

# CHANGES IN PARENTS' PERCEPTION OF PEDIATRIC PATIENTS REQUIRING DENTAL REHABILITATION UNDER GENERAL ANESTHESIA AFTER THE PANDEMIC

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## ABSTRACT

Access to proper dental services appropriate to patient need became an issue as a consequence of COVID-19 due to many regulations in the past 3 years, one of which is delaying elective surgeries. As a result, the number of pediatric dental patients on the General Anesthesia (GA) list increased. SDF is an excellent and effective method to manage dental caries in children in certain cases and it has been approved by the American Academy of Pediatric Dentistry (AAPD). This study aims to assess children doomed to be treated under GA who could be suitable for other treatment options and evaluate the parent's perception of SDF use as an alternative treatment to GA to resolve the increase in the pediatric GA list after the COVID-19 pandemic. It was concluded that the Covid pandemic placed a huge demand on dentistry. The shot-down of elective services had negatively impacted general oral health. Teledentistry can be effectively used for initial screening and triage however, it cannot replace clinical dental practice.

**Key words:** Dental Caries, Pediatric patients, Prevention, silver diamine fluoride, Parents perception.

## Introduction

The World Health Organization (WHO) defined dental caries as a local pathological process with an extra-somatic background leading to enamel decalcification and decomposition of dental hard tissue to form a dental cavity [1, 2]. A study conducted in 2010 showed that 2.43 billion people (35.3% of the population) worldwide suffer from it [3].

In Saudi Arabia, dental caries prevalence and its severity in children is estimated to be around 80% in the primary dentition with a DMFT mean of 5.0; which is considered a high prevalence [4, 5].

For more than 40 years, silver topical products like silver nitrate and Silver Diamine Fluoride (SDF) have been used in Japan to arrest caries and decrease hypersensitivity in primary and permanent teeth [6, 7]. SDF is a colorless liquid consisting of silver particles and a fluoride ion concentration of 38 percent (44,800 ppm). At pH 10, it is 25 % silver, 8% ammonia, 5% fluoride, and 62% water [8]. The U.S. Food and Drug Administration (FDA) has classified SDF as “a Class II medical device and it is cleared for use in the treatment of tooth sensitivity, which is the same type of clearance as fluoride varnish and must be professionally applied” [9].

Dental caries can be treated effectively using silver diamine fluoride (SDF), which only needs inexpensive supplies and short chair time. The exact mechanism of SDF is yet to be

understood [7]. A theory suggests that fluoride ions act mainly on the tooth structure leading to remineralization, and silver ions are antimicrobial like other heavy metals. Also, it is theorized that in an alkaline environment, SDF reacts with hydroxyapatite. This reaction forms significant products, silver phosphate and calcium fluoride (CaF<sub>2</sub>). CaF<sub>2</sub> provides adequate fluoride to form fluorapatite, which is less soluble than hydroxyapatite in an acidic environment [7]. SDF's main discouraging side effect is black discoloration of demineralized and cavitated surfaces. This side effect must be disclosed to parents using before-and-after photographs of teeth treated with SDF before consenting to use it [7]. Sedation and GA have been utilized in the practice of dentistry and medicine since the 1840s [10].

Dental rehabilitation under General anesthesia is a widely accepted treatment in pediatric dentistry and it has been found it is the number one cause of admissions of children under the age of 5 in hospitals [11].

GA can be considered if the patient is unable to cooperate or suffer from a certain physical or mental disability, or when the treatment magnitude and volume exceed the patient's cognitive development. Also, it can be used for children and adolescents who are highly anxious and there is no expectation that their behavior will improve within time to prevent dental pain and infection [12].

Access to proper dental services appropriate to patient need became an issue as a consequence of COVID-19 due to

many regulations in the past 3 years, one of which is delaying elective surgeries. As a result, the number of pediatric dental patients on the General Anesthesia (GA) list increased. Subsequently, in many cases, treatment plans' complexity increased from simple restoration to pulpotomy, pulpectomy, and/or extractions [12].

Although that SDF is an excellent and effective method to manage dental caries in children in certain cases and it has been approved by the American Academy of Pediatric Dentistry (AAPD) [1]. However, in the past couple of decades it has been mainly used in Asian countries and its adaptation into Western clinical practice is still in its early stages [13]. The aim of this study is to assess children doomed to be treated under GA who could be suitable for other treatment options and evaluate the parent's perception of SDF use as an alternative treatment to GA to resolve the increase in the pediatric GA list after the COVID-19 pandemic.

