

# Understanding Oral Health Behaviors Among Children Treated for Caries Under General Anesthesia

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## ABSTRACT

**Purpose:** To identify factors that influence oral health behaviors in the pediatric population treated for caries under general anesthesia (GA).

**Methods:** Nineteen semi-structured key informant interviews were conducted with caregivers while their children received comprehensive dental care under GA. Interviews were recorded on audio and professionally transcribed. Transcripts were coded using an inductive approach, with codes categorized and themes identified in an iterative process among four investigators.

**Results:** Data from 14 English and five Spanish interviews were reported. Factors that impacted accessing dental services, toothbrushing, and sugar intake were related to experiences living with severe caries and family dynamics. Many caregivers found the process of accessing care challenging, with barriers ranging from a caregiver's denial of disease severity to insurance status and provider availability. Discordant dynamics between parents and their children hindered efforts to change oral health behaviors. Stress of daily life impacted the ability for some caregivers to prioritize oral health.

**Conclusion:** Our findings provide a better understanding of how a family's experiences and dynamics prior to dental care under GA can serve as barriers to changing oral health behaviors within an urban, Medicaid-enrolled population. Future work should address the complexity and context of familial interactions in efforts to improve surgical outcomes. (J Dent Child 2019;86(2):101-8)

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Severe early childhood caries disproportionately affects children in vulnerable populations (e.g., racial/ethnic minorities, children from low socioeconomic households, uninsured/Medicaid-enrolled

rural residents).<sup>1-3</sup> Though rare (affecting approximately 0.5 percent of Medicaid-enrolled children),<sup>4</sup> the prevalence of treatment of dental caries under general anesthesia (GA) is increasing globally<sup>5</sup> and represents a significant financial burden to state Medicaid programs.<sup>4</sup> Despite significant social and financial impacts on families and health systems, most patients experience disease recurrence within 24 months postoperatively.<sup>6,7</sup>

High caries recurrence rates after dental treatment under GA point to the limitations of an intervention that removes disease sequelae but does not directly address recurrent caries. A GA event may elicit intentions

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to reduce high-risk behaviors in some families,<sup>8</sup> but too often it fails to translate into sustained improvement in oral health. Effective means for reducing risk behavior and improving oral health have been elusive in the surgical population, in part because underlying mechanisms contributing to these behaviors are not well understood. In order to change oral health behaviors (e.g., tooth-brushing, carbohydrate intake, establishing a dental home) and improve long-term surgical outcomes, a greater understanding of the barriers to behavioral change is necessary.

The purpose of this study was to identify factors that influence oral health behaviors in the pediatric population treated for caries under GA.

## **METHODS**

### **STUDY DESIGN AND SETTING**

This qualitative study comprised of semistructured interviews of key informants (i.e., caregivers within the pediatric dental surgical population) was approved by the Institutional Review Board of the University of Illinois at Chicago (UIC), Chicago, Ill., USA. Both the pediatric dental clinic and the affiliated hospital are a Medicaid safety net provider in the state of Illinois.

### **INTERVIEW GUIDE DEVELOPMENT**

Interview guide development was informed by Patrick et al.'s<sup>9</sup> organizational framework of factors that influence dental utilization as well as prior work with the GA population.<sup>10</sup> The interview guide addressed household oral health behaviors, understanding of child's oral health status, knowledge about disease etiology, household history of caries, access to dental care, and sources of oral health information. The interview guide development was an iterative process with revisions solicited from experts in qualitative research. Spanish versions of the demographic survey and interview guide were created by a bilingual research assistant. Back translations into English were performed by a separate bilingual research assistant.

### **STUDY POPULATION**

For the purposes of this study, the term dental surgery refers to comprehensive oral rehabilitation under GA. Criteria for recruitment included: English or Spanish speaking parent or legal guardian of a child receiving dental care under GA and any additional accompanying adult household member; informant's age between 18 and 65 years; and a child's age of one to 12 years. Exclusion criteria included children with systemic health issues, as classified by American Society of Anesthesiology classification >3, or a behavioral issue (e.g., autism or developmental delay). The patients presented to the pediatric dental clinic at the UIC College of Dentistry seeking initial care. They were offered dental care under GA after

the initial consultation based on their dental disease severity and behavior. The patients going under GA in this institution have historically had average decayed, missing or filled tooth score of 10 or higher. Measures of disease severity were inconsistently recorded preoperatively due to variable patient compliance.

