



Children and parents perspectives on children's dental treatment under general anesthesia: a narratology from Saskatoon, Canada

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Abstract

Aim This study aimed to explore the emotional and psychological effects of dental treatment under general anesthesia (DTGA) on children and parents in Saskatoon city, Saskatchewan, Canada.

Design Semi-structured interviews, video diaries, drawings, and a questionnaire were used to collect data. The study used a narrative perspective and thematic analysis to analyze data.

Results The findings from children and their parents ($N=25$) indicated DTGA is disconcerting from both views. Parental guilt and the desire of both parents and children to not have to go through the experience again fueled at least short-term compliance with brushing, flossing, and changes in dietary habits.

Conclusion The children participants provided valuable information to augment that gathered from parents. As the study revealed that the DTGA is psychologically and emotionally troubling for both children and their caregivers, it is imperative to explore ways to ease the GA experience. Specific recommendations were provided for optimizing dental and health services for those children and their families.

Keywords Child · Qualitative · Dental general anesthesia

Introduction

Dental caries is the most common chronic disease in children. Evidence shows dental decay, particularly when severe, adversely affects the quality of life for young children; caries can lead to pain, infection, abscesses, malnutrition, and gastrointestinal problems, all affecting children's daily routines (BaniHani et al. 2018). When severe, childhood caries treatment is done under general anesthesia. Recently, and with the dental community response to the COVID-19 pandemic, more minimally intervention techniques (MIT) in caries management have been suggested to be utilized instead of conventional surgical measures (Al-Halabi et al. 2020; BaniHani et al. 2020). Baghdadi (2017) and Nickman (2017) argue that MIT may be an unrealistic set of

choices for a young child with established dental pain and infection from childhood caries. Instead, a host of treatment options, including sedation and general anesthesia (GA), exist to manage this disease, depending upon the extent and severity of caries, the age and developmental status of a child, their cooperation, health status, and parental and dentist choices (Nickman et al. 2017). Despite the increased risk and cost of dental treatment under general anesthesia (DTGA) compounded by wait times that delay treatment, it is considered effective as it enables a dentist to perform complete rehabilitation of a child's dentition in one visit and mitigates the possible psychological trauma associated with long visits (Jamali et al. 2018) or the need for multiple visits. In recent years, more attention in both research and practice has focused on treating disease and improving patient quality of life (QoL), in line with the goal of patient-centered care (Grossman et al. 2020; Jokovic et al. 2004). Health-related QoL (HRQoL) is multidimensional, including physical (e.g., pain), psychological (e.g., anxiety and fear), and social (e.g., teasing/bullying) constructs (Jokovic et al. 2004). The consequences of dental pain/infection on a child who often endures in addition to significant doses of pain medication or emergency room utilization and the effect on parents whose

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caretaking and work routines are disrupted are all reasons to go beyond SDF for caries management to sedation or GA. Several studies (Baghdadi and Muhajarine 2015; Park et al. 2018) have assessed the effects of DTGA on HRQoL, but this form of inquiry, due to its limited nature, may not be sensitive enough to assess the full effects on child-patients and families as the use of pre-determined questions from the OHRQoL measures may not accurately reflect impacts of DTGA that are important to children and parents.

Exploring children's experiences leading up to and after GA for dental treatment could improve provider understanding and better tailor care. Mittal and Sharma (2012) studied children (ages 6–12) 7 days after undergoing dental procedures, using a questionnaire, essays, or drawings to collect data. The researchers found children, in general, had positive recollections of a visit to a dentist. Younger children (6–8 years) who had pain during a procedure reported negative emotions. Findings from Rodd et al. (2014) suggested that child patients were mainly concerned with the physical effect of extraction, such as discomfort, bleeding, and limited eating ability, leading to hunger sensations. Additional concerns were nausea, vomiting, and pain associated with the use of an intravenous cannula. Despite its limitations, this was one of the first identifiable efforts to explore concerns from a child's perspective.

Client and family-centred care (CFCC) is integral to children's wellbeing and is widely recognized as essential to the field of child health. Parent and other family members are constants in a child's life, and CFCC, as it relates to child health, has historically been rooted in the partnership and collaboration between parents and providers (Shen et al. 2017). The purpose of this qualitative study was to understand the experiences of families when children underwent DTGA. Considering CFCC concept, the research questions were:

RQ1: What is the children's experience of the dental general anesthesia procedure, and what are parents' views regarding GA treatment?

RQ2: What is the effect of the GA experience on the child and parents?

RQ3: What do parents think about their children's oral health?

RQ4: Does a dental GA experience result in any changes to how the child and parent approach oral health?

Methods

This research focused on families whose children had been referred to receive DTGA in a mid-size Canadian Prairie city, Saskatoon, Saskatchewan. A qualitative approach was preferred because it allowed participants to describe their

lived experiences, enabling a detailed exploration of topics identified in the literature, and analyzing emergent themes.

