

Original Research Article

The effect of COVID-19 on dental treatment under conscious sedation in children: a retrospective study at Dental University Hospital, Riyadh, Saudi Arabia

Mannaa K. Aldowsari^{1,3*}, Ayman M. Sulimany^{1,3}, Saad S. Bin Saleh^{1,3}, Modhi Alhussain³,
Daniyah Alsuhaibani³, Wasayef Alwasil³, Hebah M. Hamdan^{2,3}

¹Department of Pediatric Dentistry and Orthodontics, King Saud University, Riyadh, Saudi Arabia

²Department of Periodontics and Community Dentistry, King Saud University, Riyadh, Saudi Arabia

³College of Dentistry, King Saud University, Riyadh, Saudi Arabia

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*Correspondence:

Dr. Mannaa K Aldowsari,

E-mail: maldowsari@ksu.edu.sa

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ABSTRACT

Background: This study aimed to assess the effect of the COVID-19 pandemic on the number of cases and types of dental procedures performed under conscious sedation for children at Dental University Hospital (DUH), Riyadh, Saudi Arabia during the period between 2019-2021.

Methods: This retrospective chart review study used digital and paper records for data collection. The sample was comprised of children aged 3 to 11 years of age who received dental treatment under conscious sedation from 2019 to 2021 at DUH. Descriptive statistics were presented, and negative binomial regression analysis was performed to assess the difference in the number of performed procedures by different academic year.

Results: Two hundred and twenty-seven subjects had dental treatment under conscious sedation from 2019 to 2021. Most of the sample were Saudi (88.5%) and classified as ASA I (97.8%). The number of sedation cases were almost 55% lower than the number of cases that were done in 2020 and almost 62% lower than the cases that were performed in 2019. There was a significant decrease in the pulp therapy and preventive procedures ($p=0.03$, and $p=0.02$, respectively). No statistically significant differences were found in other procedures.

Conclusions: There was a considerably huge decrease in the number of cases treated under conscious sedation as an effect of the pandemic. Pulp therapy and preventive procedures were the most affected. Our findings indicate the need to establish a protocol for delivering dental care while ensuring the safety of the patients in such difficult situations.

Keywords: Children, COVID-19, Oral sedation, Pediatric dentistry

INTRODUCTION

Pain and fear are the two most dreaded enemies of the human psyche and the fear of dental treatment is one of the worst fears experienced by human beings. Several studies across the world suggested that 3% to 43% of children exhibit dental anxiety.^{1,2} One of the most common challenges that face pediatric dentistry is dealing with and treating uncooperative children with extensive dental needs safely and effectively without traumatizing the child.³ The majority of pediatric dental patients can be

managed by a conventional approach of behavioral management techniques such as voice control, intimidation, and distraction, which are not always applicable for young, fearful, and uncooperative children. Those patients may require pharmacological intervention, either by conscious sedation (CS) or general anesthesia (GA).^{3,4}

Conscious sedation is a type of sedation that uses certain medications to depress the consciousness while maintaining verbal contact and protective reflexes.⁵

The drugs and techniques used to give conscious sedation for dental procedures should have a wide margin of safety to prevent loss of consciousness.⁶ Multiple drugs are being used to achieve conscious sedation in different routes of administration such as oral, intranasal, or combination. Oral sedation is indicated in multiple conditions such as in treating patients with dental phobia and anxiety, traumatic and long dental procedures, or medical conditions aggravated by stress such as angina, asthma, and epilepsy.⁶

In Saudi Arabia, the Dental University Hospital (DUH) in Riyadh is the first center and one of the few centers that used oral sedation for pediatric dental patients. The DUH is used to provide sedation services to pediatric patients on a regular basis. However, in March 2020, the world health organization (WHO) announce the COVID-19 as a pandemic.⁷ At that time no effective vaccine or therapeutic cure were found.⁸ Governments across the world implemented lockdown and strict infection control measurements in order to limit the spread of the disease.⁸ In Saudi Arabia lockdown was announced on March 25, 2020, as a mandatory precaution.⁸ As a result of the pandemic, most health workers became on the front line of providing health care for patients diagnosed with COVID-19.⁹

In dentistry, treatment was limited to emergency cases only and postponing elective treatment including oral sedation.¹⁰ Therefore, this study aimed to assess the effect of the COVID-19 pandemic on cases and types of dental procedures performed under conscious sedation for children at Dental University Hospital (DUH), Riyadh, Saudi Arabia during the period between 2019 to 2021.

