Original paper

Assessment of attitudes and practices regarding oral healthcare during the COVID-19 pandemic among the parents of children aged 4–7 years

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Abstract

Background. The coronavirus disease 2019 (COVID-19) pandemic has brought about radical changes in our habits and lifestyles. The suspension of schools has led children to spend long hours at home, with reduced socialization, and changes in dietary patterns, oral hygiene practices and sleep routines. During a pandemic, appropriate oral health management and disease prevention are very important for the child's oral and general health.

Objectives. The aim of this study was to assess the attitudes and practices of parents with regard to their children's oral healthcare, dietary habits and dental care during the COVID-19 pandemic.

Material and methods. This cross-sectional study included 381 Indian parents of children aged 4–7 years. A self-instructed questionnaire was designed in English using the Google Forms platform. The questionnaire consisted of 4 parts: sociodemographic data; dietary habits of the child; oral hygiene measures; and dental information. The collected data was analyzed using descriptive and analytical statistics (the χ^2 test).

Results. Among the children included in the study, 48% of those who experienced dental problems during the pandemic consumed more snacks and packaged foods between meals. Among the parents, 80% reported that their children used electronic devices at mealtimes, and 60% reported the food pouching habit in their children. A total of 71% of parents assisted their child at tooth brushing, while only 28% of the parents would take their child to the dental clinic for treatment.

Conclusions. This study highlights the shortfalls in attitudes and practices among parents in relation to dietary habits, oral hygiene measures and the use of dental services during the COVID-19 pandemic regarding their children. This could be attributed to a lack of awareness, the fear of exposure and the inconveniences faced by parents.

Keywords: teledentistry, COVID-19, pediatric dentistry, oral hygiene measures, dietary changes

Introduction

The World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19) a public health emergency of international concern (PHEIC) on January 30, 2020, and characterized the outbreak as a global pandemic on March 11, 2020.[1] As of October 2021, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) had spread across the globe and infected over 236 million people.[2] The SARS-CoV-2 is regarded as a highly contagious virus that spreads mainly through the small droplets expelled from the nose or the mouth when an infected person speaks, coughs or sneezes.[3] Clinical symptoms typically include a dry cough accompanied by fever.[4] Difficulty in breathing and fatigue, along with other, less typical symptoms also occur.[5] According to a study on more than 2,000 child patients with suspected or confirmed COVID-19, over 90% were asymptomatic or presented mild to moderate symptoms.[6] Of the 13.5 million cases reported in those under 20 years of age, 31% were among children aged 0–9 years.[7] In India, 11.9% of the reported COVID-19 infections are among children and adolescents.[8] The highly transmissible Omicron variant has affected children more than previous variants, but its symptoms are significantly milder.[9]

Since there is no definitive treatment protocol in place, different countries announced nationwide lockdowns to control the spread of the disease.[10] Sudden and radical changes occurred in habits and lifestyles, with a drastic reduction in all forms of socialization.[11] The suspension of schools and sports activities led children to spend long hours at home, which resulted in disturbances in dietary patterns, oral hygiene practices and sleep routines in children.[3] However, certain countries, like Sweden, avoided a complete nationwide lockdown.

Concerns regarding the safety of dentists and children led to a reduction in routine dental visits, compromising preventive appointments. This was further compounded by the unavailability of pediatric dental services in many places. Parents contacted dentists only for emergencies, such as acute pulpitis, dental trauma, and oral and maxillofacial infections that caused swelling.[10] Many resorted to a medical prescription and postponed dental treatment.

A survey conducted in Russia in 2020 collected data from 166 pediatric patients aged 1–17 years. Acute pain in primary molars in children aged 4–7 years was the most prevalent finding (62%).[12] Similar scenarios have been observed by pediatric dentists in India, although no documentation has been reported to date.

During the pandemic, appropriate oral health management and disease prevention are necessary for the general health of the child. Parents play a key role in implementing measures to foster better habits.[13] There is a directly proportional relationship between parental attitudes and the health of children.[10] Thus, this study was conducted to assess attitudes and practices regarding children's oral healthcare during the COVID-19 pandemic among parents with children aged 4–7 years.

Material and methods

Study duration and the ethics approval

A cross-sectional study was carried out from August 1 to October 1, 2021, during the phased opening stage. Approval was obtained from the Ethics Committee at the School of Dentistry of D.Y. Patil Deemed to be University, Navi Mumbai, India (IREB/2021/PEDO/21).

