

## The Experience of Pediatric Patients Undergoing Dental Rehabilitation Under General Anesthesia in King Abdulaziz Medical City, Riyadh, Saudi Arabia

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### Abstract

#### Introduction

Caries is the most common chronic disease of children worldwide. General anesthesia is used to provide high quality of treatment and full mouth rehabilitation for dental patients when conventional ways failed.

#### Aim

To assess the child and their families experience about health service provided throughout the pathway of care for dental rehabilitation under general anesthesia.

## Methods

An interview questionnaire from the children guardian at the day of general anesthesia at KASC followed by a phone call interview done two weeks later. Questionnaire was conducted to the parents based on current literature review with the addition and modification of questions related to the Saudi Arabian community and culture. Open and closed questions were used in the interview to collect data verbally from the children's guardians at the day of general anesthesia at King Abdullah Specialized Children's Hospital (KASCH).

## Results

59.7% of children are still in pre-school age. Majority of the guardians 58% were fathers and only 33.3% of the guardians have bachelor degree or above. Around 10% of the patients had previous GA and 19.5% had siblings had previous treatments done under GA. Most of the children were referred from KAMC 44.4%. Very young uncooperative child was the most reason for referral 43.1%. The waiting period from referral to dental rehabilitation under GA treatment was mostly more than 6 months 61.1%. 83% of the families take their children to the dentist's office only for emergency treatments. 81.9% of the patient experienced tooth pain during the waiting period. The most previous preventive care that the children had professionally was brushing advise 48.6% followed by avoid sugary intake 11.1%. 52% of the children do not brush their teeth. 52.8% of the guardians reported searching oral health information from the internet. The most media used by the children was television 47.2% followed by tablets 23.6%, smart phones 19.4%, and computers 4.2%. 48.6% of guardians prefer having professional dental health prevention. Headache 11.1% was the most common complication after GA followed by vomiting 4.2% and bleeding from the nose 1.4%. A high satisfaction response was reported from the guardians 93.1% regarding the pathway and treatment. 94.4% of the children had preventive care programs after GA.

## Conclusion

Based on the finding many AAPD and DOH recommendations for promoting oral health are not met. Greater effort should be done to increase the public awareness about dental caries and its prevention.

## Introduction

Dental caries is the most common chronic disease in children worldwide [1]. According to a systematic review done in Saudi Arabia in 2013 the caries prevalence among children reaches 80% in primary dentition and 70% in the permanent dentition of the children [2]. According to another study concerned in preschool children in Saudi Arabia 89% were considered high risk caries and the most significant risk factor for caries were enamel demineralization and low socio-economic status [3].

In Saudi Arabia a survey about the used behavior techniques by dentists, sixty percent of pediatric dentists reported using GA to treat their patients [4]. In order to lower the high prevalence of caries before and after the treatment, Caries preventive strategies for children should be provided such as education for the child and parents, diet, tooth brushing, systemic fluoride supplements, professional topical fluoride sealant [5]. School based programs showed the most effectiveness for dental health education [6].

Children usually lack the skills to cope with dental treatment, which jeopardize the quality of the dental care. General anesthesia is used to provide high quality of treatment and full mouth rehabilitation for dental patients when conventional ways failed. General anesthesia for dental rehabilitation exposes children to an increase risk of morbidity and mortality. Studies showed that children referred to dental rehabilitation under general anesthesia have a high need for retreatment which has cost implications on the National Guard health. Recent Australian RCT showed that promoting oral health by giving oral hygiene to parents was shown to reduce severe early childhood caries. In National Guard hospital approximately 400 to 500 children per year undergo dental rehabilitation under general anesthesia due to caries. The aim of this study is to assess the child and their families experience about health service provided throughout the pathway of care for dental rehabilitation under general anesthesia.

## Materials and Methods

An interview questionnaire was formed based on current literature review with the addition and modification of questions related to the Saudi Arabian community and culture. A pilot study was done with the formed interview questionnaires which were distributed to multiple pediatric consultants and expertise for comments and validation in National Guard Hospital, Riyadh.

An ethical and Institutional Review Board (IRB) approval was obtained from King Abdullah International Medical Research Center (KAIMRC). Total of 36 questions related to patient's demographic data, dental history and previous general anesthesia, oral hygiene, and post-operative experience and satisfaction. Firstly, open and closed questions were used in the interview to collect data verbally from the children's' guardians at the day of general anesthesia at King Abdullah Specialized Children's' Hospital (KASCH). Then, guardians were interviewed through a phone call in a period of one to two weeks for the completion of questions related to satisfaction and adverse effects after the GA.

The data included was collected from the guardians of all patients undergoing dental rehabilitation under GA from the middle of December to the middle of March which were 72 patients in KASCH. Quantitative data were entered into the SPSS for windows version 20 for descriptive analysis.