METHODS

This retrospective chart review study was conducted between December 2021 to April 2022. Ethical approval for the study has been granted by the institutional review board of the King Saud University (E-21-6293). We used a convenient sample of children between the ages of 3 and 11 years who received dental treatment under conscious sedation from 2019 to 2021 at Dental University Hospital (DUH), Riyadh, Saudi Arabia and had good quality records in their hospital files. The exclusion criteria were children who had low quality records in their hospital records, or who did not match the age range.

Digital and paper records were reviewed for data collection. Variables such as age, gender, type of treatment (restorative, pulp therapy, extraction), and the number of sedation cases were collected throughout the years.

Statistical analysis

Data were extracted from Salud software into Microsoft excel spreadsheet and then analyzed using SAS 9.4

software (SAS Institute, Inc., Cary, NC, USA). Descriptive statistics such as frequencies and percentages were used to present categorical variables, and means and standard deviation were used to present continuous variables. The negative binomial regression analyses were performed to assess the difference in the number of performed procedures by different academic year. For all statistical analyses the level of significant was set at $\alpha < 0.05$.

RESULTS

Table 1 illustrates the background characteristics of the sample populations. Two hundred and twenty-seven subjects had dental treatment under conscious sedation from 2019 to 2021. The majority of the sample were Saudi (88.5%) and classified as ASA I (97.8%). More than half of the sample were female (53.7%) with a mean age of 4.7 ± 1.3 (Table 1).

Table 1: Background characteristics of the sample population.

Characteristics	N (%)
Age (mean$\pm$SD)	4.7 $\pm$ 1.3
Gender	
Male	105 (46.3)
Female	122 (53.7)
Nationality	
Saudi	201 (88.5)
Non-Saudi	26 (11.5)
ASA	
ASA I	222 (97.8)
ASA II	5 (2.2)

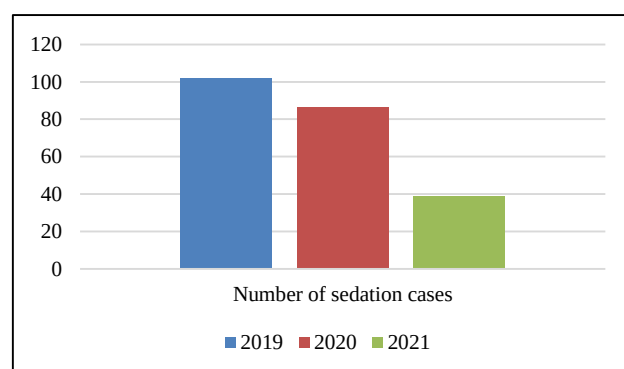


Figure 1: Number of sedation cases across the years.

Figure 1 presents the number of sedation cases across the study years. There was a considerably huge decrease in the number of cases treated under conscious sedation at the year of 2021 as an effect of the COVID-19 pandemic. In 2021, the number of sedation cases (n=39) were almost 55% lower than the number of cases that were done in 2020 (n=86), and almost 62% lower than the cases that were performed in 2019 (n=102) (Figure 1). When the type of procedures performed were analyzed, we found a

significant decrease in the pulp therapy and preventive procedures from 2019 to 2021 ($p=0.03$, and $p=0.02$, respectively). On the other hand, no statistically significant differences were found in the extraction, SSC, anterior restorations, and posterior restorations procedures across the years ($p=0.58$, $p=0.86$, $p=0.78$, $p=0.26$, respectively) (Figure 2).

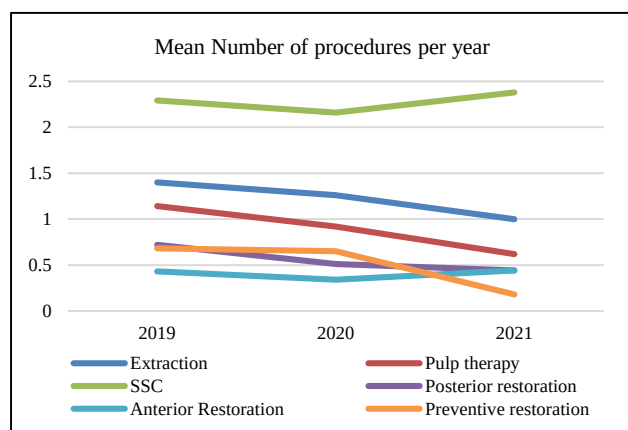


Figure 2: Mean number of different dental procedure performed per child across the years.