Data collection

The convenience sampling technique was employed for this study. The questionnaire was made available on the Google Forms platform (Google, Mountain View, USA). The link to the questionnaire was sent through the WhatsApp application (Meta Platforms, Inc., Menlo Park, USA) to the parents of schoolchildren, and to the parents who arrived for a dental visit at the Department of Pedodontics and Preventive Dentistry of the D.Y. Patil Deemed to be University School of Dentistry. The sample size was calculated by considering the representative sample size, using a 95% confidence level and a margin of error of 5%. The sample size was then estimated at a minimum of 375 respondents. The nature of the study was explained in brief and the anonymity of the respondents was affirmed. The parents were also informed that the completion of the questionnaire would be considered as consent to participate. A total of 381 parents agreed to participate in the study. The inclusion criteria were specified as all parents of children between 4 and 7 years of age. Parents who did not complete the questionnaire were excluded from the study.

This study followed the established guidelines for reporting medical surveys.[14] The questionnaire was designed by adapting questions from previous surveys in English. A pilot study was conducted among 10 parents to check the validity and reliability of the questionnaire. After necessary modifications to a few questions, the implementation phase began.

The revised questionnaire consisted of 4 parts: sociodemographic data; dietary habits of the child (7 questions); oral hygiene measures (3 questions); and dental information (6 questions) (Table 1). Multiple choices were provided for each question and the participants had to mark the option they considered appropriate.

Statistical analysis

The data was statistically analyzed using GraphPad Prism, v. 8.4.3 (GraphPad Software, Inc., San Diego, USA). Descriptive analysis was performed for the demographic data. The χ^2 test was used to test for statistically significant differences between the variables in the survey. Statistical significance was established at $p \leq 0.05$.

Table 1. Questionnaire

Parameters	Questions
Sociodemographic data	age/gender of the parent
	age/gender of the child
	socioeconomic status (education/occupation/income)
Dietary habits of the child	Was there any change in the amount of food consumed by your child during the pandemic?
	Was there any change in the eating habits of your child during the pandemic?
	Was there an increase in snacking between meals by your child?
	What was the frequency of consumption of cariogenic food (sweets/chocolate/cookies) during the pandemic?
	Does your child use electronic devices (tablet/phone/TV/computer) while eating or snacking?
	Does your child tend to pouch food in the mouth during meals, which leads to an extended mealtime?
	Has there been a change in the sleep cycle of your child since the pandemic began?
Oral hygiene measures	How often does your child brush his/her teeth?
	What measures did you take to maintain your child's oral health during the pandemic?
	Were you able to assist your child at tooth brushing during the pandemic?
Dental information	Did you take your child to a dentist before the pandemic?
	Did your child experience any toothache/cavity/swelling during the pandemic?
	Did your child experience any dental trauma during the pandemic?
	Would you take your child to a dental clinic during the pandemic?
	Do you think your child could get infected with COVID-19 during dental treatment?
	What would be your mode of contact with the dentist, if required?

COVID-19 – coronavirus disease 2019.

Results

The sociodemographic details of the participating parents are presented in Table 2 and Fig. 1. Classifying the parents according to the modified Kuppuswamy scale,[15] the majority of them were in the upper class (40.7%) and upper middle class (30.4%) categories. Based on the total number of responses (381), 138 (36%) children experienced dental problems during the pandemic.

Dietary factors

Among the children who experienced dental problems during the pandemic, 45 (33%) showed an increase in the amount of food consumed during the pandemic. However, the parents of 80 (58%) children reported no change in food consumption. Differences between the groups proved to be statistically significant ($p < 0.01$) (Fig. 2). Fifty-nine (43%) children who experienced dental problems during the pandemic consumed more processed foods, such as sweets and

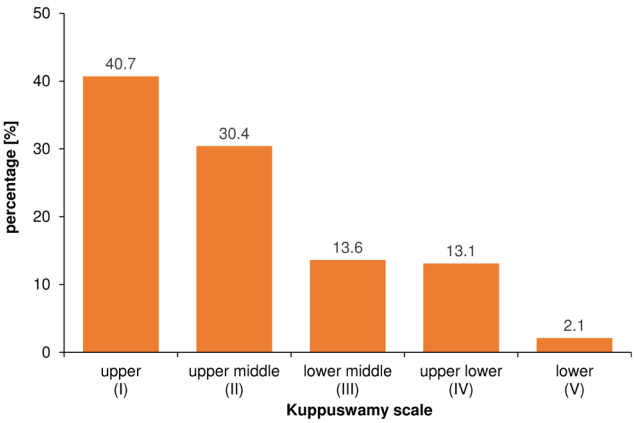

Fig. 1. Socioeconomic status of the parents according to the modified Kuppuswamy scale

