EXPLORING CHILD BEHAVIOR CHANGE POST-ANESTHESIA

by

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ABSTRACT

Children frequently undergo procedures with anesthesia, an anxiety-provoking time for families. Unfortunately, there is limited research on the peri-anesthesia experience in families with language barriers. Research gaps include factors of child behavioral change post-anesthesia. The purpose of this pilot project is to explore post-anesthesia behavior change among children ages 7-12 years in Spanish-speaking families and to determine feasibility of a study protocol for this population. Research questions are: What types of behavior change occur? Is there a correlation between anesthesia duration and behavior change? Is there a correlation between premedication and behavior change? Participants will be enrolled at the pre-anesthesia clinic visit in a large pediatric specialty center. Of 4 study time points (pre-anesthesia, day of procedure, telephone follow-up at 2 and 4 weeks after anesthesia), this project will focus on the follow-up visits, utilizing the Post Hospitalization Behavior Questionnaire (PHBQ), medical record reviews, and cognitive interviews. Certified medical language services will be utilized for each visit. At 2 weeks post-anesthesia, there were 19 participants, and there were 16 participants at 4 weeks. Parent responses indicate postoperative behavior change from 2 to 4 weeks post anesthesia in the form of disinterest in surroundings, needing help doing things, difficulty for their child to talk to them, bad dreams, and trouble falling to sleep. There was no significant correlation between anesthesia and behavior change ($p=.968$). There was no significant correlation between premedication and behavior change ($p=.945$). Cognitive interviews reveal no reported parental difficulties with the PHBQ. These results could be used to inform anticipatory guidance for families during the peri-anesthesia experience.

Introduction

Approximately six million children undergo procedures with general anesthesia administration yearly (Shah et al., 2022). For pediatric patients, the peri-anesthesia period can be a daunting and stressful experience (Johnson et al., 2022), with possible negative psychological effects, including psychological distress and post-traumatic stress disorder (Turgoose et al., 2021). Anesthesia may impact behavior post-operatively, but there are gaps in the research. The topic is also beyond the scope of many reviews in terms of causes, incidence, and duration (Turgoose et al., 2021). In addition, data is limited on the impact for Spanish-speaking families. This is significant in the life of a child and might impact parenting, developmental progress, or even decisions to undergo surgeries in the future.

It is important for a child and their family to be aware of the possible behavioral associations that accompany anesthesia. There are many factors which could play into possible associations. The gaps in the research include factors such as premedication, duration of anesthesia, the type of surgery, and the types of possible behavioral changes (Turgoose et al., 2021). This is why further research into the topic is important, and it is important to reflect population demographics for Spanish-speaking families.

The purpose of this research project was to conduct a pilot study among Spanish-speaking families, which was defined for this study as Spanish being the only language spoken by the parents. The pilot study aimed to describe post-hospitalization behavior changes among children ages seven to twelve years old who have received anesthesia for a scheduled procedure. This pilot also determined the feasibility of a study protocol translated for Spanish-speaking families.

Before beginning involvement with this research project, it is hypothesized that childhood behavior changes may occur up to four weeks after anesthesia. Related to this hypothesis are these research questions: What types of behavior changes occur with children from Spanish-speaking families? Is there a correlation between anesthesia duration and behavior change in children from Spanish-speaking families? Is there a correlation between premedication and behavior change in children from Spanish-speaking families?

Review of Literature

A PICO search was done on the database Embase. Keywords and phrases that were searched include “postoperative period”, “questionnaire”, “behavior”, “telephone interview”, and “child behavior”. A combined search was done using keywords “postoperative period” and “child behavior”, which yielded two hundred results. Phrases “pediatric surgery experience” and “pediatric anesthesia behavior consequences” were also used to search. Databases that were searched and yielded results included PubMed, ScienceDirect, Wiley Online Library, and Oxford Academic. Sources that were the most relevant to the current project were used for the review of literature, which included research on pediatric behavior change post-anesthesia and studies that used a postoperative behavior questionnaire.

