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An evaluation of pre-operative anxiety in Spanish-speaking and Latino children in the United States

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Summary

Background—There is a large body of literature examining factors associated with children's pre-operative anxiety; however, cultural variables such as ethnicity and language have not been included.

Aim—The purpose of this investigation was to examine the role of Latino ethnicity and Spanish-speaking families in pediatric pre-operative anxiety.

Methods—Participants were 294 children aged 2–15 years of age undergoing outpatient, elective tonsillectomy and/or adenoidectomy surgery and general anesthesia. Participants were recruited and categorized into three groups: English-speaking non-Latino White (n = 139), English-speaking Latino (n = 88), and Spanish-speaking Latino (n = 67). Children's anxiety was rated at two time points before surgery: the time the child entered the threshold of the operating room (Induction 1) and the time when the anesthesia mask was placed (Induction 2).

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Conflict of interest

No conflicts of interest declared.

Results—Results from separate linear regression models at Induction 1 and Induction 2 respectively showed that being from a Spanish-speaking Latino family was associated with higher levels of pre-operative anxiety compared with being from an English-speaking family. In addition, young age and low sociability was associated with higher pre-operative anxiety in children.

Conclusions—Clinicians should be aware that younger, less sociable children of Spanish-speaking Latino parents are at higher risk of developing pre-operative anxiety and manage these children based on this increased risk.

Keywords

anesthesiology; ethnicity; language; surgery; pediatrics; children; anxiety; temperament

Introduction

Of the five million children who undergo surgery in the United States (U.S.) each year, it is estimated that approximately 50% experience stress and anxiety pre-operatively.[1,2] These findings are problematic for children and their families as it has been shown that pre-operative anxiety can lead to emotional and behavioral problems post-surgery[3]. Specifically, pre-operative anxiety is associated with increased post-operative pain and maladaptive behavioral outcomes, including an increased incidence of emergence delirium, disturbances in eating and sleeping, anxiety, and oppositional behaviors[4,5]. These behavioral outcomes have been found to last up to several weeks after surgery and can lead to longer recovery times, which increases both hospital costs and physical and psychological suffering in children and their families[5,6].

Not only is there a growing understanding of the prevalence and negative sequelae of pre-operative anxiety, there is a body of literature identifying factors associated with high levels of pre-operative stress in children. For example, younger children have been consistently shown to be more likely to be anxious before surgery[1,7,8]. In addition, temperament and history of surgery have been identified as a factor associated with anxiety before surgery. Specifically, children rated as exhibiting shy and less sociable temperaments and those with a history of prior surgery experience higher levels of pre-operative anxiety[7–10]. Parental factors, including anxiety and the ability to anticipate children's uncooperative behavior have also been identified as predictors of surgical anxiety in children[9,11].

Although there is a substantial body of literature on parent and child risk factors for pre-operative anxiety, to date this work has focused largely on non-Latino White children and families[12,13]. As the U.S. is becoming increasingly diverse, there is a greater need to examine the experiences of diverse populations. In particular, the Latino population is one of the largest growing populations in the U.S. In addition, Latino children often are at greater risk of social and economic inequalities such as decreased education and lower socioeconomic status (SES), which can increase susceptibility to health disparities[14]. Furthermore, a growing number of Latino children face chronic stressors related to language, discrimination, and financial barriers to health care[15–17].

The aim of this paper, therefore, was to examine the role of Latino ethnicity and Spanish language in families in the context of previously identified predictors of pre-operative anxiety (e.g., temperament, age, parental anxiety) in the experience of anxiety in children undergoing surgery. We hypothesized that in addition to child temperament and age and parental anxiety, children of Spanish-Speaking Latino would experience greater pre-operative anxiety compared to English-speaking non-Latino White children given the unique stressors that Latino children face in regards to less access to resources and language barrier. This would be the first such paper to include a focus on the experience of pre-operative anxiety in Latino children.

