

Parental anxiety levels during pediatric induction with and without administration of premedication for general anesthesia

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This study measured parental anxiety before, during, and after elective dental procedures under general anesthesia using the Spielberger State-Trait Anxiety questionnaire. State anxiety started relatively high before the procedures, peaked immediately after induction using general anesthesia, and dropped during recovery to below the initial score. Parents, whose children were premedicated and fathers in general, had significantly higher anxiety immediately after induction. This study supports interventions to lower anxiety of the parents as well as that of children.

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INTRODUCTION

Nearly three million children undergo surgery each year, a potentially traumatic event, the impact of which affects both the child and parents. Many studies have focused on alleviating the stress of the child and anxiety levels before and after ambulatory surgery. Orientation tours, books, modeling, play therapy, and the teaching of coping skills have all been used with varying degrees of success.

Most of the literature and research has focused on administering pre-medication, such as Versed, to comfort the child and reduce anxiety levels. A previous study by Kain *et al.*¹ showed that children, who received pre-medication with Midazolam prior to surgery, were less anxious. Cameron *et al.*² found that parental presence during anesthetic induction reduced distress of children undergoing surgery. Such practices in reducing the fears of a child are sound and reliable, but they do not take into account the effect of parental stress levels.

The anxiety of the child level is related to parental attitudes toward ambulatory care. Reducing parental stress levels can ameliorate the mood and anxiety levels of the child. Henderson, Baines, and Overton³ used a questionnaire to survey 126 parents post-

operatively. They found that 88% wanted to be present at the induction of the child, with an overwhelming majority of these parents (95%) believing that their presence had not only relieved some of their own anxiety, but the anxiety of the child as well. Children will perceive the anxiety levels of the parents. A child naturally reacts to or mirrors the mood of the parents⁴ as expressed through changes in the tone of voice or facial expression.

In the dental literature indexed on Medline, we found no studies that measured the degree of stress and anxiety felt by parents before, during, and after elective dental procedures under general anesthesia, nor that determined what factors predict or alleviate stressors that cause high parental anxiety levels.

The purpose of this investigation was to measure parental anxiety before, during, and after elective dental procedures under general anesthesia and to determine if pre-medication of a child or selected parent characteristics were associated with changes in parental anxiety levels.

METHODS

Subjects for this study were patients from private dental practices and from the pediatric dental clinic at Lutheran Medical Center (LMC) located in Brooklyn, NY, the Institutional Review Board of which approved the study. All operating room procedures were performed at LMC. Those children undergoing elective dental treatment under general anesthesia (GA) ranged from 2 to 10 years of age. Subjects were divided into two groups: parents of those individuals, who did not require pre-medication prior to surgery, based on clinical criteria (no-premed group), and parents of those children, who did require pre-medication prior to surgery (premed group). Patients who presented to the operating room (OR)

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assessment area the day of surgery with high levels of uncooperativeness, apprehension, and anxiety were given Versed (1 mg/kg) 20 minutes prior to induction of general anesthesia. Parents were asked to fill out a questionnaire measuring anxiety levels on three separate occasions: in the assessment area just before transporting the patient to the operating room, right after induction of the child, and during the recovery period after OR procedures.

Anxiety was measured using the Anxiety Questionnaire developed by Spielberger.⁵ The questionnaire comprises separate self-report scales for measuring two distinct anxiety concepts: state anxiety and trait anxiety. Data was collected the day of elective surgery. The trait scale consisted of 20 statements that ask subjects to describe how they generally feel. The state scale also consisted of 20 statements, but the instructions require subjects to indicate how they feel at that particular moment in time. Subjects responded to each item by rating themselves on a four-point scale. Each answer to a specific question was given a numerical value for statistical analysis. The range of possible scores for each scale varied from a minimum score of 20 to a maximum score of 80. The higher the score, the greater the anxiety felt by the parent.

In the immediate preoperative period during the assessment portion of the visit, the parents were asked to fill out both the trait and state portions of the questionnaire. Just after inhalation induction and during recovery of the patient, the mothers and fathers filled out only the state portion. If three or more items in each questionnaire were not filled out, the validity of the survey was held in question, and that subject was removed from the study. The answers were tabulated and analyzed for statistical significance using the chi square test for categorical variables and student's *t*-test for continuous variables. Correlations were assessed using Pearson's *r*.

