

CURRICULM VITAE

CONTACT INFORMATION:

Name: Marwah Saad ALMarwan
Email: marwah.almarwan@gmail.com

EDUCATION:

Graduated from Dental college in Riyadh, Saudi Arabia in 2011. Worked as general dentist in 2012 for a year and eight months at King Fahad Medical City, Riyadh, Saudi Arabia. Enrolled in Advanced Programs for Internationally-Trained Dentists for one year in 2014, at the department of pediatric dentistry at University of Maryland. In 2015, enrolled in pediatric dentistry residency program at University of Maryland for two years, graduated in June, 2017.

Undergraduate Institution, City, State: King Saud University, Riyadh, Saudi Arabia
Degree, Major: BDS
Date of Graduation: 2011

Graduate Institution, City, State: University of Maryland, Baltimore, Maryland
Degree, Major: BDS, MS (Biomedical Research)
Date of Graduation: June, 2018

Thesis Title: Parental Perception toward Dental Sedation in Pediatric Patients at the University of Maryland.

Thesis Advisors: Vineet Dhar

PUBLICATIONS:

"Perception of Pain and Discomfort from Elastomeric Separators in Saudi Adolescents" published in Saudi Medical Journal.

"Perceptions and Knowledge of Caregivers About Oral Health Care for Special Care Patients" published in International Journal in Current Research.

ABSTRACT

Title of Thesis: Parental Perception toward Dental Sedation in Pediatric Patients at the University of Maryland
Marwah Almarwan, Master of Science, 2018
Thesis Directed by: Vineet Dhar, BDS, MDS, PhD, MBA

Purpose: To evaluate pre-operative parental perceptions towards sedation, through their knowledge, beliefs and attitude. The parents was also surveyed for post-operative satisfaction and acceptance of the sedation procedure within 2 days of the dental treatment under sedation.

Methods: One hundred and one parents of children underwent dental treatment under sedation at University of Maryland responded to two questionnaires: pre-operative and post-operative (24-48 hours).

Results: Most of the parents were the only one accompanying person with the child undergoing dental sedation (57.43%). Fisher's exact test was significant (0.006) in parents who thought that dental sedation was of a low risk and had education of college or more.

Conclusion: Less than half of parents brought an additional responsible person with them to the child's dental sedation appointment, suggestive of inconsistent compliance with the pre-operative instructions. Parents with higher education (postgraduate) viewed dental sedation for children as a safe approach.

Parental Perception toward Dental Sedation in Pediatric
Patients at the University of Maryland

by
Marwah Almarwan

Thesis submitted to the Faculty of the Graduate school of the
University of Maryland, Baltimore in partial fulfillment
Of the requirements for the degree of
Master Science
2018

DEDICATION

To my father who was always proud and supportive, to my mother who was very patient, to my sister who helped me all the way, to my brothers who encouraged my ambitions, to all of my friends: Munirah, Hanan, Nujud, Asma, Rafif, Haifa, Shahad, Soe, Chia-Yu and Rawan, who were my second family.

ACKNOWLEDGMENT

I would like to show my gratitude to my mentor Dr.Vineet Dhar , without his optimism concerning this study, enthusiasm, encouragement and support this study would hardly have been completed.

I am grateful for having Dr.Glenn Minah and Dr.Christine Hsu as part of my thesis committee, it was an honor for me.

I am indebted to all of my colleagues in the department of Pediatric Dentistry at University of Maryland, who helped me surveying the sedation patients, and special thanks to Dr.Marvin Leventer who inspired the beginning of this project.

I also owe a great gratitude to the statistician Knar Sagherian, who did a wonderful job in running statistics and teaching me many aspects of it.

Table of Contents

INTRODUCTION.....	1
LITERATURE REVIEW.....	1
Types of Sedation.....	3
Goals of Sedation.....	3
Patient Selection and General Guidelines for Sedation.....	4
1. Anatomy and Physiology of Pediatric Patient	4
2. Route of Administration	6
3. Patient Evaluation.....	10
4. Informed Consent and Parent Instructions.....	11
5. Equipment and Sitzings	12
6. Risk Factors for Adverse Events.....	13
Parental perception towards Dental Sedation	14
PURPOSE.....	17
HYPOTHESES	17
MATERIALS AND METHODS	17
• Inclusion criteria.....	18
• Exclusion criteria.....	18
• Instrument	18
• Procedure.....	20
RESULTS.....	21
• Demographic Data.....	21
• Pre-operative questionnaire (knowledge,attitude, and belief).....	23
• Post-operative questionnaire (satisfaction).....	26
• Association between Knowledge and Satisfaction.....	28
• Association between Attitude and Satisfaction.....	32
• Association between Belief and Satisfaction.....	33
• Relation between Demographic Data and Knowledge	33

- Relation between Demographic Data and Attitude..... 38
- Relation between Demographic Data and Belief..... 39
- Relation between Dental Sedation Type and Recall (Satisfaction)..... 41
- Relation between Demographic Data and Satisfaction..... 41
- Relation between Dental Sedation Type and Child’s Age..... 42

DISCUSSION 42

- Research Subjects 42
- Association between Knowledge and Satisfaction..... 45
- Association between Attitude and Satisfaction..... 46
- Association between Belief and Satisfaction..... 46
- Relation between Demographic Data and Knowledge 47
- Relation between Demographic Data and Attitude 50
- Relation between Demographic Data and Belief..... 50
- Relation between Dental Sedation Type and Recall (Satisfaction)..... 51
- Relation between Demographic Data and Satisfaction..... 51
- Relation between Dental Sedation Type and Child’s Age..... 52

LIMITATIONS..... 53

CONCLUSION..... 54

Appendix 1 (consent form)..... 56

Appendix 2 (Inclusion/Exclusion criteria form)..... 60

Appendix 3 (Pre-operative questionnaire)..... 61

Appendix 4 (Post-operative questionnaire)..... 61

Appendix 5 68

References 89

List of Tables

Table 1. 1 Demographic characteristics of the survey group.....	22
Table 1. 2 Numbers of Sedation cases.....	23
Table 2 Pre-operative questionnaire: Knowledge.....	24
Table 3 Pre-operative questionnaire: Attitude.....	25
Table 4 Pre-operative questionnaire: Belief.....	26
Table 5 Post-operative questionnaire (satisfaction).....	27
Cont. Table 5.....	28
Table 5. 1 Evideness of Illness	28
Table 6. 1 Association between Knowledge and Evidence of Illness (Satisfaction).....	29
Table 6. 2 Association between Knowledge and Recall (Satisfaction).....	30
Table 6. 3 Association between Knowledge and Recall (Satisfaction).....	30
Table 6. 4 Association between Knowledge and Alertness duration (Satisfaction).....	31
Table 6. 5 Association between Knowledge and Recall (Satisfaction).....	31
Table 7 Association between Attitude and Alertness duration (Satisfaction).....	32
Table 8 Association between Belief and Recall (Satisfaction).....	33
Table 9. 1 Association between Knowledge and Parental Age (Demographics).....	34
Table 9. 2 Association between Knowledge and Education level (Demographics).....	34
Table 9. 3 Association between Knowledge and Age of Child receiving sedation (Demographics).....	35
Table 9. 4 Association between Knowledge and Number of Children (Demographics).....	35
Table 9. 5 Association between Knowledge and Education level (Demographics).....	36
Table 9. 6 Association between Knowledge and Education level (Demographics).....	36
Table 9. 7 Association between Knowledge and Education level (Demographics).....	36
Table 9. 8 Association between Knowledge and Education level (Demographics).....	37
Table 9. 9 Association between Knowledge and Education level (Demographics).....	37
Table 9. 10 Association between Knowledge and Education level (Demographics).....	38
Table 9. 11 Association between Knowledge and Age of Child receiving sedation (Demographics).....	38

Table 10. 1 Association between Attitude and Education level (Demographics).....	39
Table 10. 2 Association between Attitude and Parental Age (Demographics).....	39
Table11. 1 Association between Belief and Number of Children (Demographics).....	40
Table11. 2 Association between Belief and Sedation type.....	40
Table11. 3 Association between Belief and Age of Child receiving sedation (Demographics).....	40
Table 12 Association between Type of Sedation and Recall (Satisfaction).....	41
Table 13 Association between Age of Child and Evidence of illness (Satisfaction).....	42
Table 14 Association between Age of Child and Sedation Type.....	42

LIST OF ABBREVIATIONS

- AAPD: American Academy of Pediatric Dentistry
- FDA: Food and Drug Administration
- CNS: Central Nervous system
- ASA: American Society of Anesthesiologists
- ECG: Electrocardiography
- USA: United States of America
- MD: Maryland
- HIPPA: Health Insurance Probability and Accountability Act
- EMS: Emergency Medical Service

INTRODUCTION

There are several challenges in providing optimal care to pediatric patients in a health care setting. One such challenge the providers experience in the medical and dental fields is rendering age-appropriate behavior guidance. Pediatric dentists are trained to provide oral health care and treatment in infants, children, adolescents and person with special health care needs. A variety of behavior guidance techniques have been developed to meet the challenge of treating children who are unable or unwilling to cooperate (Patel et al., 2016). Both pharmacological and non-pharmacological behavior guidance techniques are used to alleviate anxiety, enhance a positive dental attitude and accomplish quality oral health care safely and efficiently for all pediatric patients. The process of behavior guidance technique selection must be tailored to the needs of the patient and the skills of the practitioner (AAPD, 2015). In addition, selection of a specific behavior guidance techniques needs many factors to be assessed; child's anxiety, age of child, personality variables, parental attitudes toward behavior management techniques, dental treatment, and the legal implications (Fields et al., 1984).

The objective of this study is to assess parental perception towards dental sedation. To understand parental perception towards a specific behavior guidance technique, a full exploration of the approach should be done including implementation, types, goals, patient selection and general guidelines and risk factors.

LITERATURE REVIEW

Search strategy included articles that were related to parental perception to dental sedation in general and then focused on parental perception including; knowledge, attitude, belief and satisfaction toward dental sedation or sedation. PubMed was the main database used. The search included the terms sedation, dental sedation, oral, conscious or moderate sedation, intravenous sedation and children/ young children. In addition, knowledge, attitude, belief, satisfaction, sedation side effects.

Most pediatric patients managed very well through the implementation of basic behavior guidance techniques which include; communication, positive pre-visit, direct observation, Tell-Show-Do, Ask-Tell-Ask, voice control, nonverbal communication, positive reinforcement and descriptive praise, distraction, memory restructuring, parental presence/absence, nitrous oxide/oxygen inhalation. Some pediatric patients require more than basic behavior guidance and it falls under what American Academy of Pediatric Dentistry (AAPD) defines as advanced behavior guidance. Protective stabilization, sedation, and general anesthesia are examples of advanced behavior guidance (AAPD, 2015).

To perform the highest quality dental care for the pediatric patient, the practitioner may need pharmacologic means to obtain a cooperative patient. Techniques that used drugs to induce cooperative yet conscious state in a child are most commonly referred to as techniques of conscious sedation (new terminology Moderate sedation, AAPD), (McDonald, 2004). In 1985, the National Institutes of Health and the American Academy of Pediatrics issued guidelines for procedural sedation and analgesia in response to several sedation-related deaths. Three levels of sedation defined in these documents: conscious sedation, deep sedation, and general anesthesia. The term conscious sedation has been replaced by moderate sedation (Krauss and Green, 2006). On the other hand, inducing non-conscious state would be referred as either deep sedation or general anesthesia with differences in response.

The use of In-office sedation by dentists to treat children has increased over the past 15 years. It is estimated that between 10%-20% of children will require pharmacological approach to do dental treatment safely and efficiently. The main purpose of pharmacologic management (advanced behavior guidance technique) is to minimize or eliminate anxiety (Pinkham, 2005).

Types of Sedation

- A. Minimal sedation (old terminology anxiolysis): a drug induced state, patients respond normally to verbal commands, cognitive function and coordination could be affected but respiratory and cardiovascular functions are unaffected.

- B. Moderate sedation is a drug-induced state, depression of consciousness occurs but patients still respond purposefully to verbal commands (e.g. open your eyes either alone or accompanied by light tactile stimulation). Reflex withdrawal, (e.g. such as pushing away the painful stimulus to confirm a higher cognitive function). Respiratory and cardiovascular usually adequate and maintained (AAPD, 2015).

- C. In contrast to Moderate sedation, Deep sedation (deep sedation/analgesia): a drug-induced state with depression of consciousness, patients cannot be easily aroused but respond purposefully, after repeated verbal or painful stimulation. Impairment of adequate respiration is expected and might need support. Cardiovascular function is usually maintained. A state of deep sedation may be accompanied by partial or complete loss of protective airway reflexes (AAPD, 2015).

Goals of Sedation

1. To facilitate the provision of quality care
2. To minimize the extremes of disruptive behavior
3. To promote positive psychological response to treatment
4. To promote patient welfare and safety
5. To return the patient to a physiologic state in which safe discharge as determined by recognized criteria, is possible (McDonald, 2004, AAPD, 2015).

These goals can best be achieved by selecting the lowest dose of drug with the highest therapeutic index for the procedure. The selection of the fewest number of drugs and matching drug selection to the type and goal of the procedure are essential for safe practice. Increase the potential for an adverse outcome when three or more sedating medications are administered (AAPD, 2015).

When patient lost partial or complete control of their protective reflexes, which is the case in some moderate and almost all deep sedation procedure, patient will be at risk of laryngospasms, apnea, hypoxemia which are life threatening conditions if not detected and corrected (Pinkham, 2005).

Sedation is a continuum and studies have shown that it is common for children to pass from the intended level of sedation to a deeper, unintended level of sedation (AAPD, 2015). The rescue concept is crucial for a safe sedation. Practitioners of sedation must have the skills to rescue the patient from a deeper level than that intended for the procedure. The ability to rescue means that practitioners have the ability to recognize the various levels of sedation and have the necessary skills to provide appropriate cardiopulmonary support if needed (AAPD, 2015).

Patient Selection and General Guidelines for Sedation

1. Anatomy and Physiology of Pediatric Patient

Pediatric patients have many differences from adults, including differences in size, weight and age. Those differences put children at higher risk of desaturation or respiratory depression. Respiratory rate is higher in children, due high oxygen demand and less mature alveolar system. Additionally, children have narrow nasal passages and glottis, combined with hypertrophic tonsils and adenoids, enlarged tongue, and greater secretions, which would produce a great risk of airway obstruction (McDonald, 2004).

In the Cote et al., (2000) study found that the most common issues associated with adverse sedation events were related to the effects of sedating medications on respiration.

When one hundred eighteen reports from FDA reviewed for factors that may have contributed to the adverse sedation event, among findings were that some practitioners did not understand the basic pharmacology, or the pharmacodynamics of the drugs administered. For example, the interaction of opioids and benzodiazepines on respiration or chest wall/glottic rigidity after intravenous fentanyl. In addition, drug overdose was another prominent factor. Other factors included inadequate resuscitation by health care providers, inadequate monitoring, and inadequate medical evaluation before sedation.

As reported by Chicka et al., (2012) eighty-two percent of the malpractice insurance claims of her study involved adverse event occurrences in patients younger than 6-years-old, considering that this is the age group most commonly sedated in the dental office. In addition, she concluded that very young patients (3-years-old or younger) are at greatest risk during administration of sedative and/or local anesthesia agents.

Pediatric patients demonstrate decreased tolerance to a respiratory obstruction, and sudden apnea is a potential risk. Due to the smaller thorax with less expansion capability, pediatric patients have less functional reserve. Thus, they do desaturate rapidly on obstruction or respiratory depression.

Respiratory depression refers to a reduced activity of the respiratory center in stimulating ventilation. It is a side effect of all CNS depressants, including sedatives, opioids, and general anesthetics. Children are at greater risk for airway obstruction and experience more transient episodes of apnea. Moreover, their functional residual capacity is much less than the adult and their oxygen demand is double. For these reasons, children should receive oxygen supplementation for all levels of sedation (Becker and Casbianca, 2009).

The most significant complication is hypoventilation and it is attributable to sedation and general anesthesia. Hypoventilation can result not only from respiratory depression, but airway obstruction. In fact, the benzodiazepines and conventional doses of opioids used for most moderate sedation techniques produce only mild degrees of respiratory depression.

Far more significant is that the relaxed patient is more likely to develop anatomical airway obstruction from soft tissues (e.g. tongue, tonsils, or adenoids) (Becker and Casbianca, 2009).

Cardiovascular differences for pediatric patients are faster heart rate and lower blood pressure than adults. Thus, children are at a higher risk of bradycardia, reduced cardiac output and hypotension.

Heart rate in pediatric patients determines blood pressure, decrease in heart rate leads to corresponding reduction in blood pressure and tissue oxygenation. One should be very careful when administer a heart-rate depressing medication in the pediatric population.

The action of medication, effect and duration is very variable in pediatric patients. Lipophilic medications have more retention than other types and could be prolonged in pediatric population, especially in obese patients. Medication metabolism in pediatric patients is very variable and not predictable, some patients might metabolize medication faster than others. Medication dosages should be administered meticulously with individualized care for each patient following established guidelines (McDonald, 2004).

2. Route of Administration

Many routes are being used but mostly oral and intravenous are implemented in university-based residency programs, hospitals and outpatient in-office operator. For minimal and moderate the following are sedation route options:

- Inhalational e.g., Nitrous oxide which has many advantages including rapid onset and recovery time, ease of dose control (titration), lack of serious adverse effects. Some of the disadvantages is that Nitrous oxide is a weak agent, patient may refuse it or does not like it, nasal mask may interfere with maxillary anterior teeth, if no proper scavenging of waste gas from dental operator then potential chronic toxicity may occur.

- Oral route e.g., sedative-hypnotics, antianxiety agents, narcotics. It is the most common route and if it tastes good with some added flavors would be very convenient route. Does not need any special equipment for administration and thus economic. If it is calculated to the therapeutic level for each patient and not combined, not repeated then sedation is safe. Nevertheless, variability dose exists between patients having same standard dose. Absorption from gastrointestinal tract can be affected by the presence of food, fear, fatigue, other medications and gastric emptying time. Some patient may vomit the medication and estimation of the wasted dose would be impossible. Additionally, titration is not possible, and some patient may become agitated after administering oral medication (Paradoxical response or angry child syndrome). Oral medications have long time of onset, varies between 15 to 90 minutes depending on the medication.