**Materials and Methods**

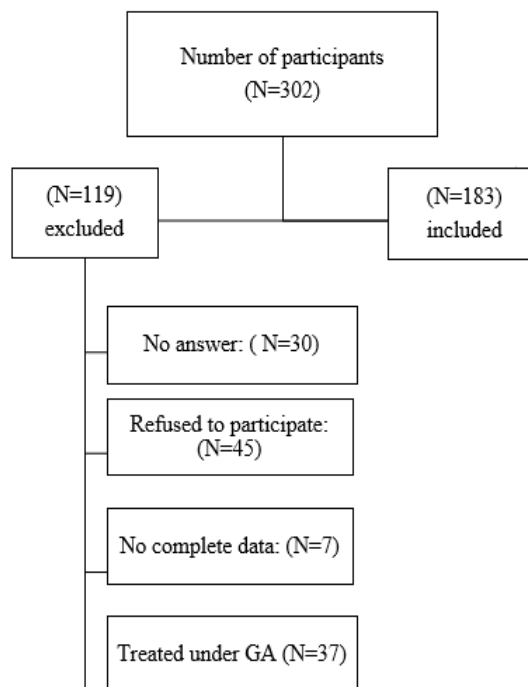
*Sample size*

This is a descriptive cross-sectional study of pediatric patients' parents' perception of SDF as an alternative treatment to the long GA waiting list caused by COVID-19. The study includes full dental rehabilitation pediatric dental patients aged from birth to 16 years old added to the GA waiting list from September 1<sup>st</sup>, 2021 to the end of February 2022.

Data is collected via phone calls to fill out a questionnaire to assess the patient's suitability for SDF treatment and register parents' interest in SDF if applicable. Suitable patients were called for an appointment with a pediatric dentist for further clinical examinations.

A total of 302 patients aged from 2-15 years who were enrolled on the waiting list between September 1<sup>st</sup>, 2021 to the end of February 2022 were included. One hundred nineteen patients were excluded from the study due to either refusal to participate, uncompleted data provided, did not answer upon multiple calls or child has already been treated under GA.

One hundred and eighty-three patients were identified as being suitable for treatment with SDF by the questionnaire. Following that, a PDF electronic leaflet containing information and a clinical picture showing the result of the SDF application in children was sent to the parents via WhatsApp messages (**Figure 1**).



**Figure 1.** Inclusion and exclusion criteria.

**Results and Discussion**

*Demography*

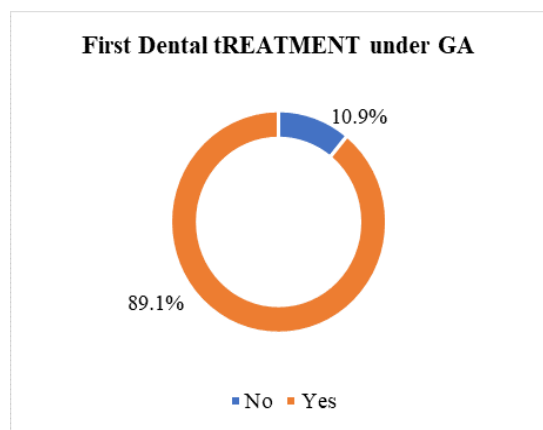
One-hundred eighty-three (n=183) pediatric dental patients' parents successfully matched this study inclusion criteria; almost evenly divided between males and females. Half of the patients were between the age of 5 - 7 years (53.0%) compared to 20.7% of patients aged between 8 - 10 years (**Table 1**).

It is founded that 89.1 % of parents reported that this is their first time for their child to be treated under GA while 10.9% of them reported that this is their second time (**Figure 2**). The medically compromised patient percentage was found to be 8.3% of the sample size (**Table 3**).

**Table 1.** Overview of Sample's Demographic Variables (n=183)

Variable	Frequency (f)	Percent (%)
Child's Gender		
Male	93	50.8
Female	90	49.2
Child's Age (years)		
2-4	36	19.7
5-7	97	53.0
8-10	38	20.7
11-13	8	4.4
14-16	4	2.2
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**Figure 2.** Distribution of the Sample according to the number of dental GA's (n=183).

When parents were asked if their child experienced any pain, 102 answered “yes“ (55.7%), while 59.0% of them answered “yes” to the question when asked about the presence of a dental abscess. Parents who responded with “yes” to having a history of abscess were also asked about the frequency, a remarkably high number of them reported experiencing it more than five times (n=30) with (27.8%).

In regard to the distribution of pediatric patients according to the use of Pain killers or antibiotics, (78.1%) of them reported using painkillers while a lower percentage of parents had to use antibiotics (39.1%) (Table 2).

**Table 2.** Distribution of Pediatric Patients according to Dental Health History Questions and medical conditions.

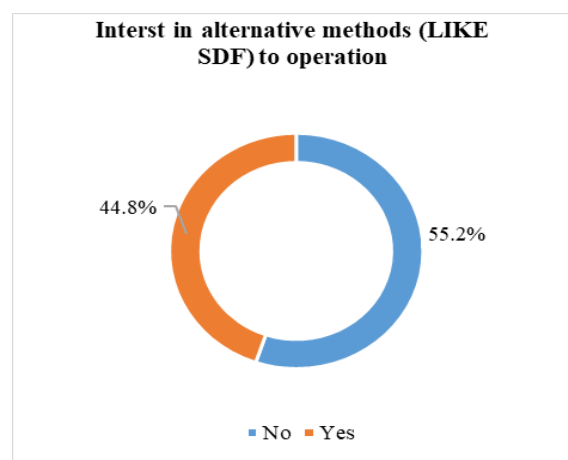
Dental Health History	Frequency (f)	Percent (%)
Had Pain Episodes (n=183)		
Yes	102	55.7%
No	81	44.3%