Additional information about the patient was filled out by the operating dentist and included whether the patient was pre-medicated, whether the patient was from a private office or from the LMC dental clinic, the sex of the parent and patient, and the ethnic group they identified with. The dentist also recorded whether the parent was noticeably crying once the child was induced. Subjects were grouped into 5 major categories of cultural origin: European, African-American, Asian Chinese, Hispanic, and Middle Eastern.

RESULTS

A total of 42 parents answered the questionnaire, 12 fathers (29%) and 30 mothers (71%); 25 were Hispanic, 11 European, 2 Asian Chinese, 3 Middle Eastern, and 1 African-American. Of 42 children, 23 (55%) were boys, and 19 (45%) were girls. A total of 18 children (43%) were pre-medicated prior to surgery, and 24 (57%) were not.

Mean parental trait anxiety was 36.2 ± 7.8 (range 24 to 51). Parental state anxiety level was high during the assessment phase, with a mean value of 41.7 ± 9.0 (range 21 to 57). The greatest state anxiety score was seen after induction, when the mean score of the parents was 44.9 ± 11.6 (range 24 to 78). The recovery phase responses showed a sizeable drop in the state score, with a mean of 35.7 ± 8.0 (range 20 to 52) (Figure 1.) The assessment score was significantly lower than the score after induction ($p = 0.02$) and significantly higher than the recovery score ($p < 0.001$). The score after induction was significantly higher than the recovery score ($p < 0.001$). These statistical differences were true as well for both premed and no-premed groups when analyzed separately.

Trait anxiety scores of parents in the premed group (mean 38.5 ± 7.8) were slightly higher than those in the no-premed group (mean 34.5 ± 7.4) (trend $p = 0.09$, Figure 2). State scores of the premed group during both the assessment and recovery phases were not significantly different from those of the no-premed group ($p > 0.3$). State scores of the two groups were different after induction: the score of the premed group was higher, with a mean of 50.0 ± 10.0 , as compared to that of the no-premed group with a mean of 41.0 ± 11.4 ($p = 0.01$, Figure 2).

Fourteen parents (33%) cried as they left the OR after induction of the children. Parents crying upon leaving the OR was not related to whether the child was premedicated: 7 of 18 parents in the premed group (40%) cried, and 7 of 24 parents in the no-premed group (29%) cried ($p > 0.5$). No significant differences were found when comparing the four trait and state anxiety scores of parents of Hispanic and European origin, the two largest such groups ($p > 0.3$). No correlation was found between the age of the child and the state anxiety level of the parent after induction ($p > 0.3$).

Fathers scored significantly higher than mothers on two anxiety measures: mean trait scores of fathers (39.9 ± 9.2) were higher than those of mothers (34.7 ± 6.7) ($p < 0.05$); mean scores of fathers after induction score (50.8 ± 14.5) were higher than those of mothers (42.5 ± 9.5) ($p < 0.04$, Figure 3). The proportion of fathers in the premed group was no larger than that in the no-premed group ($p > 0.9$). The anxiety scores of the parents did not vary according to whether the child was a girl or a boy ($p > 0.6$).

Trait and post-induction state anxiety scores were mildly, but significantly correlated ($r = .45$, $p = 0.003$, Figure 4).

DISCUSSION

This study showed that anxiety started relatively high before elective dental procedures under general anesthesia, peaked significantly immediately after induction using GA, and dropped significantly lower

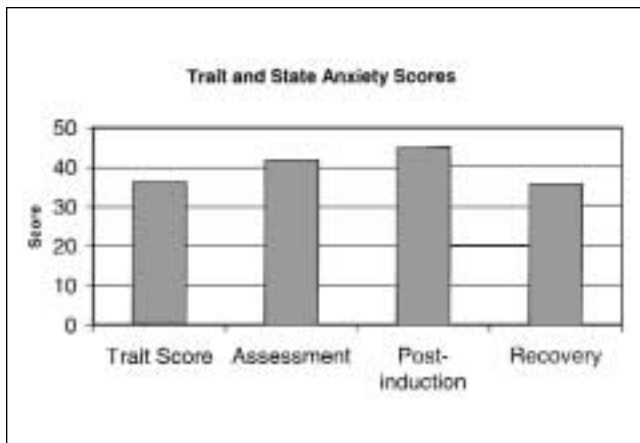


Figure 1. Trait anxiety score and state anxiety scores for each phase of the study.