Drugs or medications used in oral sedation:

- (a) **Sedative-Hypnotics:** main effect is sleeping, the more the dose the more is hypnosis effect as well. Site of action is at the reticular activating system, which maintain consciousness. Two categories of sedative-hypnotics are barbiturates such as Pentobarbital, Secobarbital and Methohexital. The non-barbiturates are Chloral hydrates and Paraldehyde. Lower doses would produce minimal and moderate sedation and higher doses may produces deeper level of sedation.
- (b) **Antianxiety agents:** primary effect to reduce anxiety, and no analgesia. Site of action is the limbic system, which is responsible of emotions. In contrary to sedative-hypnotics, antianxiety has safer therapeutic index. Benzodiazepines are primarily antianxiety agents including diazepam (Valium), midazolam (Versed), and triazolam (Halcion) and used for minimal to moderate sedation in adults. Midazolam is the most popular agent used in pediatric patients in medical and dental settings. Midazolam is preferred for pediatric patients because it has rapid onset, low possibility of inducing loss of consciousness, and reversibility is possible with Flumazenil, which is benzodiazepines antagonist. Some of the disadvantages of Midazolam are short acting and increased patient

irritability. Paradoxical reactions characterized by crying, combativeness, disorientation, agitation, and restlessness have been reported in 1-15% of children receiving midazolam (Krauss and Green, 2006).

(c) **Antihistamine:** are useful in combination with other medications, as antiemetic and potentiating agents. Additionally, hydroxyzine (Atarax, Vistaril) and diphenhydramine (Benadryl) categorized as antianxiety medication because they possess antianxiety and sedative-hypnotic properties.

(d) **Narcotics:** provide mainly analgesic effect in sedation, the site of action is the opioid receptors of the central nervous system. Increase dose may lead to sedation and a serious side effect, which is respiratory depression and resultant hypoxia. They do potentiate other CNS depressing medications, produce nausea and vomiting and in high doses may cause cardiovascular depression. Narcotics should be limited to its analgesic benefit when doing minimal or moderate sedation. They must be used carefully because of the risk of producing respiratory depression and loss of consciousness when combined with other medications or drugs. E.g., morphine, meperidine, and fentanyl (Sublimaze).

- **Intramuscular route:** faster and more reliable absorption than oral route, considered the easiest. Rate of absorption can be affected by many factors, including; anxious patient who is experiencing a peripheral vasoconstriction, thus affecting uptake of the drug and onset. Dose cannot be titrated, possibility of tissue trauma and lack of venous access in case of medical emergency are disadvantages of intramuscular route.

- **Drugs or medications used in intramuscular sedation:**

(a) Ketamine produces a unique state of cortical dissociation that allows painful procedures to be done more consistently and effectively than with other procedural sedation and analgesia drugs. This state of "dissociative sedation" is characterized by profound analgesia, sedation, amnesia, immobilization, and can be rapidly and reliably produced with

intravenous or intramuscular administration. Horizontal nystagmus is a characteristic effect of ketamine, and to avoid undue anxiety parents should be told that this is a normal effect of ketamine. Because of its unique preservation of protective airway reflexes, ketamine might be preferred over other agents for urgent or emergent procedures when fasting is not assured. (Krauss and Green, 2006).

- **Subcutaneous route:** occasionally used and drug deposited into the subcutaneous or submucosal space. Oral site could be buccal vestibule; dentist may find it convenient to perform. Subcutaneous has slower absorption rate than other routes, however submucosal is relatively faster because of the rich blood supply. Large volume of solution deposited subcutaneously or submucosal could cause tissue sloughing.
- **Intravenous route:** the best route for administration of sedative agents. Titration and desired drug effect is possible, absorption is not a factor in this route because the agent is directly injected into blood stream. Test dose can be done and thus allergic reaction could be observed. Perfect route in case of medical emergency, because it is already established. Nevertheless, establishing an access in children could be difficult even for the most trained clinician. Some of the potential complications of misplaced intravenous catheter include; extravasation of drug into tissue, hematoma, and inadvertent intra-arterial injection. Considered cost prohibitive for the routine practice of general dentistry because of the additional monitoring and the armamentarium required, in addition to the high liability cost of malpractice coverage (Pinkham, 2005).

Drugs or medications used in intravenous sedation:

- (a) Fentanyl is a potent opioid with no intrinsic anxiolytic or amnestic properties. A single intravenous dose has rapid onset (<30 s) with a peak at 2-3 min and brief clinical duration (20-40 min). Its effects can be reversed with opioid antagonists (e.g. Naloxone, Nalmefene). Intravenous fentanyl can be easily and rapidly titrated for painful

procedures. As sedation does not occur at low doses (1-2 micrograms/kg) the concurrent administration of a pure sedative-most commonly midazolam is advisable. The combination of fentanyl and midazolam is a popular procedural sedation and analgesia regimen in children, with a strong safety profile when both drugs are carefully titrated to effect (Krauss and Green, 2006).

(b) Propofol has many desirable characteristics for procedural sedation and analgesia: extremely rapid onset, substantial potency that reliably produces effective conditions for procedural sedation and analgesia, extremely short recovery (5- 15 min), and high satisfaction to patients as a result of its antiemetic and euphoric properties. The most serious adverse effect of propofol is potent respiratory depression, and apnea can arise suddenly (Krauss and Green, 2006).

3. Patient Evaluation

Medical history should include information regarding the following:

- Allergies and previous allergic drug reactions.
- Current medications, including dosage, time, route and site of administration
- Diseases and abnormalities in the patient including pregnancy status of adolescents.
- Previous hospitalizations, including the date, purpose and hospital course.
- History of general anesthesia or sedation and associated complications.
- Family history of disease and anesthetic complications
- Review of body systems
- Age in years and months and weight in kilograms.

The physical evaluation should include the following:

- Vital signs, including heart and respiratory rates and blood pressure.
- Evaluation of airway patency
- ASA classification

Patient with tonsillar tissue that occupies more than 50% of pharyngeal space is at high risk of respiratory obstruction. Two standardized systems are usually used to evaluate tonsillar size; Brodsky and Mallampati:

- The Brodsky grading scale comprised the following 5 grades: grade 0 (tonsils within the tonsillar fossa), grade 1 (tonsils just outside of the tonsillar fossa and occupy $\leq 25\%$ of the oropharyngeal width), grade 2 (tonsils occupy 26%-50% of the oropharyngeal width), grade 3 (tonsils occupy 51%-75% of the oropharyngeal width), and grade 4 (tonsils occupy $>75\%$ of the oropharyngeal width) (Kwan Ng et al., 2010).
- Mallampati score system includes the following four classes: Class 1 (full visibility of tonsils, uvula, and soft palate), Class 2 (visibility of hard and soft palate, upper portion of tonsils, and uvula), Class 3 (soft and hard palate and base of the uvula are visible), and Class 4 (only hard palate is visible). Higher scores are correlated with having sleep apnea and hence respiratory obstruction and difficult intubation (Chang SJ, 2010).

Patients who are in ASA classes I and II are frequently considered appropriate candidates for minimal, moderate, or deep sedation. Children in ASA classes III and IV, children with special needs, and those with anatomic airway abnormalities or extreme tonsillar hypertrophy present issues that require additional and individual consideration, particularly for moderate and deep sedation (AAPD, 2015).

4. Informed Consent and Parent Instructions

Informed consent should be obtained from the responsible person; parents or legal guardian before sedation and according to local, state, and institutional requirements.

Instructions and information provided to the responsible person, and the practitioner shall provide verbal and/or written instructions. Information shall include objectives of the sedation and anticipated changes in behavior during and after sedation. Special instructions shall be given about transportation to home in a car safety seat and the need to observe the child's head position to avoid airway obstruction. A parent, legal guardian, or other

responsible person, it is preferable to have two or more adults accompany children who are still in car safety seats. Consideration for a longer period of observation shall be given if the responsible person's ability to observe the child is limited (e.g. only one adult who also has to drive). A 24-hour telephone number for the practitioner or his or her associates shall be provided to all patients and their families. Instructions shall include limitations of activities and appropriate dietary precautions (AAPD, 2015).

The absolute risk of aspiration during procedural sedation is not yet known, guidelines for fasting periods before sedation generally should follow those used for general anesthesia. Agents used for sedation may cause partial or complete loss of protective airway reflexes, particularly during deep sedation and possible pulmonary aspiration of gastric contents may occur if the child regurgitates and cannot protect his or her airway. Hence, it is important to evaluate food and fluid intake before sedation and emphasize the importance of possible occurrence of a life-threatening situation if responsible person does not follow fasting instructions (AAPD, 2015).

5. Equipment and Settings

In depth-knowledge of the drugs/medications and the potential complications should be well known to the practitioner who uses sedation. Additionally, practitioner should have immediately available facilities, personnel, and equipment to manage emergency and rescue situations. Facilities providing pediatric sedation should monitor and be prepared to treat complications such as compromise of the airway or depressed respirations resulting in airway obstruction, hypoventilation, hypoxemia, and apnea. Even more complicated, hypotension and cardiopulmonary arrest that may occur from inadequate recognition and treatment of respiratory compromise. Other rare complications may also include seizures and allergic reactions (AAPD, 2015).

For nonhospital facilities (dental office), a protocol for ready access to ambulance service and immediate activation of the EMS system for life-threatening complications must be established and maintained. Accessible emergency cart or kit must be always available. This cart or kit must contain equipment to provide the necessary age and size-appropriate

drugs and equipment to resuscitate a non-breathing and unconscious child. All equipment and drugs must be checked and maintained on a scheduled basis. Monitoring devices must have a safety and function check on a regular basis as required by local or state regulation (AAPD, 2015).

Capnography could do early detection of respiratory compromise and it is especially important in young children who desaturate more rapidly than older children or adults. Continuous ECG monitoring is not required in the absence of cardiovascular disease since it has not been shown to improve outcomes during procedural sedation and analgesia (Krauss and Green, 2006).

6. Risk Factors for Adverse Events

Sedation as mentioned before is a continuum. Physiologic effects vary significantly depending on different factors, including medication, dose, delivery route, and patient characteristics. Minimal sedation or anxiolysis is considered to be the mildest form of sedation. As stronger medications and higher doses are administered, the depth of sedation shifts toward moderate sedation, deep sedation, and possibly even general anesthesia. At more profound levels, patients become unresponsive and incapable of maintaining their own breathing or cardiovascular function and reflexes. Depth of sedation with oral route cannot be titrated and difficult to predict. Consequently, over-sedation and respiratory obstruction can occur. It is the responsibility of the sedation provider to manage the unconscious child until she or he regains the ability to self-regulate. Sedation for dental procedures has been implicated in a disproportionate number of cases that resulted in death or permanent neurologic damage.

When reviewed the most common damage resulted from dental sedation was an inability to resuscitate once patient lost protective reflexes. Furthermore, it could be attributed to failure of recognition of the adverse event.

Children under the age of 5 years and those with pre-existing medical conditions appear to be at greatest risk. One concern is that dentists and other non-anesthesiologist practitioners receive varying levels of sedation training and often do not practice in settings with immediate access to rescue resources such as a code team. On the other hand,

anesthesiologists receive relatively uniform training and practice the skills required to rescue patients on a daily basis. They also commonly practice in an operating room environment and have the ability to request backup when needed (Nelson, Xu, 2015).

Parental Perception towards Dental Sedation

Parental acceptance for various basic and advanced behavior guidance techniques has changed over the years and can also vary significantly among different populations. Parental acceptance towards sedation was rated lower than other behavior management technique as reported in studies by other investigators (Fields et al., 1984; Murphy et al., 1984). Field et al., found that general anesthesia and sedation were consistently unacceptable except when used for emergency extraction (Fields et al., 1984).

As reported by Murphy et al., Techniques employing drugs (e.g. general anesthesia or sedation) were rated as least acceptable, only acceptable if it is for completing anxiety-provoking and/or necessary dental procedures (Murphy et al., 1984).

Additionally, Brandes et al., compared the acceptance of pediatric dental behavioral management techniques by 40 parents of children with disabilities with that of 40 parents whose children were not disabled, and to determine the effect of prior information on the level of acceptance for both groups of parents. Results of increased acceptability in all parent's groups towards sedation of all dental procedures, except for one dental scenario, and that was for parents of disabled children for a check-up/cleaning who had been informed (Brandes et al., 1995).

Sedation has become an important part of pediatric dentistry practice for several reasons. It provides an opportunity to provide quality and early care in otherwise anxious or pre-cooperative children. As reported in a survey done by Davis, asking about the most common reasons for a pediatric dentist to use sedation increasingly, 59.1% of responses were because of difficulty to admit patients to the hospital for general anesthesia as a result of increased costs, limited access, or other problems (Davis MJ., 1988).

ELBadrawy and Riekman thought that parents would generally agree when the option of sedation is recommended but believed that parental reaction to sedation has not been explored and there was little information about it in the literature. Their questionnaire was designed to assess the treatment techniques from parents' perspective (ELBadrawy & Riekman, 1984).

Lawrence et al., found that data regarding parental attitude of parents towards behavior management techniques is not extensive. In his study, low social economic status and low education level showed more acceptability of professional medical opinion and less likely to express dissatisfaction with a procedure. Another finding in his study was that as the parents' current stress level increased, acceptability of the various techniques decreased (Lawrence et al., 1991).

Wilson et al., mentioned in his study the importance of informing and explaining to parents about the proper behavior management technique that will be selected for the child, which will in return increase the acceptance level (Wilson, 1991). Furthermore, Hvelka et al., found that among all social statuses groups, the acceptability of parents seems to increase with explanation prior to all behavior management techniques (Havlka et al., 1992).

Since the 80's and 90's many studies have emerged showing the increased acceptability of sedation over time and the changes of parental attitude. This could be partially attributed to the changing in parenting style, where today parents are much less likely to use physical discipline and set limits on their child's behavior. Hence, they would likely try to prevent any suffering their child might experience for instance from a dental procedure (Long N, 2004).

Peretz and Kharouba, agreed that most contemporary parents do not like the idea of their child experiencing any degree of physical or psychological distress during a dental procedure; as a consequent, there is an increase and acceptance of handling any misconduct medically and pharmacologically (Shroff et al., 2015). Parents overtime are certainly

tending to be more comfortable with the idea of having their child treated under general anesthesia or sedation as reported by Eaton et al (Eaton et al., 2005)

As estimation today, about 100,000–250,000 pediatric dental sedations are performed each year in the USA and expecting grow in the need for pharmacologic behavior management in the future (Travis et al., 2015).

Parents are integral part of making decisions towards dental treatment, thus perception towards pharmacological intervention in dental procedures is of paramount importance. An understanding of the difference between the views of parents and professionals is essential for today's dental practice (Murphy et al., 1984).

From knowledge point of view, surprisingly White et al., found that previous sedation experience was not correlated with increased knowledge of parents and this highlighted the importance of re-educating parents regarding treatment expectations when sedation is planned for a child, even if the child has had a previous sedation experience (White et al., 2016).

Eaton et al., mentioned that gaining an understanding of the parental attitudes towards behavior management techniques is one of the objectives of behavior management research. Second objective, is determining factors that might affect parents' beliefs regarding behavior management techniques. Parental attitudes towards behavior management techniques are not constant and subjected to change over time, as society changes. Furthermore, re-visiting this issue will lead to a greater body of knowledge thus better dentist-parent communication, better parent education and ultimately, better patient care (Eaton et al., 2005). Additionally, Perceptions help determine the acceptability of behavior management techniques and perceptions of acceptability have been one of the most important factors influencing dental school curriculum changes (Allen et al., 1995).

PURPOSE

The purpose of this study was to assess parental perception towards dental sedation. One objective was to assess the knowledge, attitude and beliefs of parents regarding oral and intravenous sedation. Secondly, the study aimed to evaluate satisfaction after dental sedation procedure, which included patient's recall experience, patient's full alertness regaining after sedation procedure and the existence of any side effects or concerns. Finally, the study aimed to evaluate any significant association between parental perception and satisfaction.

HYPOTHESES

- Null hypothesis:
 1. There is no association between variables of pre-operative questionnaire (knowledge, attitude, and belief) and post-operative one (satisfaction).
 2. There is no association between demographic data (age, gender, number of children, age of sedated child, education, county) and categories of pre-operative data (knowledge, attitude, and belief) and post-operative one (satisfaction) of the study.
 3. There is no difference in demographic data (age, gender, number of children, age of sedated child, education, county) and categories of pre-operative data (knowledge, attitude, and belief) and post-operative one (satisfaction) of the study between intravenous sedation and oral sedation groups.

MATERIALS AND METHODS

This study was approved by the University of Maryland Institutional Review Board, Baltimore, MD, USA. Subjects were recruited were English speaking and could be from

any income group, or ethnicity. One hundred and one participants were obtained for dental treatment under both intravenous and oral sedation. The research project was explained to the parent, and then the parent was enrolled following verbal consent. The principle investigator waived HIPAA. The consent (Appendix 1) was approved by the University of Maryland School of Medicine-Human Research Protections Office (Protocol HCR-HP-00062938-1).

Inclusion criteria

- Any parent of a child treated for dental procedure under sedation either intravenous or oral who consents for participation.
- Child underwent sedation (patient) between three to ten years old.
- Patient did not have systemic disease or in ASA I/II categories (American Society of Anesthesiologist).

Exclusion criteria

- Parent did not consent or refused to participate.
- Has not responded to post-operative phone-call interview more than 48 hours.
- Patient had systemic disease (ASA III/IV).

Instrument

This study used a pre-operative questionnaire which has a demographic part included that asked parents for age, gender, number of children, the age of sedated child, number of accompanying persons with sedated child, level of education, county, and duration of time to reach the university of Maryland.

Then questionnaire was divided into three parts each with approximately four questions asked about knowledge, attitude, and beliefs towards sedation respectively. The participants were allowed to pick one answer or all that applied in the form of multiple choice, fill in blank and yes or no answers. The questionnaire was developed by the authors and was pretested to ensure that respondents could understand the questions and respond in a consistent manner (Appendix 3).

Demographic data:

- Parental age
- Gender
- Number of children
- Age of the sedated child
- Number of accompanying responsible persons
- Education level
- County
- The duration of drive to UMB

Pre-operative; Knowledge:

- Where did you first learn about dental sedation?
- What type of dental sedation did you learn about?
- Are you familiar with the medication?
- What are the side effects a child might have after dental sedation?

Pre-operative; Attitude:

- In your opinion, how risky is dental sedation?
- How did you feel when you were told that your child needed to be treated under dental sedation?
- Would you recommend dental sedation to your relatives and friends?
- How did you make the decision of having your child treated under dental sedation?

Pre-operative; Belief:

- Do you believe that a child with good behavior and cooperative with the dentist should have dental sedation?
- Do you believe that more dental offices should provide dental sedation?

- If you are not covered by insurance, would you pay \$ 400 for a dental sedation?
- Do you believe that general public should have more awareness regarding dental sedation?