**Table 3.** Mann-Whitney U test for the equality of Mean Ranks of Parents' Responses to Interest in SDF by Pediatrics' Gender and Kruskal-Wallis test for age(n=183)

Variable	Patient's gender	N	Mean Rank	Sum of Ranks	Mann-Whitney U	P-value
Interest in	Male	93	90.35	8403.0	4032.0	.620

Had Dental Abscesses (n=183)		
Yes	108	59.0%
No	75	41.0%
Prevalence of Dental Abscesses (n=108)		
1	25	23.1%
2	16	14.8%
3	22	20.4%
4	11	10.2%
5	4	3.7%
More than 5	30	27.8%
Use of Dental Pain-Killer (n=183)		
Yes	143	78.1%
No	40	21.9%
Use of Dental Antibiotics (n=183)		
Yes	73	39.9%
No	110	60.1%
Children's medical conditions		
Down syndrome	2	1.1
Autism	5	2.7
Asthma	3	1.6
Diabetes mellitus	3	1.6
Heart disease	3	1.6
Other	12	7.7
No	155	84.7

In terms of parent's perception toward SDF, 44.8% (n=82) of them showed initial acceptance of the treatment while 55.2% (n=101) were not interested (Figure 3).



**Figure 3.** Distribution of the Sample according to parents' interest in other alternatives (n=183)

“? alternative methods (LIKE SDF) to operation	Female	90	93.70	8433.0		
	Total	183				
Variable	Patient's Age (in years)	N	Mean Rank	Chi-Square	Df	P-value
Interest in alternative methods (LIKE SDF) to operation	2-4	36	91.67	.665	4	.956
	5-7	97	93.45			
	8-10	38	87.12			
	11-13	8	96.75			
	14-16	4	96.75			
	Total	183				

**Table 3** shows the findings from Mann-Whitney U test for the equality of Mean Ranks of Parents’ Responses to Interest in SDF by Pediatrics’ Gender and Kruskal-Wallis test for age. No statistically significant association was seen between age and gender with parents’ responses to interest in SDF.

Due to the covid pandemic, there has been an inevitable backlog of patients waiting for treatment. Unfortunately, too often, children have had to wait long periods while suffering discomfort, pain, and infection until assessment and treatment can commence [13]. As a consequence of the pandemic, a face-to-face approach has been restricted and this led to more shifting toward Teledentistry Which can supplement the damaged dental system if not completely replace it. Teledentistry uses information technology to facilitate dental care, counseling, and education remotely [14].

The use of teledentistry in routine dental practice is subjected to several restrictions, including lack of consumer awareness, which is frequently related to patient age and educational level. Lack of confidentiality and security of data, poor internet connectivity, and resistance to new technology, training among dentists are further obstacles that they must overcome. The provision of informed consent to patients before the start of any treatment can help to further increase the adoption of teledentistry [15].

Out of the 302 patient sample size, 24.83% either refused to participate or didn’t answer their phone upon being contacted twice. The Pain reported by parents was considerably high with our sample, with (27.8%) of them reporting having had dental abscesses that can reach up in some patients to 5 times. However it is worth mentioning that these reported percentages are not based on clinical diagnosis, however, the impact of pain and abscess on the general health of children is undisputed and might result in an impact on their sleeping, eating, weight, and overall quality of life [16]. Chronic inflammation from caries related pulpitis and abscesses is known to suppress growth through a metabolic pathway and to reduce hemoglobin as a result of depressed erythrocyte production [17, 18]

The dental treatment makes a very significant difference to the psychological and social aspects of the children. In one study, parents perceived treatment had positive social impacts on their children whether their smiles, improved school performance, and increased social interaction [19-21].

Progress of caries into primary teeth is considerably faster compared to permanent teeth adding all the risks related to children when it comes to consumption of sugar, a study conducted recently showed that there was an increased risk factor of caries compared to protective factors during the pandemic. This was due to an increased intake of fermentable sugars, frequent consumption of dietary sugars, frequent intake of snacks between meals, and incorrect oral habit hygiene [22].

Despite the research team's inability to further report on the outcome of these patients; it was not in the interest of this research. The long waiting lists for dental GA might have caused frustration among parents to have their child's dental treatment which led them to be interested (44.8%). However, the majority of them requested for it not to be applied in anterior teeth due to aesthetic concerns, our result is consistent with earlier research results which showed lower interest in SDF [23-25]. Especially as we see nowadays there is an increase in the esthetic demand when it comes to children with the introduction of Zirconia Crowns which might also impact the adaptation of SDF into clinical practice [26].

**Conclusion**

The Covid pandemic placed a huge demand on dentistry. The shot-down of elective services has negatively impacted general oral health. Teledentistry can be effectively used for initial screening and triage however, it cannot replace clinical dental practice. Despite being an acceptable choice by dental practitioners, aesthetic concerns are always will be a disadvantage for SDF. Further research in this area is advised.

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**Ethics statement:** This study fulfills the ethical requirements of Ministry of health.

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