Post-anaesthesia education for parents of pediatric dental patients having general anaesthesia: Effect of the presence of a recovering child on recall and compliance

by

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Abstract

**Background:** Post-anaesthesia education (P-AE) is a critical component of care typically provided to parents after their child’s dental treatment under general anaesthesia (GA)

**Objective:** To assess parent’s recall and compliance of P-AE depending on whether the P-AE was delivered in the presence or absence of their child.

**Method:** Parents of children (aged 2-9 years; ASA I-II; receiving dental treatment under GA) were randomly assigned to receive P-AE with their child either present (in recovery) or absent (during treatment). Compliance and recall of P-AE was assessed in a phone interview 1 day post-op.

**Results:** The presence or absence of a recovering child during P-AE did not result in significant differences in parents’ recall and compliance. In both groups, recall of education material was low, whereas compliance was higher.

**Conclusion:** Given the serious, albeit rare occurrence of complications following GA, optimizing the delivery of P-AE needs further investigation to improve retention of information by parents.
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# Table of Contents

ABSTRACT ...........................................................................................................ii  
ACKNOWLEDGMENTS ................................................................................... iii  
LIST OF TABLES ................................................................................................. vi  
LIST OF FIGURES ............................................................................................... vii  
LIST OF APPENDICES ..................................................................................... viii  
CHAPTER 1: Introduction .................................................................................. 1  
  1.1. Statement of the problem .......................................................................... 1  
CHAPTER 2: Literature review ........................................................................... 2  
  2.1. Use of general anaesthesia (GA) in pediatric dentistry ......................... 2  
  2.2. Changes in use of GA for behaviour management of children ................. 2  
  2.3. Complications in anaesthesia ................................................................. 3  
    2.3.1. Timing of anaesthetic complications ................................................. 4  
  2.4. Post-anaesthesia patient education ......................................................... 4  
  2.5. Potential factors influencing recall of post-anaesthesia patient education ........................................... 6  
    2.5.1. Demographic factors ...................................................................... 6  
    2.5.2. Timing of patient education ............................................................ 7  
    2.5.3. Environment of patient education .................................................. 8  
    2.5.4. Presence of the recovering child during patient education .......... 9  
    2.5.5. Emergence delirium (ED) ................................................................. 10  
    2.5.6. ED measurement .......................................................................... 11  
  2.6. Potential factors influencing compliance of post-anaesthesia patient  
    education ................................................................................................... 12  
  2.7. Summary ................................................................................................. 14  
CHAPTER 3: Study purpose and research questions ........................................ 15  
  3.1. Study purpose ......................................................................................... 15  
  3.2. Specific objectives of the study .............................................................. 15  
CHAPTER 4: Methodology .................................................................................. 16  
  4.1. Study participants .................................................................................. 16  
  4.2. Study design ......................................................................................... 16  
  4.3. Recruitment ......................................................................................... 18
List of Tables

TABLE 1:   Comparison of the demographics in group PEAC and PEPC ...............24
TABLE 2:   Recall and compliance scores in all participants ...............................25
TABLE 3:   Results in group PEAC vs. PEPC .................................................26
TABLE 4:   Correlation between demographic factors and recall scores: Continuous variables .................................................................28
TABLE 5:   Mean total recall scores in participants with varying demographic factors: t-test for categorical variables ..............................................28
TABLE 6:   Mean total recall scores in participants with varying demographic factors: ANOVA for a categorical variable (i.e., the level of education) ...........29
TABLE 7:   Correlation between other factors and recall scores ............................30
List of Figures

FIGURE 1: Study design ........................................................................................................17
FIGURE 2: Participant tracking ..........................................................................................23
FIGURE 3: Correlation between total recall score and total PAED score in group PEPC ......................................................................................................................27
List of Appendices

APPENDIX 1: Study information……………………………………………………39
APPENDIX 2: Informed consent form………………………………………………41
APPENDIX 3: Parent post-operative call information………………………….43
APPENDIX 4: Parent demographic information………………………………..44
APPENDIX 5: Post-anaesthesia written instruction (for parents of patients receiving intravenous conscious sedation or GA from the Department of Anaesthesia, Faculty of Dentistry, at University of Toronto) ………………………………………………………………45
APPENDIX 6: Post-anaesthesia verbal education script………………………….46
APPENDIX 7: Pediatric Anaesthesia Emergence Delirium (PAED) Scale……..48
APPENDIX 8: Post-anaesthesia interview questionnaire………………………..49
APPENDIX 9: Ethics approval……………………………………………………….53
Chapter 1
Introduction

1.1. Statement of the problem

Post-anaesthesia patient education is a critical component of clinical care. This may be of even greater importance in a pediatric ambulatory anesthesia setting, as children are discharged on the same day of their dental surgery and clinicians must rely on parents to manage the post-anaesthesia care of their child. Typically, post-anaesthesia education is presented after the dental surgery when the child is in recovery. However, post-anaesthesia education in the presence of the recovering child may be potentially distracting due to background noises, visual distractions and interruptions (Banbury, Macken, Tremblay, & Jones, 2001; Geffen et al., 1997; McDonald, Wiczorek, & Walker, 2004), as the child’s behaviour is not predictable when recovering from general anaesthesia (GA). Many factors, including the level or degree of distraction, are reported to impact retention of information (Banbury & Berry, 1998; Geffen et al., 1997). The same education in the absence of a recovering child would ensure minimal background noises and interruptions. However, parents might have difficulty focusing on the information because of their concern for their child who is separated from them while receiving dental treatment. Currently, there is no universally accepted protocol for providing post-anaesthesia education in a dental anesthesia practice. The anaesthetist often uses his or her own discretion to have the recovering child in the environment or not during the education. Thus, interest lies in whether there is an optimal environment to present post-anaesthesia education, and the impact of environment on post-anaesthesia education.
Chapter 2

Literature review

2.1. Use of general anaesthesia (GA) in pediatric dentistry

GA is defined as a state of unconsciousness and loss of protective airway reflexes (RCDSO, 2012). Patients under GA are unable to respond purposefully to both physical and verbal stimuli (RCDSO, 2012). GA serves as an invaluable modality to deliver dental care to several groups of patients, including those who are dentally anxious (Chanpong, Haas, & Locker, 2005), uncooperative (Koneru, 2009), and patients with intellectual or physical disabilities (Koneru, 2009). Approximately 19,000 children under six years of age received dental day surgeries under GA annually based on two years of data collected from 2010 to 2012. (Canadian Institute for Health Information, 2013). This accounted for 31% of all day surgeries under GA for children in this age group (Canadian Institute for Health Information, 2013). These figures did not include out-of-hospital GA cases for dentistry. Currently, there is no study to quantify the number of these cases.

2.2. Changes in use of GA for behaviour management of children

In pediatric dentistry, several techniques have been used to manage children’s behavior during the treatment. These include tell-show-do, voice control, positive reinforcement, hand-over-mouth, physical restraint by the dentist or the assistant mouth prop and GA (Murphy, Fields, & Machen, 1984). Historically, GA was not a preferred way of behaviour management in pediatric dentistry, with the majority of parents accepting pharmacological techniques only when the procedure involved teeth extraction. (Murphy et al., 1984). However, Eaton, McTigue, Fields, & Beck (2005) recently reported that GA was ranked at third out of eight as a preferred behaviour management technique in a survey involving 46 parents. Only tell-show-do and nitrous oxide sedation techniques had higher preference scores than GA. Other techniques considered in this study were active and passive restraint, oral premedication, voice control and hand-over-mouth. The authors also suggested an increasing trend for parental acceptance of GA (Eaton et al., 2005).
Children with early childhood caries (ECC) appear to be the leading reason for use of GA in pediatric dentistry (Canadian Institute for Health Information, 2013). ECC is defined as “the presence of one or more decayed, missing (due to caries) or filled tooth surfaces in any primary tooth in a preschool-aged child” (Canadian Institute for Health Information, 2013). A Canadian study (Schroth, Moore, & Brothwell, 2005) reported the prevalence of ECC as 53.7% with one in 100 children between the age of 1 and 5 years reporting dental treatment under GA (Canadian Institute for Health Information, 2013). Both high prevalence of ECC and increasing parental acceptance for GA could be responsible for increased and accepted use of GA in modern pediatric dentistry.

2.3. Complications in anaesthesia

The administration of anaesthesia has associated risks; however, the incidence of complications has declined steadily in the overall population. For example, Von Ungern-Sternberg & Habre (2007) indicated that the anaesthesia-related mortality rate has been declining during the last two decades. Tiret, Desmonts, Hatton, & Vourch (1986) conducted a prospective, survey-based study in France and reported the occurrence of all types of GA-related complications to be one in 1215 cases with the prevalence of major complications reported as approximately one in 7924 cases. Examples of these major complications included aspiration, pneumothorax, respiratory depression, atelectasis, bronchospasm, pulmonary edema, cardiac arrest, myocardial infarction and arrhythmias. A study by Cohen, Cameron and Duncan (1990) reported the rate of all complications for pediatric patients as twice in comparison to adult patients. Also, they indicated that the majority of these complications in pediatric patients were respiratory and cardiovascular related. Prevalence of pediatric complications varied by age, with significantly higher rates found in infants aged less than one year old (0.43%), as compared to children 1-14 years (0.05%) or adolescents/ adults > 14 years (0.15%) (Tiret, Nivoche, Hatton, Dismounts, & Vouch, 1988). The rate of complications remained low until the age of 45, but increased significantly thereafter (Tiret et al., 1986).

2.3.1. Timing of anaesthetic complications

The time at which the anaesthetic complications occur is another important issue. Most complications are reported as occurring during the post-anaesthesia/ recovery period.
(42%) as compared to 28% during induction and 30% during maintenance (Tiret et al., 1986). The same authors found that post-anaesthesia complications resulted in poorer prognoses than complications associated with induction or the maintenance period (Tiret et al., 1986).

The majority of post-anaesthesia complications occurred during the first hour after the emergence from GA, and approximately 75% of all post-anaesthesia complications occurred within the first five hours (Tiret et al., 1986). The incidence of delayed complications (>24 hours) was even lower among children than adults, as they lacked comorbidities (Tiret et al., 1988).

Surgery-related factors (e.g., bleeding, swelling, nerve damage, delayed healing, postsurgical infection and pain) also play an important role during the post-anaesthesia phase in addition to complications arising from anaesthesia (Bui, Seldin, & Dodson, 2003). Bleeding and swelling of surgical sites are common complications in dentistry and have the potential to impact recovery after GA (Bui et al., 2003). A blood clot is typically formed within six to 12 hours, but oozing may last 36 to 72 hours postoperatively (Pierse, Dym, & Clarkson, 2012). In terms of edema, “the onset of swelling is typically between 12 and 24 hours, with a peak incidence noted 47 to 72 hours postoperatively. Edema typically begins to subside at 4 days” (Pierse et al., 2012). Thus, in consideration of both dental surgery and anaesthesia, it appears that the first three days may be an important time period in terms of recovery after dental surgery under GA; however, the first 24 hours of the post-anaesthesia phase seems to be the most critical period when considering complications strictly related to anaesthesia.

