ORIGINAL ARTICLE

# DENTAL REHABILITATION UNDER GENERAL ANAESTHESIA: A QUALITATIVE ANALYSIS OF ITS IMPACT ON CHILDREN'S ORAL HEALTH-RELATED QUALITY OF LIFE

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**Background:** Early childhood caries is a widespread condition in the developing world, considerably affecting children's oral health-related quality of life by causing pain, discomfort, and functional impairments. Dental rehabilitation under general anaesthesia is a beneficial intervention for severe early childhood caries, offering substantial relief and marked improvements in oral health-related quality of life. This study explores the impact of dental rehabilitation under general anaesthesia on the emotional and social well-being of affected children and their families. **Methods:** A qualitative study was conducted at the Department of Paediatric Dentistry, Children's Hospital, Pakistan Institute of Medical Sciences, Islamabad. Out of 40 children who underwent comprehensive dental treatment under general anaesthesia, the parents of 15 children agreed to participate in focus group discussions and in-depth interviews. Two focal group discussions (with five parents each) and five in-depth interviews were conducted and thematic analysis synthesized data into a comprehensive picture of the participants' experiences. **Results:** Before dental rehabilitation under general anaesthesia, children experienced pain, sleep issues, behavioural problems, poor academics, and social withdrawal, causing emotional and financial stress for families. After treatment, children showed improved behaviour, school performance, and well-being. Parents reported enhanced family dynamics and reduced financial burdens, significantly improving overall quality of life. **Conclusion:** Dental Rehabilitation treatment under general anaesthesia, substantially improves children's oral and functional health, emotional stability, and social interaction, while positively influencing family well-being. Parents expressed high levels of satisfaction, highlighting it as a valuable intervention for managing extensive forms of early childhood caries and enhancing overall quality of life.

**Keywords:** Early Childhood Caries (ECC); Dental Rehabilitation under General Anaesthesia (DRGA); Oral Health-Related Quality of Life (OHRQoL)

**Citation:** Qazi HS, Amir N, Babar P, Alam F, Khan AM, Ahmad S. Dental rehabilitation under general anaesthesia: A qualitative analysis of its impact on children's oral health-related quality of life. J Ayub Med Coll Abbottabad 2025;37(2):206–212.

**DOI:** 10.55519/JAMC-02-14123

## INTRODUCTION

Early childhood caries is a prevalent health challenge affecting developing and industrialized countries worldwide. When untreated, it can cause both immediate and long-standing complications, compromising the well-being and overall quality of life of children and families considerably.[1] The American Academy of Paediatric Dentistry defines early childhood caries (ECC) as "the presence of one or more decayed, missing, or filled (cavitated/non-cavitated) teeth or surfaces in any primary tooth in a child under the age of 6 years."[2] Pedodontists have various treatment strategies to address this aggressive form of caries. When behavioural management techniques are adequately used, general anaesthesia is often used for young patients with multi-quadrant tooth damage who cannot cooperate with basic behaviour management techniques for chair-side dental procedures.[1] According to the World Health Organization, early childhood caries continues to be a pandemic worldwide among preschool children and toddlers.[3] A review of previous literature showed that the prevalence of ECC in most developed countries is 1–12%. In less developed countries the prevalence has been reported to be as high as 70%.[4,5] ECC is a rapidly destructive condition involving the primary and also first permanent molars that erupt in the sixth year of a child's life.[6] The pain and discomfort due to extensive caries, infections, or abscesses may affect the academic performance of the children, their