Recruitment and enrollment procedures were as follows. Caregivers received an informational flier about the study at the preoperative clinical visit. On the day of surgery, they and other adult family members (e.g., spouse, grandmother) who were also present and could provide a household perspective were invited to participate in the interview. This was done in an effort to capture data from all caregivers who may affect the child's oral health behaviors. Informed consent was obtained by the person conducting the interview, which was done in English or Spanish during the child's procedure in a private room near the operating rooms. Each interview began with the following: "The nurse (in the operating room) knows that you are here and if there are any issues with your child, we will stop the interview." All interviews were audio recorded.

Participants were also asked to complete a short survey to report household demographics. Interviews lasted 20 to 85 minutes, based on the presence of a single caregiver or multiple adults. Upon completion of the interview, participants were compensated for their time with a \$40 voucher to the hospital cafeteria.

### **DATA TRANSCRIPTION, TRANSLATION, CODING, AND ANALYSIS**

Interviews were transcribed verbatim. Spanish interviews were initially transcribed in Spanish and then translated into English. The translations were verified by a second bilingual transcriptionist. Each transcript was deidentified and assigned a code generated using Atlas.ti 8.0 software (Scientific Software Development, Berlin, Germany). Four authors participated in the initial coding of each of the first nine English interviews. Transcripts were analyzed inductively without theoretical imposition.<sup>11,12</sup> All transcripts were initially coded by each reviewer independently. Reviewers met to discuss patterns of text and develop codes in a repetitive process of identification, comparison across transcripts, and review until convergence was attained across coders. Codes were continually developed and defined until consistency was reached across transcripts and reviewers. The same transcripts were again reviewed by at least two reviewers to organize codes into categories.

Discrepancies were reviewed and discussed until consensus was reached by the entire group. Based upon categories, authors identified themes, which were then applied to remaining transcripts. Each of the remaining transcripts was independently coded by two authors. There was no divergence between codes in English and Spanish speaking informants. No new data, coding, or

themes emerged in the interviews conducted in 2016 compared to earlier interviews. We were able to demonstrate the ability to replicate the study through saturation of themes and meaning at 14 interviews.<sup>13,14</sup> All processes described were performed with assistance of Atlas.ti software to analyze qualitative data.

## RESULTS

Initial interviews were conducted between July and October of 2014. Four eligible families declined participation. Additional interviews were conducted in May 2016 after presenting preliminary results at a national conference to confirm “meaning saturation”; no new themes emerged.<sup>13</sup> Five interviews were conducted in Spanish by a male bilingual interviewer who was a native of Colombia. Sixteen interviews were conducted in English by the bilingual interviewer as well as two other interviewers who are native English speakers (a Caucasian male who had no contact with families in the clinical setting, and an Asian female who had no clinical responsibilities involving the families interviewed). Two interviews were excluded from analysis due to technical issues with audio recording and a medically complex history. Within the 19 surgical households, there were 42 children and 39 adults living together. Two households reported siblings who had prior dental surgery with GA, and several reported siblings who had extensive dental treatment without GA. Two families identified English and Spanish as the household primary

languages. Other household demographics are summarized in the Table.

Two main themes emerged as caregivers discussed their child’s oral health: living with severe caries and challenges in changing oral health behaviors. These themes provide clarity about why some families pursued treatment, advice, or assistance in behavior modification (or not). Unique interview labels (D1 to D20) are presented adjacent to quotes in order to demonstrate that presented quotes represent the full spectrum of interviews rather than a cluster of select families.

### LIVING WITH SEVERE CARIES

While each family was eventually successful in receiving treatment for their child’s severe caries, caregivers reported enduring great adversity associated with the child’s poor oral health status and the subsequent process of seeking care. The experience of living with caries, from the child’s perspective, was described as negative to the child’s quality of life. From the caregiver perspective, having a child with severe caries was challenging and frustrating, as it required navigating a fragmented health system for Medicaid enrollees. The experience related to severe caries was discussed in three subthemes: (1) the child’s experience; (2) cues to seek care; and (3) navigating the health care system.

**Child’s experience.** Caregivers reflected upon negative impacts on quality of life, mainly due to pain (N=10) and poor self-image (N=4). Several caregivers described children’s teeth as “ugly.” Several described severe dental caries that had reached the “nerve” or resulted in teeth “falling out by pieces.” Pain was frequently reported to impair eating or toothbrushing. Appearance of caries, particularly in the front teeth, significantly affected the child’s sense of self, likely driven by social interactions. For example, one caregiver said (D9):

*“And then, now that he go to school, little bitty kids picks (on) him....Cause he came home and he said ‘Grandma, why I got black teeth?’”*

**Cues to seek care.** Pain and appearance were typical cues to seek care. However, symptoms of severe caries (e.g., extensive tooth breakdown) did not prompt treatment for all. For one mother, despite the child being teased at school, seeking care was driven by continual family pressure, as one grandmother told us (D9):