2.4. Post-anaesthesia patient education

Post-operative patient education is defined as “the communication of information about the course of recovery following surgery” (Rankin, 2002). Its objectives are: (1) to provide knowledge for self-management after discharge, (2) to reduce the number of complications and associated symptoms after discharge, and (3) to improve recovery (Dunstan & Riddle, 1997). Since the majority of complications occur during the post-
anaesthesia phase (Tiret et al., 1986; Tiret et al., 1988), post-anaesthesia patient education has become an important area of emphasis in clinical care.

Numerous studies in both medicine and dentistry investigated post-operative patient education retention and resulting consequences in hospital settings (Atchison et al., 2005; Davison, Moore, MacMillan, Bisaillon, & Wiens, 2004; Isaacman, Purvis, Gyuro, Anderson, & Smith, 1992; Jenkins, Blank, Miller, Turner, & Stanwick, 1996). Current studies reveal that patients’ or caregivers’ recall of post-operative education is generally unsatisfactory. For example, in a study by Atchison et al. (2005), 34 participants were asked to assess their recall of post-operative education (e.g., changing gauze regularly, no spitting, no smoking, diet plan, rinsing with salt water and instructions on calling the dentist and emergency room) after third molar extraction or mandibular fracture surgery, of which only 14 were able to recall elements of the education. In another study, Davison et al. (2004) evaluated efficacy of discharge instruction after radical retropubic prostatectomy of 100 men. This study incorporated several modalities to improve compliance with the discharge education. These included booklets, patient education checklists, discharge bags containing education-related sample products and resource brochure, and 48 hour and 30 day post-discharge telephone calls. In spite of these, the authors reported significant non-compliance of the discharge information in their overall population. This indicated the need for improvement in contents and delivery of post-operative education, as the non-compliance could have been due to lack of information retention and/or pure non-compliance. Isaacman et al. (1992) and Jenkins et al. (1996) investigated parents’ recall of discharge information after treatments for otitis media and burns, respectively. In order to improve recall of information, Isaacman et al. (1992) incorporated written instructions and Jenkins et al. (1996) utilized a customized education book in addition to their standardized verbal education. Both studies failed to observe significant improvements in parents’ recall of discharge education. These studies varied in their modality and timing of measuring patients’ or caregivers’ recall of discharge information after surgeries and they did not strictly focus on anaesthesia-related discharge instructions. In addition to the existing post-operative education literature reporting limited patient recall, interest lies in investigating the effectiveness of post-
anaesthesia patient education in ambulatory care settings where patients have greater responsibility for their recovery because they are discharged sooner than in hospital.

2.5. Potential factors influencing recall of post-anaesthesia patient education

2.5.1. Demographic factors

The specific education content or information presented has the potential to be interpreted differently based on individuals’ demographic factors (Fredericks et al., 2010). The variability in interpretation may be due to perceived relevance of the material. In fact, Fredericks et al. (2009) stated that “the more relevant patient education content is (to the individual), the more likely it will be to produce changes in desired outcomes”. The current study identified several variables that may affect patients’ recall of post-anaesthesia education information. These include age (McDonald-Miszczak, Neupert, & Gutman, 2005), gender (Herlitz, Nilsson, & Backman, 1997), level of education (Hekkenberg, Irish, Rotstein, Brown, & Gullane, 1997), emotional state of information receiver (Kessels, 2003), and perception of importance toward the education (Pette, Pachaly, & David, 2004). In terms of age, younger patients may have advantages in retention of information. McDonald-Miszczak et al. (2005) indicated that their ‘younger-old’ group (mean age = 68.10 years) recalled more information in comparison to the older-old group (mean age = 80.31 years) adults. Gender also appeared to have impacts on retention of information. Females consistently demonstrated better episodic memory (i.e., “autobiographical records of unique events in the individual’s experience encoded in a particular temporal-spatial context”) (Herlitz et al., 1997). This task of episodic memory involved recall of words, sentences, newly acquired facts, activities, name and faces (Herlitz et al., 1997). Another important factor was patient’s level of education. A higher level of education showed a positive correlation with better information retention (Hekkenberg et al., 1997). The authors assessed patients’ recall of information regarding potential complications after thyroidectomy, parathyroidectomy and parotidectomy, and people with higher levels of education had higher recall scores (p = 0.04). Some studies assessed the influence of emotional status of participants on their recall abilities. Eysenck
& Calvo (1992) stated that anxiety was associated with lower task processing efficiency. More specifically they reported that four types of thinking tasks were performed by two groups (i.e., high-anxiety group and low-anxiety group), with people in the high-anxiety group requiring more effort to complete the same thinking tasks. Anxiety also disrupts memory function through two different phenomena: (1) attentional narrowing, and (2) state-dependent learning. Attentional narrowing happens when one perceives a situation as stressful (Wessel, Van der Kooy, & Merckelbach, 2000). In this condition, a person’s attention is focused on the stressful situation, which limits attentional resources for other information. State-dependent learning is a phenomenon in which information retrieval is only possible under the same condition or situation in which it was originally learned (Schramke & Bauer, 1997). Therefore, if the level of anxiety and/or stress differs between when the information is learned, and when it is asked to be retrieved, there may be a lack of recall of the specific information. For example, patients’ recall of post-operative information may be poor when they are in a relaxed state at home after surgery, as compared to when they first received the post-anaesthesia information in a high-anxiety environment on the day of the surgery. Kessels (2003) further reported that both low levels of stress/anxiety and high levels of stress/anxiety could have a negative impact on patients’ recall of medical information; however, the impact of dental anxiety on parents’ ability to recall post-operative education information has not been studied. Several studies investigated patients’ perception of the importance of the medical information provided and their ability to recall that information (Bradshaw, Ley, Kincey, & Bradshaw, 1975). It has been suggested that people tend to have greater recall of information when they value the information received. Janz & Becker (1984) proposed that people with greater perceived severity of illness are more motivated to comply with medical advices. Later, Kravitz et al. (1993) and Michie, Marteau, & Bobrow (1997) showed that the perceived level of importance of specific information influenced patients’ recall. However, Pette et al. (2004) were not able to confirm this finding in their study.

In summary, the literature indicates that a number of demographic factors might contribute to and should be taken into consideration when providing post-anaesthesia education to patients in order to optimize recall of post-anaesthesia education.
2.5.2. Timing of patient education

The timing of education may also play an important role in information retention. There were no studies that strictly investigated the influence of timing of post-anaesthesia education on patients’ recall of information. However, a number of studies investigated the impact of timing of the education on people’s recall of information in the context of medical consents and preoperative instruction. Tait, Voepel-Lewis, & Gauger (2011) conducted a study investigating the timing of the presentation about medical consent information and its impacts on participants’ recall. They concluded that recall was significantly better when patients were presented with the consent information on the day of surgery when compared to being presented at an earlier date. Another study by Mavrais et al. (1990) examined postoperative recovery outcomes (i.e., state anxiety, pain ratings, mood, physical recovery, analgesic use and length of recovery) in participants who attended preoperative education two weeks versus the day before surgery. The study concluded that there was no significant difference in outcome measures between the two groups with respect to timing of patient education. Thus, studies investigating the role of timing report conflicting results and opinions about the optimal timing of patient education.

2.5.3. Environment of patient education

The environment in which patients receive education may be another key factor influencing information retention. This specifically includes background noises and visual distractions. In a review paper, Banbury, Macken, Tremblay, & Jones (2001) concluded that a relatively quiet background without irrelevant sounds reinforced cognitive functioning. Earlier, Banbury & Berry (1998) published similar results, indicating that irrelevant speech and background office noise impeded cognitive functioning. However, responses to these noises habituated significantly after prolonged exposure (i.e., 20 minutes) (Banbury & Berry, 1998). Geffen et al. (1997) found that visual distractions had significant negative impacts on people’s working memory. This study utilized measurements of brain electrical activity during a visual-spatial response task on a computer screen in the presence or absence of irrelevant visual distractors. The
result showed greater brain activities associated with working memory in the presence of visual distractions. This implied that greater effort was required to memorize something with visual distractions. Thus, one may hypothesize that patients might be able to memorize more content from post-anaesthesia education in the absence of noises and visual distractions. McDonald, Wiczorek, & Walker (2004) more recently studied the impact of background noises and interruptions on learning health education related to antibiotic resistance. Four different environments were investigated: 1) no background noise or interruptions, 2) background noise only (i.e., “a constant, low-level background noise of hospital sounds, such as footsteps, movement of stretcher, or paper rustling”), 3) interruptions only (i.e., two brief interruptions of the education by cellphone ringing) and 4) both background noise and interruptions. Participants with no background noises or interruptions scored better than those who experienced both background noises and interruptions on a test assessing their knowledge on antibiotic resistance after their health education sessions; however, environment 1) participant’s scores were not significantly different than participants in environments 2) and 3). Review of the literature suggests that both background noises and visual distractions can have negative impacts on patients’ retention of post-anaesthesia education material, but the evidence is not conclusive.

2.5.4. Presence of the recovering child during patient education

The practitioner can control the environment in which the post-anaesthesia education is presented to parents by deciding whether to have the recovering child present or absent. Education provided to parents in the presence of their child increases the likelihood of noises, distractions and interruptions from the child. However, having the same education session while the child is absent (e.g., still receiving the treatment) eliminates these disturbances.

Several studies explored the influence of a child on the interaction between doctors and parents. However, these studies focused on the significance of the contribution by the child to the communication between the doctor and parents (Elbers, Maier, Hoekstra, & Hoogsteder, 1992; Hart & Chesson, 1998; Meeuwesen & Kaptein, 1996). These findings are not directly applicable to a pediatric dental anaesthesia setting, as almost all children
recovering from GA are not able to participate in the post-anaesthesia education due to incomplete recovery, sleepiness and disorientation. However, interest lies in the impact of a recovering child on parental recall and compliance of the provided education, because the child can provide significant crying, other background noises and overall distractions in the environment where the post-anaesthesia education is given. To date, no studies have specifically investigated the presence or absence of the recovering child on parents’ recall and compliance of post-anaesthesia education.

2.5.5. Emergence delirium (ED)

The level of distraction in the recovery area can vary depending on how agitated the child is during their emergence and recovery phases. The phenomenon of ‘emergent agitation’ was first described by Eckenhoff, Drips, & Kneale (1961) who reported hyper-excitation in patients emerging from GA. Kwak (2010) further described agitation as “a state of mild restlessness and mental distress”. Later, emergence delirium (ED) was defined as “a dissociated state of consciousness in which the child is irritable, uncompromising, uncooperative, incoherent, and inconsolably crying, moaning, kicking, or thrashing” (Vlajkovic & Sindjelic, 2007). However, the terms emergence agitation and emergence delirium are often used interchangeably in the literature (Kwak, 2010).

