

# Evaluation of Change in Quality of Life, Dental Fear and Dental Anxiety in Young Children Following Full-mouth Dental Rehabilitation under General Anesthesia for Early Childhood Caries

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## ABSTRACT

**Aim:** To evaluate the change in quality of life, dental fear, and dental anxiety in young children following full-mouth dental rehabilitation under general anesthesia for early childhood caries.

**Materials and methods:** About 200 children who were diagnosed with early childhood caries requiring full-mouth rehabilitation under general anesthesia were recruited after obtaining parental consent. Oral health-related quality of life (OHRQoL) was measured using the Early Childhood Oral Health Impact Scale (ECOHis). Dental fear was evaluated using Children's Fear Survey Schedule-Dental Subscale and dental anxiety was evaluated using the Facial Image Scale. Scores were taken on the day of intervention, and after 14 days when the child reported for posttreatment follow-up.

**Results:** All 200 participants returned for a follow-up visit after 2 weeks. The child impact section was reduced from  $15.7 \pm 4.1$  to  $7.7 \pm 1.9$  after treatment. The family impact section was reduced from  $9.6 \pm 2.7$  to  $3.5 \pm 2.6$  after treatment. A statistically significant difference was seen in both sections when pre- and posttreatment values were compared ( $p < 0.001$ ). The total ECOHis showed statistically significant improvement as the pretreatment score of  $21.6 \pm 9.5$  reduced to  $11.2 \pm 4.2$  showing 51.9% improvement in OHRQoL after full-mouth rehabilitation under general anesthesia was done ( $p < 0.001$ ). Dental fear and anxiety among the participants showed a statistically significant reduction after treatment was done and most participants were found to be less fearful of doctors, dentists, and injections after treatment.

**Conclusion:** Full-mouth rehabilitation was found to be a reliable treatment modality to improve the OHRQoL of children suffering from early childhood caries.

**Clinical significance:** Significant improvement was seen in the OHRQoL within 2 weeks after treatment and most participants were found to be less anxious and fearful toward dentists and dental treatment. Comprehensive dental rehabilitation under general anesthesia has been proven to be an effective treatment modality for early childhood caries and a productive treatment technique to reduce dental fear and anxiety.

**Keywords:** Comprehensive dental care, Dental anxiety, Dental fear, Early childhood caries, Full-mouth rehabilitation, General anesthesia, Oral health-related quality of life.

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## INTRODUCTION

The presence of decayed, missing, or filled teeth in children below 71 months of age is known as early childhood caries (ECC). Despite being completely preventable, ECC is the most common disease-affecting children all over the world.<sup>1</sup> A recently published systematic review by Uribe et al. has revealed that ECC affects almost half the preschool children all over the world.<sup>2</sup> Tinanoff N et al., in their review, reported that caries increased from 17% in 1-year olds to 36% in 2-year olds when data were analyzed from 72 studies.<sup>3</sup> Thus, ECC is a major public health problem despite significant improvements in preventive interventions.

Early childhood caries has a complex multifactorial etiology which involves the interaction of sugar-rich diet, cariogenic biofilm, and tooth anatomy with various sociodemographic, behavioral, and environmental determinants.<sup>4</sup> Early childhood caries begins as a non-cavitated white lesion, usually on the labial surface of primary maxillary incisors. The reinforcement of oral hygiene instructions can reverse the ECC at this stage, but parents do not usually consider this as a serious clinical sign. Parents report to the

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dental office with their children when children have discomfort or pain which may also be accompanied by abscesses which result in difficulty in eating eventually leading to malnutrition and delay in growth and development.<sup>5,6</sup>

Due to their young age, children are often potentially uncooperative and difficult to manage on the dental chair. Because children with ECC require extensive treatment and managing them on the dental chair will not result in optimal results. Hence, to obtain high-quality treatment, children are often treated under general anesthesia. A comprehensive dental treatment under general anesthesia can be done conveniently in a single visit, allowing the dentist to perform dental treatment efficiently.<sup>7,8</sup>