Research in the Spanish-Speaking Population

There is limited research including the Spanish-speaking population regarding children undergoing anesthesia and potential behavior changes. In a retrospective cohort study by Dixit et al. (2020), they investigated whether English language proficiency influenced pain management in the post-anesthesia care unit (PACU) in a group of 257 children who underwent a laparoscopic appendectomy. They found that low English proficiency patients received more oral morphine equivalents than English proficiency patients and low English proficiency patients also

had almost double the likelihood of having no pain score recorded during their recovery in the PACU (Dixit et al., 2020). Based on the finding that English language proficiency may relate to improved management of children's pain in the perioperative setting, the Spanish-speaking population may also be more vulnerable to anesthesia-related problems in the perioperative period (Dixit et al., 2020).

Behavior in the Post-Anesthesia Care Unit

Chorney et al. (2011) conducted a study aiming to develop and validate a behavioral coding measure, the Children's Behavior Coding System-PACU (CBCS-P), for children's distress and nondistress behaviors while in the post-anesthesia recovery unit (PACU). The method they used was reviewing video recording of 121 children in the PACU and developing a coding scheme based on patient behavior in the immediate post-operative period (CBCS-P) (Chorney et al., 2011). Participants were healthy children undergoing elective, outpatient surgery, and general anesthesia. Both parents and children five years and older provided written informed consent (Chorney et al., 2011). The five behaviors shown by most children were eating/drinking (67.7%), crying (62.9%), engaging in nonverbal distraction (64.3%), talking about food/drink (61.3%), and informing positive physical status (58.9%) (Chorney et al., 2011). Nine behaviors were determined to have face validity for distress based on previous literature and clinical observations (Chorney et al., 2011). Some of these behaviors include verbal pain, crying, guarding, verbal resistance, and nonverbal resistance (Chorney et al., 2011). These results identify child behaviors that may not be part of a typical pain assessment in the recovery room but may be indicative of children needing additional intervention (Chorney et al., 2011).

Similarly, Ing et al. (2020) conducted a systematic review looking at literature from different databases and platforms researching the question of whether exposure to a single

general anesthetic in early childhood causes long-term neuro-developmental problems. They found that the collected outcomes showed that a single general anesthetic exposure was associated with statistically significant increases in one-time parent reports of behavioral problems with no difference in general intelligence, however, it was not stated how long after anesthesia the parent report was conducted (Ing et al., 2020).

These studies demonstrate the importance of research in the field of children's behavior post-anesthesia. To further demonstrate this importance, a study of young children following exposure to general anesthesia by Bakri et al. (2015) concluded that proper perioperative pain management, social support, and avoidance of unpleasant surgical experiences could minimize potential behavioral and emotional disturbances post-anesthesia.

Longitudinal Behavior Assessment

Shi et al. (2022) conducted a study which assessed the behavior of children ages two-and-a-half to six years old who were undergoing general anesthesia. Data was collected at two points in time, preoperatively and postoperatively. Researchers used a parent-reported measure, the Behaviour Assessment System for Children, third edition (BASC-3), to collect data on the children's behaviors, both positive and negative (Shi et al., 2022). To assess longitudinal changes in the parent-reported behavior measured by BASC-3, linear mixed models were built (Shi et al. 2022). The study aimed to assess the short-term trajectory of parent-reported behavior in those children undergoing anesthesia (Shi et al., 2022).

68 children were enrolled in the study, and the majority of procedures performed were ear, nose, and throat procedures (Shi et al., 2022). Inclusion criteria included: age, undergoing non-cardiac procedures, and residence within 30 miles of the city of Rochester (Shi et al., 2022). About half of the children received oral midazolam as premedication, all but two received

inhalation anesthetics, and the median anesthesia duration was seventy-five minutes (Shi et al., 2022). The results of the study found that at three months after anesthesia, which was the only post-anesthesia time point, there were statistically significant improvements in internalizing problems, anxiety, and somatization (Shi et al., 2022). Overall, the study found that surgery and anesthesia in children two-and-a-half to six years old were not associated with increases in parent-reported behavioral problems as measured by the BASC-3 at 3 months postoperatively (Shi et al., 2022). Another notable finding was that Shi et al. (2022) did not find evidence that behavior changes in the postoperative period are associated with multiple exposures to anesthesia.