Table 2. Characteristics of the study population ($N = 381$)

Characteristics		*n* (%)
Gender of the child	boys	206 (54.1)
	girls	175 (45.9)
Parents' education	illiterate	1 (0.3)
	diploma	61 (16.0)
	primary school	7 (1.8)
	middle school	35 (9.9)
	high school	53 (13.9)
	professional degree	224 (58.8)
Parents' occupation	unemployed	57 (15.0)
	elementary occupation	16 (4.2)
	craft and related trades workers	4 (1.0)
	plant and machine operators and assemblers	3 (0.8)
	skilled agricultural and fishery workers	13 (3.4)
	service workers and shop and market sales workers	34 (8.9)
	technicians and associate professionals	23 (6.0)
	legislators, senior officials and managers	54 (14.2)
	professionals	177 (46.5)

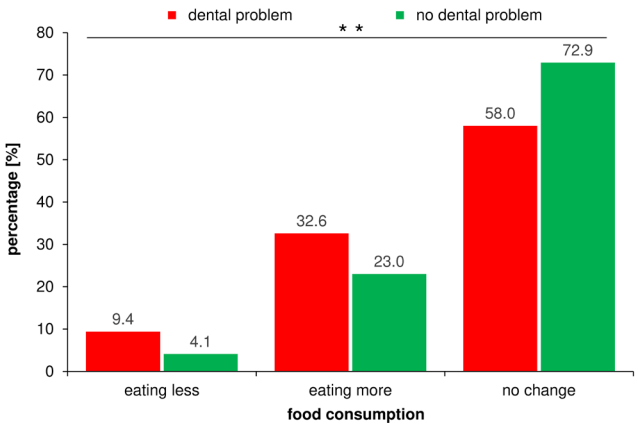

Fig. 2. Relationship between dental problems and changes in food consumption

** statistically significant ($p < 0.01$).

cookies, and soft drinks, with merely 17 (12%) children having consumed more fresh fruits and vegetables during their time away from school. As shown in Fig. 3, differences in the percentages of children in the context of their eating habits were also found to be statistically significant ($p < 0.0001$). Additionally, it was determined that 66 (48%) children who experienced dental problems during the pandemic consumed more snacks and packaged foods between meals. There were statistically significant differences between the groups ($p = 0.0003$) (Fig. 4). On average, children who consumed snacks once a day (31%) and several times a day (29%) experienced more dental issues ($p < 0.0001$) (Fig. 5).

Among the 381 respondents, 304 (80%) parents reported that their children used electronic devices at mealtimes and while snacking between meals. Hence, out of the 138 children who experienced dental problems,123 (89%) accounted for those who used electronic devices ($p < 0.001$) (Fig. 6). Another significant finding was the habit of food pouching during meals in 82 (60%) of the children who experienced dental problems ($p < 0.0001$) (Fig. 7).