Materials and Methods

Participants

Data collected for this study were drawn from a larger trial, examining pediatric pre-operative anxiety (R01HD048935) and is funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD). Prior to randomization, a sample was collected from four major children's hospitals including Lucile Packard Children's Hospital, The Children's Hospital Denver, Children's Hospital of Orange County (CHOC Children's) and Children's Hospital Los Angeles (CHLA). Informed consent and assent were obtained from the parent-child dyads and the institutional review board at each hospital approved this study. Eligible children were 2–15 years old and were scheduled to undergo outpatient adenoidectomy and/or tonsillectomy surgeries. Only children from the American Society of Anesthesiologists (ASA) Physical Status I–III were included in the study in order to control for the impact of illness on surgical recovery. Furthermore, adenoidectomy and tonsillectomy surgeries were chosen, because they are conducted on primarily healthy populations (ASA I–II), are minimally invasive, and the most common pediatric surgical procedures. Exclusion criteria included children who were born before 32 weeks gestational age who had a history of chronic illness and/or developmental delay, or children with severe obstructive sleep apnea (OSA), given the need to hospitalize many children with OSA for overnight observation postoperatively. In addition, for this study, only children who did not receive pre-operative sedatives were included in order to control for any confounding effect of medication on pre-operative anxiety.

Measures

Demographics—Demographic data were collected including gender, race, ethnicity, parent's education, occupation, age, and household income. Detailed information about ethnicity was collected including country of origin as well as primary and secondary languages spoken at home. Primary language spoken was self-reported by parents and used to categorize families into language/ethnicity groups.

Preoperative Anxiety—Child anxiety was measured using the Modified Yale Preoperative Anxiety Scale (mYPAS) which was developed in 1995 and modified in 1997[18,19]. More recently, a short version of the mYPAS was developed called the Modified Yale Preoperative Scale – Short Form (mYPAS-SF)[20]. This version was used in our analysis, which involves dropping the 'use of parent' domain for quicker assessment and greater

clinical applicability while retaining the accuracy of the measure. The mYPAS-SF consists of 18 items in four domains of behavior (activity, emotional expressivity, state of arousal, and vocalization). All mYPAS domains have good to excellent inter and intra-observer reliability using Kappa statistics (0.73–0.91) and has good face validity [21]. Total scores range from 23.3 to 100 with higher scores indicating a higher level of anxiety. Moreover, the mYPAS demonstrated strong criterion validity[18,21]. The measure has been used extensively in studies in various fields including psychology, surgery, anesthesia, and dentistry and has been used in over 12 different languages including Spanish, Danish, and Swedish and in 14 different countries including Spain, Israel, and Portugal.

Child Temperament—Child temperament was measured using the Emotionality Activity Sociability Temperament Survey (EAS-TS)[22]. The EAS-TS is a parental report assessment of temperament in early childhood to adolescence. It is used to evaluate baseline temperament and consists of 20 items in four categories: emotionality, sociability, activity, and shyness. Items are scored on a scale of 1 to 5 with 1 being not at all true and 5 being very much true. Test-retest reliability is satisfactory (0.82) and the measure has good validity and has been validated for use in Spanish language[22,23].

Parent Anxiety—Parent anxiety was measured using the State-Trait Anxiety Inventory (STAI), a self-report inventory of state (situational) and trait (baseline) anxiety[24]. Questions are scored on a four point Likert-type scale and analyzed by examining the total score, which ranges from 20 to 80 with higher scores indicating higher levels of anxiety. The STAI has good validity and reliability with acceptable test-retest reliability[24]. The Spanish version of the STAI is comparable to the English version and has good to excellent internal consistency[25].

Study Protocol—Potential participants were identified through surgery schedules the day before surgery and assessed for eligibility by viewing the patient's electronic medical record using exclusionary criteria as listed above. Families of parents determined to be eligible were approached in person the day of surgery in the preoperative holding room. Parents provided informed consent, and children provided assent as appropriate. All baseline measures at all sites were completed in the preoperative holding room and the waiting area during their child's surgery. The mYPAS-SF was measured at two time points: upon entrance to the operating room (OR; Induction 1) and placement of the anesthesia mask on the child (Induction 2).

Data Analysis

All analyses were conducted using IBM SPSS Version 23.0 (Armonk, NY: IBM Corp). Participants were categorized into three groups based upon ethnicity and primary language spoken: English-speaking non-Latino White (n = 139), English-Speaking Latino (n = 88), and Spanish-Speaking Latino (n = 67). Total sample size was therefore 294 participants. Analysis of group differences in demographic variables was conducted using analysis of variance (ANOVA) for continuous variables (child and parent age, and parent education) and chi-square analysis for categorical/ordinal variables (child and parent gender and household income).