## Results

**Table 1:** Demographic data

Question	Answer	NO	%
Gender	Male	35	48.6
	Female	37	51.4
School of the child	Pre-school	43	59.7
	Governmental School	16	22.2
	Private school	13	18.1
City the child live in	Riyadh	70	97.2
	Qassim	1	1.4
	Alahsa	1	1.4
Has the child lived in a city other than the current	No	69	95.8
	Yes	3	4.2
Relation with the child	Father	42	58.3
	Mother	28	38.9
	Other	2	2.8
Father education level	bachelor degree or above	24	33.3
	High school	36	50
	Secondary	3	4.2
	Primary	8	11.1
	Illiterate	1	1.4
Mothers education level	bachelor degree or above	28	38.9
	High school	23	31.9
	Secondary	11	15.3
	Primary	6	8.3
	Illiterate	4	5.6
Family net income	Less than 5000	7	9.7
	5000-10000	27	37.5
	10000-15000	27	37.5
	Above 15000	11	15.3

Out of 72 participants in the study the female to male ratio of the children undergoing dental rehabilitation under general anesthesia is almost 1:1, 59.7% of them are still in pre-school age. All of the children are citizens of Riyadh except two were from Qassim and Alahsa. The majority of the guardians 58% were fathers of the children and only 33.3% of them have bachelor degree or above. Generally, large percentage of the families (47.2%) has net income less than 10000 SR.

**Table 2:** GA related information's

Question	Answer	NO	%
Number of family child dental GA previously	0	58	80.6
	1	11	15.3
	2	2	2.8
	3 or more	1	1.4
Number of how many times the child had dental GA previously	0	65	90.3
	1	7	9.7
Canter of referral	B2	10	13.9
	Um Alhamam	1	1.4
	Yarmuk	22	30.6
	KAMC	32	44.4
	Other	7	9.7
Reason of referral	Uncooperative	31	43.1
	Medical condition	20	27.8
	Extent of treatment	21	29.2
Waiting time	Less than 3 months	17	23.6
	3-6 months	11	15.3
	More than 6 months	44	61.1

Seven of the children undergoing dental rehabilitation under general anesthesia had previous GA which accounts 9.7%, and 14 (19.5%) of the children's siblings had previous treatments done under GA. Most of the children were referred from King Abdulaziz Medical City 44.4% others were from different primary care centers such as: Yarmouk 30.6%, Badr2 13%, and other centers 11.1%. The reason of referral varied from being a very young uncooperative child 43.1%, having a medical condition 27.8%, and treatment extent 29.2%. The waiting period from referral to dental rehabilitation under GA treatment was mostly more than 6 months 61.1%

**Table 3:** Dental related questions

Question	Answer	NO	%	Percent of those who brush
How often the child visited the dentist	Regularly	8	11	
	Occasionally	4	5.6	
	Only for ER	60	83.3	
Problem accessing dental care	No	52	72.2	
	Yes	20	27.8	

As a result of decay, the child experience problem with	None	10	13.9	
	Pain	59	81.9	
	Chewing	1	1.4	
	Speech	1	1.4	
	Confidence	1	1.4	
Previous preventive care	None	22	30.6	
	Avoid sugar intake	8	11.1	
	Brushing technique	35	48.6	
	Use of fluoride toothpaste	3	4.2	
	ITR caries control	2	2.8	
Frequency of brushing	Application of fluoride	2	2.8	
	None	38	52.8	
	Once a day	16	22.2	
Brushing supervision	Twice a day	18	25	
	None	38	52.8	0
	Himself	5	6.9	14.7
	Parent	28	38.9	82.3
Type of toothbrush	Sibling	1	1.4	3
	None	38	52.8	0
	Manual	32	44.4	94.1
Toothbrush hardness	Electrical	2	2.8	5.9
	None	38	52.8	0
	Soft	29	40.3	85.2
Type of toothpaste	Medium	5	6.9	14.8
	None	38	52.8	0
	Adult fluoridated	16	22.2	47
	Children fluoridated	16	22.2	47
Amount of toothpaste used	Children non-flouridated	2	2.8	6
	None	38	52.8	0
	Smear layer	4	5.6	11.8
	Pea size	23	31.9	67.6
Other aids of OH	Any amount	7	9.7	20.6
	None	69	95.8	
	Floss	2	2.8	
	Mouth wash	1	1.4	

Rinsing after brushing	None	38	52.8	0
	No	3	4.2	8.
	Yes	31	43.1	91.2

Eighty-three percent of the families take their children to the dentist's office only for emergency treatments. Only 27.8% had a problem accessing dental care, which was the appointment desk, is not responding. As a result of decay, 81.9% experienced pain and 4.2% had chewing, speech, and confidence difficulty.