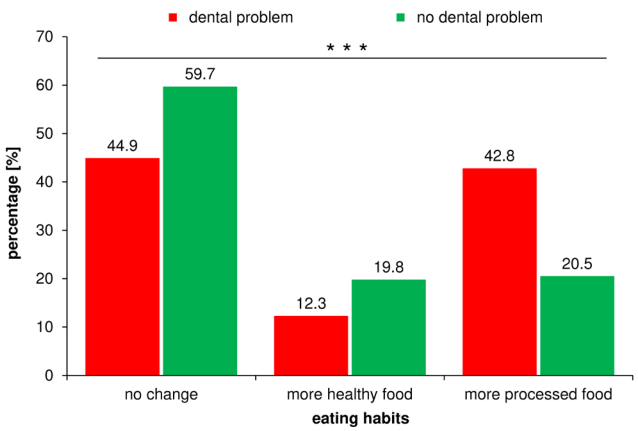

Fig. 3. Relationship between dental problems and changes in eating habits

*** statistically significant ($p < 0.001$).

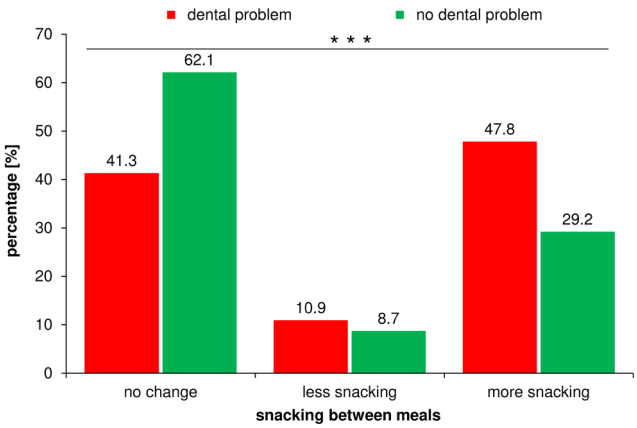

Fig. 4. Relationship between dental problems and snacking between meals

*** statistically significant ($p < 0.001$).

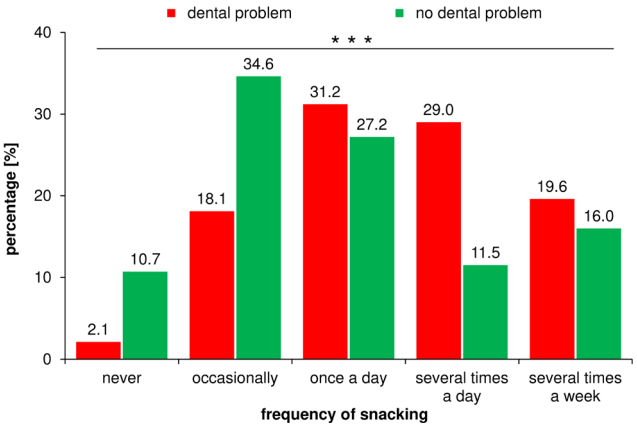

Fig. 5. Relationship between dental problems and the frequency of snacking

*** statistically significant ($p < 0.001$).

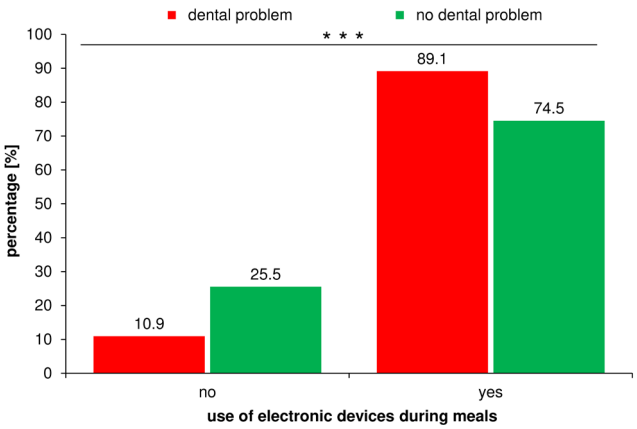

Fig. 6. Relationship between dental problems and the use of electronic devices during meals

*** statistically significant ($p < 0.001$).

Oral hygiene factors

Most parents reported that the frequency of tooth brushing by their children did not change when they were not going to school. Eighty-nine (65%) children who experienced dental problems during the pandemic brushed their teeth once daily ($p = 0.012$) (Fig. 8).

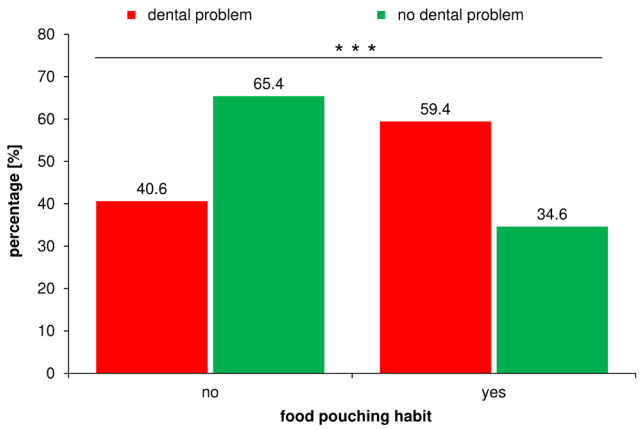

Fig. 7. Relationship between dental problems and the food pouching habit
*** statistically significant ($p < 0.001$).