*“(Mother) didn’t get around to it until we pushed her. We had to keep sayin’ somethin’ about it and we had to keep sayin’, ‘(Mother), take (child to dentist). Take (child). Take (child).’”*

**Navigating the health system.** The stress of the negative impact of caries on a child’s quality of life was exacerbated by challenges in navigating the health care system. These difficulties ranged from reported dissatisfaction with provider interactions to barriers to care. One characteristic of a dissatisfying interaction was the

Table. Characteristics of Pediatric Dental Surgery Households (N=19)	
Mean age of child (years) ±(SD)	3.8±0.9
Caregiver*: N (%)	
Mother	16 (67)
Father	6 (25)
Grandmother	2 (8)
Mean age of caregiver (years) ±(SD)	
Mother	24.8±6.3
Father	28.7±5.9
Grandmother	47.5±1.5
Primary language(s) in home: N (%)	
English †	11 (52)
Spanish †	9 (43)
Other	1 (5)
Race/ethnicity, household: N (%)	
Caucasian	3 (16)
African American	4 (21)
Latino/Hispanic	12 (63)

\* Nineteen families were interviewed, which were represented by varying combinations of mothers, fathers, and grandmothers.

† Two families identified English and Spanish as the primary languages for their household.

ineffective transfer of knowledge, to the frustration of many. One parent told us (D6):

*"...they just tell me what needs to be done. They didn't give me any kind of specific answer like 'we can tell it's from too much sweets.'"*

Another characteristic of a negative provider interaction was perceived judgement from dental clinic staff, as evidenced by the following comment we received (D20):

*"The only problem I have is when they (dentists) jump to conclusions and say that I let my children sit up and eat Cheetos and bubble gum and drink pop."*

Finally, the experience of seeking care for severe caries was challenged by access to care. The reported barriers to care were either due to Medicaid status and/or provider availability, as exemplified in the following comment (D19):

*"Sometimes it's... difficult to find a dentist with the state insurance."*

Several community dentists did not treat severe caries due to need for sedation or GA or poor reimbursement by public aid insurance.

## **CHALLENGES IN CHANGING ORAL HEALTH BEHAVIORS**

Changing oral health behaviors was a challenge for all families. We identified subthemes around education, knowledge, application of knowledge, family functioning (relationship dynamics within a household) and parenting styles (permissive, authoritative, authoritarian). For most families, multiple subthemes served as barriers to behavioral change.

**Education, knowledge, and application of knowledge.** Education, knowledge, and the ability to apply knowledge to life scenarios were, at times, separate skill sets. Oral health education varied in terms of sources, awareness, and adequacy. Sources of education included pediatricians, general dentists, and pediatric dentists. Some reported a complete lack of education provided by health professionals. Perhaps related, extent and quality of oral health knowledge varied. Many caregivers could identify a specific caries risk factor. However, interviews ( $N = 15$ ) revealed either an incomplete understanding or lack of awareness of multiple risk factors and basic oral health concepts. Avoidance of caries-promoting food intake was applied only to specific high-risk substances, such as candy. Several caregivers were not aware of replacing one high-risk substance with another, such as when parents described reducing sugary intake by eliminating juice in the morning but then reporting that the substitute was another sugary beverage, suggesting a health literacy issue, as demonstrated in the following exchange (D8):

*Father: "Absolutely, no more apple juice."*

*Mother: "Water, milk."*

*(Later)*

*Mother: "(Child) loves milk."*

*Interviewer: "Does he?"*

*Mother: "Every morning he ask for hot cocoa."*

A few caregivers were surprised to learn that substances with fruit in the label (juice, snacks) were actually sources of sugar. When caregivers described how their children's dental caries had become so severe, it became clear that, even for those who received provider-based oral health education, this did not translate into knowledge. Many questioned why surgical intervention was necessary for primary teeth. For example, one parent told us (D6):

*"To me it seems weird that a two-year-old would have dental surgery, because they are just going to fall out."*

Frequency and competency of toothbrushing were concepts underappreciated by this family and many other families. Prior to surgery, this mother reported toothbrushing only once a day and allowing her two-year-old twins to brush their own teeth without adult assistance. Education often clashed with personal experiences. Caregivers often attributed a strong family history of severe caries to genetics rather than high-risk oral health behaviors. The bias toward a genetic etiology was evident, even when caregivers discussed engaging in high-risk oral-health behaviors. A genetic etiology for caries was particularly prominent among caregivers who cited siblings within the same household. For example (D20):