Study design

Narratology was chosen for the present study because it is a specific qualitative design where "narrative is understood as a spoken or written text giving an account of an event/action or series of events/actions, chronologically connected" (Creswell 2013, p. 70). Experiences of illness and medicine are often understood through narrative constructions and, "interest in the narrative has shifted since the beginning of the 1980s; today less attention is being given to its use in the study of the clinical practice and experiences of doctors and more to patients' experience of suffering" (p. 51). This study embraced the social constructivist paradigm because social constructivism emphasizes the importance of culture and context in understanding what occurs in society and constructing knowledge based on this understanding. This is a new paradigm: seeing children as active social agents who "shape the structures and processes around them, and whose social relationships are worthy of studying in their own right" (Creswell 2013, p. 50).

This research was informed by Wilson's and Cleary's (1995) model for HRQoL and its revised versions and based on Amin's and Harrison's (2007) model for parent's experience of children's DTGA. The models guided the semi-structured interviews. For example, the question of GA's cost and whether it is prohibitive is informed by the former model's economic resources element. Similarly, the questions on parental emotions before, during, and after GA are informed by the latter model's emotional factors.

Participants

Eligible participants were children referred to receive DTGA for restorative dentistry and possible extraction, in addition to preventive procedures such as fluoride application. Patients were required to be eligible for GA, and other eligibility criteria were: children younger than age 10; classified as either ASA I (healthy) or ASA II (mild systemic disease); no disabilities affecting the quality of life; and severe childhood caries as defined by the AAPD. Patients with significant medical or developmentally compromised conditions, such as autism, patients requiring other than simple extractions, and very young children (< two years) were excluded. The selection of participating families (i.e., parents) was based on the amount of detail they were willing and able to provide about their DTGA experience (i.e., information-rich cases). This was confirmed by contacting the potential participating families by phone before enrollment into the study. The proposed age range for children was selected to maximize the quality of data collected, as well as based on

the age range of children who were referred to DTGA by reviewing data on children receiving DTGA from the previous five years, showing the ages attending for a DTGA range between 2 and 10. To do this effectively, the children had to be at an age where they possessed adequate linguistic capacity. This selection constitutes a quota sampling technique, which is considered by some as a type of purposive sampling technique; choosing the criteria allows the researcher to focus on people most likely to experience, know about, or have insights into the research topic (Creswell 2013; Merriam 2014). When a family whose child had been referred for DTGA contacted the surgical center for an appointment, the surgical center receptionist informed the family about the study and requested the family's consent to pass their contact details to the research team. The parent was informed about the study in more fact by the research team, and an interview was scheduled at the convenience of the participants before and after the surgery day.

Data collection

Data were collected through children's drawings, researcher field notes, video recordings, transcribed conversations with

children and parents, and a short form for family background information (Table 1). Semi-structured, open-ended, one-on-one interviews to collect child and parent stories were conducted. A short questionnaire recorded each patient's demographics (e.g., age, gender, SES) and dental history. Dental health status of children before DTGA (expressed by the number of decayed, missing, filled teeth surfaces [dmfs/DMFS]), information on the severity of caries (i.e., number of teeth with pulpal involvement/infection and number of extractions), and any adverse medical occurrences during DTGA from the clinic chart were recorded. Besides, data collection included a personal video diary, enabling child patients to document their thoughts and experiences related to DTGA as they went through the pre-, peri-, and postoperative pathway.

For most patients, pre- and postoperative interviews were conducted; some families, at their discretion, completed an additional interview (the second day following GA [peri-operative]). All interviews were conducted either in a quiet area of the Health Sciences Library or in the child's home. This was chosen based on parents' preferences, ensuring privacy and convenience. The child's parent(s) attended all the interviews. Children's parents were also separately

Table 1 Data collection: methods, objectives, and timing

Method	Objectives	Materials	Data collected	Timing
Drawing	Non-threatening and familiar method to use with children Focus the inquiry, build rapport	Blank sheets of paper, crayons, colored pencils	Drawings were collected and analyzed	Pre-, peri- and postoperative
Participatory observation	Detailed narrative of the visit Meanings of drawings or brief descriptions of drawings	Field notes and memos written up after each visit Reflections, questions, interpretations that came to mind during the visit	Field notes	Pre-, peri- and postoperative
Video recording	Immediate, visual documentation of emotions and experience	–	Video diaries	Peri-operative
Conversation with children	Build rapport, allow children to express themselves Patient-centered research practice Allowing children to vocalize issues via direct consultation	Structured interview guide	One, two, or three visits per child Personal information, direct quotes, individual needs, and preferences of participant	Pre-, peri- and postoperative
Conversation with parents	Build rapport with parents and develop trust Family-centered health care Allowing mothers/fathers to vocalize issues via direct consultation	Structured interview guide	Personal information, family dynamics, parents' preferences (gathered over 1 to 3 family visits)	Pre-, peri- and postoperative
Family background information form	Collect pertinent demographics	Short paper form	Information form completed	Preoperative

interviewed to gather information related to their children's DTGA. All interviews were conducted by an experienced female research assistant who has previous experience doing similar research. Through an ongoing recording, the principal investigator was able to monitor all interviews, along with continuous feedback to the interviewer.