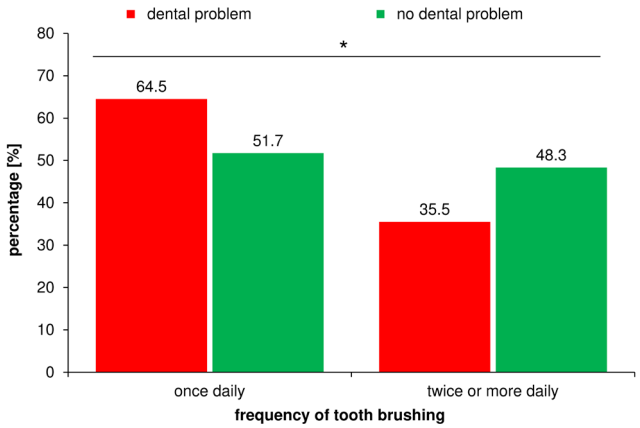

Fig. 8. Relationship between dental problems and the frequency of tooth brushing
* statistically significant ($p < 0.05$).

When asked about the measures taken to maintain their child's oral health, 221 (58%) parents stated that they did not have time for any additional methods. An equal number of parents added flossing or mouth rinsing ($n = 25$, 7% for each) to the oral hygiene routine of their child. The remaining parents increased the frequency of tooth brushing. Two hundred and seventy (71%) parents assisted their child during tooth brushing; however, there was no significant correlation between assistance at tooth brushing and the occurrence of dental problems during the pandemic ($p = 0.906$) (Fig. 9).

Dental information

Fortunately, in this survey, only 57 (15%) children experienced dental trauma during the pandemic, of which only 12 (21%) sought treatment at the dental clinic. One hundred and seven (28%) parents stated that they would take their child to the dental clinic for treatment during the pandemic, as advised by the dentist, and an approximately equal number of parents stated that they would take their child only for a dental emergency.

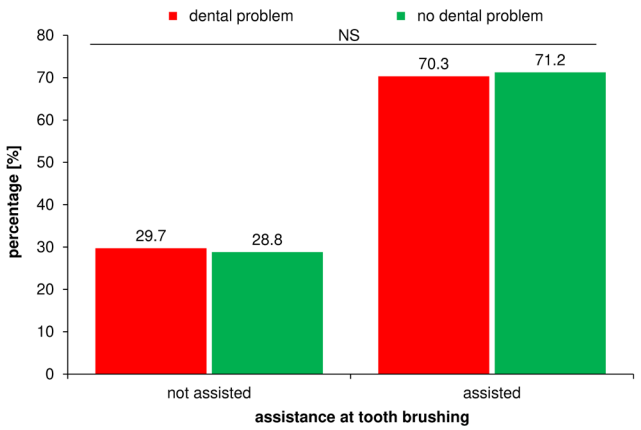

Fig. 9. Relationship between dental problems and assistance at tooth brushing
NS – non-significant.

Most parents (54%) were unsure about their child getting infected with COVID-19 during dental treatment. Only 14% were affirmative about their child getting infected at the dental clinic (Fig. 10). When asked about their preferred mode of contact with the dentist, 162 (43%) parents still preferred visiting a nearby dental clinic (Fig. 11).

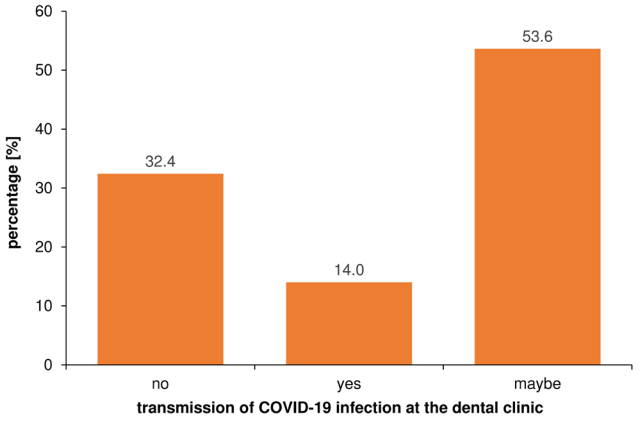

Fig. 10. Chances of the transmission of coronavirus disease 2019 (COVID-19) during dental treatment