*"Well, one, they said that they both have the same father, but then genetically every child is different. So, just because (patient's) brother has stronger teeth doesn't mean (patient) is going to have strong teeth the same way... Basically, it's just like when all your children can have black hair and then one of them has blonde hair and blue eyes and you wonder where it comes from."*

**Family functioning.** Family functioning and parenting styles also influenced oral health behaviors. Within family functioning, caregiver's psychosocial state and interpersonal relationships directly impacted a child's oral health. Poverty and related insecurities contributed to low prioritization of regular preventive dental visits and toothbrushing. In response to a probe about a dental home, one mother explained how financial stressors precluded her from taking her son to the dentist (D13):

*"I don't usually take him to the dentist."*

*(The interviewer probes to clarify why.)*

*"Because I am the only one providing for my home and I work too much. If I don't work, my bills don't get paid."*

Single mothers, in particular, related the stress of daily life to their low prioritization of oral health. For instance, one mother told us (D19):

*"I was alone. I had nowhere to live, and brushing his teeth was the last thing on my mind...because I was always worried (about) 'today, where are we going to sleep tonight, where will I get food from, and to give him food...And the last thing to go through my mind was, 'today, I need to brush his teeth.'"*

Interpersonal relationships between caregivers were often cited as barriers to caring for a child's teeth. Extended family members and daycare providers were described as barriers when they did not share or enforce the same goals for care. Case in point (D11):

*"You leave (child) with a babysitter, and the babysitter won't take time to brush her teeth."*

Parent-parent dynamics served as a barrier, regardless of marital or residential status. However, split households shared unique challenges when parent-parent dynamics were a source of discord. For instance, one mother said (D13):

*"But I don't know. I mean, (child) goes to his dad's house and his dad always puts the blame on me. But his dad...all he has is snacks, juice, popsicles. You know I can't control that. I can't control what he has in his house...every time (child) goes over there he lets them do whatever, not do whatever they want, but just so they can be quiet, he gives them that. And I tell him, how am I supposed to do better for (child) when you are giving (child) all the stuff that is affecting their teeth?"*

**Parenting style.** Parent-child dynamics were often framed as originating from the child's personality or developmental stage rather than from a sense of parenting style. One parent said (D4):

*"He's stubborn. He's very stubborn. He wants to do things his own way, when he wants to do it, on his time."*

Parents also described their own tendencies to submit to their children's resistance, tantrums, and repeated requests. One parent recalled (D7):

*"(Laughing) So that she didn't cry, well, we'd give her a candy, right?"*

Many indicated that their permissive parenting was due to an inability to deny requests or endure their children's behaviors. Some expressed concern about the appearance of being an unloving parent if they were not permissive with candy and treats.

There were few examples of constructive parenting tactics that facilitated oral health behaviors. Modeling oral health behaviors was seen as instrumental in establishing toothbrushing routines. For example (D11):

*"I brush with them looking at me. Then they say, 'now we go up, down, the left, the right,' and they get it as fun. They get used to it and like it. So, when you say, 'go brush your teeth,' they say, 'I'm waiting,' and you have to go there. If you don't go, they won't do it, because they feel like it's a punishment. But if you do it together, then they feel like everyone is supposed to do it."*

In addition to modeling behavior, parents engaged their children by incorporating toys or distracting activities during toothbrushing. One parent said (D12):

*"Because we sing her a song and that's what she likes and she buys her brushes to her liking, in other words, so that it calls her attention so that she doesn't say no."*

Parenting tactics also included negative feedback to enforce oral health behaviors, as evidenced by these comments from a mother and father (D15):

*Father: "We scold them. We scold them."*

*Mother: "One has to get their attention to brush their teeth."*

A more direct approach to oral health behaviors appeared more frequently in the context of very young children, as demonstrated by the following parental comment (D4):

*"We've held him down, brushed the teeth. We've let him try to do it. A three-year-old is not going to brush his teeth very well, by himself."*

## DISCUSSION

The objective of this study was to better understand factors within the surgical population that would impact a family's ability to change oral health behaviors in order to reduce risk for recurrent caries. Our findings provide a greater understanding of how a child's poor oral health-related quality of life, challenges in accessing dental care, family functioning, and parenting styles influence a child's oral health and behaviors, which serve as possible targets for intervention (e.g., establishing a dental home, toothbrushing routine, supportive parenting techniques).