Negative Behaviors Postoperative

Quintao et al. (2022) conducted a study trying to determine whether intravenous (IV) anesthesia is effective at reducing postoperative behavior changes in children undergoing ambulatory endoscopic procedures when compared to inhalation anesthesia. A randomized, double-blinded controlled trial was conducted with one hundred sixty-four children ages one to twelve who underwent ambulatory endoscopic procedures (Quintao et al., 2022). Preoperative anxiety was evaluated through the modified Yale Preoperative Anxiety Scale before all children underwent face mask inhalation induction with sevoflurane (Quintao et al., 2022). After a peripheral IV was placed, each child was allocated to sevoflurane or propofol maintenance (Quintao et al., 2022). Emergence delirium, which can occur as the child is waking up from anesthesia, was evaluated through the Pediatric Anesthesia Emergence Delirium scale. After discharge, behavioral changes were assessed through the Post Hospitalization Behavior Questionnaire for Ambulatory Surgery (PHBQ-AS) on days one, seven, and fourteen. Parents

scored each behavior from one to five, and scores of four and five were considered negative behaviors (Quintao et al., 2022).

The overall incidence of negative behaviors was 36.8%, 32.6%, and 28.4% on days one, seven, and fourteen, respectively (Quintao et al., 2022). Overall, results found that the incidence of postoperative behavior changes in children undergoing ambulatory endoscopic procedures was similar when comparing intravenous with inhalation anesthesia (Quintao et al., 2022). They also found that children who experience emergence delirium might show a greater incidence of negative postoperative behavior changes (Quintao et al., 2022).

Levels of Evidence

The Johns Hopkins Research and Non-Research Evidence Appraisal Tools were used to determine the level and strength of each evidence source. The table below outlines the level of evidence of each source.

Authors	Level of Evidence
Bakri et al. (2015)	Level III
Chorney et al. (2012)	Level III
Dixit et al. (2020)	Level III
Ing et al. (2021)	Level I
Jenkins et al. (2015)	Level III
Johnson et al. (2022)	Level III
Lee-Archer et al. (2021)	Level III
Quintão et al. (2023)	Level I
Shi et al. (2022)	Level III
Turgoose et al. (2021)	Level I

Methodology

This project is a part of a pilot descriptive correlational study. The pilot study will inform a larger Spanish/English study. Participants will be enrolled at the pre-anesthesia clinic visit in a large pediatric specialty center. In the pilot study, there are four different time points during the peri-anesthesia period in which data will be collected. The first time point, or visit with participants, will occur in the pre-anesthesia clinic. At this visit, a parent/child survey will be conducted that includes demographic data, an anxiety assessment using the State-Trait Anxiety Inventory, and a 0-10 child anxiety scale (Spielberger, 1985; Crandall et al., 2007). The second visit will occur on the day of the procedure and will consist only of the child anxiety scale. The third visit will occur two weeks after anesthesia, and the fourth visit will occur four weeks after anesthesia, both of which will consist of a telephone questionnaire utilizing the Post Hospitalization Behavior Questionnaire for Ambulatory Surgery (PHBQ-AS), found in Appendix A (Vernon et al., 1966). This student's project will focus on data from the third and fourth visits of the Spanish speaking families pilot study.

Participation is voluntary, and parent/child dyads were recruited through flyers distributed on the day of their scheduled Pre-Anesthesia Clinic visit. Clinic rosters were screened to determine which families to approach and recruit. The setting of the study is Children's Medical Center Dallas in the pre-anesthesia department. Inclusion criteria were: pre-anesthesia patient from a Spanish-speaking family; child aged seven to twelve years old. Parental consent and child assent will be obtained prior to beginning any study activities.

There are multiple measures taken in this study to protect human subjects. To participate in the first clinic visit, participants must sign an informed consent form electronically through a secure Qualtrics survey. This informed consent form outlines the risks of participation and how

those conducting the study plan to prevent loss of confidentiality, such as by assigning unique participant ID numbers. It also outlines how to keep data secure: everything will be kept on a password protected database. Data is stored on both Children's Medical Center and TCU secure servers.