capability to excel in school, self-esteem, and overall quality of life.[7] Oral health-related quality of life is defined as "a multidimensional construct that reflects (among other things) people's comfort when eating, sleeping, and engaging in social interaction; their self-esteem; and their satisfaction concerning their oral health."[8] For the majority of children, dental caries treatment can be successfully managed through behavioural techniques that enhance communication and minimize undesirable behaviours. For young children and those with special health care needs (SHCNs), managing dental care can be especially difficult.[9,10] In severe cases, uncooperative behaviour precludes the delivery of oral health care, driving the postponement of treatment and the use of sedation or general anaesthesia.[11] Treatment under general anaesthesia is indicated if the patient: is uncooperative, has had failed previous appointments, is a young child with multiple carious lesions, or is a child with special care needs. DRGA is beneficial for the practitioner as it makes the dental procedure easier, efficient and enables the doctor to perform superior dental management in a single visit. However, Severe ECC often necessitates extensive treatment, with dental rehabilitation under general anaesthesia being most feasible, particularly for pre-schoolers with behavioural difficulties.[12] General anaesthesia in paediatric dentistry is directed by national guidelines and used for children with medical conditions precluding chairside care, complex or long procedures, urgent surgical emergencies for infections, or when local anaesthesia carries risks, such as allergies or recurring ineffectiveness, make sure safe and effective treatment personalized to the child's requirements.[11] Baghdadi *et al.* reported an improvement in vital parameters of oral symptoms, functional limitations, and emotional and social well-being after DRGA.[13] Dental rehabilitation under general anaesthesia (DGA) surpasses conventional paediatric dentistry by enabling comprehensive, high-quality treatment in a single visit. It restores dental function, improves oral health, regulates the oral micro-ecological environment, and significantly reduces caries risk for children.[14] The SCAN score is a simple, adaptable tool aimed to help paediatric dentists in determining referrals for dental general anaesthesia, principally for pre-schoolers with early childhood caries. It enhances communication with anaesthesiologists and addresses referral criteria gaps, serving as a tool to support dental surgeons' clinical judgment.[15] Recent evidence shows dental treatment under general anaesthesia reduces toothache- related behavioural issues, improving dental management and quality of life. It alleviates pain, enhances sleep, supports better eating habits, fosters growth, and improves social interactions.[16] Existing literature on the impact of dental rehabilitation under general anaesthesia (GA) on oral health-related quality of life (OHRQoL) predominantly focuses on global populations, with limited evidence from Pakistan. Despite the high prevalence of early childhood caries (ECC) in the region, there is a scarcity of studies examining how comprehensive dental treatment under GA influences the OHRQoL of children and their families. Investigating this relationship can provide valuable insights into improving dental care practices and reducing the burden on practitioners, particularly in managing uncooperative paediatric patients. This study aims to address this gap by evaluating the impact of GA on OHRQoL in a culturally and regionally specific context Understanding the impact of dental rehabilitation under general anaesthesia (GA) on the quality of life of children and their parents is crucial for improving dental care procedures and reducing the practitioner's workload associated with managing uncooperative paediatric patients. This study seeks to answer the research question: How does comprehensive dental treatment under general anaesthesia influence the oral health-related quality of life (OHRQoL) of children with early childhood caries (ECC) and their families? To address this, the study comprehensively explores the effects of GA on the OHRQoL of children with ECC, providing valuable insights into the benefits and broader implications of this intervention in a regional context.

## MATERIAL AND METHODS

The qualitative study was conducted at the Department of Paediatric Dentistry, Children Hospital, Shaheed Zulfiqar Ali Bhutto Medical University (SZABMU), Pakistan Institute of Medical Sciences (PIMS), Islamabad, over six months. The sample size was calculated using the World Health Organization (WHO) sample size calculator. While the initial estimated sample size was 28, it was increased to 40 to account for potential non-response and loss to follow- up.

The study included children aged 3 to 10 years who exhibited acute situational anxiety, uncooperative behaviour, or required invasive procedures, making them suitable candidates for comprehensive oral rehabilitation under general anaesthesia. Eligible participants were classified as ASA I or ASA II according to the American Society of Anaesthesiologists guidelines, and both male and female children were considered, provided they were mentally and physically healthy with no underlying systemic disorders. Participation required informed consent from parents or caregivers. Conversely,

children who could be effectively managed using non- pharmacological behaviour guidance techniques were excluded, as were those with special healthcare needs such as Cerebral Palsy or Down's Syndrome. Additionally, patients with cognitive or physical impairments or those who were medically compromised were not considered for inclusion in the study.