The household experiences related to having a child with severe caries provide insights into challenges for changing behaviors. A child complaining of pain, social stigma of caries, or difficulties with eating did not always serve as a catalyst for families to seek care. It cannot be assumed that these outcomes will induce families to establish a dental home or serve as motivators to maintain oral health behaviors for all surgical families. For those who actively sought care, some experienced difficulties in navigating the health care system, which contributed to delayed care. Though all families eventually received care, many lived a considerable geographic distance from the university. We expect that establishing or

maintaining a dental home after surgery will continue to be problematic for these families, due to the reasons identified in interviews: lack of community dentists who treat children, accept public insurance, or provide effective education and communication. We anticipate that presurgical experiences with oral health services may contribute to a reluctance to pursue follow-up care. Interventions should consider these experiences in order to understand values, priorities, and biases that affect the ability of these families to establish a dental home after dental GA.

This study points to limitations of educational interventions within this population. In our institution, families meet with providers for a minimum of three presurgical visits, presenting several opportunities to discuss risk factors. Interventions to address oral health behaviors are limited by a pattern of poor postsurgical follow-up among the pediatric dental surgery population.<sup>15</sup> From the clinical provider's perspective, it is assumed that families view surgery as an event that will intrinsically motivate change. It may also be assumed that caregivers understand why their children developed severe caries and how to modify risk.

However, plans to reduce risk of recurrence were typically general (e.g., avoid all sugar) and lacked specific implementation strategies. In response to probes about disease recurrence, some were still not sure how their child developed such a severe disease. Some adopted a philosophy that recurrence was not in their control, attributing disease to factors such as genetics, fate, or having mineral deficiencies. Integration of oral health education into daily life was difficult, which appeared to be complicated by low health literacy. Health literacy-guided educational interventions have had a greater impact than standard educational interventions in changing unhealthy snacking habits.<sup>16</sup> The dietary focus centered on avoiding candy, rather than a more fundamental understanding of caries-promoting caloric intake. Acceptance of education was challenged by caregivers' personal observations and incomplete understanding of caries (e.g., siblings were exposed to similar risk for severe caries, yet never required surgery). Timing and assessment of educational interventions may be critical to changing oral health behaviors. Although caregivers had already received presurgical education regarding risky oral health behaviors, they often did not recall this. Our findings highlight the importance of probing for health literacy, which has been associated with oral health behaviors and may mediate the effects of socioeconomic status on behaviors.<sup>17</sup>

This study sheds light on how family dynamics and parenting styles influence behaviors and thwart good intentions. Our findings are consistent with prior work that described a child's personality and familial dysfunction as contributors to the need for repeat dental GA.<sup>10</sup> The relationships between family dynamics and parenting styles on oral health behaviors fit well within the framework of family systems theory.<sup>18</sup> Within the family

systems variables, the dynamics of the intercaregiver relationship (family cohesion) have a bidirectional effect. We found that caregiver conflict was a barrier to changing/maintaining oral health behaviors. However, even with concordance in goals and behaviors, divergent parenting styles made enforcing oral health behaviors difficult.

These findings lend credence to prior work on the influence of family functioning on children's health behaviors. There is growing evidence that family functioning, including parental stress, influences health.<sup>19</sup> Stress influences parenting and may, in this way, influence a child's overall health.<sup>20</sup> Within the context of a child's oral health, parental stress has been associated with health behaviors<sup>21</sup> and caries.<sup>22,23</sup> There is overlap in the dimensions of family functioning (responsiveness, communication, partner-relation, and social network) that are associated with caries.<sup>24</sup> On a broader scale, family functioning has been proposed as an explanatory variable for childhood caries,<sup>25</sup> but it is not clear whether its influence on outcomes is through an association with oral health behaviors.<sup>24</sup> There may also be domains of family functioning, such as the emotional quality of relationships, which have been recognized<sup>25</sup> but not adequately explored as being important to maintaining a child's oral health.

Our findings are limited by the inherent architecture of qualitative studies. The themes we propose as influential to oral health behaviors in the perioperative period may reflect the specific population we studied or the biases of the authors. A limitation of any qualitative study includes the concept that the investigators' personal lens might influence the collection, presentation, and analysis of data. At each point of the development of the codebook and analysis, analysts addressed these points in group discussions. Through greater awareness of our own biases and values, we attempted to minimize the impact on presentation and interpretation of data. We feel we may have succeeded in this, as we identified themes around family functioning that were unexpected yet repeatedly discussed by our caregivers in our Medicaid-enrolled population.

## CONCLUSIONS

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

1. The experiences of living with caries before dental care under GA, such as a child's pain, social stigma of caries, or difficulties in navigating the health system, should be considered as factors that may influence motivation or ability to change behaviors after surgery.
2. Caregiver and patient education should be responsive to the health literacy needs of the surgical population, and providers should probe for discrepancies in knowledge and practical application of knowledge in daily life.

- Interventions to change oral health behaviors should be adaptive to various psychosocial factors and household dynamics.

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