries. These variations can lead to different assessments of anxiety and anxiety provoking behaviors. It would be difficult to generalize these studies to the culture of the United States without replication of studies and further research.

Nursing Implications

Implications for Research

This integrative review of literature discussed several methods of preoperative education in reducing stress and anxiety in pediatrics. Six out of the seven research studies examined for this integrative review of literature indicated that preoperative education is beneficial to the patient in reducing anxiety and stress. However, due to the low volume of literature on this topic, and the heterogeneity of the interventions, significant conclusions cannot be made comparing the effectiveness of the interventions discussed. This thesis exposes the need for more research focused on developmentally appropriate interventions.

Nurses have always been responsible for educating their patients. However, many nurses may not know the learning needs of different developmental groups. With further research, nurses can start to develop and use information and education that is developmentally appropriate for educating their pediatric patients before surgery. More research needs to be done to determine the most effective educational delivery method in reducing preoperative stress for each developmental stage. Research examining one intervention per each experimental group, in addition to a control group, would provide the best evidence to indicate which method is best at decreasing stress and anxiety in children before surgery.

With the advancement of technology, and the use of the internet, more research should be performed on how new technology can help deliver preoperative education to the patient and reduce their anxiety. Utilization of the internet, video games, up-to-date peer-modeling films, and use of computer tablets can open up a wide door for implementation of education.

Implications for Practice

Utilization of written materials, the internet, a Child Life Specialist, play therapy or a video can make the delivery and knowledge acquisition of preoperative education easier for different developmental groups to grasp. These interventions showed a benefit to the children; whether it resulted in a decrease in anxiety or pain.

The easiest intervention for the nurse to use, if available, is education delivered by the Child Life Specialist. Many larger hospitals have this specialist to aid in making the hospital stay easier for a child. The child life specialist would be able to educate not only the patient, but the nurse on how to deliver the information in the future. Developmentally appropriate teaching strategies can also be discussed with the nurse. Nurses can also try to use play modeling, role playing, coloring sheets, pamphlets and other such items at their disposal to facilitate the educational and learning process.

Implications for Education

Undergraduate nursing curriculum should include education on the different developmental theorist's and their corresponding stages. As part of many undergraduate programs, developmental psychology is a required prerequisite. This course helps pave the way for future education received in the nursing program.

Nursing students should be informed as to why education is important to their patient's overall. Education, at all ages, helps to reduce stress and anxiety. Relieving stress is important to improve wound healing, decrease widespread inflammation in the body, and to promote overall better physiological and psychological outcomes for the patient. Students should focus on which interventions are developmentally appropriate for certain age groups, and their mode of delivery.

Summary

The purpose of this review of literature was to determine if preoperative education decreased stress in the pediatric population. The findings support the use of education to decrease stress and anxiety in the pediatric patient. Most interventions decreased stress, even if not to the statistically significant level. Interventions such as verbal instruction, tours of the facility, internet programs, peer-modeling books and videos, play therapy and the use of a Child Life Specialist all showed a benefit in the reduction of stress. Use of the internet to assist children before surgery shows great promise. No intervention showed any harm to the child, or an increase in stress. From the data, conclusions can be drawn that education is beneficial to children at all developmental stages, as long as the material is developmentally appropriate. However, due to the lack of research, it is not clear which delivery method of education works the best for different developmental stages.

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