A total of 40 children undergoing dental treatment under general anaesthesia recruited from the OPD Paediatric Dentistry Department Children Hospital and meeting the inclusion criteria were included in the study. Parents of children undergoing dental rehabilitation under GA were invited to participate in the qualitative component of the study. Of the 40 children in the study, 15 parents consented to participate, with 10 joining focus group discussions (FGDs) and 5 participating in in-depth interviews (IDIs). Participants were selected by convenience sampling to ensure diverse representation and were approached during their child's pre-treatment and also in follow-up visits with empathy and respect. Parents were thoroughly briefed on the study's purpose, emphasizing its potential benefits for children locally and globally. Detailed information sheets (in Urdu or English) outlined objectives, methods, and rights, ensuring voluntary participation without affecting their child's treatment. Written consent was obtained, and a supportive environment encouraged parents to share their experiences openly. It aimed to explore parents' perceptions of the impact of dental treatment under general anaesthesia (GA) on their children's oral health- related quality of life (OHRQoL). Two focus group discussions (FGDs), each involving five participants, were conducted to gain insights into parents' perspectives on their child's quality of life before and after treatment, their satisfaction with the treatment, and the challenges faced post-treatment. Each FGD lasted approximately 1 hour, facilitating thorough engagement with the participants. Additionally, five in-depth interviews (IDIs), each lasting 20–25 minutes, were conducted to obtain deeper individual insights. With parental consent, all interviews were recorded to ensure the accuracy of responses and later transcribed. The researcher herself moderated both the FGDs and IDIs to ensure consistency in facilitation. The interviews were conducted in the seminar room of the Paediatric Dentistry Department at the Outpatient Department of Children's Hospital, Islamabad.

The interview guide was developed through a structured process to ensure clarity, relevance, and alignment with the study objectives. It aimed to explore parents' perspectives on their child's quality of life before and after dental rehabilitation under general anaesthesia, their satisfaction, and any post-treatment challenges. A literature review informed the development of open- ended questions addressing key themes. The guide was then pilot-tested with senior colleagues and the Head of the Department, incorporating their feedback for refinement. Designed to be culturally and contextually appropriate, it prioritized ethical considerations by avoiding leading questions and ensuring participant confidentiality through anonymized audio recordings. The researcher conducted all interviews using a semi- structured format, maintaining focus while allowing participants the flexibility to express their views. However, member checking was not feasible due to participants' professional and financial constraints, and scheduling group discussions during working days posed additional challenges.

A thematic approach was used to analyze the qualitative data. Audio recordings and discussions were transcribed verbatim, with field notes initially recorded in Urdu and later translated into English to preserve accuracy. Themes were identified through an inductive coding process, ensuring alignment with the research objectives, and a structured list of topical codes was developed for systematic analysis. NVivo 10 (QSR International, Australia) streamlined data organization and interpretation. Data saturation was achieved when responses became repetitive, indicating no emergence of new information. This rigorous methodology facilitated a comprehensive and systematic exploration of parental perspectives and experiences regarding their child's treatment

## RESULTS

The participants actively shared their perspectives, including their satisfaction, concerns, and the impact of dental treatment on their children's quality of life. The respondents commonly reported issues such as severe pain, swelling, sensitivity to hot and cold, gum bleeding, sleepless nights, weight loss, and difficulties with eating. The children often missed school, becoming weak, lethargic, and irritable, with noticeable behavioral challenges and social withdrawal. These problems also impacted their academic performance. Additionally, parents faced a significant financial strain due to frequent hospital visits and associated travel expenses.

"I often stayed awake all night because my son couldn't sleep due to severe pain. Despite having a three- month-old baby, my older son's condition was even more distressing, leaving me exhausted and overwhelmed. I frequently gave him antibiotics and painkillers, but they provided little

relief. His teacher also noted in his diary that he often cried in class because of persistent pain that remained unaffected by medication.*"* (IDI, Mother 1)

Respondents reported that their child was free from pain, slept peacefully, ate and chewed food with ease, attended school regularly, and actively engaged in sports. They observed a marked improvement in the child's overall quality of life, with the child appearing happier and the entire family experiencing greater peace and well-being.