Each interview's goal was to create a relaxed atmosphere to encourage the participants to share their experiences/feelings. In constructing (and revising) the interview questions, the principal investigator used open-ended questions and shared his own experiences as a father of young children and a pediatric dentist who regularly treats children to reflect on their responses and express his empathy. He avoided judgment, as well as professional opinions and advice-giving. The interview started with a warm-up talk related to the child's hobbies and then gradually asked about the child's oral health and what oral health means to them, and their personal experiences of dentistry (what they like and what they do not like) to explore their own experiences of oral health and dentistry. Specific questions were then asked to explore their experiences and thoughts about DTGA as guided by the research models and questions.

Data management and analyses

Data collection resulted in a diverse dataset to manage, analyze, and report. The interviews and video recordings were transcribed verbatim. A narrative approach in data analysis was followed to discern meaning from children's stories. A coding paradigm identified concepts and interrelationships. Each transcript was read twice before making notes or comments. Each transcript was analyzed for similar terms, emerging themes, or divergent terms or themes. Transcribed interviews were coded and separated into categories with similar codes or data related to a theme. Field notes were integrated with the transcribed interviews to ensure accurate interpretation. Each interview was coded as described by Merriam (2014) using NVivo codes (common phrases or concepts derived from the data) or using participants' words. The codes were re-checked by another member of the analysis team. Some parents were also asked to confirm specific codes to confirm accurate representation of their views. After interviews were coded, similar codes were grouped to remove redundant codes and then placed into themes or categories.

The data from this study were grouped thematically based on participant narratives. In addition to thematic analysis, structural, dialogic-performative, and visual narrative analyses were used to interpret different texts—oral, written, and visual—considering stories are purposeful and told or performed to accomplish particular aims. Data collection and analysis were conducted concurrently to guide participant recruitment. For example, some children found it difficult

to run the camera and, therefore, older children or children were considered who would likely have had experience with video recording. When providing video equipment was not an appropriate approach, children were allowed to draw a representation of their experiences. The findings related to children's drawings were reported elsewhere (Baghdadi et al. 2020).

Results

Recruitment occurred from May 3, 2016, through January 30, 2017, when data saturation occurred. Data saturation was observed with the tenth child-parent pair, and two more child-parent pairs were recruited as a check to confirm theme redundancy had been reached. As a result, 12 joint interviews with patients ($n = 12$) and family members (mothers, $n = 12$; father $n = 1$) were completed. The total number of participants whose interviews were recorded and analyzed was, therefore, 25.

Table 2 presents the demographic information of the child participants. There were eight girls and four boys, with a mean age of 6.1 ($SD = 2.1$).

Table 3 presents demographic information of the children's parents. Twelve parents were mothers; one father was a co-participant with a mother. The mean age of parents was 33.7 ($SD = 7.8$), ranging from 22.8 to 46.2. For ethnicity/status in Canada, there were three non-Indigenous families, 5 Indigenous families, three refugee families, and one newcomer family. This was taken from the family background form and based on Canada's Government glossary (2019), which refers to landed immigrants who came to Canada up to 5 years before a given census year as newcomers. Seven parents self-reported low-income, two low/middle-income, two middle-income, and one high-income. Interviews with refugee participants were conducted in their native language (Arabic) and translated during transcription, and reviewed by another member of the research team.

The participants' themes directly addressed the research questions on experience, effects, and oral health behavior changes. Emergent themes were anxiety, wait times, GA side effects, dentist referrals, less pain for a child, a hesitation to repeat GA, and cost. Themes also surfaced on the importance of primary teeth, the need for education, the reason for decay, and barriers to oral hygiene. The themes are presented below.

Anxiety

Anxiety was a common theme from the narratives of the children and parents. Child participants described anxiety differently. For example, Child 3 said she was nervous and scared; she did not want to go to sleep. Child 3 reported

Table 2 Child participants

Code	Age	Sex	Race/Status	Age at first dental visit	Pain	Payment	DTGA
Child 1	5.8	F	Indigenous	2	Yes	Government	2 Extractions 3 SSCrowns/ other crowns 2 Amalgams Prophy and Fluoride
Child 2	8.8	F	Indigenous	4.5	Yes	Government	1 Pulp treat- ments 1 SSCrowns/ other crowns 1 amalgam- prophy and Fluoride
Child 3	6.3	F	Caucasian	3	Yes	3rd party	1 Extraction 2 Pulp treat- ments 3 SSCrowns/ other crowns Prophy and Fluoride
Child 4	9.9	F	Indigenous	2	Yes	3rd party	2 SSCrowns/ other crowns 1 Amalgam 4 Composites Prophy and Fluoride
Child 5	6.5	F	Caucasian	4	No	3rd party	1 Extraction 1 Pulp treat- ment 3 SSCrowns/ other crowns 4 Amalgams Prophy and Fluoride
Child 6	2.6	M	Indigenous	1	No	Government	3 Pulp treat- ments 8 SSCrowns/ other crowns 1 Composite Prophy and Fluoride
Child 7	4.3	F	Indigenous	4.2	Yes	3rd party	1 Extraction 4 Pulp treat- ments 5 SSCrowns/ other crowns 1 Amalgam 4 Composites Prophy and Fluoride
Child 8	5.2	F	Caucasian	1.5	No	3rd party	No treatment
Child 9	6.5	M	Refugee	6	Yes	Government	9 extractions (OR) 2 or 3 extrac- tions (clinic) 4 Amalgams 4 SSCrowns