As a first step, to determine potential predictors of child preoperative anxiety, preliminary analyses were conducted between demographic and baseline variables with Induction 1 and Induction 2 mYPAS-SF scores. Specifically, for continuous/ordinal demographic and baseline variables, including child age and parent age, child temperament, parent anxiety, parent education, and household income, Pearson product-moment correlations were conducted. For categorical demographic and baseline variables, including child's history of previous surgery, parental presence in the operating room and child gender, independent samples t-tests were conducted. These variables were chosen as they have previously been found to be associated with child preoperative anxiety[8,26,27]. In addition, ANOVA was conducted to examine preliminary differences in mYPAS-SF scores in our three ethnic/language groups.

Finally, a model of preoperative anxiety was developed that included variables identified in preliminary analyses/extant literature as covariates and ethnicity/language as a predictor. To examine group differences in child anxiety, two linear regression models were used examining Induction 1 and Induction 2 mYPAS-SF scores as the dependent variables separately.

Results

Demographic Characteristics

Eight hundred and twenty-seven parent-child dyads completed baseline data for the larger NICHD study and of these participants, 294 participants met criteria for this study (English-speaking non-Latino White = 139, English-speaking Latino = 88, and Spanish-speaking Latino = 67) following application of exclusion criteria as listed above. Demographic data of the participants are reported in Table 1. The sample was comprised primarily of mothers (84%), and there was a relatively even split in child gender (53% female). Children were on average 7.08 ± 3.24 (M ± SD) years old. Most (70%) children had parents present in the OR for induction of anesthesia. There were differences among ethnic and language groups in regards to parent age, income, and education (Table 1). There was an approximate two-year age difference between groups, with English-speaking non-Latino White parents two years older than Spanish-speaking Latino parents, who were two years older than English-speaking Latino parents. In addition, English-speaking non-Latino White parents reported an average of almost 3 years greater educational attainment compared to English-speaking Latino parents who reported 3 years greater educational attainment than Spanish-speaking Latino parents. Finally, English-speaking non-Latino White parents reported an average income that fell in the upper middle class range, compared to both Latino parent groups, whose income fell at or below the poverty limit.

Examination of Variables Associated with Children's Pre-Operative Anxiety

Pearson product-moment correlation analyses revealed significant associations for mYPAS-SF scores at Induction 1 and 2 and child age and for mYPAS-SF scores and child sociability (Table 2). Although statistically significant, the correlations were small, all at or below $r = 0.20$. In contrast, no significant correlation was found between child anxiety and child shyness, child emotionality, child activity, parent age, years of parent education, parent state

anxiety, parent trait anxiety and household income (Table 2). All non-significant correlations were all at or below the $r = 0.10$ range.

Results of independent samples t-tests showed that children who had never had surgery were not significantly more anxious than children with a history of surgery at Induction 1 or at Induction 2 (Table 3), demonstrating mYPAS-SF scores within 2–3 points from one another that were not clinically significant. Similarly, children whose parents were not present in the OR were not significantly more anxious compared to children whose parents were present in the OR at Induction 1 or Induction 2, demonstrating anxiety scores that were 1–3 only points different. Finally, boys experienced similar levels of anxiety compared to girls at Induction 1 and at Induction 2 (Table 3). At entrance to the OR and introduction to the anesthesia mask, boys and girls had mYPAS-SF scores that were clinically similar to one another.