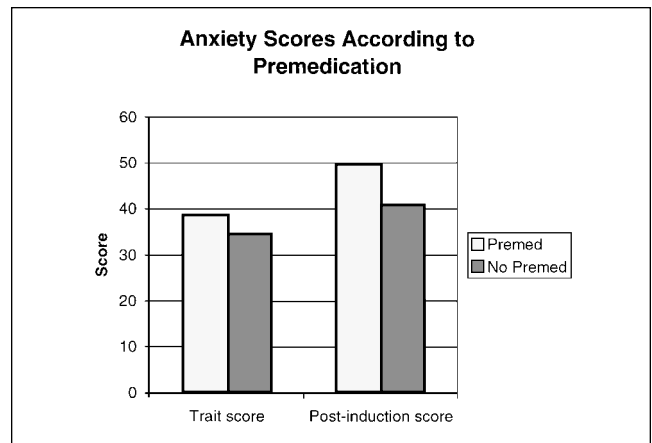


Figure 2. Mean trait anxiety scores and post-induction state anxiety scores by premedication.

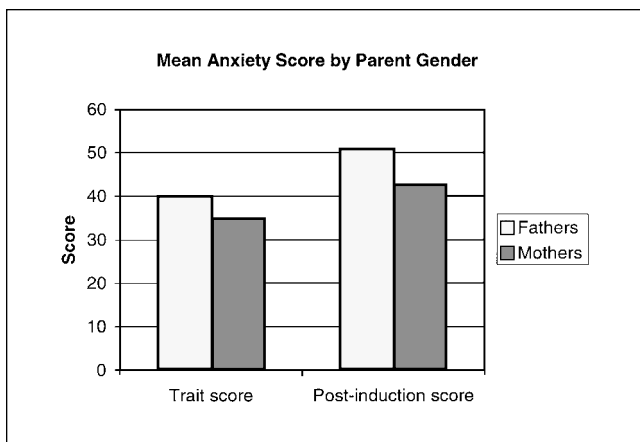


Figure 3. Mean trait and post-induction anxiety scores for mothers and fathers.

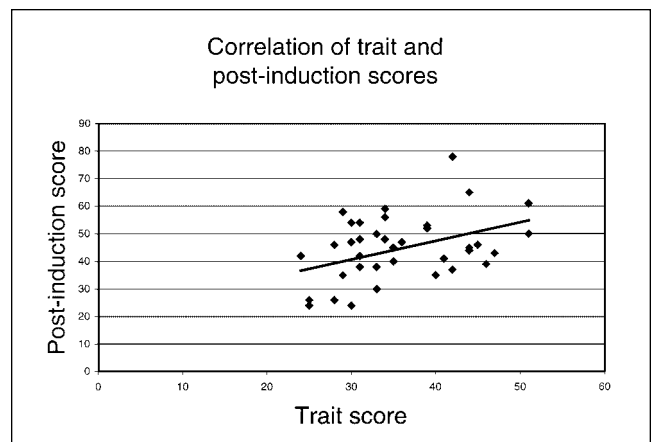


Figure 4. Scatter plot of trait and post-induction state anxiety scores.

during recovery than the initial score. Parents whose children were premedicated had significantly higher anxiety immediately after induction. They also showed a trend in having a higher trait anxiety than parents of children, who did not require premedication.