Table 2 (continued)

Code	Age	Sex	Race/Status	Age at first dental visit	Pain	Payment	DTGA
Child 10	6.6	M	Newcomer	3	No	Government	8 Extractions 8 SSCrowns 2 Band & Loop
Child 11	8.1	M	Refugee	5	Yes	Sponsor	DTGA completed
Child 12	3.1	F	Refugee	2	Yes	Government	DTGA completed

Table 3 Parent participants

Code	Age	Sex	Race/Status	Income	Education	Single	Child's GA experience	Work experience
Mother 1	27	F	Indigenous	Low	College degree	No	No	Student
Mother 2	37.8	F	Indigenous	Low	College degree	No	Yes	Student
Mother 3	46.2	F	Caucasian	High	College degree	No	No	Yes
Mother 4	28.4	F	Indigenous	Low/Middle	High school diploma	No	Yes	Yes
Mother 5	39	F	Caucasian	Middle	College degree	No	No	Yes
Mother 6	22.8	F	Indigenous	Low	High school diploma	No	No	Yes
Mother 7	28.5	F	Indigenous	Low	College degree	Yes	Yes	Student
Mother 8	38	F	Caucasian	Low/Middle	College degree	No	No	Yes
Mother 9	41	F	Refugee	Low	High school diploma	No	No	No
Mother 10	31.3	F	Newcomer	Middle	Graduate degree	No	No	Student
Mother 11	30.2	F	Refugee	Low	High school diploma	No	No	No
Mother 12	23.6	F	Refugee	Low	High school diploma	No	No	No
Father 1	44.5	M	Refugee	Low	Elementary school	No	No	No

Total: $N=13$: Mother $n=12$, Father $n=1$

several different facets of the experience as concerning. She knew she would have to fast before the surgery and was worried she would be hungry and be unable to eat. She was nervous at the surgery time and was made more uncomfortable by the smell of the mask used to administer GA. Child 3 said, “I don’t like the smell of the mask a little bit, and I did not want to go to sleep.” These concerns were common to the children; four participants reported being anxious about GA.

The severity of the anxiety varied by parent participants, with some reporting mild discomfort or concern. Others reported a great deal of fear and guilt from allowing a child to be anesthetized. Mother 1 described watching her daughter undergo GA:

I felt sick to my stomach. I was scared. I was nervous, so it made me feel sick. Just, I did not like it because when I went there and watched her, I just felt bad. I mean, before that a woman -- a woman and her daughter before my child, the woman came out crying, so I said, oh, my God. So, I hoped I do not cry, but I did not cry, I just did not feel better,

just felt sick to my stomach. It did not simmer it, it did not feel normal.

Child preference for GA

Like adult participants, a small number of children were relieved to have DTGA. Two child participants were not concerned about undergoing GA because they knew they would not have pain. Mother 2 indicated her daughter was very calm before and after the procedure and credited Child 2’s calm demeanor to the dentist who explained the procedure. Mother 2 explained:

She was just nice and calm. She knew what to expect because they explained to her. She didn’t, like, freak out or anything. Yeah, she was very calm. She didn’t make a peep. Like, she didn’t cry or anything, but she was very calm and quiet, but she just woke up kind of loose.

The night before surgery, Child 1 stated in her video diary she was unconcerned about the surgery. At that time, she was practicing putting the mask over her nose and mouth to

breathe in the anesthetic. To explain how she was feeling, she said:

I can eat nothing till tomorrow after my surgery, yeah. I feel like I have to do it. I feel like the dentist will ask me to blow something on my head [the mask]. I think it will be awesome. I will go to sleep in no time.

Side effects

Many participants reported side effects when they or their children had GA. Ten (83.32%) families reported side effects that affected the overall experience. For some families, side effects were mild and expected; for others, effects were severe and problematic. Common side effects included pain in the teeth and gums, lack of appetite, nausea, fatigue, and moodiness. Mother 1 described her daughter as tired and cranky after surgery and indicated Child 1 had lost her appetite. Mother 1 said:

When [child 1] got up, she was cranky and tired. She didn't cry or nothing, she just...before we went in, she was like, Mom, can we go to Burger King when I am done? And then after she was, like, Mom, I don't think that we can go to Burger King. I do not feel so good, so we can't go to Burger King.