The questionnaire that this student's project will focus on is the Post Hospitalization Behavior Questionnaire for Ambulatory Surgery (PHBQ-AS) (Vernon et al., 1966). This questionnaire will be completed at the third and fourth visits of the study through a telephone interview to the patient's home number. Certified medical language services will be utilized for each visit. Patient families will respond to questions such as, "Does your child spend time just sitting or lying and doing nothing?" and "Does your child have temper tantrums?" by stating either "no trouble," "a little trouble," "some trouble," "a lot of trouble," or "impossible." Refer to Appendix A for the full telephone script and questionnaire. This questionnaire was interpreted into Spanish over the telephone using a certified Spanish interpreter.

Also included in the pilot study were cognitive interviews with the families to assess their understanding of the questionnaire. An example of questions from the cognitive interview includes "Did you understand the questions asked?". With the results from the cognitive interviews, face validity, which refers to the transparency of the questionnaire to the participants, can be determined. Furthermore, internal consistency, which is an evaluation of the extent to which the items/questions that compose a measurement instrument capture the underlying concept, will be measured using Cronbach's alpha (Brown, 2018).

Reliability and Validity of the PHBQ-AS

Lee-Archer et al. (2021) conducted a study which aimed to assess the reliability of the newly developed English version Post Hospitalization Behavior Questionnaire for Ambulatory

Surgery (PHBQ-AS) and determine concurrent validity with another measure of child behavior, the Strength and Difficulties Questionnaire (SDQ). A sample of 248 children who underwent day surgery and anesthesia, with ages ranging from two to seven, were taken from a study which randomized children ages two to seven to receive dexmedetomidine as a premedication intranasally, as an intraoperative intravenous bolus or a placebo (Lee-Archer et al., 2021). Participants were followed up on postoperative days three, fourteen, and twenty-eight when parents were asked to complete both the PHBQ-AS and the SDQ by telephone interview (Lee-Archer et al., 2021). Next, the reliability of the PHBQ-AS was measured through internal consistency using Cronbach's Alpha and split-half correlation, and it was determined “good” (Lee-Archer et al., 2021). A weak-to-moderate correlation was found with another measure of child behavior, the SDQ, however, the SDQ is not designed to detect changes in behavior after general anesthesia, so it may not be the best tool to measure concurrent validity (Lee-Archer et al., 2021). Overall, the study found that the PHBQ-AS showed good reliability in terms of its internal consistency, but it could not draw any conclusions about its validity, due to a recurring limitation in this area of research: selecting an appropriate measurement tool to use as a comparison. (Lee-Archer et al., 2021).

Jenkins et al. (2015) investigated the psychometric properties of the PHBQ to potentially increase the efficacy and relevance of the instrument in perioperative settings. 1,064 participants from multiple studies that they examined were all recruited from two major children’s hospitals, and they underwent outpatient surgery with general anesthesia. The parents of participants completed the PHBQ on postoperative days one, two, and three, and weeks one and two (Jenkins et al., 2015). The original PHBQ questionnaire consisted of twenty-seven items with a subscale structure, whereas the PHBQ-AS has eleven items and no subscale structure. Multiple statistical

methods were used when evaluating the PHBQ and PHBQ-AS questionnaires, including reliability and validity (Jenkins et al., 2015). The study used Cronbach's alpha to test for reliability. To test for validity, they measured the correlation with the Functional Disability Inventory (FDI), which assesses limitations in psychosocial and physical functioning as a part of children's physical health (Jenkins et al., 2015). Overall, they concluded that the shortened PHBQ-AS questionnaire resulted in a more relevant, efficient, and valid means of assessing behavioral change in children undergoing outpatient surgery (Jenkins et al., 2015).

Data Analysis

In this Spanish pilot study, data analysis will focus on data from the third and fourth visits. To analyze data, a statistical software, SPSS, was used. The survey responses from Qualtrics will be imported to SPSS, where analysis was completed. For analysis, only data from the patients who completed both visit 3 and visit 4 will be used. When analyzing the collected data, each research question will be addressed individually. When analyzing the first research question: what types of behavior change occur, the data will be reviewed using descriptive statistics. Each question of the PHBQ will be analyzed, and an average of the responses to each type of behavior will be found.