The most previous preventive care the children had professionally was brushing advise 48.6% followed by avoid sugary intake 11.1%, use of fluoride tooth paste 4.2%, caries control and application of fluoride 5.6%. Only, 47.2% of the children brush their teeth once or twice a day with the supervision of their parents mainly 82.3%. Among the children who brush their teeth 94% use manual brush, and 85.2% use soft brush. Only 6% of the children use non-fluoridated toothpaste. The amount of toothpaste used 67.7% was pea size, any amount 20.6%, and smear layer 11.8%. A very little percentage reported that they used other oral hygiene aids 4.2% such as mouthwash and floss.

**Table 4:** *Internet usage*

Question	Answer	NO	%
Internet usage of dental information	No	38	52.8
	Yes	34	47.2
Most media device used of the child	None	4	5.6
	TV	34	47.2
	Tablet	17	23.6
	Smart phone	14	19.4
	Computers	3	4.2
Guardians recommendation	Health professional	35	48.6
	Leaflets	4	5.6
	Video games	11	15.3
	Educational videos	6	8.3
	School program	16	22.2

Guardians who reported searching oral health information from the internet were 52.8%. The most media used by the children was television 47.2% followed by tablets 23.6%, smart phones 19.4%, and computers 4.2%. Different recommendations and opinions were obtained from the guardians of the best way approaching their children to give them preventive care and enhance their oral health, 48.6% of them focused mainly on having dental health professional, followed by 22.2% having school preventive programs, 15.3% video games, 8.3% educational videos, and 5.6% leaflets.

**Table 5:** Post-operative related questions

Question	Answer	NO	%
Complication after GA	None	60	83.3
	Vomiting	3	4.2
	Bleeding from the noes	1	1.4
	Headache	8	11.1
Satisfaction of the treatment	Yes	67	93.1
	No	5	6.9
Traumatic experience to the child	Yes	4	5.6
	No	68	94.4
Traumatic experience to the family	Yes	1	1.4
	No	71	98.6
Preventive program after GA	Yes	68	94.4
	No	4	5.6

Most complication resulted after GA treatment was headache 11.1% followed by vomiting 4.2% and bleeding from the nose 1.4%. A high satisfaction response was reported from the guardians 93.1% regarding the pathway and treatment. Only 5.6% felt that their children had traumatic experience with the treatment. The majority of the children 94.4% had preventive care programs after GA.

## Discussion

Sixty percent (59.7%) of the children in our sample are in pre-school age, which is similar to other national and international studies [7-12]. Caries experience is significantly associated with educational background and net income [13]. The majority of parents (> 60%) have a high school or less educational level and 47.2% have a net income of less than 10000. A Systemic review [14] published in 2014 reported that Children of parents with high educational level and family income were more likely to have better OHRQoL and Children from poor families have limited access to health care and preventive interventions which might lead to a poor quality of life. A study done by Saldūnaitė *et al* [15] found that Parents with a high educational level and those receiving sufficient income cared more about oral hygiene and are more likely to visit the dentist for preventive check-up.

Ten percent (9.7%) of these children are having dental rehabilitation under general anesthesia for the second time. This is more than the percentage reported by Ba'akdah and others [9] (7%) but less than other studies [12,16,17]. 19.5% of the children had siblings who had dental rehabilitation under general anesthesia. 15.3% one sibling, 2.8% two siblings and 1.4 three or more siblings compared to one (21%), two (7%) or three or four (6%) of their siblings reported by Olley *et al* on 2011 [17].

Being a very young and uncooperative was the most common reason for referral (43.1%) this disagrees with other previous studies [9,10]. Jamjoom *et al* in 2001 [10] reported that rampant caries was the major indication for use of DGA in the youngest age group similarly Ba'akdah *et al* [9] found that 58% were referred because of being young with extensive caries and behavior problems counts for 20% only.

More than half of the children waited for 6 months or more to have dental rehabilitation under GA. This is more than the average waiting time reported in many studies [16,18,19]. Only one research in Saudi Arabia reported a similar average waiting time (8.9 months) [9]. This long waiting time could be used to improve the child's oral habits by involving the child and parents in a preventive program.

AAPD in its 2016 guideline update recommended that a child should visit the dentist within six months of eruption of the first tooth and no later than 12 months of age [20]. Even though the majority has no problem accessing the dental clinic only 11% takes their children to the dentist regularly. This might be because they are not aware about the importance of the regular dental checkups and early visit to the dentist. Some parents think that having caries is acceptable and can't be prevented and they should visit the dentist when there are symptoms only [21]. Murshid in 2015 [22] reported that pain was the dominant factor bringing children to their first dental visits. Her findings were similar to other studies in Saudi Arabia and other countries [23-26]. Camargo in 2012 [27] found that mother's behavior is highly relevant to child's dental visit. Children whose mothers reported regular dental visits had a rate 2.5 times higher for routine visits than children whose mothers did not go to the dentist regularly. Dental caries has negative effect on oral health related quality of life (OHRQoL). The more the extent of caries the worse the OHRQoL was found [28]. Treating dental caries under general anesthesia improve the OHRQoL in children [29,30]. The most common problem reported in the literature was pain followed by other complains such as problems with chowing or talking and emotional effect [16,17,31].