Post-operative satisfaction questionnaire was adopted from the study of ELBadrawy and Riekman (1984), was asked in 24-48 hours after sedation procedures. It consisted of 8 questions; whether parent was adequately informed, duration of regaining full alertness after sedation procedure, any side effects, whether patient recall the experience, was sedation effective in rendering dental treatment, would parent permit sedation again if needed, concerns and comments of sedation procedure (Appendix 4).

Post-operative; Satisfaction:

- Were you adequately informed about the use of sedation techniques in aiding in the treatment of your child?
- How long did it take your child to become fully alert following the sedation procedure?
- Was there at any time any evidence of illness?
- What does your child recall regarding this experience?
- Do you think the sedation technique was effective?
- Would you permit your child to be treated again with this method?
- Prior to your child's sedation, what were some of your concerns (if any) regarding this method of dental care delivery?
- Comments you wish to add.

Procedure

Potential participants were selected according to the schedule of appointments for either intravenous or oral sedation, were asked to participate voluntarily and verbally consented. Patients were scheduled either for Midazolam (short dental procedure) or Meperidine/Hydroxyzine combination (long dental procedure) as oral sedation or Ketamine/Propofol combination as intravenous sedation. Then the pre-operative

questionnaire with total of twenty questions was given to the parent before the procedure of sedation, while they were waiting in clinic. The parent was asked to provide name and best phone number to reach them for the second part of the questionnaire which asked about satisfaction.

In 24-48 hours, the parent was called and asked to answer questions from satisfaction post-operative questionnaire that was adopted from the study of ELBadrawy and Riekman (1984).

Data were analyzed using descriptive statistics and chi-square analysis for the information focused on relationships between demographic data and the variables of pre-operative (knowledge, attitude, belief) and post-operative (satisfaction). Fisher's exact probability test was conducted when the number of items in the groups was too small for the chi-square. All statistical analysis was done with the STATA (version 14.2), and the level of significance was set at $P < 0.05$.

RESULTS

Demographic data

The majority of parents were between the ages of 31-40 years (51.49%), female (83.17%), and most parents were having a total of two children (36.63%). Most of the children, who were about to receive dental sedation, were between 3-4 years (31.68%) and 5-6 years (30.69%). Most of parents were the only one accompanying person with the child undergoing dental sedation (57.43%). Parents' education was mostly of High school or General educational development (40.00%), living in Baltimore city (71.29%) and it took them about 10-20 minutes to reach University of Maryland, Dental school (28.71%). The number of oral sedation cases was 65 (64.00%) and intravenous cases were 36 (35.64%). **Table 1.1 and 1.2.**

Table1. 1 Demographic characteristics of the survey group

Table 1.1 Demographic characteristics of the survey group	
Characteristic	% of respondents (N=101)
<i>Parent's age</i>	
<ul style="list-style-type: none"> • <30 years • 31-40 years • 41-50 years • >50 years 	<ul style="list-style-type: none"> • 34 (33.66%) • 52 (51.49%) • 12 (11.88%) • 3 (2.97%)
<i>Parent's gender</i>	
<ul style="list-style-type: none"> • Male • Female 	<ul style="list-style-type: none"> • 17 (16.83%) • 84 (83.17%)
<i>Number of children</i>	
<ul style="list-style-type: none"> • 1 • 2 • 3 • 4 • 5 or more 	<ul style="list-style-type: none"> • 20 (19.80%) • 37 (36.63%) • 21 (20.79%) • 14 (13.86%) • 9 (8.91%)
<i>Age of child receiving sedation</i>	
<ul style="list-style-type: none"> • 3-4 years • 5-6 years • 6-7 years • 7-8 years • 9-10 years 	<ul style="list-style-type: none"> • 32 (31.68%) • 31 (30.69%) • 6 (5.94%) • 17 (16.83%) • 15 (14.85%)
<i>The only person accompanying the child</i>	
<ul style="list-style-type: none"> • Yes • No 	<ul style="list-style-type: none"> • 58 (57.43%) • 43 (42.57%)
<i>Educational level</i>	
<ul style="list-style-type: none"> • Elementary • High school/GED • Some college • Finished college/more 	<ul style="list-style-type: none"> • 5 (5.00%) • 40 (40.00%) • 32 (32.00%) • 23 (23.00%)
<i>County</i>	
<ul style="list-style-type: none"> • Baltimore city • Out of Baltimore city 	<ul style="list-style-type: none"> • 72 (71.29%) • 29(28.71%)
<i>Traveling time to reach UMB, Dental school</i>	
<ul style="list-style-type: none"> • <10 min • 10-20 min • 21-30 min • 31-40 min • >40 min 	<ul style="list-style-type: none"> • 11 (10.89%) • 29 (28.71%) • 24 (23.76%) • 19 (18.81%) • 18 (17.82%)

GED: General educational developmental

UMB: University of Maryland, Baltimore

Table 1. 2 Numbers of Sedation cases

Table 1.2. Numbers of sedation cases		
Type	Oral	Intravenous
	65 (64.00%)	36 (35.64%)

One hundred and one parents answered the pre-operative questionnaire; responses were reported for the three categories of knowledge, attitude and belief.

Pre-operative questionnaire (knowledge, attitude and belief)

For the “Knowledge” category of pre-operative questionnaire, majority of parents first learned about dental sedation through physician, dentist or health care provider (84.16%), and were familiar with oral sedation rather than intravenous sedation (58.42%), but only few were familiar with the medication used through the procedure of dental sedation (34.65%). Forty-six parents picked “prolonged sleepiness” as a side effect a child might have after receiving dental care under sedation (45.54%).

In the “Attitude” category of pre-operative questionnaire, forty-three parents (42.57%) perceived dental sedation as a “low risk” procedure, and picked “nothing, they already knew it” as a response to how they felt when they were told that their child needed to be treated under dental sedation (37.62%). Ninety-five parents (94.06%) would recommend dental sedation to their relatives and friends. Parents made their decision of having their children to be treated under dental sedation after having recommendation from the dentist (78.22%).

In the “Belief” category of pre-operative questionnaire, seventy- six parents believed that a child with good behavior with the dentist may still need dental sedation (75.25%) and said: “Yes” to providing dental sedation more in dental offices (84.16%).

Most parents would pay about \$ 400 for dental sedation, if their children were not covered by insurance (64.36%), and almost all parents believed that the general public should have more awareness regarding dental sedation (97.03%). **Table 2,3,4.**

Table 2 Pre-operative questionnaire: Knowledge

Table 2. Pre-operative questionnaire: Knowledge		
Question	Yes (%)	No (%)
<i>Where did you first learn about dental sedation/sleep dentistry?</i>		
<ul style="list-style-type: none"> • Newspaper, Radio, TV • Internet • Billboards • Brochures, posters and other printed materials • Physician, dentist, health care provider • Family, friends, neighbors and colleagues • Other (please, tell) * 	<ul style="list-style-type: none"> • 5(4.95%) • 6(5.94%) • 0 • 1(0.99%) • 85(84.16%) • 14(13.86%) • 5 (100%) 	<ul style="list-style-type: none"> • 96(95.05%) • 95(94.06%) • 101(100.00%) • 100(99.01%) • 16(15.84%) • 87(86.14%) • 0
<i>What kind of dental sedation are you familiar with?</i>		
<ul style="list-style-type: none"> • Through oral syrup which is oral sedation. • IV sedation • I don't know 	<ul style="list-style-type: none"> • 59(58.42%) • 47(46.53%) • 19(18.81%) 	<ul style="list-style-type: none"> • 42(41.58%) • 54(53.47%) • 82(81.19%)
<i>Are you familiar with the medication?</i>		
<ul style="list-style-type: none"> • Yes • No 	35(34.65%)	66(65.35%)
<i>What are the side effects a child might have after receiving dental care under dental sedation</i>		
<ul style="list-style-type: none"> • Headache • Vomiting • Increased activity • Decreased activity • Prolonged sleepiness • Rash • Fever • Don't know • Other (please, tell) ** 	<ul style="list-style-type: none"> • 24(23.76%) • 26(25.74%) • 13(13.00%) • 41(41.00%) • 46(45.54%) • 5(4.95%) • 15(14.85%) • 32(31.68%) 	<ul style="list-style-type: none"> • 77(76.24%) • 75(74.26%) • 87(87.00%) • 59(59.00%) • 55(54.46%) • 96(95.05%) • 86(85.15%) • 69(68.32%)

*Emergency room, healthcare provider, my older kid had it, personal experience, social worker were some ways five subjects wrote about how they learnt about dental sedation for the first time.

**Death as per media/TV, angry child syndrome, was written on instruction sheet, difficult balance, and unable to communicate were some of the side effects five subjects wrote about Dental sedation.

Table 3 Pre-operative questionnaire: Attitude

Table 3. Pre-operative questionnaire: Attitude		
Question	Yes (%)	No (%)
<i>In your opinion, how risky is dental sedation?</i>		
<ul style="list-style-type: none"> • No risk • Low • Moderate • High • I don't know 	<ul style="list-style-type: none"> • 9(8.91%) • 43(42.57%) • 27(26.73%) • 5(4.95%) • 17(16.83%) 	
<i>How did you feel when you were told that your child needed to be treated under dental sedation?</i>		
<ul style="list-style-type: none"> • Fear • Surprise • Shame • Embarrassment • Sadness or hopelessness • Relief • Nothing, I already knew it • Other (please, tell)* 	<ul style="list-style-type: none"> • 30(29.70%) • 6(5.94%) • 4(4.00%) • 2(2.00%) • 8(7.92%) • 29(28.71%) • 38(37.62%) • 12 (99.99%) 	<ul style="list-style-type: none"> • 71(70.30%) • 95(94.06%) • 96(96.00%) • 98(98.00%) • 93(92.08%) • 72(71.29%) • 63(62.38%) • 0
<i>Would you recommend to your relatives and friends that their children receive dental treatment under dental sedation?</i>		
<ul style="list-style-type: none"> • Yes • No 	95(94.06%)	6(5.94%)
<i>How did you make the decision of having your child treated under sedation?</i>		
<ul style="list-style-type: none"> • Discussed with family and friends. • My other child has received treatment under sedation • Internet • The dentist recommended it • Other (please, tell)** 	<ul style="list-style-type: none"> • 25(24.75%) • 10(9.90%) • 0 • 79(78.22%) • 7 (100.00%) 	<ul style="list-style-type: none"> • 76(75.25%) • 91(90.10%) • 101(100.00%) • 22(21.78%) • 0

*I already asked for it, I don't know, concerned, fine, looking forward to it, nervous, some trepidation, worried are some of the feelings that twelve subjects wrote about sedation.

**I already knew it, I am in medical field, I asked for it, talked with his/her father, best option, she did not let the other dentist treat her.

Table 4 Pre-operative questionnaire: Belief

Table 4. Pre-operative questionnaire: Belief		
Question	Yes (%)	No (%)
<i>Do you believe that a child with good behavior with the dentist may still need dental sedation?</i>		
<ul style="list-style-type: none"> • Yes • No 	76(75.25%)	25(24.75%)
<i>Do you believe that more dental offices should provide dental sedation?</i>		
<ul style="list-style-type: none"> • Yes • No 	85(84.16%)	16 (15.84%)
<i>If your child were not covered by insurance, would you pay a \$ 400 for a dental sedation?</i>		
<ul style="list-style-type: none"> • Yes • No 	65(64.36%)	36(35.64%)
<i>Do you believe that the general public should have more awareness regarding dental sedation?</i>		
<ul style="list-style-type: none"> • Yes • No 	98(97.03%)	3(2.97%)

Post-operative questionnaire (satisfaction)

Based on parents’ responses over the phone, answers to questions were divided to high satisfaction and low satisfaction. Responses to questions depicting a pleasant/acceptable experience during and after the procedure were categorized as high satisfaction and all other responses were categorized as low satisfaction. Answering “Yes” to first, fifth and sixth question was considered high satisfaction experience, answering “No” was considered low satisfaction experience (Appendix 4). Also, answering “Less than one hour” to question two, “No” to question three and “No recall” to question four was considered high satisfaction experience, answering differently was considered low satisfaction experience (Appendix 4).

One hundred and one parents, who answered pre-operative questionnaire, were called in 24-48 hours to answer the post-operative questionnaire, which evaluated satisfaction. About eighty parents stated they were adequately informed about the use of dental sedation techniques in aiding in the treatment of their child (79.21%). Forty-five parents reported

that their children were fully alert in less than an hour following the dental sedation procedure (44.55%) and rest of the parents reported variable durations, all was more than an hour (55.44%). Twelve parents reported mostly fever and vomiting as an evidence of illness following dental sedation procedure (11.88%) out of which seven (58%) reported vomiting, and fifty-five of children had no recall of their dental experience as per their parents' responses (54.46%). Parents answered questionnaire thought that the technique of dental sedation was effective in allowing the child to receive the needed dental care with minimal psychological trauma (92.08%). Ninety-two parents would permit their child to be treated again with dental sedation if they needed it (91.09%), and sixty-three had no concerns regarding the method of treatment or technique prior to their children dental sedation (62.38%). Comments were varying between expression of happiness of the level of treatment rendered, how the experience went as prescribed, nice people and staff (12.24%). **Table 5, 5.1.**

Table 5 Post-operative questionnaire (satisfaction)

Table 5. Post-operative questionnaire (satisfaction)		
Question	High satisfaction (%)	Low satisfaction (%)
<i>Were you adequately informed about the use of sedation techniques in aiding in the treatment of your child?</i>		
<ul style="list-style-type: none"> • Yes • No 	<ul style="list-style-type: none"> • 80 (79.21%) 	<ul style="list-style-type: none"> • 21(20.79%)
<i>How long did it take your child to become fully alert following the sedation procedure?</i>		
<ul style="list-style-type: none"> • Less than an hour • 1-2 hours • 2-3 hours • 3-4 hours • 4-5 hours • > 5 hours 	<ul style="list-style-type: none"> • 45(44.55%) 	<ul style="list-style-type: none"> • 39(38.61%) • 9(8.91%) • 6(5.94%) • 0 • 2(1.98%)
<i>*Was there at any time any evidence of illness?</i>		
<ul style="list-style-type: none"> • Yes • No 	<ul style="list-style-type: none"> • 88(87.13%) 	<ul style="list-style-type: none"> • 13(12.87%)
<i>What does your child recall regarding this experience?</i>		
<ul style="list-style-type: none"> • No recall • Vague memory • Detailed memory 	<ul style="list-style-type: none"> • 55(54.46%) 	<ul style="list-style-type: none"> • 34(33.66%) • 12(11.88%)

Cont. Table 5

<i>Do you think that the technique of sedation was effective in allowing your child to receive the needed dental care with minimal psychological trauma?</i>		
<ul style="list-style-type: none"> • Yes • No 	<ul style="list-style-type: none"> • 93(92.08%) 	<ul style="list-style-type: none"> • 8(7.92%)
<i>Would you permit your child to be treated again with this method?</i>		
<ul style="list-style-type: none"> • Yes • No 	<ul style="list-style-type: none"> • 92(91.09%) 	<ul style="list-style-type: none"> • 9(8.91%)
<i>Prior to your child's sedation, what were some of your concerns (if any) regarding this method of dental care delivery?</i>		
<ul style="list-style-type: none"> • None • Other comments 	<ul style="list-style-type: none"> • 63(62.38%) • 38(37.62%) 	
<i>If you have any comments you wish to add</i>		
<ul style="list-style-type: none"> • None • Other comments 	<ul style="list-style-type: none"> • 86(87.76%) • 12(12.24%) 	

* Some of the symptoms parents mentioned post-sedation, table is below

Table 5. 1 Evideness of Illness

<i>*Q3: Was there at any time any evidence of illness?</i>	<i>Frequency</i>	<i>Percentage</i>
Drowsiness, lip swelling	1	8.33%
fever	1	8.33%
Fever, shaking and delusion	1	8.33%
Intermittent headache	1	8.33%
Nausea	1	8.33%
Very sick, vomiting and sweating	1	8.33%
Vomiting	4	33.33%
Vomiting twice	1	8.33%
Vomiting, fever	1	8.33%

Association between Knowledge and satisfaction

On testing the association between variables of pre-operative knowledge category with post-operative satisfaction variables, there was no significant relation between parents who learnt about dental sedation through newspaper, radio, TV, internet, billboards, brochures, posters and other printed materials with any of the post-operative questions.

Regarding association between parents who learned about dental sedation for the first time from Physician, dentist or health care provider and the evidence of illness following dental sedation procedure, a significant relation was found between this option and all satisfaction questions, $X^2 (1, N=101) = 6.58, P=.010$. Parents who learned first about dental sedation from physician, dentist or health care provider reported no evidence of illness following the dental sedation procedure, hence, reported high satisfaction. **Table 6.1. (Appendix 5 Table 1).**

Table 6. 1 Association between Knowledge and Evidence of Illness (Satisfaction)

	<i>Evidence of illness</i>		
	High satisfaction	Low satisfaction	
<i>Knowledge Q1/opt E</i>	No	Yes	
No	10(11.36%)	5(38.46%)	15(14.85%)
Yes	78(88.64%)	8(61.54%)	86(85.15%)
Total	88(100%)	13(100%)	101(100%)

Pearson chi2 (1) = 6.5770, P = 0.010

Parents who first learnt about dental sedation through family, friends, neighbors or colleagues had no significant relationship with any of the satisfaction questions. (**Appendix 5 Table 1**). Additionally, no parents chose “other” as an answer to the first question of knowledge category.

No significant relationship was found between parents’ familiarity with oral sedation type (question 2/opt A) and any of the satisfaction questions except for “recall experience”. Prior or pre-existing parental knowledge about oral sedation was significantly associated with higher chances of the child post-operatively recalling the sedation experience, which could be indicative of low satisfaction, $X^2 (1, N-101) = 4.32, P=.038$. **Table 6.2.**

Table 6. 2 Association between Knowledge and Recall (Satisfaction)

Recall

	High satisfaction	Low satisfaction	
<i>Knowledge Q2/opt</i> A	No	Yes	Total
No	28(50.91%)	14(30.43%)	42(41.58%)
Yes	27(49.09%)	32(69.57%)	59(58.42%)
Total	55 (100%)	46(100%)	101 (100%)

Pearson chi 2(1) =4.3227, P=0.038

There was no significant relationship between those parents who had knowledge about intravenous sedation and the satisfaction questions. In addition, those parents who chose “I don’t know” as an answer to what type of dental sedation you learnt about, had no significant relationship with satisfaction questions except for the recall experience.