When analyzing the second research question: if there is a correlation between anesthesia and behavior change, a correlation analysis was used, applying Spearman's rank correlation coefficient, also known as Spearman's Rho. SPSS provides a choice of correlational analysis used. With one continuous data set, being the duration of anesthesia, and one ordinal data set representing behavior change from the total scores of Visits 3 and 4, Spearman's Rho is appropriate for (Khamis, 2008, pg. 158). Behavior change is measured using a Likert-type scale, which is considered ordinal, with each answer option assigned a different number. For example,

in response to one of the behavior change questions, “no trouble” is “0”, “a little trouble” is “1”, and so on. Other studies have also scored the PHBQ using a Likert-type scale and analyzed statistics as ordinal data (Jenkins et al., 2015). Correlation analysis was applied to this data set.

For the third research question: the correlation between premedication and behavior change, correlation analysis using Chi Square was used. Behavior change is ordinal data, represented as the total scores from Visit 3 and Visit 4, and premedication is represented as categorical data since each option is assigned a different number. For example, “no premedication” is “0”, “Midazolam” as the premedication is “1”, “Midazolam and Acetaminophen” is “2”, and so on. Correlation analysis was also applied for this research question.

Results

At visit three, which was two weeks post-anesthesia, there were nineteen participants, and at visit four, four weeks post-anesthesia, there were sixteen participants. The mean age of all the participants was 9.2 years old. The minimum minutes of anesthesia was 31.0 minutes, and the maximum was 516.0 minutes. The median minutes of anesthesia was 100.5 minutes, the mode was 100.0, and the mean minutes of anesthesia was 140.19 minutes (See Figure 1). Fifty percent of procedures in the sample were ENT procedures. Other procedures include radiology, general surgery, plastic surgery, neurosurgery, etc. (See Figure 2). The minimum total PHBQ score possible was 11, and the maximum score possible was 55. The mean total for Visit 3 was 13.25, and the mean total for Visit 4 was 13.17. For the cognitive interviews, the majority of the parents reported no problems understanding survey items interpreted in Spanish. Internal consistency was measured by Cronbach’s Alpha = 0.762.

When looking at the questionnaire responses, responses with any level of trouble experienced by the child with that behavior were combined into one overall category of "trouble". Parent response options that indicated the child having trouble with a behavior included, "a little trouble", "some trouble", "a lot of trouble", and "impossible". The other option of response to each behavior was "no trouble". For example, if there were four responses of "a little trouble" and two responses of "some trouble", these were combined to total six responses of "trouble" for that behavior. This would then be compared to the total responses of "no trouble" for that same behavior, for each question response.

When looking at the first research question: what types of behavior change occur, at Visit three, two weeks post-anesthesia, the behaviors with the highest frequency of responses of "trouble" were Q1: Fuss about eating (31.6%), Q7: Temper tantrums (36.9%), and Q11: Poor appetite (26.3%). There were five behaviors that had an increase in responses of "trouble" from week two to week four. These behaviors were: Q3: Uninterested in surroundings, Q5: Needs help doing things, Q8: Difficult for child to talk to you, Q9: Bad dreams or wake up crying, and Q10: Trouble getting to sleep (see Figure 3).