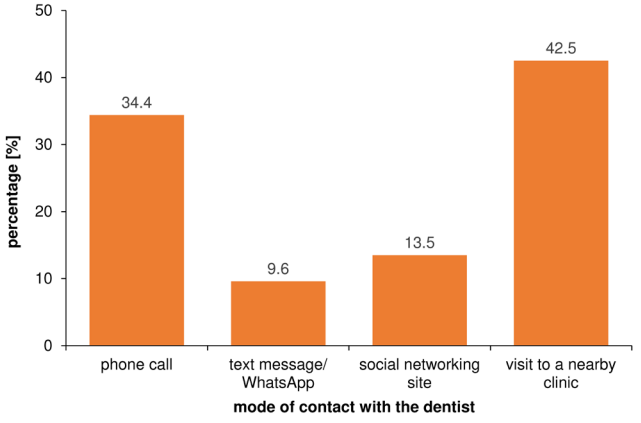

Fig. 11. Mode of contact with the dentist

Discussion

The COVID-19 pandemic has affected billions of people around the world, changing lives dramatically and requiring adaptations in all facets of life. Parents usually act as the primary caregivers for their child's general and oral health.[16] Good oral health is a prerequisite for the general well-being of the child. Parents should instill healthy dietary habits and good oral hygiene practices from an early age. Following up with constant guidance and supervision is essential to avoid severe oral health problems in the future.[17] The COVID-19 pandemic has created financial instability, unemployment and economic crises among many parents, which indirectly affects their mental health, and causes fear and anxiety. This can further lead to emotional distress and prevent the parent from monitoring their child's daily activities (e.g., oral hygiene practices).[3] Since parental attitudes and practices significantly impact the child's oral health, these variables were assessed in this study.

According to Kamalova et al.[12] and Goswami et al.,[18] more than 50% of children in the 4–7-year-old age group who reported to pediatric dental emergency departments during the COVID-19 pandemic had acute dental pain in primary molars. Insufficient prevention and the neglected treatment of the existing dental problems, as well as low parental care could be the reasons why children of this age group had significantly more oral health problems during the pandemic.[12] Most parents adopted a work-from-home lifestyle during the pandemic, and being in a busy period of life and work, the time spent caring for their children was compromised. This could be a possible explanation for the increased number of patients in this group reporting to the pediatric dental emergency departments during the COVID-19 pandemic.

The majority of parents in this study (58%) reported no changes in the amount of food consumed by their child during the pandemic. Campagnaro et al. stated that 61% of their respondents reported an increase in food intake during the pandemic,[3] which contradicts the findings of this study.

In a study by Goswami et al., 77% of the respondents increased their intake of high-carbohydrate foods.[10] The authors suggested that it could be attributed to new routines – work-from-home for parents and remote classes for children. In this survey, 43% of the children consumed more processed foods during the pandemic, which resulted in more dental problems.[10] The stockpiling of processed foods during the pandemic for the ease of use during and between meals could have possibly led to a higher consumption of these food items. These dietary changes have been shown to affect general health in the form of increased obesity and nutritional deficiencies, as well as an increased risk of dental caries.[3] However, this is contrary to a study by Kalyoncu et al., in which the mothers recognized the importance of oral health for the general well-being of the child; they provided non-cariogenic foods to their children and the children consumed healthier food items.[13]

The frequency of snack consumption during the COVID-19 pandemic was significantly higher in this study as compared to the results obtained by Goswami et al.[10] These dietary habits, as explained by Kotha et al., have been shown to be proportional to the decayed, missing due to caries and filled teeth (DMFT) score.[19] The presence of caries is related to the nature of food consumed and the frequency of eating. Parents need to be educated about the cariogenic and cario-protective properties of specific foods. Furthermore, they should plan to avoid the frequent consumption of high-carbohydrate foods.[17,20]

Eighty percent of the children in this survey used electronic devices at mealtimes and while snacking. This indirectly leads to poor diet quality characterized by higher fat and sugar consumption, with fewer fruits and vegetables, which is a potentially cariogenic diet. This would explain the strong correlation between the use of electronic devices and dental issues in this study.[21] Das et al. stated that a longer use of electronic devices during eating and snacking compromises the oral clearance of food.[22] This leads to the food pouching habit in the oral cavity during screen viewing, which acts as a predisposing factor for dental caries.[22] Such observations are similar to those made in this study.