"My son's suffering has come to an end, and we are no longer burdened with worry. He sleeps peacefully through the night, attends school punctually, eats well, and no longer causes distress to his mother. Both his mother and I are greatly relieved and fully satisfied now that his infection has been effectively treated." (IDI, Father 1)

After undergoing dental treatment under general anaesthesia, most respondents observed significant improvements in their children's emotional and social behaviours. The children displayed increased confidence in both school and social settings. Their interactions with siblings and friends became more pleasant and positive, as they engaged in play more actively and exhibited a fun-loving attitude.

"My son has regained significant confidence after the treatment. Previously, he would hide his discoloured teeth and avoid laughing or speaking openly because his classmates often teased him about his appearance. This caused him to develop an inferiority complex, which is now steadily improving. His teeth are visibly clean and healthy, and his overall oral health has improved significantly."(FGD 1, Mother 1)

Respondents in both IDIs and FGDs noted substantial improvements in their children's academic performance, focus, and involvement in extracurricular activities following treatment under GA. They attributed these positive changes to increased confidence, improved physical health, and the elimination of pain and discomfort that previously impacted their social and educational experiences.

"Before the treatment, he was reluctant to go to school and often caused trouble in the mornings. Now, he happily attends school and willingly engages with others. His shyness around teachers and classmates has significantly improved, and he actively participates in extracurricular activities. His focus on studies has also sharpened, and his first result after the treatment was an A+. Teachers have praised his pleasant behaviour, which brings me immense happiness." (FGD 2, Mother 1)

The majority of respondents stated that after treatment, their financial, social, emotional, and family lives have improved. They considered intervention as one of the positive things in their lives. Furthermore, they reported that when their children were suffering from dental problems, they had to go to private doctors every other day and spent a lot of money, the whole family was disturbed and the rest of the children were neglected. Such problems were now resolved.

"Frequent hospital visits caused financial strain, and family tensions, and disrupted household responsibilities, adversely affecting my relationship with my husband and mother-in-law. After the treatment, the burden of private doctor fees ended, and the family environment improved significantly. They finally enjoyed a peaceful trip to Northern areas after four years of stress and suffering." (FGD 1, Mother 2)

Most of the respondents noted a substantial improvement in their professional productivity after the intervention. Supervisors acknowledged their enhanced performance, while self-employed parents found they could focus more effectively on their businesses without the constant distractions and worries that previously hindered them.

"My husband and I both work, and the treatment has made managing our professional lives much easier. We can now attend work regularly without needing frequent short leaves. Our efficiency has improved, and issues like unpunctuality from the office, frequent absences, and reduced productivity have been resolved. We feel more relaxed, professionally focused, and productive." (FGD 2, Mother 2)

Most respondents observed significant improvements in their children's oral and general health after the intervention. Better sleeping and eating habits, increased appetite, and weight gain were noted, with children appearing healthier and happier. Parents and children received dental education, shared awareness within their community, and encouraged younger siblings and peers to adopt improved oral hygiene practices to prevent future issues.

"During the treatment, we were educated about the importance of maintaining oral hygiene and how it impacts overall health. We learned that a healthy mouth helps prevent many other health issues. Now, we are diligent about proper brushing, and my daughter has even started avoiding junk food to avoid future problems. Her general health is improving, and we feel more at ease. She now enjoys eating healthy food." (FGD 1, Father 1**)**

**Table-1: Focal Group Discussion 01**

| Hospital Number | Name | Sex/Age | Operation Date | Interview Date |
|---|---|---|---|---|
| 96306 | Balaaj | 5.5 | 01.07.15 | 29.08.15 |
| 85350 | Mh.Umer | 3.5 | 08.07.15 | |
| 34299 | Mh.Musa | 3.5 | 15.07.15 | |
| 12183 | Eeman | 10/F | 22.07.15 | |
| 81266 | Sikandar | 8/M | 29.07.15 | |
| 14959 | Abdul Rafay | 4/M | 08.07.15 | |
| 38072 | Tayyab | 4/M | 15.07.15 | |

**Table-2: Focal Group Discussion 02**

| Hospital Number | Name | Sex/Age | Operation Date | Interview Date |
|---|---|---|---|---|
| 24436 | Mh.Aarish | 4.5/M | 05.08.15 | 05.10.15 |
| 41436 | Hashim | 7/M | 12.08.15 | |
| 59757 | Sumama | 7.5/M | 19.08.15 | |
| 03026 | Momina | 6.5/F | 26.08.15 | |
| 07142 | Maheen | 5/F | 05.08.15 | |
| 60425 | Areeba | 9/F | 12.08.15 | |
| 58924 | Muneeb | 7/M | 26.08.15 | |