Dental fear and anxiety are common among children with ECC. Children often complain of pain and due to anxiety, they often refuse treatment. High dental anxiety is associated with poorer oral health status but also causes psychosocial problems in adults. However, the exact relationship between dental anxiety and oral health has not been completely understood in children with ECC. Children with ECC are often accompanied by their parents, usually the mothers when they visit the dental office. Studies have shown that maternal dental anxiety affects the child's attitudes toward dentists resulting in poor dental attendance and eventually leading to anxiety toward dentists and dental treatment and poor oral health.<sup>9-11</sup> A longitudinal study conducted by Murray et al.<sup>12</sup> to explore the association between caries experience and dental anxiety has revealed that children who did not receive invasive procedures were more anxious than those who received invasive treatment. Communication between the dentist, parent, and child plays an important role in reducing dental anxiety and improving access to dental treatment.<sup>4-6</sup>

Early childhood caries affects the oral health and general health of the child. Children with ECC usually report to the clinic with chief complaints of pain, which is a distressing situation for both the child and their parents with either or both of them exhibiting dental fear and anxiety. Due to these complaints, children are found to have difficulty eating and weigh less than children who are caries-free. These children also complain of disturbed sleep, poor academic performances, missed school days, and have been found to be anemic. Treatment for the child requires the presence of parents who in turn will need to take a day off work thus affecting the family financially. Thus, ECC not only negatively impacts the child but their family also.<sup>7,8,10</sup> Studies that have been published over the years have shown that ECC results in poor oral health-related quality of life (OHRQoL).<sup>4,7,13</sup> Management of ECC under general anesthesia results in improved OHRQoL, and high satisfaction rates have been reported by parents.<sup>13</sup> Though various studies have explored the changes in OHRQoL after full-mouth rehabilitation for ECC, very few studies have been conducted to find the changes in dental fear and anxiety in children with ECC.<sup>5,13,14</sup> This study was undertaken to investigate the change in quality of life, dental fear, and dental anxiety in young children following full-mouth dental rehabilitation under general anesthesia for ECC.

## MATERIALS AND METHODS

The present prospective cohort study was initiated after receiving ethical approval from the Institutional Human Ethics Committee (IHEC/SDC/FACULTY/21/PEDO/335). The study was conducted from September 2021 to January 2022.

Children below 6 years of age who were diagnosed with ECC and requiring full-mouth rehabilitation under general anesthesia

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with American Society of Anesthesiologists physical status I and II were included in the study. Children who were above 6 years, those who could be managed in the dental office, and those who were medically compromised were excluded from the study. If a child was visiting for a repeat treatment under general anesthesia for ECC, the child was not included in the study.

Out of a total of 562 patients who visited for the management of ECC, 200 dyads of children and their parents or caregivers who fulfilled both the inclusion and exclusion criteria and were willing to participate were included in the study.

The patients were examined in the outpatient department of Pediatric Dentistry Department at Saveetha Dental College and Hospitals, Chennai. After clinical examination, the treatment plan was explained to the parents based on clinical and radiographic findings. The entire treatment procedure was explained in detail to the parents and they were given opportunities to ask about any doubts they had about the procedure. After consent was obtained from parents, the child was sent for blood tests and echocardiography. After the results were obtained, the child and their parents were taken to the anesthetist so that the anesthetist could evaluate the child's readiness for surgery, and a date for the operation was scheduled. All patients were treated in the operating room of the pediatric dentistry department.

Data were gathered using the ECOHIS,<sup>15</sup> a self-administered questionnaire, and the Modified Children's Fear Survey Schedule-Dental Subscale (CFSS-DS), a questionnaire provided to children by the dentist. Both on the day of surgery and at the child's postoperative review session, which took place 2 weeks following the full-mouth rehabilitation, the parent or caregiver filled out the ECOHIS questionnaire. CFSS-DS was completed by the dentist at the child's preoperative review appointment and also completed by the same dentist at the postoperative appointment. If the family failed to attend the postoperative review appointment, the subject was excluded from the study.