The majority of parents in this study reported a once-daily brushing schedule for their children. However, Goswami et al. claimed that parents increased the frequency of tooth brushing due to constraints in achieving adequate dental services during the pandemic.[10] Our results are in agreement with a study conducted in Istanbul, in which the frequency of tooth brushing did not change.[13] In the present study, the results referring to the parents' assistance at tooth brushing during the pandemic were similar to those reported by Campagnaro et al.,[3] but contrary to the results of Kalyoncu et al., who reported fewer parents supervising their child's tooth brushing during the COVID-19 pandemic.[13] When asked about additional efforts made to maintain the oral hygiene of their child, the majority of parents in this study increased the frequency of tooth brushing, while a small percentage added mouth rinsing or flossing to the routine. However, most parents did not find enough time between their work schedules for implementing additional oral hygiene measures. These findings are consistent with a study by Goswami et al.[10] The prevention of caries is based on adequate and effective oral hygiene measures in addition to dietary habits.

According to some studies, children spent the entire day in a home setting, which results in the creation of active play patterns, and thus the risk of dental tissue trauma is increased. However, in this study, only 15% of children experienced dental trauma during the COVID-19 pandemic; this is similar to the incidences reported by Campagnaro et al.[3] and Kamalova et al.[12] This can be explained by the prohibition of outdoor games, sports training and coaching for children during the COVID-19 pandemic. In the present study, 21% of the children who experienced dental trauma sought treatment at the dental clinic, which

is contrary to the findings of Campagnaro et al., where only 17% of the respondents were willing to take their child to the dentist during the pandemic, regardless of the procedure.[3] However, the present study identified a slight increase (28%) in the number of parents who would follow the treatment protocol, as advised by the dentist. Considering the need for emergency treatment, the percentage of respondents who would seek urgent care was much higher in the Brazilian population as compared to this study.[3] A study conducted in Istanbul also showed a similar attitude of parents regarding dental care during the pandemic.[13] The reluctance of the parents in the present study to utilize pediatric dental care services may negatively impact the oral health of these children and trigger the need for extensive invasive treatment in the future.[3] Regular dental visits allow the detection of dental issues much earlier, which reduces the treatment time, and subsequently the treatment cost. With time, the approval of COVID-19 vaccines for young children will be underway; these may cause orofacial side effects, such as burning sensations, taste alterations, xerostomia, and pain, as reported in adults.[23] Though these symptoms are self-limiting, parents need to be aware of them and report back to the pediatric dentist for professional care.

Contrary to the results obtained in this study regarding parental views about their child being infected with COVID-19 at the dental clinic, Sun et al.[16] and Kalyoncu et al.[13] reported that more than 90% and 80% of the parents, respectively, agreed that their child could be easily infected with the virus during treatment. Respiratory viruses, such as SARS-CoV-2, can be transmitted through direct or indirect contact, or through small droplets. As pediatric dentists, we are potentially at a higher risk, since dental treatment involves aerosol-generating procedures. Thus, appropriate precautions need to be taken to prevent the virus from infecting children as well as its transmission from infected children to healthcare professionals.[13] There needs to be a focus on parental education regarding the measures taken for sterilization, disinfection and protection in the dental clinic.[24] Several authors have described the insufficient use of teledentistry, which is an effective consultation tool, along with safeguarding against the transmission of the infection during the pandemic,[10,25] which was also observed in this study. This reluctance might be due to the complexity involved, coordination issues or resistance to learn new skills. In the future, pediatric teledentistry could be useful for counseling children and parents with regard to appropriate oral hygiene measures.[17,26]

Limitations

This study has certain limitations. The most significant is that the study sample mostly belonged to the upper and upper middle class population, so we were unable to analyze variations in the results based on different socioeconomic statuses.

Conclusions

This study highlights the deficits in the attitudes and practices of the parents of 4–7-year-olds in relation to dietary habits, oral hygiene measures and the use of dental services during the COVID-19 pandemic. This could be attributed to a lack of awareness, the fear of exposure and the inconveniences faced by parents. The impact of the pandemic have been far-reaching for our children. It is essential to not underestimate the indirect effects of COVID-19 on the oral health of children.

Ethics approval and consent to participate

This study was approved by the Ethics Committee at the School of Dentistry of D.Y. Patil Deemed to be University, Navi Mumbai, India (IREB/2021/PEDO/21). Informed consent was obtained from all participants.

Data availability

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Consent for publication

Not applicable.

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