Children of parents who did not know about types of sedation were less likely to recall their sedation experience, which translated to high satisfaction. The Fisher’s exact test was significant (.022) for this association. $X^2 (1, N=101) =5.66, P=0.017$. **Table 6.3.**

Table 6. 3 Association between Knowledge and Recall (Satisfaction)

Recall

	High satisfaction	Low satisfaction	
<i>Knowledge Q2/ opt</i> C	No	Yes	Total
No	40(72.73%)	42(91.30%)	82(81.19%)
Yes	15(27.27%)	4(8.70%)	19(18.81%)
Total	55 (100%)	46(100%)	101 (100%)

Pearson chi2 (1) =5.6602, P=0.017, Fisher’s exact=0.022

There was no significant relationship between those parents who had knowledge about medications used in dental sedation and the satisfaction questions, except for alertness duration. (**Appendix 5 Table 1**).

A chi-square test of independence examined the relation between parental familiarity with sedation medications and alertness duration following the procedure. The relation between these variables was significant, $X^2(1, N=101) = 5.54, P=0.019$. Parents, who were familiar with dental sedation medication, noticed that their children required more than an hour to become fully alert compared to parents who were not familiar with dental sedation medication. **Table 6.4.**

Table 6. 4 Association between Knowledge and Alertness duration (Satisfaction)

Alertness duration

	High satisfaction	Low satisfaction	
<i>Knowledge Q3</i>	< 1 hour	≥ 1 hour	Total
No	35(77.78%)	31(55.36%)	66(65.35%)
Yes	10(22.22%)	25(44.64%)	35(34.65%)
Total	45 (100%)	56(100%)	101 (100%)

Pearson chi 2(1) =5.5387, P=0.019.

Parental awareness of side effects following dental sedation particularly “headache, vomiting, increased activity, decreased activity, prolonged sleepiness and fever”, had no significant relationship to any of the satisfaction questions.

Parents who did not know about any side effect of dental sedation that a child might have after the procedure, their children did not recall the sedation experience as answered by the parents, $X^2(1, N=101) = 3.86, P=.049$. **Table 6.5.**

Table 6. 5 Association between Knowledge and Recall (Satisfaction)

Recall

	High satisfaction	Low satisfaction	
<i>Knowledge Q4/opt H</i>	No	Yes	Total
No	33(60.00%)	36(78.26%)	69(68.32%)
Yes	22(40.00%)	10(21.74%)	32(31.68%)
Total	55 (100%)	46(100%)	101 (100%)

Pearson chi2 (1) =3.8591, P=0.049

Association between Attitude and satisfaction

Testing the association between variables of pre-operative “Attitude” category with post-operative satisfaction variables, there was no significant relation between question asked about the risk of dental sedation and any of the satisfaction questions. Similarly, there was no significant relationship between feeling “fear, surprise, shame, embarrassment, sadness or hopelessness and nothing I already knew it” toward dental sedation and the questions of satisfaction. Interestingly, there is a significant relationship between relief feeling toward dental sedation as a suggested treatment for their children and alertness duration following the procedure. The children of parents who favored (felt relieved regarding) dental sedation were likely to become fully alert quicker than children of parents who felt differently, $X^2(1, N=101) = 5.05, P=0.025$. **Table 7.**

Parents who felt relieved as an attitude toward dental sedation tended to report less dramatic outcomes including alertness duration, which was less than an hour and hence parents considered highly satisfied (**Appendix 5 Table 1**).

Table 7 Association between Attitude and Alertness duration (Satisfaction)

Alertness duration

	High satisfaction	Low satisfaction	
<i>Attitude Q2/ opt F</i>	< 1 hour	≥ 1 hour	Total
No	27(60.00%)	45(80.36%)	72(71.29%)
Yes	18(40.00%)	11(19.64%)	29(28.71%)
Total	45 (100%)	56(100%)	101 (100%)

Pearson chi 2(1) = 5.0516, P=0.025

No significant relationship was found between parents’ recommendation of dental sedation to their relatives/friends and any of the satisfaction questions.

Discussing parental decision of having their children treated under dental sedation either through family, previous experience with another kid, Internet or dentist had no significant relationship with any of the satisfaction questions.

Association between Belief and satisfaction

In testing the association between variables of pre-operative “Belief” category with post-operative satisfaction variables, there was no significant relationship between parents who thought a child with good behavior with dentist still need dental sedation with any of the satisfaction questions. Parents, who believed that more dental offices should provide dental sedation had significance only with one satisfaction question, recall of sedation experience. Fisher’s exact test is significant between parental belief of having more dental offices providing dental sedation and their children recalling the experience, $X^2 (1, N=101)$, $P=0.011$, Fisher’s exact=0.018 . **Table 8. (Appendix 5 Table 1)**.

Table 8 Association between Belief and Recall (Satisfaction)

	<i>Recall</i>		
	High satisfaction	Low satisfaction	
<i>Belief Q2</i>	No	Yes	Total
No	12(22.22%)	2(4.44%)	14(14.14%)
Yes	42(77.78%)	43(95.56%)	85(85.86%)
Total	54 (100%)	45(100%)	99 (100%)

Pearson chi2 (1) =6.3892, P=0.011, Fisher’s exact=0.018

Paying \$400 for dental sedation if not covered by insurance, did not have any significant relationship with any of the satisfaction questions. In addition, believing that general public should have more awareness about dental sedation did not associate significantly with any of the satisfaction questions.

Relation between Demographic Data and knowledge

Testing demographic data with knowledge category of pre-operative questionnaire, no significant relation was found between parents who learned about dental sedation for the first time from newspaper, radio, TV, internet, billboards, brochures, posters, and other printed materials, and physician, dentist or health care provider and demographic variables; parental age, gender, education, child’s age, type of dental sedation and children number. Fisher’s exact test was significant (0.031) in parents who first learned about dental sedation

through family, friends, neighbors or colleagues and their ages; they were more likely to be in the thirty-one years and older age group $X^2(1, N=101) = 5.12, P=0.024$. **Table 9.1. (Appendix 5 Table 2).**

Table 9. 1 Association between Knowledge and Parental Age (Demographics)

<i>Knowledge/Q1/opt F</i>	<i>Parental age</i>		Total
	<30 years	≥31 or above years	
No	33(97.06%)	54(80.60%)	87(86.14%)
Yes	1(2.94%)	13(19.40%)	14(13.86%)
Total	34 (100%)	67(100%)	101 (100%)

Pearson chi2 (1) = 5.1190, P=0.024, Fisher's exact=0.031

No other significant relation was found between parents who first learned about dental sedation through family, friends, neighbors or colleagues and other demographic variables. No significant relationship was found between parents' familiarity with oral sedation type and demographic variables.

There were two significant relationships between parents' familiarity with intravenous sedation and demographic variables: parental education and child's age. A chi-square test of independence examined the relation between parents who learned about intravenous sedation and their level of education, the relation between these variables was significant, $X^2(1, N=101)=6.25, P=0.044$. **Table 9.2.**

Table 9. 2 Association between Knowledge and Education level (Demographics)

<i>Knowledge Q2/opt B</i>	<i>Education level</i>			Total
	High school/GED	Some college	Finished college or more	
No	30(66.67%)	14(43.75%)	9(39.13%)	53(53.00%)
Yes	15(33.33%)	18(56.25%)	14(60.87%)	47(47.00%)
Total	45 (100%)	32(100%)	23(100.00)	100(100%)

Pearson chi2 (2) = 6.2495, P=0.044 GED=general educational development

Parents who learned about intravenous dental sedation, their children were sedated of age older than six years old, $X^2 (1, N-101) = 14.72, P=0.000$, Fisher's exact=0.000. **Table 9.3.**

Table 9. 3 Association between Knowledge and Age of Child receiving sedation (Demographics)

Age of child receiving sedation

<i>Knowledge Q2/opt B</i>	<6 years	≥ 6 years	Total
No	43(68.25%)	11(28.95%)	54(53.47%)
Yes	20(31.75%)	27(71.05%)	47(46.53%)
Total	63 (100%)	38(100%)	101(100%)

Pearson chi2 (1) = 14.7192, P=0.000

There was no significant relationship between parents who picked “I don’t know” as an answer to what type of dental sedation they were familiar with and demographic variables. No significant relationship was found between parents’ familiarity with medication used in dental sedation and demographic variables except number of children. (**Appendix 5 Table 2**).

Chi-square test examined the relation between parental familiarity with sedation medications and the total number of children each parent has, those who had three or more children were not familiar with dental sedation medication, $X^2 (1, N-101) = 8.766, P=0.012$.

Table 9.4.

Table 9. 4 Association between Knowledge and Number of Children (Demographics)

Number of children

<i>Knowledge Q3</i>	One child	Two children	Three children/more	Total
No	11(55.00%)	31(83.78%)	24(54.55%)	66(65.35%)
Yes	9(45.00%)	6(16.22%)	20(45.45%)	35(34.65%)
Total	20 (100%)	37(100%)	44(100.00)	101(100%)

Pearson chi2 (2) = 8.7665, P=0.012

A significant difference was found between parents who answered “headache and vomiting” as a side effect a child might have after dental sedation, and their level of education $X^2 (1, N=101)=12.531, P=0.002$, Fisher’s exact=0.002, and $X^2 (1,N=101)=7.54, P=0.023$, respectively. **Table 9.5 and 9.6.**

Table 9. 5 Association between Knowledge and Education level (Demographics)

Education level

<i>Knowledge</i> <i>Q4/Headache</i>	High school/GED	Some college	Finished college or more	Total
No	41(91.11%)	18(56.25%)	17(73.91%)	76(76.00%)
Yes	4(8.89%)	14(43.75%)	6(26.09%)	24(24.00%)
Total	45 (100%)	32(100%)	23(100.00)	100(100%)

Pearson chi2 (2) =12.5316, P=0.002, Fisher’s exact=0.002

Table 9. 6 Association between Knowledge and Education level (Demographics)

Education level

<i>Knowledge</i> <i>Q4/Vomiting</i>	High school/GED	Some college	Finished college or more	Total
No	39(86.67%)	19(59.38%)	16(69.57%)	74(74.00%)
Yes	6(13.33%)	13(40.63%)	7(30.43%)	26(26.00%)
Total	45 (100%)	32(100%)	23(100.00)	100(100%)

Pearson chi2 (2) =7.5451, P=0.023

Additionally, those parents who picked “decreased activity and prolonged sleepiness”, had significant relationship with their level of education, which is some college or higher, $X^2 (1, N=101) =9.81, P=0.007$, and $X^2 (1, N=101) =12.75, P=0.002$, respectively. **Table 9.7 and 9.8.**

Table 9. 7 Association between Knowledge and Education level (Demographics)

Education level

<i>Knowledge Q4/decreased activity</i>	High school/GED	Some college	Finished college or more	Total
No	34(75.56%)	14(45.16%)	10(43.48%)	58(58.59%)
Yes	11(24.44%)	17(54.84%)	13(56.5%)	41(41.41%)
Total	45 (100%)	31(100%)	23(100.00)	99(100%)

Pearson chi2 (2) =12.7580, P=0.007

Table 9. 8 Association between Knowledge and Education level (Demographics)

Education level

<i>Knowledge Q4/Prolonged sleepiness</i>	High school/GED	Some college	Finished college or more	Total
No	33(73.33%)	11(34.38%)	10(43.48%)	54(54.00%)
Yes	12(26.67%)	21(65.63%)	13(56.52%)	46(46.00%)
Total	45 (100%)	32(100%)	23(100.00)	100(100%)

Pearson chi2 (2) =12.7580, P=0.002

On the other hand, parents who reported “don’t know” as an answer to side effects of dental sedation a child might have following the procedure, were more likely to have high school or general educational development level of education, $X^2 (1, N=101) =19.1, P=0.000, Fisher’s\ exact=0.000$. **Table 9.9.**

Table 9. 9 Association between Knowledge and Education level (Demographics)

Education level

<i>Knowledge Q4/I don’t know</i>	High school/GED	Some college	Finished college or more	Total
No	21(46.67%)	28(87.50%)	20(86.96%)	69(69.00%)
Yes	24(53.33%)	4(12.50%)	3(13.04%)	31(31.00%)
Total	45 (100%)	32(100%)	23(100.00)	100(100%)

Pearson chi2 (2) =19.0804, P=.000, Fisher’s exact=0.000

Parents who picked more than one symptom as a side effect of dental sedation following the procedure, significantly related to a higher level of education; some college or finished college, $X^2 (1, N=101) = 24.73, P=0.000$, Fisher's exact=0.000. **Table 9.10.**

Table 9. 10 Association between Knowledge and Education level (Demographics)

Education level

<i>Knowledge Q4/ Other</i>	High school/GED	Some college	Finished college or more	Total
No symptoms	24(53.33%)	4(12.50%)	4(17.39%)	32(32.00%)
1-2 symptoms	15(33.33%)	10(31.25%)	12(52.17%)	37(37.00%)
Three or more	6(13.33%)	18(56.25%)	7(30.43%)	31(31.00%)
Total	45 (100%)	32(100%)	23(100.00)	100(100%)

Pearson chi2 (4) =24.7314, P=0.000, Fisher's exact=0.000

Most parents who picked “headache” as a side effect a child might have after dental sedation, their children were sedated of age older than six years old, $X^2 (1, N-101) = 5.75, P=0.016$. **Table 9.11.**

Table 9. 11 Association between Knowledge and Age of Child receiving sedation (Demographics)

Age of child receiving sedation

<i>Knowledge Q4/Headache</i>	<6 years	≥ 6 years	Total
No	53(84.13%)	24(63.16%)	77(76.24%)
Yes	10(15.87%)	14(36.84%)	24(23.76%)
Total	63 (100%)	38(100%)	100(100%)

Pearson chi 2(1) =5.7531, P=0.016

Relation between Demographic Data and Attitude

Testing demographic data with attitude category of pre-operative questionnaire, two significant relations were found. First finding, Fisher's exact test was significant (0.006) in parents who thought that dental sedation was of a low risk and had education of college or more, $X^2 (1, N=101) = 24.73, P=0.000$, Fisher's exact=0.006. **Table 10.1.** (Appendix 5 Table 2).

Table 10. 1 Association between Attitude and Education level (Demographics)

<i>Attitude Q1</i>	<i>Education level</i>			Total
	High school/GED	Some college	Finished college or more	
Low risk	23(51.11%)	14(43.75%)	15(65.22%)	52(52.00%)
Moderate risk	9(20.00%)	16(50.00%)	7(30.43%)	32(32.00%)
High risk	13(28.89%)	2(6.25%)	1(4.35%)	16(16.00%)
Total	45 (100%)	32(100%)	23(100.00)	100(100%)

Pearson chi2 (4) = 15.0062, P=0.005, Fisher's exact=0.006

The second finding, parents who discussed the decision of having their child treated under dental sedation with family, friends and their ages; less likely of 31 years or older, $X^2 (1, N=101) = 5.00, P=0.025$. **Table 10.2.**

Table 10. 2 Association between Attitude and Parental Age (Demographics)

<i>Attitude Q4/Discussed w/family</i>	<i>Parental age</i>		Total
	<30 years	≥31 or above years	
No	21(61.76%)	55(82.09%)	76(75.25%)
Yes	13(38.24%)	12(17.91%)	25(24.75%)
Total	34 (100%)	67(100%)	101(100%)

Pearson chi2 (1) = 5.0024, P=0.025

Relation between Demographic Data and Belief

Testing demographic data with belief category of pre-operative questionnaire, three significant relations were found. First finding, fisher's exact test was significant (0.020) when examining the relation between parents who had one child and paying \$ 400 for dental sedation when needed if insurance is not covering or not available, $X^2 (1, N-101) = 7.97, P=0.019$. **Table 11.1.**

(Appendix 5 Table 2)

Table11. 1 Association between Belief and Number of Children (Demographics)

Number of children

<i>Belief Q3</i>	One child	Two children	Three children/more	Total
No	3(15.0%)	19(51.35%)	14(31.82%)	36(36.64%)
Yes	17(85.00%)	18(48.65%)	30(68.18%)	65(64.36%)
Total	20 (100%)	37(100%)	44(100.00)	101(100%)

Pearson chi2 (2) = 7.9760, P=0.019

Second finding, parents of children underwent intravenous sedation, were able to pay \$ 400 if insurance is not covering dental sedation, $X^2 (1, N-101) = 6.39, P=0.011$. **Table 11.2.**

Table11. 2 Association between Belief and Sedation type

Sedation type

<i>Belief Q3</i>	Oral sedation	Intravenous	Total
No	29(44.62%)	7(19.44%)	36(35.64%)
Yes	36(55.38%)	29(80.56%)	65(64.36%)
Total	65 (100%)	36(100%)	101(100%)

Pearson chi2 (1) = 6.3991, P=0.011,

Moreover, parents would pay \$ 400 if insurance is not covering or not available, when their children were of age six years or older, $X^2 (1, N-101) = 5.65, P=0.017$. **Table 11.3.**

Table 11. 3 Association between Belief and Age of Child receiving sedation (Demographics)

Age of child receiving sedation

<i>Belief Q3</i>	< 6 years	≥ 6 years	Total
No	28(44.44%)	8(21.05%)	36(35.64%)
Yes	35(55.56%)	30(78.95%)	65(64.36%)
Total	63 (100%)	38(100%)	101(100%)

Pearson chi2 (1) = 5.6540, P=0.017

Relation between Dental Sedation Type and Recall (Satisfaction)

The only relation between type of sedation and post-operative questionnaire was that children who undergone oral sedation were able to recall the experience more than those who undergone intravenous dental sedation, $X^2 (1, N-101) = 5.1, P=0.024$. **Table 12.**

Table 12 Association between Type of Sedation and Recall (Satisfaction)

Recall

	High satisfaction	Low satisfaction	
<i>Type of sedation</i>	No	Yes	Total
Oral sedation	30(54.55%)	35(76.09%)	65(64.36%)
Intravenous	25(45.45%)	11(23.91%)	36(35.64%)
Total	55 (100%)	46(100%)	101(100%)

Pearson chi2 (1) = 5.0673, P=0.024

Relation between Demographic Data and Satisfaction

Testing demographic data with satisfaction category of post-operative questionnaire, one significant relation was only found. Parents did not report evidence of illness when their children were of age older than six years old, $X^2 (1, N-101) = 5.69, P=0.017$, Fisher's test exact=0.028. **Table 13.**

(Appendix 5 Table 2).