Lastly, one-way ANOVA was performed examining mYPAS-SF scores as a function of parent ethnicity and language (Table 4). Significant group differences were found for Induction 1 ($F(2,285) = 6.76$, $p = 0.001$), in which Spanish-speaking Latino children were significantly more anxious at entrance to the OR compared to both English-speaking non-Latino White ($p = 0.010$) and English-speaking Latino ($p < 0.001$) children, who did not differ from one another ($p = 0.119$). Spanish-speaking children scored up to 9 points higher on the mYPAS-SF at entrance to the OR compared to English-speaking children, with confidence intervals indicating the mean difference could be as high as nearly 14 points, indicating clinically higher levels of pre-operative anxiety (potential 30% difference in scores). The ANOVA for Induction 2 was nearly significant ($F(2,286) = 2.25$, $p = 0.107$), with the same pattern of pairwise comparisons. Specifically, Spanish-speaking Latino children were more anxious at entrance to the OR compared to both English-speaking non-Latino White ($p = 0.075$) and English-speaking Latino ($p = 0.045$) children, who did not differ from one another ($p = 0.649$). All mYPAS-SF scores at Induction 2 were above 30, which is the threshold for clinically significant levels of anxiety.[18]

Predictive Models of Children's Pre-operative Anxiety

Linear regression was used to determine the independent contribution of each of the variables identified in univariate analyses (Table 5). Two linear regression models were examined with Induction 1 mYPAS-SF and Induction 2 mYPAS-SF scores as dependent variables, respectively. Ethnicity/language groups were examined as an independent variable, with child temperament (sociability), child age, parent anxiety, parental presence in the OR, and household income included as covariates in order to examine the unique contribution of ethnicity/language. For both Induction 1 and Induction 2 mYPAS-SF, ethnicity/language was associated with child anxiety such that Spanish-speaking Latino children experienced higher anxiety compared to the other two groups ($p < 0.001$ and $p = 0.032$, respectively). Child age and temperament were also associated with child anxiety at Induction 1 (p's = 0.022 and 0.020, respectively) and Induction 2 (p's = 0.002 and 0.032, respectively). Ethnicity/language was the strongest predictor of pre-operative anxiety in both models.

Discussion

The primary aim of this study was to examine the potential role of ethnicity and language in children's pre-operative anxiety in addition to examining previously established predictors such as child age and temperament. Consistent with prior literature, we found that child age and temperament were associated with children's anxiety on the day of surgery. Children who were younger and rated as less sociable had higher levels of pre-operative anxiety. This finding agrees with past research as children of younger age (1–6 years) often do not have the coping abilities to handle stressful situations[28]. Furthermore, in past studies it has been found that less sociable children have higher anxiety as they are often uncomfortable in new social situations such as awaiting surgery in the hospital[29].

In addition to child age and temperament, results of the present study suggest that language may also influence children's anxiety on the day of surgery. More specifically, children of Spanish-speaking parents experienced significantly higher anxiety compared to children of English-speaking parents. Because of the lack of association of SES variables (income and education) with children's anxiety, our findings point to a specific association with language and children's anxiety, even after controlling for age and temperament. Possible reasons for this finding include the fact that children of Spanish-speaking Latino parents face unique circumstances in terms of language barriers. Although more than half of U.S. Latino adults speak English "very well," a significant number of Latino adults speak English "not well" or "not at all" [30]. This can be of concern in the hospital setting where medical terminology can be complicated and communication often takes place under circumstances of high emotion and fast speech. Having to use an interpreter to convey information can cause additional anxiety, particularly in a fast paced pediatric surgical environment where cultural competency is highly important[31]. Challenges with communication could feasibly impact the stress level of the child facing surgery, particularly given potential difficulty understanding fully the nature of the medical procedure and the surgical process. In addition, given the documented underutilization of health care services by the Latino population due to fear of being misunderstood, individuals who do not speak the dominant language of the U.S. may be less likely to have received past education concerning the medical field and the surgical experience [32,33]. All of these factors can presumably lead to the higher anxiety faced by children of Spanish-speaking Latino parents before surgery.

Although this study contributes to our understanding of the experience of anxiety of children before surgery, it is not without limitations. One limitation is the fact that pre-medicated children were not included in our sample. Thus, the children who experienced the highest levels of anxiety may not have been included in this study as they are most likely to receive premedication, potentially limiting the variance observed in anxiety. In addition, there was a lack of formal assessment of language skills. It may be that some parents had equal language skills in both Spanish and English. Moreover, we were unable to document interpreter use or anesthesia provider language, which could have impacted children's anxiety. Furthermore, this study examined healthy children undergoing surgery from four hospitals with three of the hospitals in California and one in Colorado. This West Coast location bias may limit the generalizability of the findings. Therefore, the examination of children from other locations throughout the United States and native Spanish speakers outside of the United States would

be beneficial for future examination of this issue. Finally, our sample included on children undergoing outpatient tonsillectomy from one of three categories of ethnicity/language and thus findings cannot be generalized to a broader population of surgeries and ethnic/language backgrounds.