Figure 1

Descriptive Statistics For Anesthesia Duration

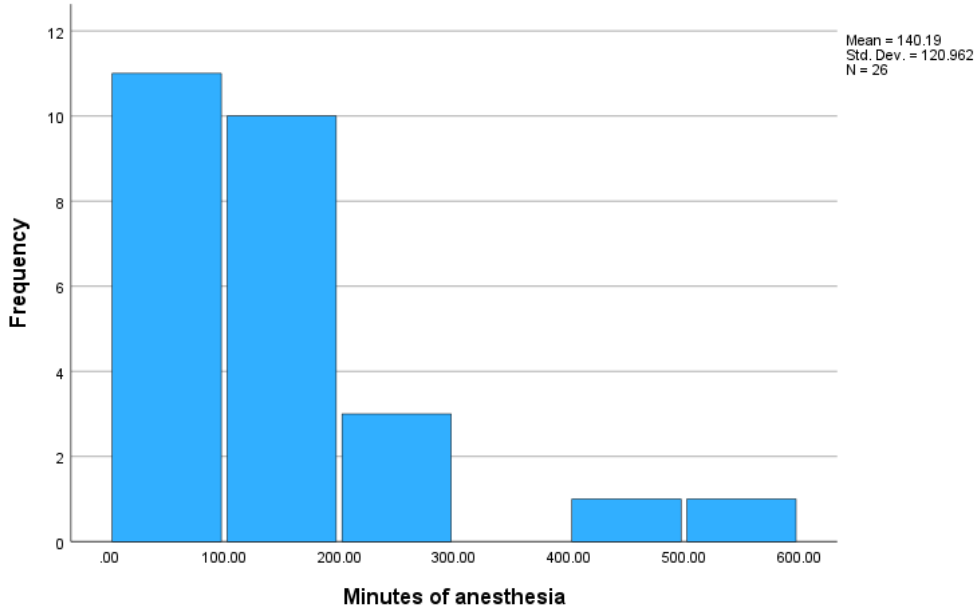


Figure 2

Types of Surgeries

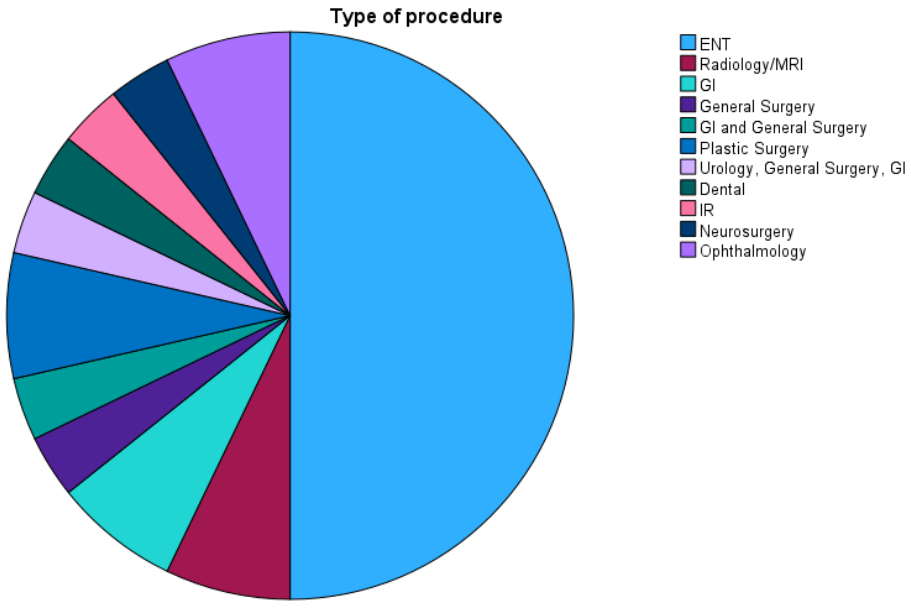
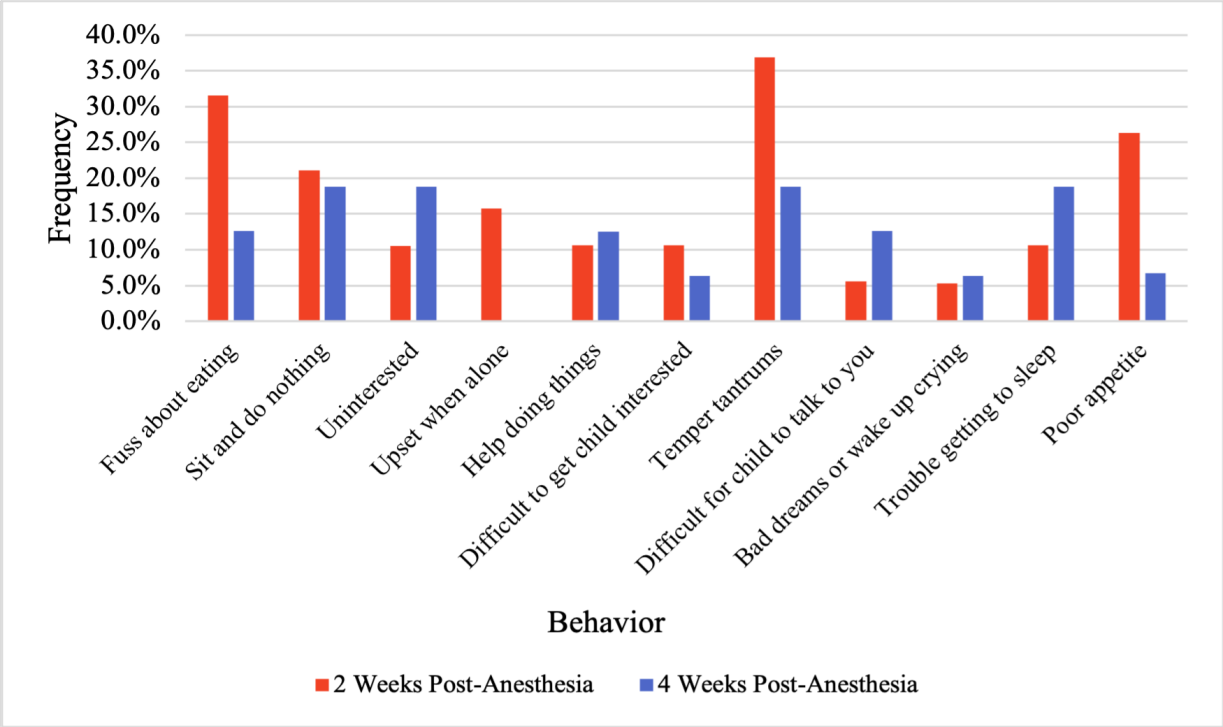