In a very early study, Smessaert, Schehr, & Artusio (1960) reported that the incidence rate of post-anaesthesia agitation was greater in pediatric patients (12%) in comparison to the adult population (5.3%). As well, Wells & Rasch (1999) reported the age group of two to five years old to be the most vulnerable to ED. In addition to age, the incidence of ED appeared to depend on several other factors including anesthetic techniques (i.e., rapid emergence) (Lerman et al., 1996; Welborn et al., 1996), surgical procedures (e.g., otorhinolaryngologic procedures) (Galford, 1992; Voepel-Lewis, Malviya, & Tait, 2003) and administration of adjunct medications (e.g., anticholinergics, barbiturates, benzodiazepines, opioids and antidopaminergics) (Galford, 1992).

Patients emerging from anaesthesia with ED were reported to be at risk of injuring themselves and the surgical site, and accidental removal of the surgical dressing or intravenous (IV) catheters (Lepouse, Lautner, Liu, Gomis, & Leon, 2006). Moreover,
parents who witnessed ED were more concerned about their children and less satisfied with the quality of their recovery (Uezono et al., 2000). Healthcare providers also reported less satisfaction when managing patients recovering with ED (Galinkin et al., 2000). Galinkin et al. (2000) measured post-anaesthesia care unit (PACU) nurses’ satisfaction scores on a visual analog scale, and reported lower satisfaction associated with providing care to patients with greater emergence agitation scores. Kain et al. (2004) postulated a close association between ED and the onset of maladaptive behaviour changes (e.g., general anxiety, separation anxiety, nighttime crying, enuresis and temper tantrums). These maladaptive behaviour changes were measured by the Post Hospital Behaviour Questionnaire (PHBQ). The PHBQ is a validated measure and consists of 27 items evaluating general anxiety, separation anxiety, sleep anxiety, eating disturbances, aggression toward authority and apathy (Vernon, Schulman, & Foley, 1966).

2.5.6. ED measurement

A psychometrically sound measurement of ED is important, as ED can have significant, negative impacts on both patients and health care providers as stated above. To date, at least 16 different ED rating scales exist (Sikich & Lerman, 2004). Thirteen of these scales do not report any reliability and validity, and the remainder only established either reliability or validity (i.e., not both). (Sikich & Lerman, 2004). Heaman & Mattle (1982) claimed to have both reliability and validity for their scale, but no reliability coefficient was reported.

Among these scales, some evaluate crying (Davis, Greenberg, Gendelman, & Fertal, 1999) or use of physical restraints (Cole, Murray, McAllister, & Hirshberg, 2002) as components of their scales. However, it is not entirely clear whether these components successfully differentiate between post-anaesthesia agitation and ED (Sikich & Lerman, 2004). Further complicating the evaluation of ED in pediatric patients is the difficulty for the clinician in distinguishing between pediatric patients’ pain, fear, thirst and/or hunger and actual ED due to the child’s lack of ability to verbalize what they are feeling.
In 2004, Sikich and Lerman developed and validated a scale to assess the severity of emergence delirium in the pediatric population called the Pediatric Anaesthesia Emergence Delirium (PAED) scale (Appendix 7) (Sikich & Lerman, 2004). The scale is comprised of five items that relate to the child’s awareness and behaviour post-surgery. Three items are scored zero (not at all), one (just a little), two (quite a bit), three (very much) and four (extremely), with two items reverse scored, for a total potential score of 20. The higher the total score, the more severe the emergence delirium. The PAED scale shows a clear negative correlation with the age and duration of emergence, with the score significantly higher in children receiving sevoflurane (i.e., rapid emergence) in comparison to halothane (i.e., slower emergence) (Sikich & Lerman, 2004). Further, the internal consistency and reliability of the PAED scale has been reported as 0.89 and 0.84, respectively (Sikich & Lerman, 2004). As the PAED scale is a validated measure of ED, utilization of the PAED scale can provide an indirect measure of the level of distraction of a recovering child.

2.6. Potential factors influencing compliance of post-anaesthesia patient education

The current literature investigating factors associated with pre- or post-operative education mainly focuses on recall rather than compliance of the education. Of those studies focusing on compliance, they mostly focus on the compliance rate in different clinical scenarios rather than factors influencing compliance. For example, Cho & Rho (2012) showed that compliance rate for self-care education after cataract surgery was higher in a group who received additional individualized education in comparison to another group without the extra education. Also, some studies do not specifically differentiate between recall and compliance as the outcomes of their study. Correa et al. (2001) examining compliance with post-operative instructions involving 750 patients undergoing day surgeries. The authors measured compliance of the instruction with regard to alcohol consumption, vehicle use, and making important decisions, but the study did not investigate whether noncompliance from patients was due to actual noncompliant behaviours (e.g., too complicated to follow, lack of incentives to follow
and no perceived value in complying to the instruction) or lack of retention of information (Correa et al., 2001).

There is a lack of studies investigating potential factors affecting compliance in post-operative/ post-anaesthesia setting. However, a number of studies have tried to identify factors affecting compliance with medical therapies (e.g., medication, diet, exercise and lifestyle changes). Several studies have investigated the relationship between compliance and patient’s age and shown increased compliance with advancing age (Kim, Sunwoo, & Lee, 2002; Frazier, Davis-Ali, & Dahl, 1994; Senior, Marteau, & Weinman, 2004). A study by Buck, Jacoby, Baker, & Chadwick (1997) reported compliance with anti-epileptic medication was higher in patients over 60 years old (86%) compared to younger patients (66%). Results with regard to impact of gender on compliance have been equivocal. Lindberg, Ekstrom, Moller, & Ahlner (2001) and Choi-Kwon, Kwon, & Kim (2005) indicated that females were more compliant with medical therapies, whereas Hertz, Unger, & Lustik (2005) showed the opposite result. Moreover, another group of authors suggested no significant difference in compliance with diet between male and female diabetic patients (Spikmans et al., 2003). Also, the impact of patients’ level of education on compliance has been inconclusive. For example, Ghods & Nasrollahzadeh (2003) showed higher compliance to immunosuppressive medications following renal transplant in patients with higher level of education, whereas Senior et al. (2004) indicated higher compliance to cholesterol medications in patients with lower level of education. Patients’ beliefs toward the medicine or therapy have significant influence on their compliance. These beliefs include anxiety and perceived importance of the therapy. In terms of anxiety, patients have been shown to comply more with their antidepressant medications with increased self-perceived severity of their depression (Sirey et al., 2001). In addition, patients have shown improved compliance to continuous positive airway pressure for treatment of obstructive sleep apnea when their perceived benefit of the treatment was greater (Wild, Engleman, Douglas, & Espie, 2004).

Several studies have shown the possible influence of various factors on compliance with medical therapies (e.g., medication regime, diet control and exercise instruction). However, these studies are not directly comparable to investigations with regard to
impacts of these factors on compliance with education provided during post-operative/post-anaesthesia phase, as the settings are different (i.e., long-term/chronic vs. short-term/acute setting). Currently, evidence supporting the potential influence of demographic factors on compliance with post-anaesthesia education in an acute setting is lacking.

2.7. Summary

The use of GA has been gaining popularity in pediatric dentistry for various reasons that include dental anxiety, (Chapong, Haas, & Locker, 2005), lack of cooperative (Koneru, 2009), and intellectual or physical disabilities (Koneru, 2009). As the demand for GA increases (Canadian Institute for Health information, 2013), more ambulatory GA is being provided for dentistry. In ambulatory anaesthesia settings, patients and their parents often leave the clinical facility earlier than in hospital anaesthesia settings and therefore must rely on post-anaesthesia education to guide their recovery at home. Thus, recall of and compliance with the provided post-anaesthesia instructions is critical for successful recovery in this unmonitored environment. To date, no studies have assessed information retention and compliance of post-anaesthesia education by parents whose children undergo GA for dentistry. As well, there is no universally accepted protocol for providing post-anaesthesia education in a dental anaesthesia practice. Often, the anaesthetist uses his or her discretion as to whether to have the recovering child in the environment or not during the education. Anecdotaly, most parents want to see their children as soon as possible after the surgery and therefore may be thinking about their child rather than listening to instructions about how to care for them once they go home. Alternatively, a child recovering after dental treatment with GA may be distressed or irritated, causing a distraction to the parent listening to the take-home instructions. In this situation, the post-anaesthesia education may not be as effective according to those studies which reported adverse effects of noises and distractions on learning and recalling information (Banbury et al., 2001; Geffen et al., 1997; McDonald et al., 2004).
Chapter 3

Study purpose and research questions

3.1. Study purpose
The purpose of this study was to assess parental recall and compliance of post-anaesthesia education when delivered in the absence or in the presence of their recovering child. Preoccupation with the child’s well-being while in treatment, or distractions of a distressed child while in recovery, both have the potential to influence parents recall and compliance. A secondary purpose was to evaluate the impact of demographic and other factors on parents’ recall and compliance of the education material. The findings from this study may lead to revisions to the current practice of delivering post-anaesthesia education at the Faculty of Dentistry, and possibly other ambulatory anaesthesia settings, in an effort to improve pediatric patient outcomes and care after dental treatment with GA.

3.2. Specific objectives of the study
1) To investigate parental recall of post-anaesthesia education received in two different settings: (i) in the absence of a recovering child or (ii) in the presence of a recovering child.

2) To investigate parents’ compliance to post-anaesthesia education received in two different settings: (i) in the absence of a recovering child or (ii) in the presence of a recovering child.

3) To investigate the impact of demographic and other factors on parents’ recall of post-anaesthesia education received. Factors being considered include: parent age, gender, level of education, and anxiety; previous anesthesia experiences of parents or their children; perceived importance of post-anaesthesia education; level of distraction (ED) by children measured by the PAED scale; number of questions asked by parents during and after the education; time spent answering parents’ questions by a registered nurse; and number of times parents read the paper copy of the post-anaesthesia education handed out upon discharge.
Chapter 4
Methodology

4.1. Study participants

This study recruited parents of children between the ages of two and nine undergoing GA for dental surgery in the Department of Anaesthesia at the Faculty of Dentistry, University of Toronto. This specific population was selected as children in this age group require their parents to take care of them and assess any problems they experience as a result of the GA or dental treatment received. Older children were deemed to be able to understand and remember the post-anaesthesia education on their own. Inclusion criteria for parent participants included: (1) The ability to read and speak English without a translator due to the nature of the phone interview; (2) Their child being classified as either ASA I (i.e., “a normal healthy patient”) or II (i.e., “a patient with mild systemic disease”) (ASA, 2014); (3) Their agreement to be contacted on post-op day-1; (4) That they were 18 years of age or older.