**Table-3: In-Depth Interviews**

| S/N | Hospital Number | Name | Sex/Age | Operation Date | Interview Date |
|---|---|---|---|---|---|
| 1 | 19417 | Adam | 4/M | 15.04.15 | 21.05.15 |
| 2 | 94943 | Fasi | 10/M | 29.04.15 | 13.06.15 |
| 3 | 01081 | Farazeen | 4.5/F | 13.05.15 | 29.06.15 |
| 4 | 703216 | Sukaina | 5/F | 17.06.15 | 15.08.15 |
| 5 | 30775 | Talha | 4.5/M | 19.08.15 | 30.09.15 |

**Table-4: The key themes emerging in response to the research questions are outlined below.**

| Theme | Subthemes and Key Points |
|---|---|
| **1. Problems Faced Before Treatment Under GA** | **Pain and discomfort** (toothache, swelling, infection)<br>**Feeding and nutrition issues** (difficulty chewing, selective eating)<br>**Sleep disruption** (restlessness, crying at night)<br>**School absenteeism** (inability to focus, missing classes) **Psychological distress** (irritability, anxiety, low self-esteem) **Social implications** (avoidance of peers, reluctance to smile) |
| **2. Effects of Intervention on Overall Well-being** | **Pain relief and comfort** (reduced or eliminated pain)<br>**Improved daily routine** (regular meal and sleep patterns)<br>**Better participation in family life** (reduced stress, fewer mood swings)<br>**Confidence and happiness** (feeling more secure, restored self-esteem) |
| **3. Emotional and Social Behaviour Changes Post-GA** | **Reduced anxiety and fear** (less dental phobia, calmer demeanor)<br>**Enhanced self-confidence** (feeling more positive about appearance and oral health)<br>**Improved peer interaction** (more sociable, better communication at home/school)<br>**Positive mood shift** (less irritability, more willingness to engage) |
| **4. Changes in Academic Performance and Extracurricular Activities** | **Increased school attendance** (fewer missed days due to pain or illness)<br>**Better classroom engagement** (improved concentration, ability to follow lessons)<br>**Wider participation** (willingness to join extracurricular events, sports, or group activities) |
| **5. Financial, Social, Emotional, and Family Adjustments** | **Reduced financial burden** (fewer emergency visits, less medication needed)<br>**Lower emotional stress** (relief from ongoing child discomfort, minimized parental worry)<br>**Strengthened social ties** (families more willing to socialize, children able to attend gatherings)<br>**Healthier family environment** (overall morale boost and sense of normalcy) |
| **6. Changes in Parental Professional Output** | **Improved work attendance** (less time off to care for a child in pain)<br>**Better job focusses and productivity** (reduced worry, less distraction at work)<br>**Enhanced sense of control** (confidence in managing child's oral health, peace of mind) |
| **7. Impact on Oral and General Health Post-GA** | **Improved oral hygiene** (regular brushing habits, better preventive care)<br>**Less infection and swelling** (restorations, extractions, or preventive treatments complete)<br>**Positive future outlook** (encouraged to seek timely dental care, reduced fear)<br>**Overall health benefits** (better nutrition, sleep, and psychological well-being) |

## DISCUSSION

This study stands out as it explores the qualitative impact of dental treatment under general anaesthesia on children. This area has been minimally addressed in Pakistan, with limited literature available on such qualitative investigations. The respondents highlighted the most common challenges they faced before their child's treatment under general anaesthesia. Most parents reported that their child endured severe dental pain, which disrupted sleep, hindered eating, and led to significant weakness, lethargy, and weight loss. Additionally, frequent

toothache also prevented the child from attending school, disrupting academic and extracurricular development. Beholding their child's suffering caused parents considerable emotional and physical anguish, further compounding the deterioration in the child's overall health and well-being. A similar trend was observed in a UK-based study, with 56.4% (n=78) of parents recognizing their child's health as poor before dental treatment under general anaesthesia. Parents noted issues such as pain, disrupted sleep, poor eating habits, and overall diminished well-being.[17]