Table 13 Association between Age of Child and Evidence of illness (Satisfaction)

Evidence of illness

	High satisfaction	Low satisfaction	
<i>Age of child</i>	No	Yes	Total
< 6 years	51(57.95%)	12(92.31%)	63(62.38%)
≥ 6 years	37(42.05%)	1(7.69%)	38(37.62%)
Total	88 (100%)	13(100%)	101(100%)

Pearson chi2 (1) =5.6958, P=0.017, Fisher's exact=0.028

Relation between Dental Sedation Type and Child's Age

The only relation between type of sedation and demographic variables was that most of the children underwent Intravenous sedation were of age older than 6 years old, $X^2 (1, N-101) =24.13, P=0.000$, Fisher's test exact=0.000. **Table 14.**

Table 14 Association between Age of Child and Sedation Type

Sedation type

<i>Age of child</i>	Oral sedation	Intravenous	Total
< 6 years	52(80.00%)	11(30.56%)	63(62.38%)
≥ 6 years	13(20.00%)	25(69.44%)	38(37.62%)
Total	65 (100%)	36(100%)	101(100%)

Pearson chi2 (1) =24.1350, P=0.000.

DISCUSSION

The history of parental acceptance and attitude toward dental sedation especially oral premedication or formerly called conscious sedation along with general anesthesia go back in time to 1984 and 1991, when they were rated the lowest. However, the acceptability for dental sedation (pharmacologic approach) has increased over the past years (Patel et al., 2013). The body of literature had many studies assessing the attitude of parents toward

advance behavior management techniques, but few were targeting solely dental sedation including oral and intravenous routes.

In the present study, the purpose was to assess knowledge, attitude, belief and satisfaction in parents toward dental sedation.

Research subjects

One hundred and one parents answered the pre-operative questionnaire on the day of dental sedation procedure, after being informed about the procedure at the screening (initial visit) appointment by one of pediatric dentistry residents at the department of pediatric dentistry at the University of Maryland. All categories of pre-operative questionnaire (knowledge, attitude, belief) were tested against the post-operative questionnaire which is mainly about satisfaction after dental sedation procedure, which would show how much the child recall as per parents' reporting, child's full alertness regaining after sedation procedure and the existence of any side effects or concerns. In addition, testing demographic data with pre-operative and post-operative variables.

Almost half of the subjects (57.43%) comprised of only one parent/guardian accompanied the child receiving dental sedation to the appointment. This is a critical issue needs to be revisited and emphasized with parents, in screening appointment and before the dental sedation appointment when instructions given over the phone. As per Ritwik et al., if additional responsible adult is not accompanying the child, then guardian driving the car will be unable to reposition the child's head and maintain a patent airway (Ritwik et al., 2013). This is not uncommon finding, Dosani et al., reported that 32% children were accompanied by only one adult and 63% of these children slept on the way home monitored only by the driver (Dosani et al., 2014). AAPD highly recommends the consideration for a longer period of observation if the responsible person's ability to observe the child is limited (e.g., only one adult who also has to drive) (AAPD, 2015).

About (64.00%) of all cases were oral sedation, which is in agreement with Wilson et al., who aimed in his survey to determine the clinical and didactic experiences associated with

conscious sedation in pediatric dentistry programs and to compare some of the findings to those collected a decade ago. All programs indicated that they used the oral route. In his study noted that pediatric dentistry primarily used the oral route of sedative administration. In addition, he attributed the increased use of oral sedation to some distinct advantages including, but not limited to: easy administration; no needles, which have the potential of frightening young children; the likelihood of rapid onset of adverse reactions is less than that of parenteral routes (especially intravenous); if covered by third party agencies the cost is usually lower because the oral route is not regarded as high a risk as other parenteral techniques; and the perceived training required for the actual technique of oral administration is less. Moreover, many children have had experience in taking other medications by mouth (e.g., amoxicillin for otitis media) and thus much more likely to consume the sedative by this route (Wilson et al., 2001).

Subjects in this research when asked about where they first learned about dental sedation, majority answered that it was through physician, dentist or health care provider. Interestingly, few answered through newspaper, radio or TV (4.95%) and those who answered internet were about six parents (5.94%) and no one answered billboards (0%) and only one answered brochures, posters and other printed materials (0.99%). Sheller described in her conference paper one of the difficulties to reach an agreement on a specific treatment with parents was the influence of marketing, media and internet research (Barbara Sheller, 2004). It is clear that Internet and media had no or low influence on knowledge of the present study's subjects, however it could be because of the small sample size. On the other hand, White et al, had only 24.6% of the two hundred fifty-six subjects reported seeing media coverage regarding dental sedation, and very few reported it having any influence on their decision about choosing sedation (White et al., 2016).

Twelve parents reported post-sedation symptoms, seven of them reported vomiting, two of the parents reported fever and the rest of symptoms were ranging between nausea, delusion, sweating and intermittent headache. The drugs used in oral and intravenous sedation were; midazolam, meperidine-hydroxyzine combination, and propofol-ketamine combination, respectively. In this study, differentiation between drugs regimen was not done and was

not put into different groups for comparison purposes. Although both combinations meperidine-hydroxyzine and propofol-ketamine have antiemetic feature, vomiting is not uncommon as a post-sedation side effect. This is in agreement with many studies (Ritwik et al., 2013; Canpolat et al., 2016). Vomiting is unpleasant experience for both parent and child and could carry the risk of aspiration in a somnolent child (Ritwik et al., 2013). Parental education and concerns about vomiting as an expected post-sedation side effect should be addressed constantly at screening appointment, before sedation and immediately after.

Association between Knowledge and Satisfaction

In this study, all significant findings about knowledge associated with satisfaction variables seem to be stemmed out from the good explanation and preparation before the actual dental sedation procedure. Acceptability level of the behavior management technique increases with explanation, regardless of the social economic status (Hvelka et al., 1992). In the present study, parents who learned first about dental sedation from physician, dentist or health care provider reported no evidence of illness following the dental sedation procedure. It implied that good preparedness would predict expected outcomes for the parent about the dental sedation procedure, and hence less discomfort and high satisfaction level would be accomplished. In agreement with a study by ELbadrawy and Riekman, that presenting instruction sheet and emphasizing important points would inform and prepare parents for the outcomes (ELbadrawy and Riekman, 1986). It is important to note that parents of the present study have gone through explanation of procedure before actual appointment of sedation twice; at the screening appointment and confirming via phone call one day before the sedation. Additionally, because in this study total reliance was on the parental response toward any evidence of illness presented post-sedation, there might be slight inaccuracy or exaggerating due to low satisfaction level.

Parents, who knew about oral sedation, reported that their children were able to recall the dental procedure experience post-sedation. This is attributed to the different route used, drugs, dosages and variability in individuals' response. Moreover, as supported by ELbadrawy and Riekman recall of the experience responses may not be reliable as most of

the children underwent oral sedation was younger than six years old (ELbadrawy and Riekman, 1986). This was considered as a low satisfaction outcome.

Parents, who did not know about any type of dental sedation and its possible side effects, reported that their children did not recall the dental experience post-sedation. Thus, parents reported high satisfaction.

Parents who were familiar with dental sedation medication, noticed that their children required more than an hour to become fully alert compared to parents who were not familiar with dental sedation medication. Despite the pre-existing knowledge, parents reported low satisfaction. Emotional and psychological factors could be attributed to this: concern, anxiety, over-protection and parenting style.

Association between Attitude and Satisfaction

For the attitude part of pre-operative questionnaire, those parents who picked “relief” as a feeling toward dental sedation being suggested as a behavior guidance modality, reported full alertness of their children following the procedure within short period of time, usually less than an hour ($P=0.025$). This could be attributed to the lower level of anxiety as reported by Peretz et al., that those who had low dental anxiety approved of sedation significantly more than parents with higher levels of dental anxiety (Peretz et al., 2013). Additionally, it could be attributed to the expected outcomes as a result of good preparation and explanation prior to the actual procedure or previous dental sedation experience, which this study did not ask about. Findings by ELBadrawy and Riekman, and Peretz and Zadik suggested that parents tend to approve previously used behavior management techniques with their children (ELbadrawy and Riekman, 1986; Peretz and Zadik, 1999). In White et al, study, parents were viewing sedation as a safe behavior management technique, and those with previous sedation experience were more likely to view it as safe/very safe (White et al., 2016).

Association between Belief and Satisfaction

When belief category was cross-tabulated with satisfaction, there was one significant association found ($P=0.018$), those parents who believed that there should be more dental offices to provide dental sedation, reported that their children were able to recall the experience. The relationship is not clear but could be explained and attributed to many factors; one of them is socioeconomic status.

Additionally, about forty-five parents had an educational level of elementary and high school/GED, this could give a reflection of what Lawrence et al explained in his study, that lower socioeconomic status subjects are more willing to accept professional medical opinion and less likely to express dissatisfaction with a procedure (Lawrence et al., 1991). On the other hand, Murphy et al study shown that higher socioeconomic status subjects would have reduced approval toward general anesthesia procedure. They either understand or imagine the increased risk involved with the procedure (Murphy et al., 1984).

The socioeconomic level including the high education would influence the belief in choices, options, opinions and decisions. The significant relationship between parents' belief of having more offices providing dental sedation and their children recalling the experience could suggest that those children were sedated through oral sedation just because of the half-life of the drugs used in oral sedation are lesser than those used in intravenous sedation.

Relation between Demographic Data and Knowledge

When Testing demographic data against knowledge category of pre-operative questionnaire, Fisher's exact test was significant (.031) in parents who first learnt about dental sedation through family, friends, neighbors or colleagues and their ages; they were more likely to be in their thirty-one years and older age group. This is in part disagreement to many studies, which found no relation between parental age and parental acceptability and attitude. Murphy et al., did not have a significant relationship between age of parents and approval of management technique. Moreover, Boka et al., find no relation between parental age and acceptance of all behavior management technique. Percentage of parents who had media coverage awareness about sedation in White et al., study was about only 14.5% and not aware about sedation was 73.6% (White et al., 2016). Possibly parents who

were not aware about sedation through media and internet, not necessarily lacking the information but probably gained knowledge through different sources or simply did not have any pre-existing knowledge about it.

A statistical significance association was found between those parents who learned about intravenous sedation previously and their level of education ($P=.044$). Murphy et al, did not find correlation between educational level and approval of management techniques but found significant relationship between higher socioeconomic status and the understanding of the increased risk that is involved with general anesthesia (Murphy et al., 1984). In this study, we did not address the level of socioeconomic status, income and occupation were not asked; it is possible to assume that high socioeconomic status is equivalent to high education because it is often measured as a combination of education, income and occupation. Most of the patients are of Medicaid and Medical assistance insurance in the present study.

Moreover, Parents who learned about intravenous dental sedation, their children were sedated of age older than six years old, $X^2(1, N-101)=14.72, P=0.000$, Fisher's exact=.000. It could be explained that parents before actual appointment of dental sedation they go through screening and patient get evaluated accordingly. In the present study, no questions were asked about behavioral disorder or disability, this could be an additional factor to why deep sedation or intravenous suggested at the first place. Patients who had history of failed oral sedation or as per request of parent to have intravenous sedation rather than oral are some of the assumptions to this finding.

Chi-square test examined the relation between parental familiarity with sedation medications and the total number of children each parent has, those who had three or more children were not familiar with dental sedation medication, $X^2(1, N-101)=8.766, P=0.012$. In contrary to other studies that used different methodology to test parental attitude and acceptability (toward all behavior management techniques including sedation) and cross-tabulated it with number of children in the family found no association between the two variables (Pretez et al., 2013; Elango et al., 2012). One explanation could be that parents

with more than one child tend to have more responsibilities distracting them including but not limited to socioeconomic status, educational level, parental age and psychological characteristics. In one study parental happiness trajectories were studied before and after the birth of a child using large British and German longitudinal data set. One of their aims was whether number of children would influence well-being or happiness of parents. Potential reason suggested was happiness impact of anticipating having children get attenuated with parity, being highest for the first, lower for the second, and non-positive for the third child (Mikko Myrskylä & Rachel Margolis, 2012).

When Parents answered, “headache and vomiting” as a side effect a child might have after dental sedation, there was significant relationship with their level of education, Fisher’s exact=0.002, and $P=0.023$, respectively. Additionally, those parents who picked “decreased activity and prolonged sleepiness”, showed significant relationship with their level of education, which was some college or higher ($P=0.007$, and $P=0.002$), respectively. In this study, no previous experience has been explored or asked in the pre-operative questionnaire, which could be an explanation of the relationship between possible side effect of sedation picked by parents and their educational level.

Same previous justification applied to those parents in the present study, who picked more than one symptom as a side effect of dental sedation following the procedure, and significantly related to their level of education; some college or finished college, Fisher’s exact=0.000. However, White et al, found that previous sedation experience was not correlated with increased knowledge of many of the aspects of sedation, especially those instructions before sedation appointment which include but limited to NPO and returning to school (White et al., 2016).

Parents who picked “headache” as a side effect a child might have after dental sedation, their children were sedated of age older than six years ($P=0.016$). Parents who had the knowledge that the possible side effect that might happen to their children of age six and older following dental sedation procedure would be headache. This could be attributed to the fact that one third of children at least seven years of age and one half of adolescents at

least 15 years of age have headaches (Donald W.Lewis, 2002). Because headaches are common in children and adolescents, expecting them as a potential side effect following any medical or dental procedure is not uncommon, especially in this age group who could differentiate pain and describe it.

On the other hand, parents who reported “don’t know” as an answer to side effects of dental sedation a child might have following the procedure, were more likely to have high school or general educational development level of education, Fisher’s exact=0.000. This finding is in agreement with White et al, study, reported that those parents who were young and of low education were more likely to select “not sure” as a response (White et al., 2016).

Relation between Demographic Data and Attitude

Testing demographic data with attitude category of pre-operative questionnaire, Fisher’s exact test was significant (0.006) in parents who thought that dental sedation was of a low risk and had education of college or more. This finding is in agreement with White et al, study, although not significant but most of parents who viewed oral sedation as “very safe and safe” were of college or professional degree educational level (White et al., 2016). Other study suggested that contemporary parents as opposed to parents in past decades might be more likely have had personal or family experience with outpatient general anesthesia. In addition, they may also more likely encountered pharmaceuticals marketing or seen surgical cases under general anesthesia on television. Dental treatment under general anesthesia or sedation may be perceived as less severe or risky to these parents (Eaton et al.,2005).

Significant relation was found between parents who discussed the decision of having their child treated under dental sedation with family, friends and their ages; less likely of 31 years or older, ($P=0.025$). According to Grembowski et al, the evidence indicates that clinical decision-making is a social process that includes the dentist, the patient, sometimes family members and insurers, as well. On the other hand, Shroff et al., found parents who were willing to be present in dental operatory, were more likely female and between the ages of 31 to 40. Suggested the nature of mothers’ tendency to nurture and being protective

for the child's psyche (Shroff et al., 2015). Anxiety could be the reason lying behind having other people to participate in reaching a decision.

Relation between Demographic Data and Belief

Fisher's exact test was significant when examining the relation between parents who had one child were willing to pay \$400 for dental sedation if insurance is not covering or not available, parents of children older than six years old were willing to pay as well same amount if insurance is not covering the service ($P=0.020$, $P=0.017$) respectively. For the pediatric patients being the only child, parents tend to be overprotective and less likely to be aggressive in decision-making and setting limits. This suggesting that parents would be inclined toward pharmacological approaches in treatment, which would make their children less receptive to pain or discomfort. According to Patel et al, parents may perceive oral premedication (sedation) and general anesthesia to be less risky, more cost effective, more comfortable for their child and convenient than in the past; which led to a rise in acceptability rate (Patel et al., 2016). Moreover, parents of children who undergone intravenous sedation, would be able to pay \$ 400 if insurance is not covering dental sedation, ($P=0.011$). Paying \$400 "out of pocket" if insurance not covering the expense in the present study was in disagreement with the Patel et al study, they found parents were able to pay up to \$200 per visit for oral premedication but not \$400 (Patel et al., 2016). Due to the more complexity and affectivity of intravenous sedation procedure in analgesia and amnesia, especially if oral sedation was not effective in case of previous experience, parents will be more willing to pay out of pocket.

Relation between Dental Sedation Type and Recall (Satisfaction)

Children who underwent oral sedation were able to recall the experience more than those who underwent intravenous dental sedation, ($P=0.024$). This is expected due to the difference of the depth and route of sedation, mild-moderate sedation (oral sedation) versus deep sedation (intravenous sedation), different drug classes, action of medication, dosages, effect, duration, and individuals' response variability. Most pediatric dentistry programs discriminate among drug regimens based on child personality and behavioral

characteristics such as child temperament, manifestations of behavior, patient age, medical history, and dental needs (Wilson et al., 2001).

Relation between Demographic Data and Satisfaction

Parents did not report any evidence of illness when their children were of age older than six years old, $X^2(1, N=101) = 5.69, P=0.017$, Fisher's test exact=0.028. The accuracy of parents reporting through post-operative questionnaire, which was conducted in 24-48 hours, could be subjected to variations. Ritwik et al, suggested it is likely that parents were able to report events more accurately at the 8-hour interview they conducted for the post-sedation events in children (Ritwik et al., 2013).

As the child grows the response to medications vary and it may not be the same response every time and differs between different children due variability in metabolism, weight and dosage. E.g. prolonged sedative effect in obese children for some lipophilic medication.

Relation between Dental Sedation Type and Child's Age

Most of the children undergone Intravenous sedation were of age older than 6 years old, Fisher's test exact=0.000. Some possible explanations for this finding are previous failed oral sedation, traumatizing previous experience, or what the patient and/or parents requested. According to Wilson et al., intravenous sedation route was not a route that was used by a majority of pediatric dentistry programs, when surveyed the clinical and didactic experiences associated with conscious sedation in pediatric dentistry programs. As justified, this method of administration has practical issues that relegate it to a less frequently used technique for operative dentistry. For instance, young children are typically fearful of and react negatively to needles. Also, very young children who are considered pre-cooperative typically require deeper levels of sedation and more monitoring, increasing the likelihood of adverse events and thus discouraging using it (Wilson et al., 2001).

One of the findings which is not in agreement with the present study was dentist anesthesiologist residencies provide their anesthesia residents with a large number of pediatric dental resident cases involving children less than six years of age and especially for patients with special health care needs (Hicks et al., 2012). Often, children younger than

six years and those with developmental delay require deep levels of sedation to gain control of their behavior (Chicka et al., 2012). A child's ability to control his or her own behavior to cooperate for a procedure depends both on his or her chronologic and developmental age. Therefore, the need for deep sedation should be anticipated.

Further studies addressing the parents' concerns and their perception including knowledge, attitude, belief and satisfaction about dental sedation will allow the practitioner to improve the informed consent process and communication with both parents and patients effectively and efficiently.