Mother 11 indicated her son was nauseous after GA. He also exhibited moodiness that may have been caused by nausea or the GA. She stated:

When he was in the recovery room, he was so annoyed and upset as well as crying. He became better after some time when he woke up from anesthesia, but he started to vomit a lot, several times. And even on our way home...he vomited some blood because he swallowed a lot while they were working on him. He then slept, and when he woke up he was okay and even normal, and he started to eat without pain or similar stuff. Directly after the operation, he was annoyed from the anesthetic and he complained from toothache. After he had some sleep, he didn't complain at all. So probably that was because he was tired after the operation.

Wait time

Wait time was a salient theme in participant narratives. All participants experienced some wait time between when they knew their child would undergo GA and the appointment. This wait time ranged from several weeks to several months. A majority of participants thought the wait time was acceptable. Three participants, however, reported the wait time was too long and was concerning. Two participants remarked because their children were not in much pain, the wait time was not overly concerning, but it would have been if a child's

condition had been urgent. Mother 9, however, said the wait time caused her child unnecessary discomfort as he was in considerable pain. Mother 9:

[Child 9] is in severe pain. We have already removed three of his teeth, and he was living on painkillers. We are waiting for the letter to reach our box telling about his operation. That was too long to get that letter.

Less pain

Many participants reported, after the dental appointments using GA, children reported less pain. While pain reduction may affect a child on a physical level, parents suffered psychologically from an inability to ease the pain. This was a lasting effect enjoyed by six participants who reduced concern for their children's pain. When asked about her daughter's experience after her surgery, Mother 12 stated, "Her eating gets better after the surgery because she complained about toothache before when she was eating. [Her eating got better because] no more pain! No more pain!" Mother 3 reported her daughter experienced a similar lack of pain after surgery. As a result, Child 3's eating improved after surgery. Mother 3 said, "As far as chewing and what she had, it got better; she used to have pain when she chewed because her teeth were sore, and they got better."

Hesitation to undergo DTGA

When asked if they would prefer their child to have GA or a local anesthetic for future dental work, three parents chose a local anesthetic, two indicated GA, and three indicated their choice would depend on the work needed. Participants who stated they would prefer not to undergo GA again but did not know what they would do if children exhibited the same fear that caused them to choose GA for the procedures detailed here. Mother 10 stated, while she would prefer not to have GA administered again, it was because she hoped her daughter's teeth would not need so much work again. Mother 10 expressed:

I just hope that we don't let things get to the point we need general anesthesia. Now we are more aware of preventing or at least going to the dentist early when he has one cavity, not too many where we have to do the general anesthesia.

Mother 5 stated she would prefer her child not undergo GA again because while the experience with GA had been generally positive, she thought inhalational anesthetic was terrible for the body. Mother 5 explained:

I think we would prefer without. Just because -- we didn't have a bad experience with all of this, no concerns or anything, but I think in general we just know

that having general anesthetic, if there were to be complications, that -- what we think would be from having general anesthetic, and that is not necessarily good for your body. But if you have to do it, we are not against it. What has to be done, it has to be done. But we rather prefer to go to a regular dental.

Mother 3 stated her decision to use GA again would depend on the work needed. Mother 3 pointed out that if a procedure was quick, it would be preferable not to use GA; however, she also acknowledged that GA was preferable for more complicated procedures when doing a great deal of work in one appointment. Mother 3:

I would prefer without, on one hand, because it is just so much simpler, but, on the other hand, when she did go under GA, I think she, the dentist, was able to do more completely take care of all the problems where she got three caps put on.

Cost

The cost of GA was a concern for several participants. Two participants indicated they did not know how to afford the procedure, with two others stating they were unsure if insurance would cover the surgery. Mother 5 meant, while she thought insurance would cover the cost of her daughter's surgery, she was not sure. Mother 5:

We are not sure [if it will be covered by insurance] yet. Because how that clinic does is they are going to send us -- we have to pay, like, with a credit card, then they are going to send us the receipt thing that we hand it to the insurance. We are pretty sure that all will be covered, but we do not...are not sure 100%.

Mother 8 expressed a similar concern to Parent 5, indicating she was unsure if insurance would cover her daughter's procedure. Additionally, Mother 8 revealed she was told to bring money to pay for the procedure, but no one told her how much the procedure would cost.

Well, we both [mother and spouse] have benefits that pay for dental appointments, and in setting up this appointment, we have been told to bring money, but they didn't know how much money. And maybe it would be covered [by insurance], but they were not sure, and they did not give us any information to go on.

Importance of primary teeth

A majority of participants believed primary teeth were important. Two participants stated permanent teeth were more important than primary teeth and did not specifically say if they thought primary teeth were important.