In this study, both working-class and self-employed parents with low socioeconomic status faced time constraints, making single-visit treatment highly beneficial. Respondents reported enhanced professional productivity post-intervention, with supervisors recognizing improved performance and self-employed parents able to focus more effectively on their businesses. Similarly, in a Malaysian study, parents with lower income levels are more inclined to opt for general anaesthesia, viewing it as a necessary and cost-effective option for their children to receive comprehensive treatment in a single visit, rather than attending multiple dental appointments.[18] Socioeconomic factors profoundly affect oral health-related quality of life (OHRQoL). Research reveals that children from lower socioeconomic backgrounds face poorer OHRQoL, underscoring the extensive physical and psychological impacts of socioeconomic disparities on oral health and overall well-being.[19] In the present study parents and children were provided dental education by the researcher before and after the treatment under GA, actively promoted awareness within their community, and encouraged younger siblings and peers to adopt better oral hygiene practices, fostering preventive habits to avoid future dental problems. In a local study in Abbottabad, it was reported that children's oral health greatly depends on parental influence, particularly mothers. Parents who are properly educated about oral hygiene practices can prevent dental diseases, as positive family attitudes and better dental knowledge strongly correlate with improved oral health outcomes.[20]

In the current study, the parents shared that frequent hospital visits, mental stress, and costly private dental care disrupted parents' professional productivity, leading to financial strain and emotional exhaustion. Multiple appointments consumed time and resources, while the child's poor oral health caused significant emotional, physical, and social challenges. These hardships profoundly affected the overall well-being and quality of life of the entire family. Thomson et al., in their review, reported similar findings, highlighting a strong association between early childhood caries and the psychosocial well-being of both the child and their family. The condition significantly impacted family dynamics, stress levels, and overall quality of life.[21]

When participants in the current study were asked about the improvements observed following treatment under general anaesthesia, most parents expressed high satisfaction, noting that after their child's successful dental treatment, his sufferings had markedly reduced. Parents reported significant improvements in their child's sleep patterns, eating habits, academic performance, and social interactions. They also appreciated the post-operative guidance on oral hygiene significance as proper brushing instructions had improved the bleeding gums problems of their child. A study conducted by de Souza et al. in the United Kingdom reflected similar findings, with 43.1% of parents (n=78) reporting notable improvements in their child's overall quality of life after the operation. Parents observed enhanced well-being, including better physical health, emotional stability, and social interactions post-treatment.[17]

The FGDs and IDIs facilitated a deep understanding of the topic, allowing participants to share their detailed views and experiences. Parents showed exceptional compliance and provided detailed feedback on their experiences, likely facilitated by the novelty of the treatment process. However, the study has certain limitations, including a short follow-up period that provided only a snapshot of the post-operative benefits. Nevertheless, these findings stem from a single-center study, which limits their transferability to other populations. Future research should involve multiple centers, include larger and more diverse samples, and implement measures to address biases such as socially desirable responses to enhance the robustness and applicability of the results.

## CONCLUSION

This study underscores the positive impact of dental rehabilitation under general anaesthesia on children's oral health-related quality of life and overall family well-being. While effective, potential conflicts of interest, including financial incentives and institutional policies, must be addressed to maintain ethical care. The study's limitations include single-institution data and qualitative bias, restricting generalizability. Additionally, the long-term effects of dental rehabilitation under general anaesthesia remain unexplored. Future research should focus on assessing long-term outcomes, improving accessibility, and ensuring ethical, transparent, and patient-centered care to enhance its benefits for a broader population.

## AUTHORS' CONTRIBUTION

HSQ: Conceived idea, data collection, study design, write-up. NA: Data analysis, data interpretation, proof reading. PB: Statistical analysis, critical analysis. FA:

Literature review, correspondence. AM: literature search, bibliography. SA: Data analysis, data interpretation, proof reading.

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| *Submitted: December 19, 2024* | *Revised: February 16, 2025* | *Accepted: March 5, 2025* |
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