4.2. Study design

This prospective study randomized parents to one of two different post-anaesthesia education conditions on the day of their child’s surgery: (1) post-anaesthesia education received in the absence of the recovering child (PEAC) or (2) post-anaesthesia education received in the presence of the recovering child (PEPC). Both groups were followed up on post-op day-1 by a short structured telephone interview (Figure 1). Ethics approval was received from University of Toronto, Research Ethics Board (Protocol reference number: 31797; Appendix 9).
Figure 1. Study design

Parent and child present for dental treatment with GA

Randomization

Group PEAC
Child absent

Parent in waiting room
Child receives dental tx with GA
Education provided
Child in recovery
Parent joins child
Child/Parent home
Post-op day 1 interview: recall and compliance questions

Group PEPC
Child present

Parent in waiting room
Child receives dental tx with GA
Education provided
Child in recovery
Parent joins child
Child/Parent home
Post-op day 1 interview: recall and compliance questions
4.3. Recruitment

The Department of Anaesthesia at the Faculty of Dentistry, University of Toronto routinely contacts parents to confirm their child’s scheduled appointment 1-3 days before the surgery. At this time, the receptionist notified parents about this research study and informed them that they would be asked about participating in the study when they arrived for their child’s appointment. They were reassured that the decision to participate could wait until the day of the surgery when a research assistant would give them full details about the study. Parents were also told that their participation was voluntary, that they were under no obligation to participate, and that their decision to participate or not would have no impact on their child’s care.

On the day of the child’s surgery, a Registered Nurse (RN)/research assistant approached parents of children about participating in the study. Information regarding the study was provided (Appendix 1) and written informed consent was obtained from those parents interested in participating (Appendix 2).

4.4. Randomization

Each participant was randomly assigned to one of two education conditions: (1) PEAC or (2) PEPC. Parent participants drew a number (either one or two) from a box to determine their group allocation, with equal opportunity to draw either number. An RN/research assistant recorded the group allocation; however, the investigator conducting the post-op day-1 phone interview was blinded to the assignment until the end of data collection and the start of data analysis.

4.5. Post-anaesthesia education protocol

All parent participants were provided with a combination of verbal and written post-anaesthesia instructions. The written instructions (Appendix 5) were provided in paper form and addressed important issues about post-anesthesia phase, including activities, eating and drinking, pain, and when to seek professional advise. This information is given to all parents of children receiving GA in the Department of Anesthesia, Faculty of
Dentistry, at the University of Toronto just prior to their children’s discharge from the clinic. These instructions are in accordance with legislative regulations (RCDSO, 2012).

The verbal post-anaesthesia education provided to all parents contained the same detail and depth of information as provided in the written instructions. Two different RNs participated in providing the verbal education to the parents. Both went through a process of calibration for two hours under the supervision of the primary researcher. Details on study design, participant inclusion criteria, randomization, post-anaesthesia education material and question answering were discussed. Each RN gave a mock post-anaesthesia education session as a part of this calibration, and the primary researcher provided feedback afterwards. RNs were also asked to use a written script with checkboxes in order to maximize the consistency of the verbal education and to minimize the chance of missing any material (Appendix 6). Parents were allowed to ask for clarification if the information was not clear, and to ask questions regarding the information presented during and after the post-anaesthesia education. RNs recorded the number of questions and time taken to answer these questions.

Patient participants assigned to the PEAC group were brought into the recovery area 15 minutes prior to the end of the dental treatment. The operator dentist notified the RN of this timing. The recovery area consists of a recovery bed and vital sign monitors. Parents were asked to put their phones away during the session and a privacy screen was placed around the recovery area in order to minimize the level of distraction. During this group’s verbal education session, parents were provided with a laminated copy of the written education to follow along with during the verbal instructions (Appendix 5). They returned the laminated copy to the RN at the end of the verbal education session but were provided a copy of the same written education at discharge. This ensured that parents in the PEAC group did not have longer exposure to the written education while waiting for their children’s emergence from GA. Immediately after the post-anaesthesia education, the RN asked parents to return to the waiting room but they came back after their children were transported to the recovery area.
For those assigned to the PEPC group, the child was transported to the recovery area after completion of their dental surgery and emergence from GA. Parent participants were brought into the recovery area once their child’s vital signs were stable. The recovery area was identical to that used for the PEAC group except for the presence of the recovering child. Parents were asked to put their phones away and a privacy screen was used in the same way; however, the pulse oximeter was beeping and the recovering child was resting on the recovery bed. The level of activity for the recovering child was evaluated by an RN using the Pediatric Anaesthesia Emergence Delirium (PAED) scale (Appendix 7). The PAED scale is a validated scale that assesses the level of pediatric patient’s delirium during their emergence and recovery phase after anaesthesia (Sikich & Lerman, 2004). The study utilized this scale to indirectly measure the potential distraction for parents attributed by the recovering child. Both RNs were instructed on how to assign the PAED score by the primary researcher using three real life pediatric patients during their recovery following GA. During the education session, parents in the PEPC group had the same laminated copy of the written education (Appendix 5) as the PEAC group, which was also returned to the RN after the verbal education session, with a take home copy provided just prior to the child’s discharge as in PEAC group.

Just prior to discharge, all parents were provided with an information sheet to remind them of the post-op day-1 phone interview (Appendix 3), as well as a $5 Tim Horton’s coffee card to thank them for participating. Also, they were reminded that their participation was voluntary and that they could withdraw at any time until the point of data analysis.

4.6. Data collection

4.6.1. Demographic data

Patient participants’ contact information was collected for the post-op day-1 phone interview, along with the best time and number to call (Appendix 3). Demographic information was also collected at this time, including gender, level of education, level of anxiety (scored 1 – not at all anxious to 10 – extremely anxious), perception of
importance towards post-operative patient education and previous anaesthesia experiences of the child and the participant (Appendix 4).

4.6.2. Interview questionnaire

The principal researcher contacted parent participants by phone on post-op day-1 at their preferred time. A standardized, semi-structured interview questionnaire was used (Appendix 8). The interviewer was blinded to parents’ group allocation during the interview. The interview questionnaire script included a checklist, but also open-ended questions to allow elaboration on information sought (Appendix 8). However, questions were mostly quantitative to facilitate statistical analysis.

The main sections of the interview questionnaire inquired about: (1) parents’ recall of post-anaesthesia education, and (2) compliance with post-anaesthesia education (i.e., what parents actually did during the post-anaesthesia period). Any post-anaesthesia complications were also noted, as these clinical events might have provided parents with an incentive to review the written instruction to ensure appropriate advice for these situations. The interview inquired about the four main categories in the post-anaesthesia instructions, including: (i) activity monitoring, (ii) eating and drinking after treatment, (iii) pain control, and (iv) knowing when to seek professional advice/help. These questions were based on the existing ‘Post-Operative Instructions’ provided to the parent participants. (Appendix 5). The confidentiality of the children’s identity and information were reaffirmed at the end of phone interviews. Prior to the start of data collection phase, the interview was pilot-tested against four dental anaesthesia residents and 10 parents of children who were treated in the Department of Anaesthesia at the Faculty of Dentistry, University of Toronto.

4.7. Sample size calculation

The estimated sample size was calculated based on a study by Tait et al. (2011) using G*Power 3.1.9.2. Tait et al. (2011) investigated the recall of anaesthesia information after informed consent among parents of children between the ages of one and 18. The authors provided the consent process at varying timing (i.e., day of surgery, < one week
before the surgery, 1 week-1 month prior, 1-3 months prior and 3-6 months prior). The authors then tested for parental recall of information after their children’s surgery started. Results reported the recall of information as significantly better when informed consent was obtained on the day of surgery. The estimated effect size $f$ was 0.34 (Tait et al., 2011). A confidence level of 95% and power of 80% led to a total sample size of 70. Thus, each group required 35 participants according to the G*Power 3.1.9.2 sample size calculator tool.

4.8. Data analysis

The primary researcher was unaware of parent participants’ identifiable information except for their assigned group letters (i.e., either A or B) during data analysis. The researcher was not aware which letter corresponded with which post-anaesthesia education group until the completion of data analysis.

Data was originally entered into a Microsoft Excel spreadsheet, which was then exported to SPSS version 19.0 for statistical analysis. Chi-square tests and t-tests were conducted to explore differences between parents in PEAC and PEPC groups for categorical and continuous variables, respectively. Differences in recall scores were also assessed among parents with different demographic characteristics. ANCOVA was further utilized to assess for a significant difference in recall scores between PEAC and PEPC groups after adjusting for any significant confounders (i.e., the level of education and the number of times parents read the written instruction following discharge). Differences in recall scores of parents based on level of education were analyzed using Tukey’s post hoc analysis. Pearson’s correlation test was utilized to analyze any significant correlation between recall scores and other continuous variables. P values less than 0.05 were considered statistically significant for all analyses.
Chapter 5

Results

5.1. Participant demographics

In the PEAC and PEPC groups, 34 and 36 participants were allocated, respectively (Figure 2). Overall, there were no differences with regard to demographic characteristics between the two groups (Table 1).

Figure 2. Participant tracking

The mean age of group PEAC was $35.5 \pm 7.0$ years and that of group PEPC was $37.1 \pm 8.5$ years ($t(66) = -0.83, p=0.41$) (Table 1). In group PEAC, 85.3% of the participants were female, whereas 69.4% of participants in group PEPC were female. However, this difference did not reach statistical significance ($\chi^2(1, N = 70) = 2.50, p = 0.11$). Overall, the level of education between participants in the two groups did not differ ($\chi^2(3, N = 67) = 4.72, p = 0.19$). This study gathered data on whether participants and/or children receiving the treatment had previous anaesthetic experiences, complications from those experiences and post-anaesthesia education in the past. There was no significant
difference in any of these items. The mean pre-anaesthesia anxiety scores were 6.2 ± 2.8 and 6.3 ± 2.7 out of 10 for participants in groups PEAC and PEPC, respectively ($t(67) = -0.06, p = 0.96$). The pre-anaesthesia perception of importance towards post-anaesthesia education was 9.3 ± 1.3 out 10 in group PEAC and 8.4 ± 2.6 out of 10 in group PEPC. However, this did not result in a significant difference ($t(68) = 1.73, p = 0.09$) (Table 1).