Limitations

- This study was subjected to several limitations, primarily associated with the questionnaire. Although it was simple, but parents showed slight hesitance and diminishing desire to read through all three categories of pre-operative questionnaire.
- The cohort of participants in this questionnaire was regional, self-selected, English-speaking and might not be representative of different cultures and geographic locations.
- Quality of the data was dependent on the reliability and validity of participant's responses.
- This study did not address socioeconomic status, previous dental sedation experience. Additionally, did not investigate if developmental delay or behavioral disorder/disability was present in patients.
- Post-operative questionnaire difficult to conduct even though parents provided their best phone number, they would not answer until after many attempts or not at all.
- Small sample size; patient could get sedated multiple times, so we could only survey their parents once, other parents they did not pick up the phone after many attempts in 48 hours.

CONCLUSION

Based on this study's results, the following conclusions can be made:

1. Less than half of all the parents brought an additional responsible person with them to the child's dental sedation appointment, suggestive of inconsistent compliance with the pre-operative instructions.
2. Vomiting was the most commonly reported side effect post-sedation regardless of the sedation type and medication.
3. Parents who gained knowledge about dental sedation from a health care provider as compared to other sources, reported high satisfaction.
4. Parents who had a pre-existing knowledge of oral sedation, reported low satisfaction post-sedation.
5. Parents with higher knowledge of sedation medication, reported low post-sedation satisfaction.
6. Parents with limited knowledge with sedation side effects, reported high satisfaction post-sedation.
7. Parents who felt relieved upon the suggestion of dental sedation for their children, reported high satisfaction post-sedation.
8. Parents who reported low post-sedation satisfaction, also believed that more dental offices should provide dental sedation.
9. Parents older than thirty years of age tended to gain knowledge about dental sedation from their family, friends, neighbors and colleagues.
10. There was significant association between parental pre-existing knowledge about intravenous sedation and their higher educational level.
11. Parents of children aged six years or older were more knowledgeable about intravenous sedation compared to parents of younger children.
12. Parents with three or more children showed less familiarity about sedation medications.
13. Parental awareness of three or more side effects post-sedation including: headache, vomiting, decreased activity and/ or prolonged sleepiness, was significantly associated with the high educational level. On the other hand, those reported no

- side effects or did not know about side effects post-sedation were mostly of high school level of education.
14. Parents of children aged six years or older exhibited prior knowledge of side effects of dental sedation especially “headache”.
 15. Parents of high education (post-graduate) viewed dental sedation for children as a safe approach.
 16. Parents younger than thirty years relied more on their family, friends, and/or colleagues for decision making regarding dental sedation as a suggested advanced behavior guidance technique.
17. Payment and demographic data:
- Parents with one child were more willing to pay out-of-pocket to cover for treatment under sedation.
 - Parents of children who needed intravenous sedation were more willing to pay out-of-pocket for treatment.
18. Parents of children who had undergone oral sedation reported higher recall of sedation experience compared to parents of children who had undergone intravenous sedation.
 19. Parents of children older than 6 years who underwent intravenous sedation reported high post-sedation satisfaction.
 20. More children underwent intravenous sedation than oral sedation , were of age older than 6 years old.

Appendix 1 (consent form)



RESEARCH CONSENT FORM

Protocol Title: Parental Perception Toward Dental Sedation in Pediatric patients treated in the Division of Pediatric Dentistry at the University of Maryland.

Study No.:

Protocol #: HP-00062938

Principal Investigator: Vineet Dhar

Sub-Principal Investigator: Marwah Almarwan, Huda Alkuhl

-
- This is a research study about the awareness of the parent toward dental sedation, participation is voluntary, and you can ask questions at any time.

PURPOSE OF STUDY

- This survey is to evaluate parental awareness before the dental treatment under sedation and satisfaction after the sedation which will be 2 days later through a phone call. The survey will be done in dental clinic at the Division of Pediatric Dentistry, University of Maryland, Baltimore.
- You are qualified to participate in this study, because your child is having a dental sedation appointment which we the pediatric dental division would like to know about your perspective and satisfaction.
- The number of participants will be approximately about 50 parents.

PROCEDURES

- The survey will ask questions today about social information: including age and sex of the parent, level of education of the parent, county of residence and number of children. Then two days later a phone call will be conducted. We will need to collect details like names and phone numbers.
- The survey will be done at the Division of Pediatric Dentistry, University of Maryland, Baltimore.
- The time of the interview will be fifteen minutes preoperative and five minutes postoperative.

POTENTIAL RISKS/DISCOMFORTS:

- No potential risks are expected from the survey.
- Phone number is required for the phone interview; It will not be used for any other purpose not related to dental uses or the survey itself.
- All information provided by the participants will be used for the purpose of the research and will be confidential.

- Loss of confidentiality will be minimized by storing data in a secure location, it will be kept in the Division of Pediatric Dentistry office, in a secure cabinet and “Electronic data will be password-protected.”

POTENTIAL BENEFITS

- You will not benefit directly from your participation in this study.

ALTERNATIVES TO PARTICIPATION

- The participants will be already informed by the procedure of their child and consented for it in advance to the interview. No risks will be expected from the study, and the risks of the procedure will be explained by the treating pediatric dentist.
- “This is not a treatment study. Your alternative is to not take part of it. If you choose not to take part, your healthcare at University of Maryland, Baltimore will not be affected.”

COSTS TO PARTICIPANTS

- “It will not cost you anything to take part in this study.”

PAYMENT TO PARTICIPANTS

- Participants will not be paid.

CONFIDENTIALITY AND ACCESS TO RECORDS

- The study will involve confidential information: Name of the parent, phone number. It will be accessible only to authorized individuals: Principal investigator, sub- investigators and other study staff.
 - The name of the parent and phone number will be stated on the questionnaire paper separately. The questionnaire will be stored and locked in office, at the Division of Pediatric Dentistry, University of Maryland, Baltimore.
 - The name and the phone number will be collected in separate page in order to destroy it easily after the phone call.
 - After the phone call the data will be de-identified and a study number will be assigned.
 - The file number will be used for patient’s procedure confirmation purposes, and it will be stored in Axium.
- “Information will be considered confidential, and participant’s name will not be used in reports or publications”

“The data from the study may be published. However, you will not be identified by name. People designated from the Division of Pediatric Dentistry, University of Maryland where the study is being conducted will be allowed to inspect sections of your research records related to the study. Everyone using study information will work to keep your personal information confidential. Your personal information will not be given out unless required by law.

RIGHT TO WITHDRAW

- “Your participation in this study is voluntary. You do not have to take part in this research. You are free to withdraw your consent at any time. Refusal to take part or to stop taking part in the study will involve no penalty or loss of benefits to which you are otherwise entitled.
- If you decide to stop taking part, or if you have questions, concerns, or complaints, or if you need to report a medical injury related to the research, please contact the investigator “Vineet Dhar, (410-706-7970)”
- There are no adverse consequences (physical, social, economic, legal, or psychological) of a participant’s decision to withdraw from the research.
- If you are an employee or student, your employment status or academic standing at UMB will not be affected by your participation or non-participation in this study.”

CAN I BE REMOVED FROM THE RESEARCH?

The person in charge of the research study or the sponsor can remove you from the research study without your approval. Possible reasons for removal include: the child did not match the criteria (age, treatment option changed, the child has systemic disease, the parents did not respond to both questionnaire).

UNIVERSITY STATEMENT CONCERNING RESEARCH RISKS (Minimal Risk Studies)

The University is committed to providing participants in its research all rights due them under State and federal law. You give up none of your legal rights by signing this consent form or by participating in the research project. This research has been reviewed and approved by the Institutional Review Board (IRB). Please call the Institutional Review Board (IRB) if you have questions about your rights as a research participant.

The research described in this consent form has been classified as minimal risk by the IRB of the University of Maryland, Baltimore (UMB). The IRB is a group of scientists, physicians, experts, and other persons. The IRB’s membership includes persons who are not affiliated with UMB and persons who do not conduct research projects. The IRB’s decision that the research is minimal risk does not mean that the research is risk-free. You are assuming risks of injury as a result of research participation, as discussed in the consent form.

If you are harmed as a result of the negligence of a researcher, you can make a claim for compensation. If you have questions, concerns, complaints, or believe you have been harmed through participation in this research study as a result of researcher negligence, you can contact members of the IRB or the staff of the Human Research Protections Office (HRPO) to ask questions, discuss problems or concerns, obtain information, or offer input about your rights as a research participant. The contact information for the IRB and the HRPO is:

Participation in this study indicates that you have had this consent read to you, your questions have been answered to your satisfaction, and that you voluntarily agree to participate in this research study.

Date: _____

*Witness is optional unless IRB requires it.

Appendix 2 (Inclusion/exclusion criteria form)

Protocol Title: Parental perception towards pediatric dental sedation (HP-00062938)

Eligibility Checklist

Inclusion/Exclusion Criteria (once the protocol is approved, this page must be copied, used as a checklist for screening subjects, signed by investigator, and inserted in research record for every subject screened):

Inclusion Criteria

Yes	No	Criteria
<input type="checkbox"/>	<input type="checkbox"/>	Any parent who will have his/her child treated for dental procedure under sedation.
<input type="checkbox"/>	<input type="checkbox"/>	Child should be between 3 and 10 years
<input type="checkbox"/>	<input type="checkbox"/>	Parent whose child does not have systemic disease

Exclusion Criteria

Yes	No	Criteria
<input type="checkbox"/>	<input type="checkbox"/>	Parent who does not consent to have the survey
<input type="checkbox"/>	<input type="checkbox"/>	Any parent who will not respond to the post-operative questionnaire within 2 days.
<input type="checkbox"/>	<input type="checkbox"/>	Parent who can not be reached after five calling attempts.
<input type="checkbox"/>	<input type="checkbox"/>	Parent whose child has systemic disease

For use during screening of subjects:

Name of Subject _____ Date Screened _____

Reviewed and subject acceptable for study: _____ YES _____ NO

Signature of Principal Investigator _____

Date _____

Version: v4-18-2015-1429386960443

Appendix 3 (Pre-operative questionnaire)

Pre-operative questionnaire:

Name of the Parent/ Legal guardian: _____

Phone number: _____

(To contact you for the post-operative questionnaire).

1- How old are you?

- 1- Under 30 years
- 2- 31-40 years
- 3- 41-50 years
- 4- Over 50 years

2- *What is your gender?*

- Male
- Female

3- *How many children live with you in the same house, including _____?*

- 1
- 2
- 3
- 4
- 5 or more

4- *How old is the child who will receive dental care under sedation today?*

- 3 – 4 years
- 5 – 6 years
- 6-7 years
- 7 – 8 years
- 9- 10 years

5- *Are you the only person accompanying the child?*

- Yes
- No

6- Which is the highest level of education you have completed?

- 1- Elementary
- 2- High school; graduated or GED
- 3- Some College
- 4- Finished college or more

7- Please tell me which county do you live in?

8- How long did it take you today to get to the University of Maryland in Baltimore?

- 1- Less than 10 minutes
- 2- 10-20 minutes
- 3- 21-30 minutes
- 4- 31- 40 minutes
- 5- More than 40 minutes
- 6- Other (please explain)_____

A- Knowledge:

1- Where did you first learn about dental sedation/sleep dentistry? (check all that are mentioned)

- Newspaper, Radio, TV
- Internet
- Billboards
- Brochures, posters and other printed materials
- Physician, dentist, health care provider
- Family, friends, neighbors and colleagues
- Other (please, tell) _____

2- What kind of dental sedation are you familiar with?

- Through oral syrup which is oral sedation.
- IV sedation
- I don't know

3- Are you familiar with the medication , if yes (please, tell):

- Yes _____
- No

4- What are the side effects a child might have after receiving dental care under dental sedation (please check all that apply)

- Headache
- Vomiting
- Increased activity
- Decreased activity
- Prolonged sleepiness
- Rash
- Fever
- Don't know
- Other (please, tell) _____

B-Attitude:

1- In your opinion, How risky is dental sedation?

- No risk
- Low
- Moderate
- High
- I don't know

2- How did you feel when you were told that your child needed to be treated under dental sedation? (check all that apply)

- Fear
- Surprise
- Shame
- Embarrassment
- Sadness or hopelessness
- Relief
- Nothing, I already knew it
- Other (please, tell)_____

3- Would you recommend to your relatives and friends that their children receive dental treatment under dental sedation?

- Yes
- No

4- How did you make the decision of having your child treated under sedation?

- Discussed with family and friends.
- My other child has received treatment under sedation
- internet
- the dentist recommended it
- other(please, tell)_____

C-Belief:

1- Do you believe that a child with good behavior with the dentist may still need dental sedation?

- Yes
- No
-

2- Do you believe that more dental offices should provide dental sedation?

- Yes
- No

3- If your child were not covered by insurance, would you pay a \$ 400 for a dental sedation?

- Yes
- No

4- Do you believe that the general public should have more awareness regarding dental sedation?

- Yes
- No

Appendix 4 (Post-operative questionnaire)

Table 2. Questionnaire

Please check the appropriate answer:

1. Were you adequately informed about the use of sedation techniques in aiding in the treatment of your child?
Yes ___ No ___
2. How long did it take your child to become fully alert following the sedation procedure?
less than 1 hour ___ 3 to 4 hours ___
1 to 2 hours ___ 4 to 5 hours ___
2 to 3 hours ___ more than 5 hours ___
3. Was there at any time any evidence of illness (e.g., nausea)?
Yes ___ No ___
4. What does your child recall regarding this experience?
No recall ___ Detailed memory ___
Vague memory ___
5. Do you think that the technique of sedation was effective in allowing your child to receive the needed dental care with minimal psychological trauma?
Yes ___ No ___
6. Would you permit your child to be treated again with this method?
Yes ___ No ___
7. Prior to your child's sedation, what were some of your concerns (if any) regarding this method of dental care delivery?
8. If you have any comments you wish to add, kindly note them on the back of this sheet.

Thank you for your cooperation.

Appendix 5 Table 1 Association between Pre-operative and Post-operative variables

Variables	Satisfaction I		p
	No	Yes	
Knowledge			
Knowledge/physician			
No	1 (4.76)	14 (17.50)	.144
Yes	22 (95.24)	66 (82.50)	
Knowledge/family			
No	20(95.24)	67(83.75)	.175
Yes	1 (4.76)	13 (16.25)	
Familiar with oral sedation			
No	7 (33.33)	35 (43.75)	.389
Yes	14 (66.67)	45 (56.25)	
Familiar with IV			
No	12 (57.14)	42 (52.50)	.704
Yes	9 (42.86)	38 (47.50)	
Don't know sedation			
No	18 (85.71)	64(80.00)	.551
Yes	3(14.29)	16(20.00)	
Are you familiar with meds			
No			.510
Yes	15 (71.43) 6 (28.57)	51(63.75) 29(36.25)	
Headache side effect			
No	16(76.19)	61(76.25)	.995
Yes	5(23.81)	19(23.75)	
Vomiting side effect			
No	18(85.71)	57(71.25)	.177
Yes	3(14.29)	26(28.75)	
Increased activity side effect			
No			.207
Yes	20 (95.24) 1(4.76)	67(84.81) 12(15.19)	
Decreased activity SE			
No	10 (50.0)	49(61.25)	.360
Yes	10(50.0)	31(38.75)	
Prolonged sleepiness side effect			
No			.830
Yes	11(52.38) 10(47.62)	44(55.00) 36(45.00)	
Fever side effect			
No	20(95.24)	66(82.50)	.144
Yes	1 (4.76)	14(17.50)	
Don't know side effect			
No			.731
Yes	15(71.43) 6(28.57)	54(67.50) 26(32.50)	

Cont. Table 1 Association between Pre-operative and Post-operative variables

<i>Attitudes</i>	Satisfaction 1		
	No	Yes	<i>p</i>
Risk of dental sedation low moderate high	11(52.38) 5(23.81) 5(23.81)	41(51.25) 27(33.75) 12((15.00)	.525
Feeling toward dental sedation; Fear No Yes	16(76.19) 5(23.81)	55(68.75) 25(31.25)	.507
Feeling toward dental sedation; Relief No Yes	12(57.14) 9(42.86)	60(75.00) 20(25.00)	.107
Nothing, I already knew it No Yes	16(76.19) 5(23.81)	47(58.75) 33(41.25)	.142
Decision of sedation; Discussed w/family No Yes	15(71.43) 6(28.57)	61(76.25) 19(23.75)	.649
Decision of sedation; Dentist recommendation No Yes	2(9.52) 19(90.48)	20(25.00) 60(75.00)	.126

Cont. Table 1 Association between Pre-operative and Post-operative variables

<i>Beliefs</i>	Satisfaction 1		
	No	Yes	
Do you believe that a child with a good behavior & cooperative with the dentist should have dental sedation? No Yes	6(28.57) 15(71.43)	19(23.75) 61(76.25)	.649
Do you believe that more dental offices should provide dental sedation? No Yes	4(19.05) 17(80.95)	10(12.82) 68(87.18)	.467
If you are not covered by insurance, would you pay a \$400 for a dental sedation? No Yes	10(47.62) 11(52.38)	26(32.50) 54(67.50)	.198

Cont. Table 1 Association between Pre-operative and Post-operative variables

<i>Variables</i>	<i>Alert duration</i>		<i>p</i>
	<i>< 1 hour</i>	<i>≥ 1 hour</i>	
<i>Knowledge</i>			
Knowledge/physician			
No	7 (15.56)	8(14.29)	.858
Yes	38 (84.44)	48(85.71)	
Knowledge/family			
No	39(86.67)	48 (85.71)	.890
Yes	6 (13.33)	8 (14.29)	
Familiar with oral sedation			
No	20(44.44)	22 (39.29)	.601
Yes	25 (55.56)	34(60.71)	
Familiar with IV			
No	24(53.33)	30(53.57)	.981
Yes	21 (46.67)	26(46.43)	
Don't know sedation			
No	36 (80.00)	46(82.14)	.784
Yes	9 (20.00)	10(17.86)	
Are you familiar with meds			
No			.019
Yes	35 (77.78) 10 (22.22)	31(55.36) 25(44.64)	
Headache side effect			
No	34 (75.56)	43(76.79)	.885
Yes	11(24.44)	13(23.21)	
Vomiting side effect			
No	41(75.56) 11(24.44)	34(73.21) 15(26.79)	.789
Yes			
Increased activity side effect			
No			.492
Yes	38 (84.44) 7 (15.56)	49 (89.09) 6 (10.91)	
Decreased activity SE			
No	24(54.55)	3(62.50)	.422
Yes	20 (45.45)	21(37.50)	
Prolonged sleepiness side effect			
No			.316
Yes	27(60.00) 18 (40.00)	28 (50.00) 28 (50.00)	
Fever side effect			
No	35 (77.78)	51 (91.07)	.062
Yes	10(22.22)	5 (8.93)	
Don't know side effect			
No			.749
Yes	30 (66.67) 15(33.33)	39 (69.64) 17 (30.36)	