A standardized treatment protocol for all patients. Single-surface lesions or occlusal lesions that did not compromise cusp integrity were restored with intracoronal restorations using glass ionomer cement (GC Gold Label Type II Universal Restorative, GC Corp., Tokyo, Japan) or composite (Tetric N-Ceram, Ivoclar Vivadent, Schaan, Liechtenstein). Teeth with multisurface carious lesions were restored with stainless steel crowns (3M ESPE, St. Paul, Minn., USA). Teeth with caries involving the pulp were treated with pulp therapy and restored with full-coverage restorations: stainless steel crowns for posterior teeth (3M ESPE) and strip crowns for anterior teeth (3M ESPE). All dental materials were manipulated following the manufacturers' specifications. Teeth with necrotic pulps and non-restorable teeth were extracted under local anesthesia. Preoperative and postoperative photographs were taken and uploaded into the dental information archival system of Saveetha Dental College and Hospitals. Demographic details were collected from parents on the day of surgery.

All children received instructions on oral hygiene maintenance and dietary counseling regarding caries-promoting food. Toothbrushing was demonstrated on a supersized model followed by hands-on practice by the children. Parents were also instructed on how to brush their children's teeth. All children were recalled after

2 weeks after full-mouth rehabilitation for postoperative follow-up appointment to evaluate the OHRQoL, dental fear, and anxiety.

### Data Collection for OHRQoL

To assess the OHRQoL in the present study, ECOHIS<sup>15</sup> was used. The ECOHIS consists of two sections [child impact section (CIS) and family impact section (FIS)] and 13 questions which are answered by the parents.

In the CIS, there are four domains, each assessed as being due to dental problems or dental treatment: (1) child symptoms, including pain in the teeth, mouth, or jaws; (2) child functions, including drinking, eating, pronouncing words, or missed school; (3) child psychology, including trouble sleeping and irritable/frustrated; and (4) child self-image and social interaction, including avoiding smiling/laughing and avoiding talking. In the FIS, there are two domains: (1) parental distress of feeling upset or guilty and family function of having to take time off work; and (2) financial impact due to the child's dental problems or treatments. The ECOHIS items were answered and scored on a scale from 0 to 4, as follows: never (score 0); hardly ever (score 1); occasionally (score 2); often (score 3); and very often (score 4). A "don't know" option was also included.

Thus, total scores could range from 0 to 52, with higher scores indicating greater impact and/or more problems. Scores for the child and family sections could range from 0 to 36 and from 0 to 16, respectively.

### Data Collection for Dental Fear

The child's questionnaire consisted of the CFSS-DS items. There were 15 dentistry-related CFSS-DS items: "dentist"; "doctors"; "injections"; "having someone examine your mouth"; "having to open your mouth"; "having somebody look at you"; "the dentist drilling"; "the sight of the dentist drilling"; "the noise of the dentist drilling"; "having somebody put instruments in your mouth"; "choking"; "having to go to the hospital"; "people in white uniforms"; and "having the dentist clean your teeth."

The following verbal descriptions: not afraid (score 1); a little afraid (score 2); fairly afraid (score 3); quite afraid (score 4); or very afraid (score 5). However, because the young children in our sample were not likely to be familiar with a 5-point verbal scale, we substituted the Facial Image Scale consisting of five facial images for the verbal questions. The Facial Image Scale consisted of five drawings of a face displaying affective features, ranging from extremely negative to neutral to extremely positive. For each CFSS-DS item, children were presented with the five images and asked to select which best corresponded to how they were feeling. The faces were scored from 1 to 5, with 1 assigned to the most positive face and 5 assigned to the most negative face. Therefore, the total scores for the 15 CFSS-DS items could range from 15 to 75. The Facial Image Scale has been found to be a reliable and valid method for children as young as 3 years old to self-report dental fear.<sup>12</sup>