In conclusion, the study provides evidence that child pre-operative anxiety may be influenced by primary language spoken in addition to factors such as age and temperament. Further studies should examine how and why language may influence anxiety and what steps ought to be taken to reduce anxiety in Spanish-speaking families facing children's surgery. This study provides valuable insight into characteristics of patients that are important predictors of anxiety. Given that a child's pre-operative anxiety is strongly linked to postoperative recovery, findings from this study highlight the importance of further exploration of this issue.

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- Known predictors of pediatric pre-operative anxiety include child age, child sociability and shyness, parent anxiety, and children with a history of previous surgeries and/or negative medical experiences.
- This article is the first to examine the role of language and ethnicity in pre-operative anxiety in children.

Table 1

Child and Parent Demographics

Variable	English-speaking non-Latino White (*n* = 139)	English-speaking Latino (*n* = 88)	Spanish-speaking Latino (*n* = 67)	*Test Statistic*	Group Differences
Child:					
Age in years (M ± SD)	6.62 ± 3.17	7.48 ± 3.31	7.46 ± 3.24	$F(2, 290) = 2.51$	N/A
Gender (n (% Female))	139 (58%)	88 (52%)	67 (46%)	$\chi^2 (2, N = 293) = 2.57$	N/A
Parent:					
Age in years (M ± SD)	37.48 ± 6.49	33.73 ± 6.39	35.03 ± 7.07	$F(2, 276) = 8.77$	English-speaking non-Latino White > Spanish-speaking Latino and English-speaking Latino
Education in years (M ± SD)	15.77 ± 2.60	13.01 ± 2.36	10.08 ± 2.85	$F(2, 276) = 99.16$	English-speaking non-Latino White > English-speaking Latino > Spanish-speaking Latino
Gender (n (% Mother))	110 (79%)	76 (86%)	61 (91%)	$\chi^2 (4, N = 294) = 7.33$	N/A
Household Income	$100,000– $200,000	$31,000–$50,000	$21,000–$30,000	$\chi^2 (16, N = 277) = 112.37$	English-speaking non-Latino White > English-speaking Latino > Spanish-speaking Latino

Note: Household income was reported by range therefore the median range was reported; M = mean; SD = standard deviation

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Table 2

Pearson Product-Moment Correlation for Child Anxiety and Child, Parent, and Household Variables

	Child Anxiety (mYPAS-SF)	
	Induction 1	**Induction 2**
Child Age	$r(287) = -0.18$, $p = 0.020$	$r(288) = -0.20$, $p = 0.010$
Child Sociability	$r(279) = -0.12$, $p = 0.038$	$r(280) = -0.12$, $p = 0.043$
Child Shyness	$r(287) = 0.10$, $p = 0.091$	$r(288) = 0.05$, $p = 0.415$
Child Emotionality	$r(287) = -0.06$, $p = 0.318$	$r(288) = -0.01$, $p = 0.875$
Child Activity	$r(287) = 0.01$, $p = 0.816$	$r(288) = 0.01$, $p = 0.894$
Parent Age	$r(274) = -0.07$, $p = 0.277$	$r(275) = -0.07$, $p = 0.279$
Parent Education	$r(272) = -0.11$, $p = 0.062$	$r(273) = -0.10$, $p = 0.101$
Parent State Anxiety	$r(274) = 0.02$, $p = 0.718$	$r(275) = -0.08$, $p = 0.202$
Parent Trait Anxiety	$r(271) = -0.01$, $p = 0.820$	$r(272) = -0.04$, $p = 0.523$
Household Income	$r(272) = 0.05$, $p = 0.443$	r(273) = 0.03, $p = 0.639$

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Table 3

Results of Child Pre-operative Anxiety and Previous Surgery, Parental Presence, and Child Gender T-Tests