Table 1. Comparison of the demographics in Group PEAC and PEPC

<table>
<thead>
<tr>
<th></th>
<th>Group PEAC: child absent (n=34)</th>
<th>Group PEPC: child present (n=36)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>35.5 ± 7.0</td>
<td>37.1 ± 8.5</td>
<td>0.41‡</td>
</tr>
<tr>
<td>Female gender</td>
<td>29 (85.3%)</td>
<td>25 (69.4%)</td>
<td>0.11‡‡</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td>0.19‡‡</td>
</tr>
<tr>
<td>Elementary</td>
<td>3 (8.8%)</td>
<td>1 (2.8%)</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>14 (41.2%)</td>
<td>8 (22.2%)</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>10 (29.4%)</td>
<td>17 (47.2%)</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>6 (17.6%)</td>
<td>8 (22.2%)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>1 (2.9%)</td>
<td>2 (5.6%)</td>
<td></td>
</tr>
<tr>
<td>Parents with previous anaesthesia experience</td>
<td>14 (41.2%)</td>
<td>13 (36.1%)</td>
<td>0.66‡‡</td>
</tr>
<tr>
<td>Parents with previous anaesthesia complications</td>
<td>2 (5.9%)</td>
<td>1 (2.8%)</td>
<td>0.52‡‡</td>
</tr>
<tr>
<td>Parents received post-anaesthesia education in the past</td>
<td>7 (20.6%)</td>
<td>6 (16.7%)</td>
<td>0.67‡‡</td>
</tr>
<tr>
<td>Child with previous anaesthesia experience</td>
<td>15 (44.1%)</td>
<td>10 (27.8%)</td>
<td>0.15‡‡</td>
</tr>
<tr>
<td>Child with previous anaesthesia complications</td>
<td>1 (2.9%)</td>
<td>2 (5.6%)</td>
<td>0.59‡‡</td>
</tr>
<tr>
<td>Parents received post-anaesthesia education for their children in the past</td>
<td>11 (32.4%)</td>
<td>7 (19.4%)</td>
<td>0.22‡‡</td>
</tr>
<tr>
<td>Anxiety Score (1-10 scale)</td>
<td>6.2 ± 2.8</td>
<td>6.3 ± 2.7</td>
<td>0.96‡</td>
</tr>
<tr>
<td>Perception of importance towards post-anaesthesia education (1-10 scale)</td>
<td>9.3 ± 1.3</td>
<td>8.4 ± 2.6</td>
<td>0.09‡</td>
</tr>
</tbody>
</table>

†Calculated by independent samples t-test ‡Calculated by Chi-Square test
5.2. Results: All participants

In total, 94 parents were recruited to participate in the study, with 90 meeting the study’s inclusion criteria. Seventy participants responded to the postop day-1 phone interview questionnaires, and 20 participants failed to respond (Figure 2).

<table>
<thead>
<tr>
<th>Table 2. Recall and compliance scores in all participants (N = 70)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number (%)</strong></td>
</tr>
<tr>
<td>Recall score (Total score = 13): mean</td>
</tr>
<tr>
<td>Recall score (Total score = 13): median</td>
</tr>
<tr>
<td>Recall score: Standard Deviation</td>
</tr>
<tr>
<td>Recall score: Minimum score</td>
</tr>
<tr>
<td>Recall score: Maximum score</td>
</tr>
<tr>
<td>Compliance score (Total score = 4): mean</td>
</tr>
<tr>
<td>Compliance score (Total score = 4): median</td>
</tr>
<tr>
<td>Compliance score: Standard deviation</td>
</tr>
<tr>
<td>Compliance score: Minimum score</td>
</tr>
<tr>
<td>Compliance score: Maximum score</td>
</tr>
</tbody>
</table>

For the 70 parent participants who completed the questionnaires, the mean and median recall scores were both 6.5 ± 2.1 out of 13.0. The mean and median compliance scores were 3.5 ± 0.6 and 4.0 ± 0.6 out of 4.0, respectively (Table 2).

Eight pediatric patients were reported to have post-operative complications after the phone interview. Two patients had nausea with difficulty drinking fluid, but neither reported vomiting. One patient had persistent coughing following the treatment without other signs and symptoms of the cold or flu. This could have been the result of traumatic intubation or extubation of an endotracheal tube. Four patients indicated difficulty eating but these were all due to surgical reasons (i.e., tooth pain and swelling of lip). Lastly, one patient reported having one episode of diarrhea. It was not possible to determine whether the episode was a result of treatment. Overall, only three patients (i.e., two patients with nausea and one patient with post-anaesthesia coughing) had anaesthesia-related complications and they were all self-limiting within 24 hours.
5.3. Results: Group PEAC vs. Group PEPC

The final 70 participants were allocated into group PEAC (n = 34) and group PEPC (n = 36) following randomization. There were no significant differences in the main results of the study between the two groups (Table 3).

<table>
<thead>
<tr>
<th>Table 3. Results in group PEAC vs. PEPC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Group PEAC:</strong></td>
</tr>
<tr>
<td>Child absent (n=34)</td>
</tr>
<tr>
<td>Recall score (total score = 13)</td>
</tr>
<tr>
<td>Compliance score (total score = 4)</td>
</tr>
<tr>
<td>Total PAED score (total score = 20)</td>
</tr>
<tr>
<td>Number of questions asked</td>
</tr>
<tr>
<td>Time spent answering questions (min)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Group PEPC:</strong></td>
</tr>
<tr>
<td>Child present (n=36)</td>
</tr>
<tr>
<td>Recall score (total score = 13)</td>
</tr>
<tr>
<td>Compliance score (total score = 4)</td>
</tr>
<tr>
<td>Total PAED score (total score = 20)</td>
</tr>
<tr>
<td>Number of questions asked</td>
</tr>
<tr>
<td>Time spent answering questions (min)</td>
</tr>
</tbody>
</table>

Calculated by independent samples t-test

The mean recall scores were 6.5 ± 1.9 and 6.6 ± 2.4 in groups PEAC and PEPC, respectively. This did not result in a significant difference (t(68) = -0.17, p = 0.87) (Table 3). This lack of significant differences between the two groups persisted even after adjusting for factors that showed significant impact on recall scores (i.e., participants’ level of education and the number of times parents read the paper copy of the post-anaesthesia education after discharge). Analysis of covariance (ANCOVA) for recall scores revealed results of F(1, 67) = 0.074, p = 0.79 with adjustment for the level of education and F(1, 70) = 0.065, p = 0.90 after adjustment for the number of times participants read the paper copy following discharge. Also, there was no statistically significant difference for compliance scores between group PEAC (3.6 ± 0.6) and PEPC (3.4 ± 0.7) (t(68) = 0.98, p = 0.33) (Table 3). In group PEAC, participants asked 1.8 ± 1.7 questions on average during and after post-anaesthesia education and the mean number of minutes spent by the RN answering those questions was 2.9 ± 2.8. Similarly, the mean number of questions that parent participants in the PEPC group asked was 1.2 ± 1.4 and
the mean number of minutes spent by the RN answering those questions was 2.3 ± 2.9 (Table 3). The mean PAED score in group PEPC was 9.9 ± 4.3 out of 20.0 (Table 3). The Pearson correlation test between total recall score and total PAED score in group PEPC indicated a weak negative correlation, which was not statistically significant ($r(34) = -0.18, p = 0.28$) (Figure 3). In group PEAC, children were not present while the post-anaesthesia education was being given to participants. Thus, PAED scores in group PEAC were randomly created false numbers by RNs and these numbers only served as a measure to ensure blinding of the principal researcher.

**Figure 3. Correlation between total recall score and total PAED score in group PEPC**

![Correlation graph](image)

Pearson correlation = -0.18  
$P = 0.28$

5.4. Impacts of demographic factors on the recall score (group PEAC and PEPC combined)

Relationship between demographic factors and recall scores were assessed for group PEAC and PEPC combined, as no statistically significant group differences were found. Possible impact of other factors was investigated using Pearson’s correlation test for continuous variables (i.e., age, anxiety score, perception of importance toward post-anaesthesia education) (Table 4), t-test (Table 5), and ANOVA (Table 6) for categorical
variables (i.e., gender, level of education and status of parents’ previous anaesthesia experiences including complications and post-anaesthesia instructions in the past for themselves and/or any of their children.)

Table 4. Correlation between demographic factors and recall scores: Continuous variables

<table>
<thead>
<tr>
<th>Total recall score: Pearson correlation (r)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.12</td>
</tr>
<tr>
<td>Anxiety score (1-10 scale)</td>
<td>0.11</td>
</tr>
<tr>
<td>Perception of importance toward post-anaesthesia education</td>
<td>0.35</td>
</tr>
</tbody>
</table>

Calculated by Pearson’s correlation test

Table 5. Mean total recall scores in participants with varying demographic factors: t-test for categorical variables

<table>
<thead>
<tr>
<th>Total mean recall score</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male 5.8 ± 2.2</td>
<td>Female 6.7 ± 2.1</td>
</tr>
<tr>
<td>Parents with previous anaesthesia 7.0 ± 2.2</td>
<td>Parents with no previous anaesthesia 6.2 ± 2.0</td>
</tr>
<tr>
<td>Parents with previous anaesthesia complications 4.5 ± 2.2</td>
<td>Parents with no previous anaesthesia complications 6.6 ± 2.1</td>
</tr>
<tr>
<td>Parents with post-anaesthesia education in the past 7.2 ± 2.0</td>
<td>Parents with no post-anaesthesia education in the past 6.4 ± 2.1</td>
</tr>
<tr>
<td>Parents of children with previous anaesthesia 6.6 ± 2.1</td>
<td>Parents of children with no previous anaesthesia 6.5 ± 2.1</td>
</tr>
<tr>
<td>Parents of children with previous anaesthesia complications 6.0 ± 2.3</td>
<td>Parents of children with no previous anaesthesia complications 6.6 ± 2.1</td>
</tr>
<tr>
<td>Parents of children with post-anaesthesia education in the past 7.1 ± 1.9</td>
<td>Parents of children with no post-anaesthesia education in the past 6.3 ± 2.1</td>
</tr>
</tbody>
</table>

Calculated by independent samples t-test
Total recall score and parental perception of importance toward post-anaesthesia education showed low-to-moderate correlation ($r = 0.35$) that was statistically significant ($r(68) = 0.35$, $p < 0.01$) (Table 4). Also, parents’ level of education revealed statistical significance on the recall score ($F(3, 66) = 4.43$, $p < 0.01$) (Table 6). Further, Tukey’s post-hoc analysis showed that the significant difference existed between elementary and university education ($p = 0.03$) and between secondary and university education ($p = 0.02$). Other demographic factors did not have any statistical implications on the recall score (Table 4 & 5). These factors include age, anxiety level, gender, status of previous anesthesia experience and post-anaesthesia education for themselves and/or their children.