### Dental Anxiety

Facial Image Scale was used to measure child dental anxiety at baseline and follow-up examinations. The scale comprises five faces ranging from very unhappy (score 1) to very happy (score 5). Children were asked by the examiner's assistant to point to the face that best represented how they were feeling at that moment, without any parental assistance. Scores were dichotomized and defined as "afraid" (score 1 or 2) or "not afraid" (score 3, 4, or 5). Anxiety change scores were determined by subtracting the baseline score from the follow-up score; a positive changed score was

**Table 1:** Parent and child characteristics

Parent demographics	N (%)
<i>Relationship to the child</i>	
Mother	137 (68.5)
Father	63 (31.5)
<i>Education level</i>	
Secondary or below	173 (86.5)
Postsecondary or above	27 (13.5)
<i>Child demographics</i>	
<i>Gender</i>	
Male	104 (52)
Female	96 (48)
Age (years), Mean ( $\pm$ SD)	4.21 (1.37)
<i>Child's caries experience</i>	
Dmft score, mean ( $\pm$ SD)	9.33 (4.79)

**Table 2:** Mean scores and mean differences in scores the early childhood oral health impact scale (ECOHIS) before and after dental rehabilitation under general anesthesia

ECOHIS domains	No. of items	Pretreatment Mean ( $\pm$ SD)	Posttreatment Mean ( $\pm$ SD)	p-value
Child impact section	9	15.7 $\pm$ 4.1	7.7 $\pm$ 1.9	<0.001*
Child symptoms	1	3.2 $\pm$ 0.9	1.2 $\pm$ 0.6	<0.001*
Child function	4	6.7 $\pm$ 3.2	3.2 $\pm$ 1.2	<0.001*
Child psychology	2	2.9 $\pm$ 1.7	1.8 $\pm$ 1.6	<0.001*
Child self-image and social interaction	2	2.9 $\pm$ 1.8	1.5 $\pm$ 1.2	<0.001*
Family impact section	4	9.6 $\pm$ 2.7	3.5 $\pm$ 2.6	<0.001*
Parental distress	2	4.9 $\pm$ 2.3	2.1 $\pm$ 1.2	<0.001*
Family function	2	4.7 $\pm$ 1.1	1.4 $\pm$ 0.8	<0.001*
Total ECOHIS score	13	21.6 $\pm$ 9.5	11.2 $\pm$ 4.2	<0.001*

\*Statistically significant ( $p < 0.05$ ) Wilcoxon signed-rank test

deemed to be "improved" dental anxiety and a negative changed score was a "worsened" dental anxiety while a zero changed score was "no change" in the level of anxiety.

Statistical analysis was done using SPSS version 28 (SPSS, Inc, Chicago, Ill., USA). Mean age and gender distribution across groups were calculated as well as the mean scores for the ECOHIS, CFSS-DS per group, and FIS. The pretreatment and posttreatment scores were compared using the Wilcoxon signed-rank test.

## RESULTS

About 200 children who required full-mouth rehabilitation for ECC under general anesthesia were recruited for the study. All the children returned for the follow-up visit after 2 weeks, thus giving a 100% retention rate for this study.

About 68.5% of the participants were accompanied by their mothers for the dental visit, whereas the remaining 31.5% of participants were accompanied by their fathers. And 86.5% of the parents had an education level below the secondary level. The remaining 13.5% of the parents had acquired educational qualifications above secondary levels. About 52% of the participants were male. The demographic data are summarized in Table 1.

The mean differences in ECOHIS before and after full-mouth rehabilitation under general anesthesia is presented in Table 2.