Figure 3

Two Weeks Post-Anesthesia and Four Weeks Post-Anesthesia Responses of "Trouble"



Note. This table represents parents' responses of their child experiencing "trouble" with a specific behavior at visit 3 (2 weeks post-anesthesia) and visit 4 (4 weeks post-anesthesia). Each behavior is from the PHBQ-AS questionnaire.

Analyzing the second research question: Is there a correlation between anesthesia and behavior change, there was no significant correlation between anesthesia duration and behavior change ($p = .692$). Spearman's Rho was used to analyze the correlation between these two variables. For this research question, only the participants who completed both visit 3 and visit 4 were included. (See Table 1)

Table 1

Correlation Between Anesthesia Duration and Behavior Change (Visit 3 Total and Visit 4 Total)

			Minutes of anesthesia	V3Tot	V4Tot
Spearman's rho	Minutes of anesthesia	Correlation Coefficient	1.000	-.128	-.135
		Sig. (2-tailed)	.	.692	.676
		N	26	12	12
	Visit 3 Total	Correlation Coefficient	-.128	1.000	.502
		Sig. (2-tailed)	.692	.	.096
		N	12	12	12
	Visit 4 Total	Correlation Coefficient	-.135	.502	1.000
		Sig. (2-tailed)	.676	.096	.
		N	12	12	12

Analyzing the third research question: Is there a correlation between premedication and behavior change, there was no significant correlation between premedication and behavior change ($p = .615$). Chi Square was used to analyze the correlation between these two variables. For this research question, only the participants who completed both visit 3 and visit 4 were included. (See Tables 2, 3, and 4)

Table 2

Correlation Between Premedication and Behavior Change (Visit 3 Total and Visit 4 Total)

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.286[a]	8	.615
Likelihood Ratio	7.075	8	.529
Linear-by-Linear Association	.006	1	.940
N of Valid Cases	12		

Table 3

Visit 3 Crosstab

		Visit 3 Total					
		11.00	13.00	14.00	17.00	21.00	Total
Name of premed	None	2	0	0	0	0	2
	Midazolam	3	1	1	1	1	7
	Midazolam and Hycet	1	0	2	0	0	3
Total		6	1	3	1	1	12

Note. Frequencies of premedication.

Table 4

Visit 4 Crosstab

		Visit 4 Total					
		11.00	12.00	13.00	17.00	25.00	Total
Name of premed	None	1	0	0	1	0	2
	Midazolam	4	1	1	0	1	7
	Midazolam and Hycet	1	1	1	0	0	3
Total		6	2	2	1	1	12

Note. Frequencies of premedication.