Obviously, children who required premedication had a higher level of anxiety before the procedure than those who did not require premedication. The anxiety and apprehension levels of children prior to the administration of Versed could have heightened the anxiety levels of parents during the most stressful time of the procedure for parents; the induction of GA. Thus, causing the parents of the premed group to have higher anxiety levels during that time. On the other hand, perhaps the higher trait anxiety of these parents was reflected in the behavior of the children upon reaching the OR. In effect, the children could have been acting out the anxiety levels of the parents. This second explanation is especially plausible since the state scores of parents on arrival did not differ between the premed and no-premed groups. The greater vulnerability to

anxiety of parents in the premed group as indicated by the higher trait scores would have been reflected in the higher peak in anxiety immediately after induction.

Surprising to us was the higher level of anxiety in fathers than in mothers. As the proportion of fathers in both premed and no-premed groups was similar, we assume that the anxiety of the fathers was not related to whether the child was premedicated or not. Perhaps mothers are more used to dealing with the everyday crises of children and thus respond more calmly to the stress associated with dental procedures. As we did not record which fathers were primary providers of childcare and so might be like many mothers in this respect, greater certainty in explaining this finding will have to await subsequent research studies.

Preoperative anxiety is stressful for both child and parent. Control of preoperative anxiety remains an important goal as it has been shown to reduce adverse postoperative psychological events in children.⁶ Alleviation of this stress may thus be beneficial both psychologically and physically. Preoperative anxiety in

children is related to nightmares, separation anxiety, eating problems, and postoperative regression. One of the reasons for choosing Versed as a premedication agent is that it is an anxiolytic, sedative, and amnesic drug. A short-acting benzodiazepine, it is absorbed from the gastrointestinal tract rapidly. Children given preoperative oral Versed were less likely to cry and fight while being anaesthetized.⁷

The importance of parental anxiety and its effects on children undergoing medical procedures has also been addressed in the pediatric literature. This reason alone extends the role of the pediatric caretaker to the care of the parents. Vessey *et al.*⁸ investigated the effect on parents of accompanying their children during induction of anesthesia. They found that the most upsetting factors were seeing the child upset before induction of anesthesia, watching or feeling the child go limp with induction, and separation from the children after induction. Our results accord with those of this study in that the scores of the state of anxiety of the parents were consistently higher during the post-induction phase of this study.

This study had several limitations. First, since parents assessed their own anxiety through a questionnaire, various factors could have influenced them and skewed results. Did the parent read and answer the questions honestly? Some parents may have simply jotted down the answers quickly so that they could focus their attention back on the child or the situation at hand. Was the parent able to understand the questions, and did the questions mean the same thing to each person? Since the parents were under stress and sometimes dealing with intense emotions, were they stable enough to answer the proposed questions during the experiment in an honest and objective manner? Human frailties and judgment of one's self as well as comprehension for each given question casts some doubt upon the accuracy of the data. That the state/trait anxiety instrument used in this study is well reported and validated helps offset this concern, however.

Second, because of scheduling and a set OR rotation for elective dental cases under general anesthesia, more than one anesthesiologist was used in the study. Each doctor had different techniques in assessing and inducing a child, and each technique elicited a different reaction from the parent and child alike. Ideally, one anesthesiologist would have allowed the opportunity for a consistent and uniform protocol for standardization.

Third, the numbers of subjects in the premed and no-premed groups were unequal because assignment to groups was based purely on clinical factors. Even so, the number of parents in each group was sufficient to permit clear statistical significance to be achieved.

How can we as clinicians relieve some of the anxieties of parents when it comes to performing stressful procedures on a child? Previous studies have shown that the majority of parents wished to be present because they felt that it relieved the anxiety of the child and that it was the duty of parents.³ Some researchers state that the nature of the preoperative informed consent may influence parental satisfaction. Litman¹⁰ demonstrated increased parental satisfaction when the risks of anesthesia were included in the pre-anesthetic discussion. These results were challenged by Waise¹ and Truog⁹, who reported that most parents had no change in the level of anxiety after hearing of the risks of anesthesia. Dealing with the psyche of a parent, who is in turn dealing with a tense and demanding event that involves the health and possible mortality of their child, can be a difficult task for providers. Being aware of own anxiety as a parent and responding sensitively is a first step in lowering abnormally high levels of apprehension. Alleviating anxiety of parents helps lessen nervousness of children and allows a smoother transition into a complicated procedure for both parent and patient.

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