DISCUSSION

The dental treatment of children under conscious sedation has been practiced in the dental university hospital in Riyadh, Saudi Arabia since 2015. The main reasons for treating young children under conscious sedation are to minimize physical discomfort, pain, and anxiety, and to control patients' anxiety in the dental chair.^{11,12} Oral sedation service was one of the services that had been affected during the COVID-19 period. Therefore, the aim of this study was to assess how the COVID-19 pandemic affected the number of cases and types of dental procedures performed under conscious sedation for children at the Dental University Hospital (DUH) in Riyadh, Saudi Arabia, between 2019 and 2021.

Our findings showed that the number of cases treated under conscious sedation during and after the pandemic in 2021 was significantly declined than in 2020 and 2019, by 55% and 62% respectively. In line with these findings, studies have found that there was widespread deterioration in children's oral health and access to dental treatment.¹³ A study was done by Üstün et al showed that there was a considerable impact on patients' attendance at pediatric dental clinics during the COVID-19 epidemic.¹⁴ Similarly, Elsherif et al reported due to the COVID-19 pandemic, there have been more cancelled general anesthesia dental procedures on children.¹⁵

Literature showed that COVID-19 had a substantial impact on the number of attended pediatric patients has been recorded, which might be related to the fear of transmission of infection.^{13,16-18} Furthermore, early during the COVID-19 pandemic, most patients incorporate

children and young patients who would have been eligible for their first dental visit have been denied access to regular dental care. Even after services were resumed, the number of dental appointments was limited. This is partly due to additional personal protective equipment and limited appointment time. Also, many families were concerned about returning to high-risk environments, especially for non-emergency assessments and treatments.^{13,19}

The recent pandemic has had an impact on contemporary societies and psychological effects all over the world.²⁰ Meanwhile, healthcare, including dental care, was one of the most severely impacted fields.²⁰ Fear of seeking dental treatment was directly correlated to COVID-19 acquired infection through aerosols originate from dental procedures.^{20,21} In general, according to the guidelines established in response to COVID-19, only emergency and urgent cases should be managed.²² In accordance with the findings of other studies, pharmacological treatment was the most principal treatment for dental emergencies, mostly analgesics, and antibiotics, followed by extraction.²³ During the pandemic, most patients reported pain and had an appointment with pediatric dentist at the latest stage of pain due to the strict stay-at-home restrictions.²³ Additionally, the pandemic has generated high levels of fear from dental treatment.^{23,24} Moreover, studies have shown that many children shifted their eating and drinking habits by increased consumption of dietary sugars in addition to inadequate topical fluoride and teeth brushing routines during the lockdown these resulting in caries risk elevation.^{20,25,26}

Our findings indicates that there was a gradual decrease in certain procedures that were carried out under conscious sedation such as pulpal therapy and preventive procedures during the pandemic. This could be due to the lockdown hospital regulations as only urgent cases were treated under conscious sedation such as teeth with spontaneous pain and abscess that needs extraction. Other than that, cases with mild pain due to deep caries that indicates pulpal therapy or cases with insipient caries were postponed and managed with analgesics only. As a result of postponing the treatment, the disease progressed and instead of treating the pulp, it transformed into an abscess indicating extraction. Same for deep pits and fissures or incipient caries which turned into cavities.

One of the drawbacks of the present study is that it was a retrospective design, which relies on documentation. However, this study was carried out at one of the largest dental hospitals in the area which follows a strict protocol to document the sedation visits using both an electronic and paper system. Another limitation of this study was that the findings were based on a single tertiary hospital, which may affect generalizing the findings of the study. So further studies using data from multicenter from different cities should be considered. Despite the above-mentioned limitations, this study was the first study to

investigate the effect of the COVID-19 pandemic on conscious sedation.

CONCLUSION

In conclusion, there was a considerably huge decrease in the number of cases treated under conscious sedation in the year 2021 as an effect of the COVID-19 pandemic. Vital pulp therapy and preventive procedures were the most affected by the pandemic. Our findings indicate the need to establish a protocol for delivering dental care while ensuring the safety of the patients in such difficult situations.

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Conflict of interest: None declared

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