Seventy percent (69.4%) reported receiving some kind of preventive care, which is less than what is reported by Savanheimo and Vehkalahti in 2007 [32] this might be because the majority of our sample is uncooperative and according to their findings dentists seem to prefer operative treatment for uncooperative high-caries children than the preventive approach. Professional advice on brushing technique and sugar intake were given more than other preventive care that is similar to previous study [17]. AAPC and DOH recommended professional fluoride application twice yearly or more depending on the caries risk of the child [20,33]. One study found that children who started preventive care early were less likely to visit the dentist for restorative or emergency care [34]. They explained their finding by that the preventive guidance given to the parents at the preventive visit has positive outcome on the child oral health.

Another recommendation of the AAPD and DOH is that as soon as the teeth erupt in the mouth it should be brushed twice daily with fluoridated toothpaste by the parents or under their supervision [20,33]. Almost half of the children in this study don't brush their teeth and only 4.2% use other oral hygiene aids. This shows their lack of compliance with the recommended frequency of daily tooth brushing which is considered a risk factor for dental caries [35]. Wigen and Wang in 2015 [36] reported that the odds ratio for having caries experience at 5 years of age was 2.1 for children who had their teeth brushed less than twice daily at 1.5 year of age compared with children who had their teeth brushed twice daily. On the other hand children who

brush their teeth most of them brush under the supervision of their parents with fluoridated tooth-past and soft tooth brush with is in line with AAPD and DOH recommendation.

Even though 52.8% of the parents accessed the Internet to get information on oral health, having dental health professional was the most recommended way to get information on how to improve their children oral health. This might be because they trust the health professional more than the Internet. Knapp *et al* [37] reported that some parents who use the Internet as a source of information about their children's health are unable to distinguish between high and low quality information and are not confident in using the Internet. According to a study done by Beatriz *et al* [27] in 2012 most of the guidance provided to the mothers on how to prevent dental caries was by dentists and only 18.7% provided by doctors and nurses. Include information and advice on oral health in local health and wellbeing policies and ensure early years' service specifications include a requirement to promote oral health were among the interventions suggested to improve oral health in Leeds Children and Young People Oral Health Promotion Health Needs Assessment [38]. A study done on the Dentists' opinion and knowledge about preventive dental care in Saudi Arabia found that majority of the dentist felt school based programs would be effective tool in dental health education, followed by visual and printed media, community dental camps and hospital based dental programs [39]. According to a review in 2013 there is limited evidence that primary school based interventions can prevent caries by improving children's oral hygiene but there is some evidence to suggest that these interventions may have a positive impact upon children's knowledge and on plaque removal [40]. A randomized clinical trial demonstrated that a school based dental sealant program can effectively decrease more than 60% of ICDAS 3-6 carious lesions in the first permanent molars within 3 years among vulnerable children [41]. Implementing a school based dental program that provide preventive care will be beneficial and welcomed by the parents.

When parents were asked about complication after the GA more than 80% reported no complication which is more than what is reported in previous studies [42,43]. This might be because the parents were contacted after 1 week that gave time for complications to subside. In one study analysis of the differences between first and third day complaints showed that by day three, all patients' complaints were significantly reduced [42]. The high satisfaction rate among guardian is similar to other studies [29,30]. Only 5.6% reported that the GA experience was traumatic to their child, which is different from the other study that found regardless of the positive outcome of the GA it was difficult experience on most of the children and their parents [44].

## Conclusion

The overall satisfaction of the families throughout the pathway of dental rehabilitation under general anesthesia was up to 95%, only the long waiting time (61% more than 6 months) and the non-respond of the appointment desk were the reasons of un-satisfaction in general.

Many AAPD and DOH recommendations for the prevention of ECC are not met. Greater effort should be done to increase the public awareness about dental caries and its prevention.

1. Around 30% repetition of dental treatment under GA is reported in children of this study and their siblings. Failure of regular dental checkups and lack of education is confirmed by the report of 83% of the subjects visiting dental clinic only for emergency which can be linked to the low level of parents' education (>60% have less than bachelor degree). Dental preventive programs that target the children and their parents should be implemented to promote better oral health education.
2. Because 59.7% of the children in the study are in preschool age it's difficult to reach them by school programs. So our recommendation is to emphasize the need of dentists to educate the children and their caregivers in the clinics or even to make special dental education programs with children's vaccination schedules.

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