**Table 3:** Early childhood oral health impact scale (ECOHIS) response before and after dental treatment under general anesthesia

Impact	Occasionally, often, or very often N (%)		Don't know N (%)
	Before treatment	After treatment	Before or after treatment
<i>Child impact section</i>			
How often has your child had pain in the teeth, mouth, or jaws because of dental problems or dental treatment?	196 (98)	7 (3.5)	0
How often has your child had difficulty drinking hot or cold beverages because of dental problems or dental treatments?	143 (71.5)	17 (8.5)	2 (1)
How often has your child had difficulty eating some foods because of dental problems or dental treatments?	179 (84.5)	9 (4.5)	6 (3)
How often has your child had difficulty pronouncing any word because of dental problems or dental treatments?	97 (48.5)	21 (21.5)	0
How often has your child missed preschool, day care, or school because of dental problems or dental treatments?	143 (71.5)	16 (8)	0
How often has your child had trouble sleeping because of dental problems or dental treatments?	184 (92)	35 (17.5)	0
How often has your child been irritable or frustrated because of dental problems or dental treatments?	146 (73)	25 (12.5)	0
How often has your child avoided smiling or laughing because of dental problems or dental treatments?	178 (79)	13 (6.5)	0
How often has your child avoided talking because of dental problems or dental treatments?	74 (37)	15 (7.5)	0
Mean	152.2 (76.1)	17.6 (8.8)	
<i>Family impact section</i>			
How often have you or another family member felt upset because of your child's dental problems or treatments?	192 (96)	11 (5.5)	0
How often have you or another family member felt guilty because of your child's dental problems or treatments?	149 (74.5)	33 (16.5)	0
How often have you or another family member had to take time off from work because of your child's dental problems or treatments?	194 (97)	6 (3)	0
How often have you or another family member been financially impacted because of your child's dental problems or treatments?	142 (71)	4 (2)	0
Mean	169.3 (84.7)	13.5 (6.8)	

A highly significant statistical improvement was seen in the OHRQoL using ECOHIS at the end of the study ( $p < 0.001$ ). The CIS showed a significant reduction from  $15.7 \pm 4.1$  to  $7.7 \pm 1.9$  ( $p < 0.001$ ). A statistically significant reduction was seen in the FIS where scores reduced from  $9.6 \pm 2.7$  to  $3.5 \pm 2.6$  ( $p < 0.001$ ). The overall ECOHIS score reduced from  $21.6 \pm 9.5$  to  $11.2 \pm 4.2$  indicating a significant improvement after full-mouth rehabilitation under general anesthesia.

The responses to 13 items of ECOHIS before and after treatment is represented in Table 3. Significant improvements were seen in all items after treatment. The pain was the main complaint seen in 98% of the participants before treatment which was reduced to 3.5% after full-mouth rehabilitation was completed. About 71.5% of the children missed school due to ECC before treatment which reduced to 8%. About 96% of the parents were upset before treatment due to their child's dental issues which curtailed to 5.5%. And 97% of the parents had to take time off from their work due to dental problems which reduced to 3%.

The mean values of dental fear before and after treatment using CFSS-DS have been illustrated in Table 4. A statistically significant reduction in dental fear was seen after treatment with 14 out of 15 dental scenarios having  $p < 0.001$ . The mean CFSS-DS score reduced from  $46.6 \pm 7.1$  to  $23.8 \pm 5.6$  after full-mouth rehabilitation under general anesthesia.

The change in dental anxiety before and after dental treatment is presented in Table 5. About 142 patients were found to be highly anxious before treatment which reduced to 48 patients with a highly significant statistical difference seen before and after treatment ( $p < 0.001$ ). The number of children who were free from anxiety increased from 2 to 12 after treatment and a statistically significant improvement was seen ( $p < 0.001$ ).

The total ECOHIS showed statistically significant improvement after 2 weeks when patients returned for follow-up ( $p < 0.001$ ). Statistically significant reduction in dental fear and anxiety was also seen among participants at the follow-up visit.