All participants knew at least a bit about primary teeth, indicating primary teeth emerge when they are young and generally fall out to make room for permanent teeth before adolescence. Mother 8 did not think primary teeth were particularly important. She stated because primary teeth were going to fall out, they were less important than permanent teeth. She said, "Since they are falling out, I know they are important, but I don't think they are that important." Mother 7 believed primary teeth were important for establishing a good routine for when permanent teeth come in: "I believe they are important for establishing a good routine for when the big teeth come in. So yes, I do believe they are important." This was a unique statement because other participants believed primary teeth were primarily important for gum health and chewing food.

Education

Several participants commented on a lack of knowledge around GA and oral health in general. These participants either did not fully understand how to interpret their child's oral health status or GA's need. Mother 10 stated the surgery center was more focused on postoperative instructions than how to prevent further decay. Mother stated:

They didn't really discuss that much about what to do. Like, they gave you the toothbrush, they gave you the flossing, but they are usually more concerned about the postoperative instructions. They discussed these instructions more in-depth rather than what to do to prevent another cavity.

Explaining decay

A majority of participants indicated their dentist had not told them why a child's dental decay. Specifically, the role of cariogenic bacteria as the major cause for dental decay had not been explained. Four participants commented a dentist did not tell them why their child had developed dental problems. Some of these participants believed they understood why a child had developed dental issues, even if no one had told them. Mother 3 thought her daughter had developed cavities because of the tight space between her teeth. In Mother 3's words:

The dentist really did not say a whole what about [why] she got the cavities, but I know her cavities were between her teeth because the space is tight, and the flossing doesn't go between there very often.

Barriers to oral hygiene

Several participants believed they faced barriers to maintaining a child's oral hygiene after surgery. Common barriers

were a lack of time, travel distance, and a child’s discomfort at the dentist’s office. Mother 7 explained a lack of time and the dentist’s office’s distance were barriers to good oral hygiene. Mother 7 said travelling to the dentist’s office was a burden. She expressed this, saying, “So in order for us to see a natural dentist, we have to travel south, which is like 3–4 h’ drive, just to see the dentist. So, it is kind of hard.” Time was also a barrier for Mother 7. She expressed:

I would say sometimes I am overly busy and that I -- she would like travelling or basically running around, sometimes she falls asleep in the vehicle and just waking her back up to get her dress[ed], the pajamas and brush her teeth and -- the little time we have at bed [is] just enough to go pee and brush her teeth and stuff like that. Just being a single and busy mother, is kind of tough sometimes, but it doesn’t take very long.

Postoperative behavior change

A majority of participants reported positive behavioral changes after children underwent DTGA. Eight participants said they changed behavior around a child’s oral hygiene after the procedure. Common changes included increasing brushing and flossing and reduced consumption of sweets.

Mother 5 noticed her daughter did a better job brushing following surgery. She believed Child 5 was more aware of good dental hygiene after surgery.

She seems to do a better job. She tends to do it quick, so we watch her and cue her to do it more properly, and she is doing better with brushing now.

Mother 7 also thought her daughter was more aware of the following surgery and was brushing better. Mother 7 thought the experience had focused them on prevention rather than treatment.

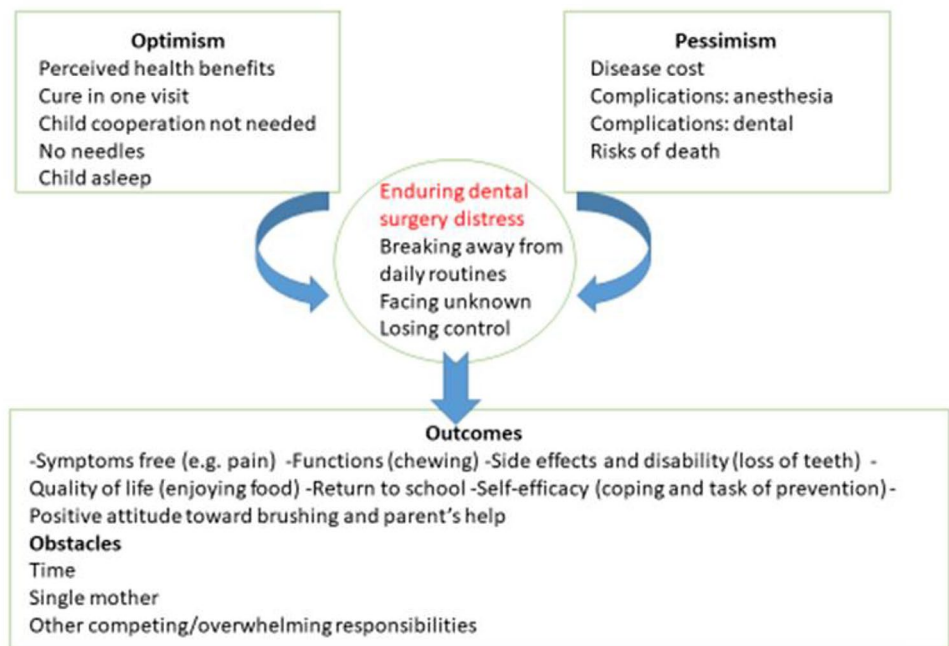
I think before the treatment, she didn’t quite know -- she didn’t quite understand, like, how important it was to brush correctly, and now that she had to go for her surgery, she takes it more seriously and she is more willing to let me help her, whereas before it was such a huge fight to get her to let me help her brush her teeth and make sure we get all of them and flossing.