Table 6. Mean total recall scores in participants with varying demographic factors: ANOVA for a categorical variable (i.e., the level of education)

<table>
<thead>
<tr>
<th>Total mean recall score</th>
<th>P-value (ANOVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>Secondary</td>
</tr>
<tr>
<td>4.6 ± 1.7</td>
<td>5.8 ± 1.9</td>
</tr>
</tbody>
</table>

5.5. Impacts of other factors on the recall score (group PEAC and PEPC combined)

The number of times parent participants read the paper copy of the post-anaesthesia education after discharge ranged from zero to four. The majority of participants read the copy once (34.3%) or twice (34.3%), and only a small group of the participants read three (5.7%) or four (1.4%) times. Participants who read the paper copy of the post-anaesthesia education after discharge achieved higher mean recall score (6.8 ± 2.1) than other participants who did not read the paper copy (5.7 ± 2.0). One-tailed t-test revealed that this difference in recall score was significant ($p = 0.03$). A Pearson correlation test also revealed a significant weak to moderate correlation between the number of times parents read the copy of post-anaesthesia education after discharge and the recall scores ($r = 0.30$; $p = 0.01$) (Table 7). In addition, the recall score and time spent answering participants’ questions by a RN during and after post-anaesthesia education revealed a significant weak, positive correlation ($r = 0.25$; $p = 0.03$). (Table 7). The number of questions
participants asked during and after the instruction did not have any significant correlation with the recall score ($p = 0.32$) (Table 7).

**Table 7. Correlation between other factors and recall scores**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Total recall score: Pearson correlation ($r$)</th>
<th>$P$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of questions asked</td>
<td>0.12</td>
<td>0.32</td>
</tr>
<tr>
<td>Time spent answering questions (min)</td>
<td>0.25</td>
<td>0.03</td>
</tr>
<tr>
<td>Number of times parents read the paper copy of post-anaesthesia education</td>
<td>0.30</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Chapter 6
Discussion

The purpose of this study was to investigate the effect of a recovering child’s presence on parental recall and compliance following post-anaesthesia education. The result showed that the absence or presence of the child had no impact on either recall or compliance. A secondary purpose was to explore the potential impact of baseline demographic and other factors on recall of the education. In our study, three out of 70 patients experienced anaesthesia-related complications, but it was not feasible to draw any meaningful conclusions regarding complications due to the low number of complications.

6.1. Recall of post-anaesthesia education material

In this study, the recovering child’s presence did not have any impact on parental recall of post-anaesthesia education material (mean recall scores of 6.5 ± 1.9 in group PEAC vs. 6.6 ± 2.4 in group PEPC). This finding was consistent with the absence of correlation (r = -0.18, p = 0.28) between total PAED score and total recall score in group PEPC, as the PAED scale served as an indirect measure of potential distractions by the recovering child on parents during the post-anaesthesia education. A higher PAED score implied a higher level of distraction and vice versa. In the literature review (Chapter 2), many factors were discussed as potentially influencing post-anaesthesia education, including the presence of a child during the education session. Unfortunately, the results of our study do not support previous findings citing the negative impact of background noise and distractions on retention of education material (Banbury et al., 2001; Geffen et al., 1997; McDonald et al., 2004).

Currently, there is no literature assessing the effectiveness of post-anaesthesia education for parents whose children are undergoing GA for dental treatments in outpatient settings. However, other literature on general post-operative education showed similar results to our findings. For example, Davison et al. (2004) conducted a study on patients’ perceived satisfaction and effectiveness (i.e., the correct use of community resources as instructed in the education) of their discharge instruction after a radical prostatectomy. The majority of their patients (94%) were either very or moderately satisfied. Nonetheless, patients’
overuse of community resources and incorrect use for their post-discharge care (25% of the entire use) indicated that patients’ recall of post-operative discharge education was not optimal. A study by Atchison et al. (2005) investigated recall of post-operative instructions after third molar extractions or mandibular fracture treatments under GA. In this study, only 41.1% of participants recalled elements of post-operative instructions and 17.6% claimed that they received inadequate information. Both studies concluded less than satisfactory recall of post-operative education material. However, these studies focused on recall of adult patients who received treatments themselves rather than parents whose children received treatments. Tait et al. (2011) investigated parental recall of anaesthesia information after informed consent. In this study, only 51.1% participants remembered being given information about any risks of anaesthesia. Further, parents’ mean composite score for recall of anaesthesia instruction was $4.9 \pm 2.5$ out of 10.

Studies by Davison et al. (2004) and Atchison et al. (2005) focused on non-anaesthesia components of discharge education. Tait et al. (2011) assessed parental recall of anaesthesia information, but this largely focused on the process of informed consent preoperatively. In spite of such dissimilarities from our study, overall contexts of these studies were comparable, with results similar to our study. Overall, participants in different studies recall of medical information would be considered at an unsatisfactory levels. In addition, recovering children’s presence did not have any impact on the extent of retention of discharge information. Such findings indicate that discharge instructions after GA for pediatric patients in ambulatory settings need to improve, as parents have to rely heavily on them to take care of their children once at home.

6.2. Compliance of post-anaesthesia education material
In comparison to recall scores, mean compliance score of all participants for post-anaesthesia education was very high in the total sample ($3.5 \pm 0.6$ out of 4). Also, the mean compliance score did not vary significantly in the presence or absence of the recovering child during the education. Such high compliance scores appear to be counterintuitive considering relatively low recall scores in this study. This discrepancy might have arisen from relatively simple compliance tasks requested from post-
anaesthesia education. These tasks included: 1) to provide food for energy after discharge, 2) to provide liquid for hydration after discharge, 3) for the child to stay home and not to be involved in outdoor activities, and 4) to monitor the child for longer than six hours after discharge. These simple compliance tasks might have been completed by parents even without post-anaesthesia education, which would explain the high compliance scores despite the low recall scores. However, if parents had to actively check for breathing (i.e., assess for chest rise, natural skin tone and colour, quiet breathing and feel for breathing coming from the nose or the mouth) and think of four different reasons to call for help (Appendix 5), their compliance score could have been possibly lower than the current result. The sample size (N = 70) did not allow for investigation of compliance rates with the complication-related items in this study, as complication rates in anaesthesia are extremely low (Von Ungern-Sternberg & Habre, 2007). Such an investigation would require a similar study with a larger sample size. The finding of high compliance rates in such simple tasks was still meaningful in ambulatory anaesthesia practice, as these simple tasks could prevent potential complications that could arise after discharge.

In addition, retention of knowledge and compliance do not always show a positive correlation. Wolf and Schirm (1992) examined recall of information on medications and compliance in elderly participants after discharge from hospitals. Their results revealed that people who received medication counseling prior to discharge had significantly higher recall of medication knowledge in comparison than those who did not attend the counseling. In spite of greater retention of medication knowledge, compliance scores with regard to medication regimen were not significantly different between two groups. Thus, it is important not to confuse recall of information and compliance when one is applying results to post-operative anaesthesia practice.

6.3. Impacts of demographic factors and other variables on recall of post-anaesthesia education

A secondary objective of this study was to investigate the possible impact of demographic and other factors on parental recall of post-anaesthesia education. These
demographic factors included age, gender, level of education, status of parents’ and/or any of their children’s previous anaesthesia experiences including previous episodes of anaesthesia-related complications and previous post-anaesthesia education, anxiety level and perception of importance toward post-anaesthesia education. Other factors (i.e., number of questions participants asked to RNs during and after the education, time spent answering these questions by RNs and number of times participants read the paper copy of post-anaesthesia education) were also considered.

In this study, only two demographic factors revealed significant correlations with recall scores: parents’ preoperative perception of importance for post-anaesthesia education and parental level of education. The perception of importance reported a positive but only low-to-moderate correlation ($r = 0.35$). This was somewhat in keeping with other studies that have shown conflicting results (Kravitz et al., 1993; Michie, Marteau, & Bobrow, 1997; Pette et al., 2004). However, a positive correlation between parents’ level of education and recall scores was consistent with other literatures (Hekkenberg et al., 1997; Jansen et al., 2010). Specifically, significant differences in recall scores were evident between university and elementary education as well as between university and secondary education.

Aside from demographic factors, length of time spent answering participants’ questions by a RN had a weak correlation with recall scores and number of questions participants asked during and after the education had no significant correlation at all. However, number of times that parents read the copy of education after discharge had a significant low to moderate correlation with recall scores. The mean recall scores were progressively higher for participants who read the copy more times. In this study, this was the only variable with a potentially significant impact on parental recall of post-anaesthesia education, other than the two significant baseline demographic factors discussed earlier (i.e., parents’ preoperative perception of importance for post-anaesthesia education and level of education). This finding supports the need to emphasize reading a copy of the education after discharge and possibly more than once.
All other measured factors in our study did not have any significant correlation with recall scores. McDonald-Misczczak (2005) reported that elderly people were less likely to recall information in comparison to younger people. Our study did not replicate this phenomenon possibly due to the young ages of all participants with a narrow range (36.4 ± 7.8). Also, Herlitz et al. (1997) concluded that females had greater abilities to recall medical information than males, but our results did not show any difference between genders. Kessels (2003) and Ley (1979) postulated that low or high level of anxiety might influence patients’ recall abilities negatively. Our results indicated no correlation between anxiety level and recall scores. This finding might be due to a true lack of correlation or the fact that the vast majority of participants reported a moderate level of anxiety in our study (6.2 ± 2.8 out of 10). Finally, parents’ and/or any of their children’s previous anaesthesia experiences did not appear to have any significant impact on parental recall of post-anaesthesia education material. From the assessment of various demographic factors in this study, one can conclude that all parents with different demographic characteristics do not vary significantly in their abilities to recall post-anaesthesia education and thus anaesthesia practitioners have to strive for improvements in their discharge education for everyone.

6.4. Limitations

There were several limitations to this study. The PAED scale was utilized to measure the level of distraction by the recovering child’s presence while parents were receiving post-anaesthesia education from a RN. A main weakness of the PAED scale was its lack of threshold value to define ED. Also, the sensitivity and specificity of the scale is known to be optimal when a PAED score is greater than 12 (Bajwa, Costi, & Cyna, 2010). In this study, the mean PAED score in group B was 9.9 ± 4.3. Moreover, fourth and fifth items of the PAED scale are not specific to ED and one may argue that it is a measure of pain instead (Appendix 7). However, this was not a critical concern for this study, as the PAED scale was implemented to serve as a measure of level of distraction rather than ED. Lastly, the PAED score was not measured for group PEAC in our study, and this made it impossible to compare the potential distractions after the education by children in group PEAC and PEPC.
A second limitation of this study was that the phone interviewer was the principal researcher. This might have possibly introduced systematic biases during data collection phase of the study. For example, the introduction of a response bias was possible due to unequal leading questions. This possibility was minimized by blinding the principal researcher to the group allocation until recruitment of all participants and completion of data entry.

A third limitation was that there were two RNs providing the post-anaesthesia education during the span of this study. RNs were also responsible for assigning PAED scores to recovering children. However, the inter-individual variability was minimized with two hours of introductory education with the principal researcher for calibration. Also, both RNs were asked to use a script with checkboxes to ensure consistency while they were providing the post-anaesthesia education. However, the inter-individual variability was not assessed statistically, and numerous variables between the two RNs could not be controlled (e.g., voice volume, tone and pitch, speech speed, gesture).