Discussion

In looking at child behavior after undergoing general anesthesia for an elective surgical procedure, behavior changes may be present as long as 2-4 weeks post-anesthesia. Behavior changes that could occur include temper tantrums, fussiness, poor appetite, and trouble getting to sleep. The study results also show that some behavior changes may worsen over time as evidenced by parents reporting an increase in trouble for certain behaviors from two weeks to four weeks post-anesthesia. However, these behaviors do not seem to occur in the majority of children undergoing a scheduled procedure with anesthesia. Similarly, in the study by Quintão et al. (2023) of children ages one to twelve years old who underwent ambulatory endoscopic procedures, 25.1% of children presented at least one negative behavior two weeks after the procedure. Study results also show that child behavior changes are not always related to the type of premedication they received (Midazolam, etc) or the duration of anesthesia. Other studies in the review of literature conducted did not specifically look at these two variables and their possible effects on behavior change post-anesthesia.

Some limitations of this pilot study include missing data, small sample size, and possible variation with the interpretation of questions to Spanish-speaking parents. One piece of information that could have been helpful to know for the pilot study is the number of previous anesthesia procedures the children had or did not have. In the study by Quintão et al. (2023), the children in their study were considered frequent flyers in the clinic who had chronic and systemic diseases, had undergone procedures before, and had multiple previous interactions with healthcare providers. They believe this could have implicated why their population presented less postoperative negative behavior (Quintão et al., 2023). In the study by Shi et al. (2022), they added interaction terms for analysis between a history of prior anesthesia and study visits. They found that no significant interactions were observed, so the pattern of results did not depend upon prior anesthesia exposure (Shi et al., 2022). Therefore, further research is needed to define whether previous procedures with anesthesia affect children and any behavior change.

Nursing Implications

In analyzing and understanding these results, nurses can use this evidence to inform anticipatory guidance for families during the peri-anesthesia experience. Furthermore, nurses can educate families on possible expected behavior changes after undergoing anesthesia, both short-term and long-term. These results can also be used to guide nurses in conducting follow-up assessments up to four weeks postoperatively to assess for any behavior changes or repercussions from behavior changes. For example, weight loss due to a decrease in appetite or issues related to a lack of sleep in children.

Conclusion

In conclusion, evidence exists regarding postoperative behavioral changes in children who undergo anesthesia, however, few have focused on the 7-to-12-year-old age group and

included Spanish-speaking families. Throughout all the previous studies reviewed, there is a commonality that anesthesia has some sort of effect postoperatively on children, however, further research is needed to describe the effects and associated factors. Our pilot study found no correlation between duration of anesthesia and behavior change, and no correlation between premedication and behavior change. There are many aspects of this study which pose more questions and needs for further research, such as considering a child's past anesthesia history and enabling more diversity in future research samples. Overall, this project allowed for a more holistic understanding of the effects of anesthesia on children's behavior, and implications for future research.

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Appendix A

Post Hospitalization Behavior Questionnaire for Ambulatory Surgery (PHBQ-AS)

Telephone script for investigator: Hello, this is [investigator] from Children's Health Dallas. I am with the research team that is working on the study that you and your child participated in at your clinic visit and on the day of your child's procedure. We just have a short list of questions to ask you about your child to find out if they have had any changes since they were here at the hospital for their procedure. It will take about 5 minutes for us to complete- is this a good time? [If the parent states not a good time, arrange another time within the next few days]. Please tell me how much more difficulty your child is now having with the following activities compared to how they were before their recent anesthesia. Answer by stating either "no trouble," "a little trouble," "some trouble," "a lot of trouble," or "impossible." If you do not understand the question, please let me know and I will try to restate the question.

1. Does your child make a fuss about eating?
2. Does your child spend time just sitting or lying and doing nothing?
3. Is your child uninterested in what goes on around him [or her]?
4. Does your child get upset when you leave him [or her] alone for a few minutes?
5. Does your child need a lot of help doing things?
6. Is it difficult to get your child interested in doing things (like playing games with toys?
7. Does your child have temper tantrums?
8. Is it difficult to get your child to talk to you?
9. Does your child have bad dreams at night or wake up and cry?
10. Does your child have trouble getting to sleep at night?
11. Does your child have a poor appetite?

Thank you so much for answering these questions. We will be calling you again in two weeks to ask you these questions again. We appreciate your participation in this project.