In summary, while it is true that children (and their parents) were anxious and sad about undergoing the dental surgery (for some, it was like facing an unknown reality, and for others, it was a break from daily routines and an unenjoyable experience), but all participants expressed a sigh of relief after “safely” getting through it (Fig. 1). They also said positive thoughts that, while enduring the distress, everything had been “fixed” and that engaging in the prevention of new oral disease would help negate having gone through the stressful experience.

Discussion

Given the importance of family to children, understanding the experiences of families of young people with the dental illness can be valuable in clarifying the phenomenology of evolving illness and decisions regarding its prevention, negligence, or treatment. This study provides further evidence

Fig. 1 Outcomes of dental surgery experience



that families play a crucial role in the path toward disease and therapy; therefore, engaging them may improve prevention and access to care for children experiencing severe dental decay. This is particularly true in light of our findings that children with dental decay frequently go untreated for years. This research's conclusions corroborate others' findings that dental treatment under general anesthesia has both negative and positive outcomes.

Anxiety

The key theme from the data was participant anxiety. This is consistent with the results of other researchers. Hosey et al. (2006) found the majority of children undergoing DTGA were generally anxious. These authors also reported dental anxiety, induction stress, and postoperative morbidity were interrelated. Li and Lopez (2006) demonstrated that children and parents experience elevated anxiety and distress before surgery. Notably, the primary concern of parents was exclusively related to anesthesia, not dental work.

Other researchers (Goodwin et al. 2015) have shown that DTGA does nothing to alleviate dental treatment anxiety, as was the case with the current findings. According to the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS), at least one group of researchers reported an increase in dental anxiety after treatment DTGA (Cantekin et al. 2014).

Although the findings here are generally consistent with the literature, there are areas where they differ. Parents from a study conducted by Wong et al. (2005) were anxious about treating children's teeth under GA because they thought GA would affect the development of a child's brain, threaten a child's life, affect temperament, memory, growth, and development, and cause hair loss. Amin (2007) reported one mother said: "He might not awaken after the [dental] surgery...and it might affect my child's brain or his IQ" (p. 292). Amin's studied nine Chinese immigrants in Burnaby, British Columbia. In comparison, none of our participants mentioned the potential complications of GA reported by Wong et al. (2005) and Amin (2007) as concerns.

Factors related to anxiety

Related to anxiety were age, wait times between arrival and induction, and prior non-DTGA exposure to a mask. While Lumley et al. (1993) considered children ages 1–5 to be at a higher risk for significant anxiety before surgery, a clinician involved in the current study suggested very young children might not understand enough about the procedure to experience anxiety. How young is too young to understand or not experience fear in unfamiliar situations deserves further exploration. The role age plays in preoperative anxiety warrants examination, mainly because the population of children age five and younger is a considerable number of children

receiving day dental surgery in Canada, the US, and the UK (CIHI 2013; Saxen et al. 2017; Hosey et al. 2014).

Anxiety may have been reduced by playing at home with an anesthesia mask before a GA appointment: At least one parent indicated a child had received a mask by mail for this purpose. Aydin et al. (2008) found this practice to relieve mask-related anxiety, improve acceptance, and shorten the induction period.

As the effects of DTGA on children and parents were examined, we found the results nuanced, as the absence of pain in children may constitute a significant relief to a parent. Similarly, when a child does not eat or miss school due to toothache, parents are worried about health and education; treating a condition improves a parent's emotional wellbeing. This burden of GA and the possible side effects had an emotional impact on parents.

Barriers to care

A common thread connecting themes in the data was barriers to care for families. Wait times, cost, and a poor understanding of children's oral health are barriers prevalent in the literature and warrant discussion here.

Wait times

Participants reported experiencing varying wait times between several weeks to several months. A majority of participants indicated the wait time was acceptable. Demand for DTGA when treating caries in young children is high and increasing in Canada, Australia, the UK, and the US (Goodwin et al. 2015; CIHI 2013). The Wait Time Alliance (2015) released a report card showing, in 2015, almost 50% of Canadian children in need of dental surgery had to wait longer than was medically acceptable and might be associated with side effects (Goodwin et al. 2015). This applied to only one case in our sample, a refugee who waited for seven months, during which he suffered pain, sleepless nights, and missed school.

Cost

Two-parent participants shared they did not know how they would afford the procedure, and a few others voiced a concern they were not sure if the surgery was covered by insurance. Locker et al. (2011) explained a lack of dental coverage associated with low-income families at a national level hinders treatment in Canada. The high cost of dental treatment and lack of insurance and financial means to meet the fee contributes to a hesitation to seek treatment.