A fourth limitation was that compliance and complication data relied solely on the self-report of participants with no way of verifying whether participants were being honest in answering the post-op day-1 interview questions. For example, in our study, the number of times that participants read the written instruction had an influence on the recall score. It was impossible to verify participants’ answers with regard to this number.

Lastly, a fifth limitation was questionable generalizability of the results from our study. Participants’ children of the study were treated at the faculty (i.e., a teaching institution) because parents either wanted the care from our institution or were referred to us by others. Parents of children receiving dental care under GA in a teaching institution compared to private practices may be different in their various demographic factors, which would limit generalizability of our results to those paediatric patients receiving GA with their dental treatment in private practice.
Chapter 7

Conclusion

7.1. Conclusion

This study differed from previous studies investigating patients’ or parents’ recall of medical education in that it was conducted in an outpatient anaesthesia practice, specifically for dental procedures. Also, participants were randomized into two separate groups to receive the post-anaesthesia education in the presence or absence of their recovering children. Overall, no significant difference was reported in both recall and compliance scores between the two groups, although compliances scores were relatively higher than recall scores. However, high compliance scores to simple, intuitive tasks do not guarantee adequate management by parents in cases of post-anaesthesia complications without proper knowledge of post-anaesthesia education. Thus, low recall scores should not be considered acceptable because of high compliance scores.

Results from this study revealed a number of factors that had significant relationships with parents’ recall scores. Two of these factors are relatively easy to manipulate to improve retention of information, namely the time spent by RNs to answer parents’ questions during and after the education, and the number of times parents read the paper copy of the post-anaesthesia education after discharge. In order to address issues regarding these variables, parents may have to be provided the education information multiple times. For example, the education could be delivered during the initial anaesthesia consultation, after the pre-operative assessment on the day of the appointment and at a post-anaesthesia session. This would allow for more opportunities to retain information by increasing the number and times of exposure to post-anaesthesia education. Moreover, it would be beneficial to reinforce parents to read the paper copy of the education as many times as possible after discharge. Furthermore, our results showed significant differences in the extent of the recall between parents of varying level of education. To minimize possible effects from this finding, it would be critical to make the paper copy simple and concise in plain language.
7.2. Future study directions

In keeping with our results, future research should be directed towards ways to improve the quantity and quality of the post-anaesthesia education material handed out upon discharge. In this study, participants with less number of exposures to the material performed worse. Therefore, a single exposure to verbal instruction within the clinic does not appear to be sufficient for satisfactory recall of the education. This suggests that additional exposure to education material should be considered, such as take-home information to supplement post-anaesthesia instruction provided after treatment.

Assessing the effect of take-home education materials on information retention could be studied in various ways such as evaluating incentives for parents that encourage reading of education material. With respect to the quality of the information, post-anaesthesia education provided in the standard sentence form could be compared with the same information reformatted to highlight key words, and include simple and catchy phrases, symbols and illustrations in an effort to evaluate preference for information, improved readability, and potential improvement in parental recall of post-anaesthesia education. Other delivery systems could also be explored beyond the traditional verbal and paper forms. Lastly, in our study, learning and recall of information were not differentiated. In other words, the study did not measure the effectiveness or extent of learning by parents at the time of education. Thus, there is uncertainty as to whether parents’ low recall scores were due to poor learning, recall or a combination of both. Thus, a future focus should be on parents’ understanding of the education material as well as recall of the information.
Appendix 1: Study information

Dear Parent/Caregiver:

My name is Dr. Brian Jin Chan Kim. I am currently registered in the Dental Anaesthesia Master of Science program at the Faculty of Dentistry, University of Toronto. As a dental anesthesia resident, I provide sedation and general anaesthesia to patients before they have their dental treatment. I am conducting a study in order to better understand parents’ and caregivers’ experience of caring for their child after having sedation or general anaesthesia for their dental treatment.

Study Process

Once you choose to participate for the study, you will receive both in-office and written postoperative information explaining how to take care of your child at home after his/her dental surgery. At a convenient time the following day, you will receive a phone call and asked to answer a series of questions about the postoperative education you received. This call will be approximately 5-10 minutes. You may refuse to participate, withdraw at any time and decline to answer any question without any negative consequences. However, collected data cannot be withdrawn from the study after data analysis, as personal identification information (e.g., name, phone number, address and etc.) will be removed from all collected documents. Thus, the research investigator will not have the access to identify to whom certain data belong after this point in the study. The dental and anaesthesia care provided to your child will be the same whether you choose to participate in the study or not.

Privacy and Confidentiality

The Ontario Personal Health Information Protection Act (PHIPA) governs the protection of your personal health care information. This Act outlines rules that must be followed when collecting, using or hearing personal health information for research purposes. You and your child’s personal and health care information will remain secure, private and confidential. All personal identifying information will
be removed before the data are analyzed. In addition, paper data will be destroyed after two years. Electronic data without patient names will be stored for ten years after publication of the study. Data collected from this study will be analyzed and compiled for the purposes of a thesis dissertation, publication in a scientific journal, presentation at scientific meetings and/or teaching in academic settings.

Risks and Benefits

There will be no extra risk or cost to you or your child as a result of participating in this study. Upon completion of this consent form, you will receive a $5 Tim Horton’s Coffee Card in appreciation for participating in this research. Your participation will help clinicians better understand the experience of children and their caregivers after dentistry under deep sedation or general anaesthesia.

Contact Information

• If you have any questions about your rights as a participant, you may contact the Office of Research Ethics at ethics.review@utoronto.ca or 416-946-3273.
• If you have any questions about the study, you may contact myself at jinchan.kim@mail.utoronto.ca or 416-979-4900 ext 4324 or my supervisor (Dr. Laura Dempster) at l.dempster@dentistry.utoronto.ca or 416-979-4929 ext 4459
• If you are interested in the results of this study, you may also request a summary of the research findings via jinchan.kim@mail.utoronto.ca

Thank you for choosing the Faculty of Dentistry, Pediatric Surgicentre for your child’s dental care and participating in this study.

Sincerely,

Brian Jin Chan Kim, D.D.S.
Principal Investigator, M.Sc. Candidate
Appendix 2: Informed consent form

Study Title: Postoperative education for caregivers of children after dentistry under deep sedation/ general anaesthesia.

Principal Investigator: Dr. Brian Jin Chan Kim, D.D.S., M.Sc. Candidate, Dental Anaesthesia, Faculty of Dentistry, University of Toronto

Purpose of Research: This study will investigate the experience of postoperative education for caregivers of children undergoing sleep dentistry.

Consent:
By signing this Consent Form, I ______________________, the parent/ guardian of _____________________________(child) agree to participate, with my child, in this study and I declare that:

• I have read and understood the information provided to me on the information letter, had the opportunity to ask questions and receive satisfactory answers, and was given sufficient time to think it over and make an informed decision regarding my participation.

• I agree to participate in a phone interview 1 day after my child’s dental surgery.

• I accept that information about my child contained in his/her personal health records will be reviewed as part of this study. I understand that at all times my child’s personal health information will be protected and my child’s confidentiality maintained.

• I accept that all personal identifying information will be removed prior to data analysis. Thus, the information will not identify him/her during and after analysis.

• I agree to be contacted in future to provide additional information related to this research work only if necessary.

• I accept that upon completion of this consent form, I will receive a gift card as a token of appreciation.

• I understand that participation is completely voluntary and that I can withdraw from the project at anytime until data analysis, without giving a specific reason, by calling the number below. I further understand that any information I provide will continue to be available to the researcher even if I withdraw from the study.

• I accept that the information collected will be kept until at least year 2025. At this time, information may be destroyed or made irreversibly anonymous.

____________________________________  __________________________________
Print Name of Parent/ Legal guardian   Print Name of Witness

____________________________________  __________________________________
Signature of Parent/ legal guardian   Signature of Witness
<table>
<thead>
<tr>
<th>Name of Child participant</th>
<th>Relationship to Child</th>
</tr>
</thead>
</table>

Date

**Contact Personnel:**
For further information, you may contact the Principal Investigator, Dr. Brian Jin Chan Kim by:

- 416-979-4900 ext 4324 or
- jinchan.kim@mail.utoronto.ca

If you have any questions about your rights as participants, you may contact the Office of Research Ethics at ethics.review@utoronto.ca or 416-946-3273.
Appendix 3: Parent post-operative call information

Post-op Call Information Sheet

This form should be completed by the adult who is responsible for taking care of their child at home while they recover from sedation.

Parent Information (i.e., Preferred parent to contact)

What is your first and last name?

(First)                      (Last)

When is the best time to call you tomorrow (24 hours after care)?

What is the best phone number to reach you at this time?

Alternative phone number

Your child’s (name)___________ appointment was TODAY:
  o Date: ____________________.

Who will phone you: Dr. Brian Kim

Dr. Brian Kim will call you:
  • 1 day after your child’s dental surgery with sedation.
    o Date: ________________.

How much time will the phone call take? 5 – 10 minutes

You may withdraw from this study at any time.

Receptionist to photocopy and provide:

  1. Copy to parent.
  2. Original to B. Kim
Appendix 4: Parent demographic information

1. What is your relationship to the child? (please check one)
   - Father □
   - Mother □
   - Other: ______________________

2. What is your age? ________

3. What is the level of your education? (please circle)
   - a) Elementary school
   - b) Secondary school
   - c) College
   - d) University-Undergraduate
   - e) University-Graduate level

4. How anxious/nervous are you about your child’s appointment today? (please circle)

   1  2  3  4  5  6  7  8  9  10
   Not anxious at all  Extremely anxious

5. a) Have you ever had sedation/general anaesthesia in the past? (please circle)
    - Yes □
    - No □ →(if NO, go to Question 6)

   b) Did you experience any problems after sedation/anaesthesia in the past?
   Examples may include nausea, vomiting, long recovery, difficulty breathing, etc. (please check one)
    - Yes □
    - No □

   c) Were you ever given any postoperative instructions after anaesthesia? (please check one)
    - Yes □
    - No □

6. a) Have any of your children ever had sedation/ general anaesthesia experience in the past? (please check one)
    - Yes □
    - No □ →(if NO, go to Question 7)

   b) Did your child previously experience any problems after anaesthesia in the past? (please check one)
    - Yes □
    - No □

   c) Have you ever had any postoperative instructions after anaesthesia? (please check one)
    - Yes □
    - No □

7. How important do you think post-operative education is after anaesthesia? (please circle)

   1  2  3  4  5  6  7  8  9  10
   Not important at all  Extremely important
Appendix 5: Post-anaesthesia written instruction (for parents of patients receiving intravenous conscious sedation or GA from the Department of Anaesthesia, Faculty of Dentistry, at University of Toronto)

POST-OPERATIVE INSTRUCTIONS
FOR GUARDIANS/PARENTS OF CHILDREN
RECEIVE DENTAL TREATMENT WITH SEDATION

Follow these instructions to keep your child safe.