Cont. Table 1 Association between Pre-operative and Post-operative variables

<i>Attitudes</i>	Alert Duration		<i>P</i>
	< 1 hour	≥ 1 hour	
Risk of dental sedation low moderate high	24(53.33) 12(26.67) 9(20.00)	28(50.00) 20(35.71) 8(14.29)	.554
Feeling toward dental sedation; Fear No Yes	30(66.67) 15(33.33)	41(73.21) 15(26.79)	.474
Feeling toward dental sedation; Relief No Yes	27 (60.00) 18 (40.00)	45 (80.36) 11 (19.64)	.025
Nothing, I already knew it No Yes	32(71.11) 13(28.89)	31(55.36) 25(44.64)	.104
Decision of sedation; Discussed w/family No Yes	33(73.33) 12(26.67)	43(76.79) 13(23.21)	.689
Decision of sedation; Dentist recommendation No Yes	11(24.44) 34(75.56)	11(19.64) 45(80.36)	.561

Cont. Table 1 Association between Pre-operative and Post-operative variables

<i>Beliefs</i>	Alert Duration		
	< 1 hour	≥ 1 hour	
Do you believe that a child with a good behavior & cooperative with the dentist should have dental sedation? No Yes	10(22.22) 35(77.78)	15(26.79) 41(73.21)	.597

Cont. Table 1 Association between Pre-operative and Post-operative variables

Do you believe that more dental offices should provide dental sedation?			
No	7(15.91)	7(12.73)	.652
Yes	37(84.09)	48(87.27)	
If you are not covered by insurance, would you pay a \$400 for a dental sedation?			
No	17(37.78)	19(33.93)	.688
Yes	28(62.22)	37(66.07)	

Cont. Table 1 Association between Pre-operative and Post-operative variables

<i>Knowledge</i>	Satisfaction 3		<i>p</i>
	No	Yes	
Knowledge/physician			.010
No	10(11.36)	5(38.46)	
Yes	78(88.64)	8(61.54)	
Knowledge/family			.059
No	78 (88.64)	9 (69.23)	
Yes	10 (11.36)	4 (30.77)	
Familiar with oral sedation			.720
No	36 (40.91)	6 (46.15)	
Yes	52(59.09)	7 (53.85)	
Familiar with IV			.976
No	47(53.41)	7 (53.85)	
Yes	41 (46.59)	6 (46.15)	
Don't know sedation			.735
No	71 (80.68)	11 (84.62)	
Yes	17 (19.32)	2 (15.38)	
Are you familiar with meds			.119
No			
Yes	60 (68.18)	6 (46.15)	
	28 (31.82)	7 (53.85)	
Headache side effect			.447
No	66(75.00)	11(84.62)	
Yes	22(25.00)	2(15.38)	
Vomiting side effect			.261
No	67(76.14)	8(61.54)	
Yes	21(23.86)	5(38.46)	
Increased activity side effect			.687
No			
Yes	77(87.50)	10(83.33)	
	11(12.50)	2(16.67)	
Decreased activity SE			.230
No	50 (56.82)	9 (75.00)	
Yes	38 (43.18)	3 (25.00)	

Cont. Table 1 Association between Pre-operative and Post-operative variables

Prolonged sleepiness side effect			
No			
Yes	45 (51.14)	10 (76.92)	.081
	43(48.86)	3 (23.08)	
Fever side effect			
No	75(85.23)	11(84.62)	.954
Yes	13 (14.77)	2(15.38)	
Don't know side effect			
No			
Yes	63(71.59)	6(46.15)	.066
	25(28.41)	7(53.85)	

Cont. Table 1 Association between Pre-operative and Post-operative variables

	Satisfaction 3		
<i>Attitudes</i>	No	Yes	
Risk of dental sedation			
low	46(52.27)	6(46.15)	
moderate	29(32.95)	3(23.08)	.341
high	13(14.77)	4(30.77)	
Feeling toward dental sedation; Fear			
No	61(69.32)	10(76.92)	
Yes	27(30.68)	3(23.08)	.575
Feeling toward dental sedation; Relief			
No	63(71.59)	9(69.23)	
Yes	25(28.41)	4(30.77)	.861
Nothing, I already knew it			
No	55(62.50)	8(61.54)	
Yes	33(37.50)	5(38.46)	.947
Decision of sedation; Discussed w/family			
No	65(73.86)	11(84.62)	.402
Yes	23(26.14)	2(15.38)	
Decision of sedation; Dentist recommendation			
No	18(20.45)	4(30.77)	
Yes	70(79.55)	9(69.23)	.400

Cont. Table 1 Association between Pre-operative and Post-operative variables

<i>Beliefs</i>	Satisfaction 3		
	No	Yes	
Do you believe that a child with a good behavior & cooperative with the dentist should have dental sedation?			
No	20(22.73)	5(38.46)	.220
Yes	68(77.27)	8(61.54)	
Do you believe that more dental offices should provide dental sedation?			
No	10(11.63)	4(30.77)	.065
Yes	76(88.37)	9(69.23)	
If you are not covered by insurance, would you pay a \$400 for a dental sedation?			
No	30(34.09)	6(46.15)	.397
Yes	58(65.91)	7(53.85)	

Cont. Table 1 Association between Pre-operative and Post-operative variables

<i>Knowledge</i>	Recall		<i>p</i>
	No	Yes	
Knowledge/physician			
No	9(16.36)	6(13.04)	.640
Yes	46(83.64)	40(86.96)	
Knowledge/family			
No	47(85.45)	40(86.96)	.828
Yes	8(14.55)	6(13.04)	
Familiar with oral sedation			
No	28(50.91)	14(30.43)	.038
Yes	27(49.09)	32(69.57)	
Familiar with IV			
No	30(54.55)	24(52.17)	.812
Yes	25(45.45)	22(47.53)	
Don't know sedation			
No	40(72.73)	42(91.30)	.017
Yes	15(27.27)	4(8.70)	
Are you familiar with meds			
No	36(65.45)	30(65.22)	.980
Yes	19(34.55)	16(34.65)	
Headache side effect			
No	43(78.18)	34(73.91)	.616
Yes	12(21.82)	12(26.09)	
Vomiting side effect			
No	45(81.82)	30(65.22)	.057
Yes	10(18.18)	16(34.78)	
Increased activity side effect			
No	50(92.59)	37(80.43)	.072
Yes	4(7.41)	9(19.57)	
Decreased activity SE			
No	34(61.82)	25(55.56)	.526

Cont. Table 1 Association between Pre-operative and Post-operative variables

Yes	21(38.18)	20(44.44)	
Prolonged sleepiness side effect			
No	32(58.18)	23(50.00)	
Yes	23(41.82)	23(50.00)	.411
Fever side effect			
No	46(83.64)	40(86.96)	.640
Yes	9(16.36)	6(13.04)	
Don't know side effect			
No	33(60.00)	36(78.26)	
Yes	22(40.00)	10(21.74)	.049

Cont. Table 1 Association between Pre-operative and Post-operative variables

<i>Attitude</i>	Recall		<i>P</i>
	No	Yes	
Risk of dental sedation			
low	30(54.55)	22(47.83)	.298
moderate	14(25.45)	18(39.13)	
high	11(20.00)	6(13.04)	
Feeling toward dental sedation; Fear			
No	41(74.55)	30(65.22)	
Yes	14(25.45)	16(34.78)	.307
Feeling toward dental sedation; Relief			
No	40(72.73)	32(69.57)	
Yes	15(27.27)	14(30.43)	.726
Nothing, I already knew it			
No	34 (61.82)	29(63.04)	
Yes	21(38.18)	17(36.96)	.899
Decision of sedation; Discussed w/family			
No	38(69.09)	38(82.61)	.117
Yes	17(30.91)	8(17.39)	
Decision of sedation; Dentist recommendation			
No	13(23.64)	9(19.57)	
Yes	42(76.36)	37(80.43)	.622

Cont. Table 1 Association between Pre-operative and Post-operative variables

<i>Belief</i>	Recall		<i>P</i>
	No	Yes	
Do you believe that a child with a good behavior & cooperative with the dentist should have dental sedation?			
No	15(27.27)	10(21.74)	.521
Yes	40(72.73)	36(78.26)	
Do you believe that more dental offices should provide dental sedation?			
No	12(22.22)	2(4.44)	.011
Yes	42(77.78)	43(95.56)	F.018

Cont. Table 1 Association between Pre-operative and Post-operative variables

If you are not covered by insurance, would you pay a \$400 for a dental sedation?			
No	21(38.18)	15(32.61)	.560
Yes	34(61.82)	31(67.39)	

Table 1. 2 Symptoms mentioned by parents when answered question three in Knowledge part of Pre-operative questionnaire

<i>Variables</i>	Satisfaction 1			Alert duration		
	No	Yes	<i>p</i>	< 1 hour	≥ 1 hour	<i>p</i>
<i>Symptoms mentioned by parents/Know 3</i>						
Nothing (0)	7(33.33)	26(32.50)	.707	16(35.56)	17(30.36)	.798
1-2 symptoms (1)	9(42.86)	28(35.00)		15(33.33)	22(39.36)	
3 or more symptoms (2)	5(23.81)	26(32.50)		14(31.11)	17(30.36)	

Cont. Table 1. 2 Symptoms mentioned by parents when answered question three in Knowledge part of Pre-operative questionnaire

<i>Variables</i>	Satisfaction 3			Recall		
	0	1	<i>p</i>	No	Yes	<i>p</i>
<i>Symptoms mentioned by parents/Know 3</i>						
Nothing (0)	27(30.68)	6(46.15)	.454	22(40.00)	11(23.91)	.229
1-2 symptoms (1)	34(38.68)	3(23.08)		18(32.73)	19(41.30)	
3 or more symptoms (2)	27(30.68)	4(30.77)		15(27.27)	16(34.78)	

Table 2 Association between Pre-operative variables and Demographic Data

<i>Variables</i>	Parental age		<i>p</i>
	<30 (0)No	>30(1)Yes	
Knowledge			
Knowledge physician			
No	5(14.71)	10(14.93)	.977
Yes	29(85.29)	57(85.07)	
Knowledge family			
No	33(97.06)	54(80.60)	.024 F.031
Yes	1(2.94)	13(19.40)	
Familiar with oral sedation			
No	17(50.00)	25(37.31)	.222
Yes	17(50.00)	42(62.69)	
Familiar with IV			
No	18(52.94)	36(53.73)	.940
Yes	16(47.06)	31(46.27)	
Don't know sedation			
No	25(73.53)	57(85.07)	.161
Yes	9(26.47)	10(14.93)	
Are you familiar with meds			
No			.218
Yes	25(73.53) 9(26.47)	41(61.19) 26(38.81)	
Headache side effect			
No	28(82.35)	49(73.13)	no p
Yes	6(17.65)	18(26.87)	
Vomiting side effect			
No	25(73.53)	50(74.26)	.905
Yes	9(26.47)	67(100.0)	
Increased activity side effect			
No			.321
Yes	28(82.35) 6(17.65)	59(89.39) 7(10.61)	
Decreased activity SE			
No	22(66.67)	37(55.22)	.274
Yes	11(33.33)	30(44.78)	
Prolonged sleepiness side effect			
No			.828
Yes	18(52.94) 16(47.06)	37(55.22) 30(44.78)	
Fever side effect			
No	30(88.24)	56(83.58)	.534
Yes	4(11.76)	11(16.42)	
Don't know side effect			
No	20(58.82)	49(73.13)	.144
Yes	14(41.18)	18(26.87)	

Cont. Table 2 Association between Pre-operative variables and Demographic Data

<i>Attitudes</i>	Parental age		<i>P</i>
	<30 (0)No	>30(1)Yes	
Risk of dental sedation			
Low	14(41.18)	38(56.72)	.268
Moderate	12(35.29)	20(29.85)	
High	8(23.53)	9(13.43)	
Feeling toward dental sedation; Fear			
No	22(64.71)	39(73.13)	.381
Yes	12(35.29)	18(26.87)	
Feeling toward dental sedation; Relief			
No	24(70.59)	48(71.64)	.912
Yes	10(29.41)	19(28.36)	
Nothing, I already knew it			
No	22(64.71)	41(61.19)	.731
Yes	12(35.29)	26(38.81)	
Decision of sedation; Discussed w/family			
No	21(61.76)	55(82.09)	.025
Yes	13(38.24)	12(17.91)	
Decision of sedation; Dentist recommendation			
No	7(20.59)	15(22.39)	.836
Yes	27(79.41)	52(77.61)	

Cont. Table 2 Association between Pre-operative variables and Demographic Data

<i>Belief</i>	Parental age		<i>P</i>
	<30 (0)No	>30(1)Yes	
Do you believe that a child with a good behavior & cooperative with the dentist should have dental sedation?			
No	6(17.65)	19(28.36)	.239
Yes	28(82.35)	48(71.64)	
Do you believe that more dental offices should provide dental sedation?			
No	5(14.71)	9(13.85)	.907
Yes	29(85.29)	56(86.15)	
If you are not covered by insurance, would you pay a \$400 for a dental sedation?			
No	12(35.29)	24(35.82)	.958
Yes	22(64.71)	43(64.18)	

Cont. Table 2 Association between Pre-operative variables and Demographic Data

	Parental gender		
	Male	Female	<i>p</i>
<i>Knowledge</i>			
Knowledge physician			
No	5(29.41)	10(11.90)	.064
Yes	12(70.59)	74(88.10)	
Knowledge family			
No	15(88.24)	72(85.71)	.784
Yes	2(11.76)	12(14.29)	
Familiar with oral sedation			
No	7(41.18)	35(41.67)	.970
Yes	10(58.8)	49(58.33)	
Familiar with IV			
No	10(58.8)	44(52.38)	.627
Yes	7(41.18)	40(47.62)	
Don't know sedation			
No	13(76.4)	69(82.14)	.585
Yes	4(23.53)	15(17.86)	
Are you familiar with meds			
No	9(52.94)	57(67.86)	.239
Yes	8(47.06)	27(32.14)	
Headache side effect			
No	13(76.4)	64(76.19)	.980
Yes	4(23.43)	20(23.81)	
Vomiting side effect			
No	14(82.3)	61(72.62)	.403
Yes	3(17.65)	23(27.38)	
Increased activity side effect			
No	13(81.2)	74(88.10)	.456
Yes	3(18.75)	10(11.90)	
Decreased activity SE			
No	10(58.8)	49(59.04)	.987
Yes	7(41.18)	34(40.96)	
Prolonged sleepiness side effect			
No	12(70.5)	43(51.19)	.143
Yes	5(29.41)	41(48.81)	
Fever side effect			
No	13(76.4)	73(86.90)	.270

Cont. Table 2 Association between Pre-operative variables and Demographic Data

Yes	4(23.53)	11(13.10)	
Don't know side effect			
No	9(52.94)	60(71.4)	.135
Yes	8(47.06)	24(28.57)	

Cont. Table 2 Association between Pre-operative variables and Demographic Data

Attitude	Parental gender		<i>P</i>
	Male	Female	
Risk of dental sedation			
Low	7(41.18)	45(43.57)	.591
Moderate	6(35.29)	26(30.95)	
High	4(23.53)	13(15.48)	
Feeling toward dental sedation; Fear			
No	14(82.3)	57(67.86)	.233
Yes	3(17.65)	27(32.14)	
Feeling toward dental sedation; Relief			
No	12(70.5)	60(71.43)	.944
Yes	5(29.41)	24(28.57)	
Nothing, I already knew it			
No	10(58.8)	53(63.10)	.740
Yes	7(41.18)	31(36.90)	
Decision of sedation; Discussed w/family			
No	13(76.4)	63(75.00)	.898
Yes	4(23.53)	21(25.00)	
Decision of sedation; Dentist recommendation			
No	6(35.29)	16(19.05)	.139
Yes	11(64.70)	68(80.95)	

Cont. Table 2 Association between Pre-operative variables and Demographic Data

Belief	Parental gender		<i>P</i>
	Male	Female	
Do you believe that a child with a good behavior & cooperative with the dentist should have dental sedation?			
No	2(11.76)	23(27.38)	.174
Yes	15(88.24)	61(72.62)	
Do you believe that more dental offices should provide dental sedation?			
No	3(17.65)	11(13.41)	.649
Yes	14(82.3)	71(86.59)	

Cont. Table 2 Association between Pre-operative Variables and Demographic Data

If you are not covered by insurance, would you pay a \$400 for a dental sedation?			
No	5(29.41)	31(36.90)	
Yes	12(70.5)	53(63.10)	.556

Cont. Table 2 Association between Pre-operative Variables and Demographic Data

	Parental education			
<i>Knowledge</i>	1	2	3	<i>p</i>
Knowledge physician				
No	10(22.22)	2(6.25)	3(13.04)	.147
Yes	35(77.78)	30(93.75)	20(86.96)	
Knowledge family				
No	37(82.22)	30(93.75)	19(82.61)	.309
Yes	8(17.78)	2(6.25)	4(17.39)	
Familiar with oral sedation				
No	22(48.89)	9(28.13)	10(43.48)	.182
Yes	23(51.11)	23(71.88)	13(56.52)	
Familiar with IV				
No	30(66.67)	14(43.75)	9(39.13)	.044
Yes	15(33.33)	18(56.25)	14(60.87)	
Don't know sedation				
No	34(75.56)	29(90.63)	19(82.61)	.236
Yes	11(24.44)	3(9.38)	4(17.39)	
Are you familiar with meds				
No	29(64.44)	20(62.50)	16(69.57)	.859
Yes	16(35.56)	12(37.50)	7(30.43)	
Headache side effect				
No	41(91.11)	18(56.25)	17(73.91)	.002 F.002
Yes	4(8.89)	14(43.75)	6(26.09)	
Vomiting side effect				
No	39(86.67)	19(59.38)	16(69.57)	.023
Yes	6(13.33)	13(40.63)	7(30.43)	
Increased activity side effect				
No	37(84.09)	28(87.50)	21(91.30)	.703
Yes	7(15.91)	4(12.50)	2(8.70)	
Decreased activity SE				
No	34(75.56)	14(45.16)	10(43.48)	.007
Yes	11(24.44)	17(54.84)	13(56.52)	
Prolonged sleepiness side effect				
No	33(73.33)	11(34.38)	10(43.48)	.002
Yes	12(26.67)	21(65.63)	13(56.52)	
Fever side effect				
No	41(91.11)	24(75.00)	20(86.96)	.142
Yes	4(8.89)	8(25.00)	3(13.04)	