The costs associated with treating children's caries in the OR are substantial for families and the health care system. In Canada, the hospital-associated costs for DTGAs are

absorbed by the health care system and exceed \$21 million annually (CIHI 2013). Additional charges include dental costs (some are covered by third-party insurers, Interim Federal Health Program [IFHP], or Non-Insured Health Benefits Program [NIHB]), travel costs, and costs borne by a family.

Poor knowledge and the need for education

Even though participants in the current study were relatively well educated (45% were college graduates; 50% were high school graduates only), it was evident that children's dentition and oral health were low in at least two mothers. An important area of concern was the perceived unimportance of primary teeth. This was reflected in statements like, "They [primary teeth] are not as important as adult teeth." A mother was not overly concerned about a "dead" tooth because it was "just going to fall out anyway." While we know from parent participant narratives that most families initiated positive changes after DTGA, it sustains positive behaviors long-term, which is the challenge.

Cultural influences

Hoover et al. (2016) revealed immigrants and refugees in Saskatoon, Saskatchewan, Canada have priorities and concerns more pressing than their children's oral health needs (e.g., learning English and adapting to the new culture). In this study, a parent considered attending English classes and a lack of time as obstacles to taking care of her daughter's oral health. Prowse et al. (2014) found parents from certain ethnic and cultural groups may seek dental care only after children experience pain. Amin and Perez (2012) found seeking dental care was not a cultural norm for African newcomers to Alberta, Canada.

Although Canadian parents seem to have good knowledge about how and why to clean a child's mouth even before primary teeth emerge due to public health messages and early childhood oral health promotion campaigns (CIHI 2013), the hesitancy of some parents to initiate and maintain preventive oral health care is troubling. It will require compassion and cultural competency on the part of providers.

Implications of the study's findings

Given the information shared by the children regarding the procedure, parents may be more aware of the importance of dental health and the need to address the oral health of children, even if it means DTGA. It has become evident that promoting toothbrushing for young children is not enough; parents and children need training and coaching into the process (hands-on demonstrations and mentoring).

This study's findings will help healthcare professionals consider aspects of treatment not generally addressed, such as reviewing preoperative protocols (e.g., fasting) and developing strategies to manage pre- and peri-operative fear/anxiety. Early intervention is an important strategy to prevent childhood caries. There are ongoing efforts and research to prepare children to develop coping strategies to ease anesthetic induction because it was the main concern for both parents and children. A potential avenue for research would be to work with children to develop age-specific material such as videos or cartoons to prepare children for a DTGA experience using child-centered terms and concepts.

Limitations of the study and future research

Given this study's qualitative nature, generalization cannot be achieved since the goal is not to generalize but to provide an understanding of the human experience. For the purpose here, trustworthiness can be thought of as the ways in which qualitative researchers ensure transferability, credibility, dependability, and confirmability are evident. Verbatim quotations and constant comparisons were two techniques used to support credibility. Thick descriptions and detailed write-ups of the results allow readers to track the valid, justifiable progression from data to data-analysis to conclusions. A convergence of the data (i.e., triangulation) collected by interviews, observations, field notes, drawings, video diaries, and a quantitative questionnaire additional to bracketing investigators' assumptions ensured that the findings are genuine reflections of the participants investigated (Baghdadi 2019).

Second, while the study tried to capture the families' lived experience of this care pathway, pre-, peri- and post-operative, there is a need to revisit participants long term to identify persistent or new effects. Third, while this study's focus was families, giving them a voice and empowering their engagement with research, there is a need to include healthcare professionals in the dialogue, enabling a more holistic understanding of patient-reported outcomes. A final limitation is related to sample size. Sample size in qualitative inquiry depends mostly on the degree to which the research purpose is met. The sample size should be consistent with the minimum number of participants needed to adequately represent the inquiry phenomenon (Vasileiou et al. 2018). Because the research tradition of the inquiry is narratology, looking for depth (rather than breadth) in the sample, a sample size of ten may be judged adequate, guided by the most recent qualitative studies examining a similar inquiry (Rodd et al. 2014). Finally, the sample involved both children and parents for 25, and data were collected longitudinally using multiple research tools to answer the research questions.

Conclusion

The findings and recommendations from this qualitative study include:

- Dental treatment under general anesthesia is psychologically and emotionally troubling for both children and their caregivers; thus, it is imperative to explore ways to ease the experience.
- Children as young as three can meaningfully participate in their surgical care pathway, along with their caregivers and healthcare providers.
- As children provided insights about their own dental and medical experiences that have scarcely been previously described, future research should fully incorporate children's perspectives into evaluating dental and medical services.
- Creative activities used as research tools, such as drawings and video or audio diaries, could be included in future research.

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Declarations

Conflict of interest The authors declare no conflict of interest.

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Informed consent All parents provided written informed consent.

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