## DISCUSSION

The prevalence of ECC is increasing all over the world with half the preschool children all over the world being reported to be affected by ECC.<sup>2</sup> Though ECC is not considered life-threatening, it can affect the growth and development of the child. The ECC has also been found to affect academic performance and social well-being and can alter the OHRQoL of both children and their families.<sup>4-6</sup> Early childhood caries is now considered as a general health risk factor in India with the national prevalence found to be 49.6%. Ganesh et al. found that all states in India had a prevalence of over 40% in 2019 and ECC has become a public health issue that requires national attention.<sup>16</sup>

**Table 4:** Mean values for fear and standard deviations of different dental situations or conditions in the modified children's fear survey schedule-dental subscale (CFSS-DS)

<i>Afraid of</i>	<i>Before treatment</i>	<i>After treatment</i>	<i>p-value</i>
Dentists	3.7 ± 1.1	1.6 ± 1.6	<0.001
Doctors	4.2 ± 0.6	2.1 ± 1.6	<0.001
Injections	3.9 ± 1.3	2.2 ± 1.1	<0.001
Having somebody examine your mouth	3.2 ± 1.7	1.4 ± 1.3	<0.001
Having to open your mouth	2.9 ± 0.7	1.1 ± 1.2	<0.001
Having a stranger touch you	2.1 ± 0.8	1.9 ± 1.4	0.00
Having somebody look at you	1.7 ± 0.8	1.5 ± 1.3	0.00
The dentist drilling	4.1 ± 0.9	1.4 ± 1.2	<0.001
The sight of the dentist drilling	4.3 ± 1.8	2.1 ± 1.6	<0.001
The noise of the dentist drilling	3.5 ± 0.8	1.6 ± 1.1	<0.001
Having somebody put instruments in your mouth	3.3 ± 1.1	1.2 ± 0.9	<0.001
Choking	3.3 ± 1.2	1.7 ± 0.9	<0.001
Having to go to the hospital	2.8 ± 1.1	1.5 ± 0.9	<0.001
People in a white uniform	3.1 ± 1.3	1.3 ± 0.6	<0.001
Having the dentist clean your teeth	3.8 ± 1.1	1.2 ± 0.4	<0.001
Total CFSS-DS score	46.6 ± 7.1	23.8 ± 5.6	<0.001

**Table 5:** Dental anxiety assessment before and after treatment

<i>Anxiety degree</i>	<i>Before treatment</i>	<i>After treatment</i>	<i>p-value</i>
	<i>N (%)</i>	<i>N (%)</i>	
Free from anxiety	2	12	<0.001
Low anxiety level	24	51	<0.001
Intermediate anxiety level	32	89	<0.001
High anxiety level	142	48	<0.001

The consequences of ECC have effects on the physical, mental, and functional aspects of children.<sup>17</sup> Children have reported various negative issues such as disturbed sleep due to pain which makes them irritable. Due to the unesthetic appearance of anterior teeth, most children do not prefer to smile and may also have difficulty speaking. The presence of multiple decayed carious teeth which have not been treated will make chewing difficult for the child.<sup>10</sup> Due to this, the nutritional requirements of the child may not be met, thus leading to malnutrition.<sup>18</sup> In order to improve the quality of life, treatment should be done at the earliest, but parents rarely report to the clinic at the initial stages. When children report to the dentist, the disease would have spread rapidly and aggressive treatment would be required.<sup>19</sup> Due to their young age and lack of maturity, children with ECC are often uncooperative and may not be easy to treat on the dental chair. This has led to the use of full-mouth rehabilitation under general anesthesia to become a favorable treatment modality for children suffering from ECC.<sup>7</sup>

The benefits of dental treatment under general anesthesia include the provision of high-quality comprehensive treatment in a single appointment and immediate pain relief.<sup>4,5</sup> Authors have reported high contentment among both children as well as their parents and caregivers for the use of general anesthesia as the treatment of choice for full-mouth rehabilitation of ECC.<sup>4,13,20</sup>

The most common complaint among children who participated was pain (98%). Untreated dental caries in ECC has been reported to cause pain as well as inflammation in children which in turn causes difficulty in eating and decreased oral intake.<sup>21,22</sup> The second most common problem among the children was difficulty in sleeping. Sardana et al., in their recent systematic review reported that children with irregular sleep patterns had a high risk for caries.<sup>23</sup> Children with lower sleep times were found to be at higher risk for ECC which is similar to the findings of this study. If sleep is not adequate, an increase in salivary glucose has been found which can alter the disease process and modify it to an environment, which would allow ECC to occur.<sup>24</sup> The dental pain that children often report to a dental office has also been considered a factor for difficulty in sleep.<sup>10</sup> A cross-sectional study conducted by Ogawa et al. which was conducted in multiple centers found that sleep time was independently associated with ECC.<sup>25</sup> The effect of ECC on talking was found to have the least effect on OHRQoL based on ECOHIS.