Cont. Table 2 Association between Pre-operative Variables and Demographic Data

Don't know side effect				
No	21(46.67)	28(87.50)	20(86.96)	.000
Yes	24(53.33)	4(12.50)	3(13.04)	X ² 19.0804

Cont. Table 2 Association between Pre-operative variables and Demographic Data

<i>Attitude</i>	Parental Education			<i>p</i>
	1	2	3	
Risk of dental sedation				
Low				
Moderate	23(51.11)	14(43.75)	14(65.22)	.005
High	9(20.00)	16(50.00)	7(30.43)	F.006
	13(28.89)	2(6.25)	1(4.35)	
Feeling toward dental sedation; Fear				
No	32(71.11)	21(65.63)	17(73.91)	.784
Yes	13(28.89)	11(34.38)	6(26.09)	
Feeling toward dental sedation; Relief				
No	33(73.33)	22(68.75)	17(73.91)	No p
Yes	12(26.67)	10(31.25)	6(26.09)	
Nothing, I already knew it				
No	30(66.67)	18(56.25)	14(60.87)	.645
Yes	15(33.33)	14(43.75)	9(39.13)	
Decision of sedation; Discussed w/family				
No	35(77.78)	23(71.88)	17(73.91)	.833
Yes	10(22.22)	9(28.13)	6(26.09)	
Decision of sedation; Dentist recommendation				
No	8(17.78)	8(25.00)	6(26.09)	.651
Yes	37(82.22)	24(75.00)	17(73.91)	

Cont. Table 2 Association between Pre-operative variables and Demographic Data

<i>Belief</i>	Parental Education			<i>P</i>
	1	2	3	
Do you believe that a child with a good behavior & cooperative with the dentist should have dental sedation?				
No	11(24.44)	8(25.00)	6(26.09)	.989
Yes	34(75.56)	24(75.00)	17(73.91)	
Do you believe that more dental offices should provide dental sedation?				
No	7(15.91)	4(12.90)	2(8.70)	.709
Yes	37(84.09)	27(87.10)	21(91.30)	
If you are not covered by insurance, would you pay a \$400 for a dental sedation?				
No	19(42.22)	9(28.13)	7(30.43)	.385
Yes	26(57.78)	23(71.88)	16(69.57)	

Cont. Table 2 Association between Pre-operative variables, Sedation type and Demographic Data

<i>Variables</i>	Children number				Sedation type			Child's age		
	1	2	3	<i>p</i>	Oral	Intravenous	<i>p</i>	0	1	<i>p</i>
Knowledge										
Knowledge/physician										
No	2 (10.00)	4(10.8 1)	9(20.4 5)	.37 9	9(13.8 5)	6(16.67 30(83.33)	.70 3	8(12.7 0)	7(18.4 2)	.433
Yes	18 (90.00)	33(89. 19)	35(79. 55)		56(86. 15)			55(87. 30)	31(81. 58)	
Knowledge/family										
No	17 (85.00)	34(91. 89)	36(81. 82)	.42 0	58(89. 23)	29(80.56)	.22 7	56(89. 89)	31(81. 58)	.303
Yes	3 (15.00)	3(8.11)	8(18.1 8)		7(10.7 7)	7(19.44)		7(11.1 1)	7(18.4 2)	
Familiar with oral sed										
No	7(35) 13(65. 00)	18(48) 19(51)	17(39) 27(61)	.52 9	24(37) 41(64)	18(50.0) 18(50.0)	.20 2	24(38) 39(62)	18(47) 20(52)	.360
Yes										
Familiar with IV										
No	7(35.0)	20(54)	27(61)	.14	41(63)	13(36.1)	.00	43(68)	11(28)	.000 x ² 14.71 92
Yes	13(65)	17(46)	17(38)	6	24(36)	23(63.8)	9	20(31)	27(71)	

Cont. Table 2 Association between Pre-operative Variables and Demographic Data

Don't know sedation										
No	17(85)	30(81)	35(79)	.87	52(80)	30(83.3)	.68	50(79)	132(84)	.546
Yes	3(15)	7(18.9)	9(20.4)	4	13(20)	6(16.67)	1	13(20)	6(15.7)	
Are you familiar with meds										
No	11(55)	31(83)	24(54)	.01	42(64)	24(66.6)	.83	38(60)	28(74)	.171
Yes	9(45.0)	6(16.2)	20(45)	2	23(35)	12(33.3)	6	25(40)	10(26)	
Headache side effect										
No	12(60)	30(81)	35(79)	.16	53(81)	24(66.6)	.09	53(84)	24(63)	.016
Yes	8(40.0)	7(18.9)	9(20.4)	1	12(18)	12(33.3)	3	10(16)	14(37)	
Vomiting side effect										
No	13(65)	28(76)	34(77)	.56	52(80)	23(64)		50(79)	25(66)	.131
Yes	7(35.0)	9(24.3)	10(23)	4	13(20)	26(26)	.076	13(21)	13(34)	
Increased activity side effect										
No	18(90)	31(84)	38(88)	.75	55(86)	32(88.9)	.67	51(82)	36(95)	.072
Yes	2(10)	6(16.2)	5(11.6)	2	9(14.1)	4(11.11)	4	11(18)	2(5.26)	
Decreased activity SE										
No	10(50)	20(54)	29(54)	.31	40(63)	19(53)	.34	39(63)	20(53)	.311
Yes	10(50)	17(46)	14(33)	5	24(37)	17(47)	3	23(37)	18(47)	
Prolonged sleepiness side effect										
No	10(50)	16(43)	29(66)	.11	35(54)	20(55)	.86	39(62)	16(42)	.053
Yes	10(50)	21(57)	15(34)	3	30(46)	16(44)	9	24(38)	22(57)	
Fever side effect										
No	16(80)	33(89.2)	37(84)	.62	54(83.1)	32(88.9)	.43	55(87.3)	31(82)	.433
Yes	4(20.0)	4(10.81)	7(15.9)	6	11(16.9)	4(11.11)	1	8(12.7)	7(18.4)	
Don't know side effect										
No	14(70)	28(75.6)	27(61)	.38	44(67.6)	25(69.4)	.85	41(65.1)	28(73)	.368
Yes	6(30.0)	9(24.32)	17(38)	0	21(32.3)	11(30.5)	6	22(34.3)	10(26)	

Cont. Table 2 Association between Pre-operative variables, Sedation type and Demographic Data

Variables	Children number			p	Sedation type		p	Child's age		p
	1	2	3		Oral	Intravenous		0	1	
Attitude										
Risk of dental sedation										
Low	9 (45.00)	19 (51.35)	24 (54.55)	.918	29 (44.62)	23 (63.89)	.170	33 (52.38)	19 (50.00)	.082
Moderate	8 (40.00)	11 (29.73)	13 (29.55)		23 (35.38)	9 (25.00)		16 (25.40)	16 (42.11)	
High	3 (15.00)	7 (18.92)	7 (15.91)		13 (20.00)	4 (11.11)		14 (22.22)	3 (7.89)	
Feeling toward dental sedation; Fear										
No	14(70.00)	25(67.57)	32(72.73)	.879	44(67.69)	27(75.00)	.441	41(65.08)	30(78.95)	.140
Yes	6(30.00)	12(32.43)	12(27.27)		21(32.31)	9(25.00)		22(34.92)	8(21.05)	
Feeling toward dental sedation; Relief										
No	13(65.00)	28(75.68)	31(70.45)	.688	46(70.77)	26(72.22)	.877	47(74.60)	25(65.79)	.343
Yes	7(35.00)	9(24.32)	13(29.55)		19(29.23)	10(27.78)		16(25.40)	13(34.21)	
Nothing, I already knew it										
No	11(55.00)	27(72.97)	25(56.82)	.245	42(64.62)	21(58.33)	.533	40(63.49)	23(60.53)	.766
Yes	9(45.00)	10(27.03)	19(43.18)		23(35.38)	15(41.67)		23(36.51)	15(39.47)	
Decision of sedation; Discussed w/family										
No	11(55.00)	27(72.97)	25(56.82)	.406	52(80.00)	24(66.67)	.137	49(77.78)	27(71.05)	.448
Yes	9(45.00)	10(27.03)	19(43.18)		13(20.00)	12(33.33)		14(22.22)	11(28.95)	
Decision of sedation; Dentist recommendation										
No	1(5.00)	8(21.62)	13(29.55)	.088	12(18.46)	10(27.78)	.277	10(15.87)	12(31.58)	.064
Yes	19(95.00)	29(78.38)	31(70.45)		53(81.54)	26(72.22)		53(84.13)	26(68.42)	

Cont. Table 2 Association between Pre-operative variables , Sedation type and Demographic Data

<i>Variables</i>	Children number			<i>p</i>	Sedation type		<i>p</i>
	1	2	3		Oral	Intravenous	
<i>Belief</i>							
Do you believe that a child with a good behavior & cooperative with the dentist should have dental sedation?							
No	3(15.00)	9(24.32)	13(29.55)	.457	15(23.08)	10(27.78)	.600
Yes	17(85.00)	28(75.68)	31(70.45)		50(76.92)	26(72.22)	
Do you believe that more dental offices should provide dental sedation?							
No	2(10.00)	5(14.29)	7(15.91)	.820	9(14.06)	5(14.29)	.976
Yes	18(90.00)	30(85.71)	37(84.09)		55(85.94)	30(85.71)	
If you are not covered by insurance, would you pay a \$400 for a dental sedation?							
No	3(15.00)	19(51.35)	14(31.82)	.019 F.020	29(44.62)	7(19.44)	.011
Yes	17(85.00)	18(48.65)	30(68.18)		36(55.38)	29(80.56)	

Cont. Table 2 Association between Pre-operative variables and Demographic Data

<i>Variables</i>	Child's age		<i>p</i>
	0	1	
<i>Belief</i>			
Do you believe that a child with a good behavior & cooperative with the dentist should have dental sedation?			
No	17(26.98)	8(21.05)	.503
Yes	46(73.02)	30(78.95)	
Do you believe that more dental offices should provide dental sedation?			
No	11(17.74)	3(8.11)	.183
Yes	51(82.26)	34(91.89)	

Cont. Table 2 Association between Pre-operative variables and Demographic Data

If you are not covered by insurance, would you pay a \$400 for a dental sedation? No Yes	28(44.44)	8(21.05)	.017
	35(55.56)	30(78.95)	

Table 3 Association between Symptoms mentioned by parents in Pre-operative questionnaire and Demographic Data

<i>Variables</i>	Parental age		<i>p</i>	Parental gender		<i>p</i>
	<30 (0)	>30(1)		Male(0)	Female(0)	
<i>Symptoms mentioned by parents/Know 3</i>						
Nothing (0)	13(38.24)	20(29.85)	.532	9(52.94)	24(28.57)	.101
1-2 symptoms (1)	10(29.41)	27(40.30)		3(17.65)	34(40.48)	
3 or more symptoms (2)	11(32.35)	20(29.85)		5(29.41)	26(30.95)	

Cont. Table 3 Association between Symptoms mentioned by parents in Pre-operative questionnaire and Demographic Data

<i>Variables</i>	Parental Education			<i>p</i>	Children number			<i>p</i>
	1	2	3		1	2	3	
<i>Symptoms mentioned by parents/Know 3</i>								
Nothing (0)	24(53.33)	4(12.50)	4(17.39)	.000 F.000 X ² 24.7314	5(25.00)	11(29.73)	17(38.64)	.499
1-2 symptoms (1)	15(33.33)	10(31.25)	12(52.17)		6(30.00)	16(43.24)	15(34.09)	
3 or more symptoms (2)	6(13.33)	18(56.25)	7(30.43)		9(45.00)	10(27.03)	12(27.27)	

References

1. Patel M, McTigue DJ, Thikkurissy S, Fields HW. Parental attitudes toward advanced behavior guidance techniques used in pediatric dentistry. *Pediatr Dent*;2016; 38:30-6 .
2. American Academy of Pediatric Dentistry. Guideline on behavior guidance for the pediatric dental patients. *Pediatr Dent* 2015;37:180-93.
3. American Academy of Pediatric Dentistry. Guideline on monitoring and management of pediatric patients during and after sedation for diagnostic and therapeutic procedures. *Pediatr Dent* 2015;37:211-27.
4. American Academy of Pediatric Dentistry. Guideline on use of anesthesia personnel in the administration of office-based deep sedation/general anesthesia to the pediatric dental patient. *Pediatr Dent* 2015;37:228-31.
5. Fields HW Jr., Machen JB, Murphy MG. Acceptability of various behavior management techniques relative to types of dental treatment. *Pediatr Dent*;1984; 6:199-203.
6. Murphy MG, Fields HW, Machen JB. Parental acceptance of pediatric dentistry behavior management techniques. *Pediatr Dent* 1984; 6:193-8.
7. Davis MJ. Conscious sedation practices in pediatric dentistry: a survey of members of the American Board of Pediatric Dentistry College of Diplomates. *Pediatr Dent*;1988;10:328-29.
8. ELBadrawy HE, Riekman GA. A survey of parental attitudes toward sedation of their child. *Pediatr Dent*;1986;8:206-8.
9. Lawrence SM, Mctigue DJ, Wilson S, Odom JG, Waggoner WF, Henry W.Fields, JR. Parental attitudes toward behavior management techniques used in pediatric dentistry. *Pediatr Dent*;1991;13:151-5.
10. Wilson, S, Antalis, D,McTigue, D J. Group effect on parental rating of acceptability of behavioral management techniques used in pediatric dentistry. *Pediatr Dent*;1991;13:200-3.
11. Havelka C, McTigue D, Wilson S, Odom J. The influence of social status and prior explanation on parental attitudes toward behavior management techniques. *Pediatr Dent*;1992;14:376-81.

12. Brandes, DA, Wilson, S, Preisch, JW., Casamassimo PS. A comparison of opinions from parents of disabled and non-disabled children on behavior management techniques used in dentistry. *Special care Dentistry*;1995;15:119-23.
13. Long N. The changing nature of parenting in America. *Pediatr Dent*;2004;26: 121-4.
14. Eaton, JJ, McTigue, DJ, Fields HW, Beck M. Attitudes of contemporary parents toward behavior management techniques used in pediatric dentistry. *Pediatr Dent*;2005;27:107-13.
15. Shroff S, Hughes C, Mobley C. Attitudes and preferences of parents about being present in the dental operator. *Pediatr Dent*;2015; 37:51-5.
16. Travis NM, Zheng X. Pediatric dental sedation: Challenges and opportunities. *Clinical, Cosmetic and Investigational Dentistry*;2015; 7: 97-106.
17. Allen KD ,Hodges ED, Knudsen SK. Comparing four methods to inform parents about child behavior management: how to inform for consent. *Pediatr Dent*;1995; 17:180-86.
18. White J, Wells M, Arheart KL, Donaldson M, Woods MA. A Questionnaire of parental perceptions of conscious sedation in pediatric dentistry. *Pediatr Dent*;2016: 38:116-21.
19. Peretz B, Kharouba J, Blumer S. Pattern of parental acceptance of management techniques used in pediatric dentistry. *Journal of clinical pediatric dentistry*;2013: 38:27-30.
20. Elango I, Baweja DK, Shivaprakash PK. Parental acceptance of pediatric behavior management techniques: A comparative study. *J Indian Soc Pedod Prev Dent*;2012; 30:195-200.
21. Peretz B, Zadik D. Parents' attitudes toward behavior management techniques during dental treatment. *Pediatr Dent* 1999;21:201-204.
22. Hicks CG, Jones JE, Saxen MA, Maupome G, Sanders BJ, Walker LA, Weddell JA, Tomlin A. Demand in pediatric dentistry for sedation and general anesthesia by dentist anesthesiologists: A Survey of directors of dentist anesthesiologist and pediatric dentistry residencies. *Anesth Prog* 2012; 59:3-11.

23. Grembowski D, Milgrom P, Fiset L. Factor's influencing dental decision-making. *J Public Health Dent.* 1988;48:159-167.
24. Lewis DW. Headaches in children and adolescents. *Am Fam Physician.* 2002 Feb 15;65(4):625-633.
25. Ritwik P, Cao LT, Curran R, Musselman RJ. Post-sedation events in children sedated for dental care. *Anesth Prog* 2013; 60:54-59.
26. Sheller B. Challenges of managing child behavior in the 21st century dental setting. *Pediatr Dent* 2004;26:111-13.
27. Canpolat DG, Yildirim MD, Aksu R, Kutuk N, Alkan A, Cantekin K. Intravenous ketamine, propofol and propofol-ketamine combination used for pediatric dental sedation: A randomized clinical study. *Pak J Med Sci* 2016;32:682-87.
28. Dosani FZ, Flatiz CM, Whitmire HC jr., Vance BJ. Postdischarge events occurring after pediatric sedation for dentistry. *Pediatr Dent* 2014;36:411-16.
29. Stephen Wilson, Kelly Farrell, Ann Griffen, Dan Coury. Conscious sedation experiences in graduate pediatric dentistry programs. *Pediatr Dent* 2001;23:307-14.
30. Mikko Myrskylä, Rachel Margolis. Happiness: Before and after the kids. MPIDR WORKING PAPER WP 2012-013. Or Myrskylä, M. & Margolis, R. *Demography* (2014) 51: 1843. <https://doi.org/10.1007/s13524-014-0321-x>.
31. Chicka, MC, Dembo JB, Mathu-Muju KR, Nash DA, Bush H. Adverse events during pediatric dental anesthesia and sedation: a review of closed malpractice insurance claims. *Pediatr Dent.* 2012;34:231–38.
32. McDonald AD. *Dentistry for the Child and Adolescent.* Eighth edition, 2004.
33. Krauss B, Green SM. Procedural sedation and analgesia in children. *Lancet*;2006;367:766-80.
34. Pinkam JR. *Pediatric dentistry: infancy through adolescence.* Fourth Edition, 2005.
35. Coté CJ, Karl HW, Notterman DA, Weinberg JA, Mc-Closkey C. Adverse sedation events in pediatrics: analysis of medications used for sedation. *Pediatrics* 2000;106:633-44.

36. Becker DE, Casabianca AB. Respiratory Monitoring: Physiological and Technical Considerations. *Anesthesia Progress*: Spring 2009; 56:14-22.
37. Kwan ng S, Yen DL, Martin A. Reproducibility of clinical grading of tonsillar size. *Arch Otolaryngol Head Neck Surg*;2010;136:159-62.
38. Chang SJ, Chae KY . Obstructive sleep apnea syndrome in children: Epidemiology, pathophysiology, diagnosis and sequelae. *Korean J Pediat*; 2010; 53:863-71.