	Child Anxiety (mYPAS-SF)	
	Induction 1 (M ± SD)	**Induction 2 (M ± SD)**
Previous Surgery	33.65 ± 15.66	39.00 ± 17.92
No Previous Surgery	35.75 ± 15.16	42.61 ± 19.15
	$p = 0.330$ 95% CI = −2.14 to 6.34	$p = 0.172$ 95% CI = −1.58 to 8.68).
Parental Presence	35.31 ± 15.52	40.90 ± 19.32
No Parental Presence	34.91 ± 14.48	43.94 ± 17.12
	$p = 0.836$ 95% CI = −4.26 to 3.45	$p = 0.206$ 95% CI = −1.69 to 7.78
Boys	35.57 ± 16.54	44.13 ± 21.64
Girls	34.92 ± 14.02	39.78 ± 15.64
	$p = 0.716$ 95% CI = −2.89 to 4.21	$p = 0.050$ 95% CI = 0.002 to 8.68

M= Mean; SD = Standard Deviation; CI = Confidence Interval

Table 4

Child Pre-Operative Anxiety among Ethnic/Language Groups

Variable	**English-speaking non-Latino White (*n* = 139)**	**English-speaking Latino (*n* = 88)**	**Spanish-speaking Latino (*n* = 67)**	***p* value**	**Comparison**	**95% Confidence Intervals**	**Group Differences**
Induction 1 mYPAS-SF (M ± SD)	34.85 ± 14.98	31.64 ± 12.94	40.66 ± 17.02	0.001	ESW & ESL ESW & SSL ESL & SSL	−0.83 to 7.24 −10.24 to −1.38 −13.87 to −4.16	Spanish-speaking Latino> English-speaking non-Latino White and English-speaking Latino
Induction 2 mYPAS-SF (M ± SD)	41.04 ± 19.82	39.87 ± 18.07	46.03 ± 16.57	0.107	ESW & ESL ESW & SSL ESL & SSL	−3.87 to 6.19 −10.56 to 0.51 −12.24 to −0.13	N/A

Note: mYPAS-SF = Modified Yale Pre-Operative Scale – Short Form; M = mean; SD = standard deviation; ESW = English-speaking non-Latino White; ESL = English-speaking Latino; SSL = Spanish-speaking Latino

Table 5

Linear Regression Results for Induction 1 and Induction 2 mYPAS-SF

Variable	Induction 1 mYPAS-SF				Induction 2 mYPAS-SF			
	B	***95% CI***	***SE***	***p***	***B***	***95% CI***	***SE***	***p***
EAS-TS (Sociability)	−0.14	−6.33 to −0.54	1.47	**0.020**	−0.12	−7.07 to 0.02	1.80	0.051
Child age in years	−0.15	−1.25 to −0.10	0.20	**0.022**	−0.20	−1.84 to −0.44	0.36	**0.002**
Parent anxiety (STAIS)	0.04	−0.12 to 0.21	0.08	0.563	0.08	−0.07 to 0.33	0.10	**0,204**
PPIA	0.02	−3.68 to 5.01	2.21	0.765	−0.11	−9.82 to 0.80	2.69	0.095
Household income	−0.03	−0.08 to 0.05	0.03	0.633	0.01	−0.07 to 0.08	0.04	0.926
Spanish-speaking Latino	0.23	3.90 to 13.73	2.49	**<0.001**	0.14	0.55 to 12.58	3.05	**0.032**
English-speaking Latino	−0.09	−7.08 to 1.19	2.10	0.162	−0.04	−6.76 to 3.32	2.56	0.501
F (df, *df*)		4.80 (7, *253*)				3.651 (*7,261*)		
R^2 (*p*)		0.117 (*p*<0.001)				0.091 (0.001)		

Note: mYPAS-SF = Modified Yale Pre-Operative Scale Short Form; EAS-TS = Emotionality, Activity, Sociability Temperament Scale; STAIS = State Trait Anxiety Inventory State Form; PPIA = Parental Presence at Induction of Anesthesia; B = Standardized Beta Coefficient; CI = Confidence Interval; SE = Standard Error; F = F statistic from regression analysis; df = degrees of freedom; R^2 = variability in child pre-operative anxiety explained by the regression model.