Significant improvement was seen in the OHRQoL after complete dental rehabilitation was done under general anesthesia. This is in accordance with previously published studies in India,<sup>4</sup> Canada,<sup>13</sup> and Turkey.<sup>14</sup> Most studies have shown that children have minimal problems after full-mouth rehabilitation under general anesthesia and have a quick recovery.<sup>26–28</sup> The clinical success rates have also been high as the child is completely passive under anesthesia and no other behavior modification is required as an adjunct.<sup>29–31</sup> The management of children with ECC under anesthesia also allows parents to save multiple visits to the dentist if the same treatment was to be done on a dental chair.<sup>30–33</sup> An important adjunct to full-mouth rehabilitation is the proper reinforcement of proper oral hygiene instructions and proper diet to prevent the recurrence of dental caries as most children would be high caries risk cases.

Dental fear has been reported to be between 5 and 20% in various countries among children.<sup>34</sup> This fear can make children uncooperative even before the treatment starts, thus hampering the provision of dental treatment.<sup>34</sup> Dental anxiety has been found to be high in children who have never visited a dentist. As children grow older, dental fear and anxiety tend to decrease.<sup>35,36</sup> Families and friends play a key role in the occurrence of dental fear and anxiety. A previous unpleasant experience at the dental office for a parent, caregiver, sibling, or friend may induce the initial seed of fear and anxiety in children.<sup>35–37</sup> First-born children have been found to have high dental fear and anxiety and have been found to pass them to younger siblings.<sup>38</sup> Though the birth order was not considered in the present study, it could have been a factor for the occurrence of dental fear and anxiety among the children. Children who suffer from ECC are preschoolers, most of whom had reported pain and would have hardly met any other children of their age with painless appointments, which could also be a reason for the high dental fear and anxiety in children.<sup>38,39</sup>

An interesting finding in the present study was the significant reduction in dental fear and anxiety among the participants. The result is in contrast to a previous study by Cantekin et al.<sup>14</sup> conducted in Turkey which found an increase in dental anxiety after full-mouth

rehabilitation under general anesthesia. This could be due to the time at which the postoperative dental anxiety was measured and the postoperative protocols which vary from location to location. Though most children have minimal discomfort after full-mouth rehabilitation, few studies have reported immediate problems, such as pain, bleeding, and nausea.<sup>40,41</sup> A possible reason for the reduction of dental fear and anxiety in children in the present study could be the continuous interaction of the dental team from the first visit to the postoperative visit 2 weeks after complete dental rehabilitation under general anesthesia.<sup>42</sup> The present study had limitations of its own. The interventions were done in a single center and thus cannot be generalized for a population. The patients were followed up for only 2 weeks, hence our results are short-term and the long-term effects on OHRQoL, dental fear and anxiety could not be evaluated. Long-term studies should be conducted to evaluate the long-term effects of comprehensive dental treatment on OHRQoL, dental fear, and anxiety.

## CONCLUSION

Full-mouth rehabilitation under general anesthesia significantly improved (51.9%) the OHRQoL for children suffering from ECC using the ECOHIS. The Child Impact Scale improved by 49% and Family Impact Scale improved by 36.5% after the intervention. About 98% reported pain which reduced to 3.5% after treatment. Only 3% of the parents had to take time off after treatment for dental-related issues of their children. Dental anxiety and fear significantly reduced when children returned for postoperative follow-up visit.

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