ACTIVITIES:
Your child should be closely monitored by a responsible adult for the remainder of the day (6-8 hours following the appointment). This is to make sure they have recovered and there is no difficulty breathing.
To check that your child is breathing normally:
  - Look – for the chest rising and that skin tone has a natural colour.
  - Listen – for quiet breathing and no unusual snoring sounds
  - Feel – for breathing coming from the nose or the mouth
Your child must rest at home and is not allowed to ride a bike or play outside for the remainder of the day

EATING AND DRINKING AFTER TREATMENT:
To prevent dehydration after your child goes home:
1. Start your child with small sips of water. Give more if your child can keep the fluids down. Go slowly at first to avoid vomiting.
2. Soft food may be given at a lukewarm temperature.

PAIN CONTROL:
If your child appears to be in pain after treatment, you may give
  1. Tylenol at __________ Or
  2. Advil at __________

SEEK ADVICE IMMEDIATELY:
1. If there is any difficulty breathing
2. If nausea and vomiting persists beyond 2 hours.
3. If your child seems dizzy & drowsy 6-8 hours after surgery.
4. If any other matter causes you concern.

Before 4:00 pm – Contact our Surgicentre at (416) 979-4757.
After 4:00pm – We are a day surgery clinic. We do not have an after-hours emergency clinic or answering service. If you are worried about your child and need help, contact your nearest hospital emergency clinic or the Hospital for Sick Children at (416) 813-7500.
Appendix 6: Post-anaesthesia verbal education script

This script is to be used by a Registered Nurse (RN) to provide postoperative verbal education to parents of children undergoing anaesthesia for dental surgeries. A RN should follow this instruction script as closely as possible to educate all of intended audiences in a standardized way. The RN will mark the checkboxes as he/she covers the material in order to ensure completion of all components of postoperative education. The RN can repeat sentences if they weren’t clear for participants. Participants are allowed to ask any extra questions at the end of the education session. Please record the number of questions and time taken to answer them. Thank you.

Relationship to the Child: ___________________________
Name of the Audience: ____________________________

"Hello, I am a Registered Nurse and my name is ______________. I am here to give you some important education so that you can take care of child safely at home after anaesthesia for dental treatment"
"You will have the chance to ask any questions about anaesthesia at the end of this education session. Is that OK?"

"First, you will be responsible to take care of your child for the remainder of the day. Especially, it is very important to closely monitor your child’s activity 6-8 hours following today’s appointment"
"This is to ensure that they are adequately recovering and having no difficulty breathing"
"In order to check for breathing, you should Look, Listen and Feel"
"You will look for the chest rise as the child is breathing and look for normal skin tone and colour. You will listen for normal, quiet breathing and check if there is any unusual snoring sound. Then, you will feel for breathing coming out of the nose and/or the mouth"

"Also, your child must stay and rest at home. Your child is not allowed to play outside for the remainder of the day"

"With regard to eating and drinking, it is important to prevent any dehydration after you go home with your child"
"You should start your child with small sips of water. If your child can drink more water, give more water. You should do this slowly at first to prevent vomiting."
"You should also start feeding your child. You will start with soft food at a lukewarm temperature."

"For pain control, give your child a regular Tylenol or Advil at __________ as instructed on the package, depending on what your child usually take for pain."

"If you follow the above instructions, your child will remain safe and comfortable most of the time. However, I will tell you 4 cases when you have to seek advice immediately."
“You should seek advice or help immediately... #1. If there is any difficulty breathing. #2. If nausea and vomiting persists beyond 2 hours. #3. If your child seems dizzy & drowsy 6-8 hours after surgery. #4. If any other matter causes you concern”

“You can seek help either by calling us or emergency department at any nearby hospital in these cases. And I will give you our contact information at the end of procedure just before you leave today.”

“Please let me know if you have any questions now.”

*If the participant doesn’t have any questions...*

“Thank you for your attention. I will provide with a written instruction covering the same information I just told you so that you can use it as a reference at home.”

---

**RN Only**

Please record

**Questions asked DURING postoperative education session**

1. How many questions the parent/guardian asked: ________________.
2. How long it took to answer all the questions: ________________ min.

**Questions asked AFTER postoperative education session (e.x., just prior to discharge)**

1. How many questions the parent/guardian asked: ________________.
2. How long it took to answer all the questions: ________________ min.
Appendix 7: Pediatric Anaesthesia Emergence Delirium (PAED) Scale

**PAED Scale**

1) The child makes eye contact with the caregiver  
2) The child's actions are purposeful  
3) The child is aware of his/ her surroundings  
4) The child is restless  
5) The child is inconsolable

1), 2) and 3) will be scored as:

4: not at all  
3: just a little  
2: quite a bit  
1: very much  
0: extremely

3) and 4) will be scored as:

4: extremely  
3: very much  
2: quite a bit  
1: just a little  
0: not at all

**Total Score:** ___________
Appendix 8: Post-anaesthesia interview questionnaire

Interview Script

“Hello, My name is Dr. Brian Kim. I am the principal investigator of the research from Anaesthesia Department at University of Toronto, the Faculty of Dentistry. Can I speak to Mr/Mrs. ____________ (i.e., the guardian who gave the informed consent on the day of the appointment)?”

If the person is not available, Ask when to call back. Time: _______________________
If the person will not be available today, ask if another parent or guardian is willing to answer the questionnaire. If yes, proceed ___. If no, stop ___.

“I am calling you because you agreed to participate in my study. Is it okay if I ask you these questions now? [Y/N].

If N: Thank you for your time.
If Y: First, I will ask questions about your child’s dental surgery from yesterday

PART A. Complications/Compliance

1. Has your child had nausea/ vomiting since the appointment? Yes ☐ No ☐
2. Has your child had difficulty eating food since the appointment? Yes ☐ No ☐
3. Has your child had any difficulty drinking fluid since the appointment? Yes ☐ No ☐
4. Has your child had difficulty breathing since the appointment? Yes ☐ No ☐
5. Was your child unusually upset after the procedure since the appointment? Yes ☐ No ☐
6. Did your child have any other problems after their dental surgery yesterday? ☐ No
   ☐ Yes –What kind of complications did the child experience? ____________
7. Proceed to 7a) and 7b) only if the child experienced any complications from 1 to 6.
   a) Did you do anything to correct these problems? ____________
   b) Did you feel confident to handle these issues?

   1 2 3 4 5 6 7 8 9 10
   Not confident at all Extremely confident
I have a few questions about your child's activities after leaving our dental clinic.

8. a. Did your child eat food on the day of surgery after the appointment? Yes ☐ No ☐
   b. Did your child drink liquid on the day of surgery after the appointment? Yes ☐ No ☐

9. What did your child do after the surgery appointment?
   Prompts: watch tv? ride bike? Play outdoors?
   Response: __________________________

10. How many hours did you watch or monitor your child after discharge?
   < 6 hrs ☐ 6-8 hrs ☐ > 8 hrs ☐ Overnight ☐

   Prompt: If less than 6 hours or more than 8 hours, ask:
   Why did you decide to watch your child for less/more time?
   Reason: __________________________

Now I would like to know about any pain your child might have experienced.

11. Did you have to give any pain medication to your child?
    Yes ☐ → Move to 19. No ☐ → Move to 18.

12. How did you decide that your child did not need any pain medication?
    Response: __________________________

13. How did you decide your child needed any pain medication?
    Response: __________________________

   a. What medication did you give? __________
   b. What time did you give? __________
   c. How much did you give? __________
   d. How many times did you give? __________

PART B. Postoperative Instruction Recall
Next I would like to ask you some questions about the instructions you were given by our dental clinic.

1. Did you get a chance to read written instructions after you left our dental clinic with your child? Yes ☐ No ☐, If Yes → Q2, If No → Q3
2. How many times did you look at or use the written instructions? Would you say it was....? _______ times

3. Do you remember what activities were recommended for your child on the day of surgery after anaesthesia? Tell me anything you remember.

Prompt: What is your child supposed to do after anaesthesia?

☐ Stayed home  ☐ Any other response  ☐ Don’t know
Other responses: ________________________________

4. Do you remember for how many hours you should be watching your child after discharge?

☐ 6-8 hrs  ☐ Any other response  ☐ Don’t know
Other responses: ________________________________

5. What kind of food was recommended for your child after surgery?

☐ Soft  ☐ Lukewarm  ☐ Any other response  ☐ Don’t know
Other responses: ________________________________

6. How are you supposed to give food/drink to your child?

☐ Small amounts  ☐ Slowly  ☐ Any other response  ☐ Don’t know
Other responses: ________________________________

7. Do you remember how to manage for your child’s pain?

☐ Tylenol  ☐ Advil  ☐ Don’t know

8. How are you supposed to check if your child is breathing properly/ normally?

☐ Look for the chest rise
☐ Look for natural skin tone and colour
☐ Listen for quiet breathing
☐ Feel for breathing coming from the nose or the mouth
☐ Any other way to monitor? ___________________________

9. What are the reasons to call for help?

Prompt: “when do you have to call the hospital or U of T dentistry for help?”

☐ Difficulty breathing
☐ Nausea and vomiting persisting longer than 2 hours
☐ Dizziness or Drowsiness persisting 6-8 hours after discharge
If any other matter causes you concern

*Finally, looking back on your overall experience in our dental clinic*

1. On a scale of 1 to 10, how satisfied were you with your post-operative care instructions?

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<td>Not satisfied</td>
<td>Extremely satisfied</td>
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2. On a scale of 1 to 10, how effective do you think the post-operative instruction was for learning how to care for your child at home after anaesthesia?

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</thead>
<tbody>
<tr>
<td>Not effective</td>
<td>Extremely effective</td>
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Do you have any other comments or questions you would like to share about your experience with anaesthesia in our dental clinic?

Thank you for participating in our study.
Appendix 9: Ethics approval

PROTOCOL REFERENCE # 31797
August 4, 2015

Dr. Laura Dempster
FACULTY OF DENTISTRY

Dr. Brian Jin Chan Kim
FACULTY OF DENTISTRY

Dear Dr. Dempster and Dr. Brian Jin Chan Kim,

Re: Your research protocol entitled, “Postoperative education for parents of paediatric patients having general anaesthesia: Effect of the presence of a recovering child on recall and compliance”

ETHICS APPROVAL

Original Approval Date: August 4, 2015
Expiry Date: August 3, 2016
Continuing Review Level: 1

We are writing to advise you that the Health Sciences Research Ethics Board (REB) has granted approval to the above-named research protocol under the REB’s delegated review process. Your protocol has been approved for a period of one year and ongoing research under this protocol must be renewed prior to the expiry date.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events in the research should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report 15 to 30 days prior to the expiry date of your current ethics approval. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry.

If your research is funded by a third party, please contact the assigned Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your research.

Yours sincerely,

Elizabeth Peter, Ph.D.
REB Chair
Daniel Gyewu
REB Manager

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References


