



Evaluation of Parental Attitudes toward and Awareness of Oral Health in Children during the COVID-19 Pandemic

Amarshree A. Shetty¹ Kavita Rai¹ Deepshikha Mehrotra⁶ Shipha Hegde² Kumara³
U.S. Krishna Nayak⁴ Cynthia D'Souza⁵

¹ Department of Pediatric and Preventive Dentistry, A B Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangalore, Karnataka, India

² Department of Prosthodontics and Crown and Bridge, A B Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangalore, Karnataka, India

³ I.A.S, Dakshina Kannada, Zilla Panchayat, Mangalore, Karnataka, India

⁴ Department of Orthodontics and Dentofacial Orthopedics, Principal and Dean, A B Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangalore, Karnataka, India

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Address for correspondence Amarsree A. Shetty, BDS, MDS, PhD, Department of Pediatric and Preventive Dentistry, A B Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangalore, Karnataka 575018, India (e-mail: dramarsheeshetty@nitte.edu.in).

⁵ Nitte Special Child Care Centre, Affiliated to Department of Pediatric and Preventive Dentistry, A B Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangalore, Karnataka, India

⁶ Department of Pediatric and Preventive Dentistry, D.Y. Patil School of Dentistry, Navi Mumbai, Maharashtra, India

Abstract

Background Children are one of the most vulnerable groups to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and depend on their parents to supervise and maintain oral hygiene. During this pandemic, disease prevention through education and awareness of the parents is the only way to maintain a child's oral health; therefore, parents must have sufficient knowledge about the ongoing pandemic and its consequences on the oral cavity. This study aims to assess the parental attitudes toward and awareness of oral health of healthy children during the COVID-19 pandemic.

Methodology A questionnaire was circulated between May and September 2020 using simple random sampling of the parents of children aged between 6 and 12 years. The questions were close ended and divided into awareness and attitude-based sections so that the parents could choose the appropriate answer.

Results and Conclusion In the present study, 50% of the participating parents had the right attitude in challenging times like the pandemic and appropriate knowledge about the same.

Keywords

- ▶ parental awareness
- ▶ COVID-19
- ▶ Oral health
- ▶ Children

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the seventh human coronavirus, first discovered in Wuhan, Hubei province of China, led to an outbreak of pneumonia in January 2020. In the span of the next few months, the spread of this virus reached the rest of the world.¹ As of October 2021, 261,763,799 people all around the world have been affected by this virus, with over 5,217,311 deaths.² This virus has ever since

caused a catastrophe across the world. The incubation period varies between 3 and 14 days; however, a 24-hour incubation period has also been reported.³ Most infected people have been shown to remain asymptomatic or have a few symptoms.³ Infected patients reported mainly having night fever, dry cough, sore throat, and asthenia; more severe symptoms exhibited were dyspnoea. However, the occurrence of severe symptoms has been observed only in about 15 to 25% of the infected patients, with an impairment of respiratory function requiring

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immediate hospitalization and assisted ventilation.³ It presents with acute respiratory distress syndrome (ARDS), distinguished by potentially lethal interstitial bilateral pneumonia.⁴ The mode of spread is through airborne contamination and direct contact with contaminated surfaces, which makes it highly contagious and transmissible. Most infected people remain asymptomatic, potentially threatening the rate at which the infection spreads. Having said so, saliva acts as the main nidus in the spread of infection. Saliva is a distinctive and protective body fluid that is present in the oral cavity mainly consisting of water and organic molecules. It plays an important role in the digestion of food and helps in swallowing by lubricating the oral structures, speech, cleaning, and preserving the oral cavity, to name a few. Of all the important roles mentioned, saliva has been instrumental in preventing the entry of pathogens into body through its antibacterial action and buffering capacity. However, SARS-CoV-2 acquisition in saliva can happen either through the upper or lower respiratory tract or via blood, which may enter the gingival crevicular fluid, or through the infection of major or minor salivary glands.⁵ A study done by Wang et al suggested that SARS-CoV-2 attaches itself to the angiotensin-converting enzyme 2 (ACE-2) receptors found on the epithelium of salivary glands, agglutinates with them, replicates, and lyses cells to trigger apparent signs and symptoms, such as discomfort, inflammation, and pain in major salivary glands.⁶

Owing to the nature of the spread of this disease, stringent action needs to be taken toward the oral hygiene measures. Children are one of the most vulnerable groups as they are unable to keep up with oral hygiene measures independently and constantly depend on their parents or caregivers for supervision. Parents or guardians must have ample knowledge about the ongoing pandemic and its deleterious consequences on the oral cavity. During a period of health emergency of pandemics like COVID-19, management of specific oral health care needs becomes difficult and the only way to manage these conditions is through disease prevention, which is possible only by spreading awareness.

Hence, the aim of this study was to assess and evaluate the attitude and level of awareness of parents of healthy children during the global COVID-19 pandemic.

Materials and Method

Ethical clearance was obtained from the institutional ethical board. The source of the data was 500 parents of children aged between 6 and 12 years residing in the Mangalore taluk. A set of close-ended questions was formulated with Google Forms and circulated to the parents between May and September 2020 via school teachers and health educators through social media platforms such as WhatsApp and e-mail. Due to the added responsibilities of online teaching for school teachers during the pandemic, a stipulated time of 15 days was given to the parents by the school authorities to fill out the questionnaire.

The study was conducted to evaluate and assess the level of awareness and knowledge of parents residing in and around the Mangalore taluk about the COVID-19 pandemic and to

know the necessary precautions they would like to take for their children in case of dental emergencies. This communication was established during the pandemic to ascertain their needs during the crisis, which they may oversee postpandemic.

A well-structured, close-ended questionnaire was given to the parents after validation and a brief explanation was given to the parents regarding the objective of the study. The first part of the questionnaire consisted of demographic details and a consent form, which explained the brief intent and authenticity of the study. The questions were divided into awareness- and attitude-based questionnaires.

The data were analyzed using MS Excel and R version 4.1.0 software. All the tests of significance were carried out at a 5% level of significance. The statistical methods used were descriptive and inferential statistics.

Results

Out of the 500 parents, a total of 416 responses were obtained at the end of 2 weeks. Since the parents were approached through the school authorities who had a better outreach, 395 (79%) responses were obtained within the first week of circulation of the forms. Following this, a single reminder was given to the parents at the end of the first week through the school authorities leading to a response of 416 (83.2%) at the end of 2 weeks.

Through the sociodemographic details, it was observed that 261 (62.74%) parents who participated in the study had a male child. Out of the 416 parents, 397 (95.43%) parents were aware of the COVID-19 pandemic and 388 (93.27%) had educated their children regarding the pandemic. When the parents were asked how they felt about the pandemic, 123 (29.57%) of them felt that this phase shall pass, 122 (29.33%) felt anxious, 105 (25.24%) felt fearful, while 38 (9.13%) were casual about the situation. When asked about the kind of masks they preferred to wear, 172 (41.35%) parents preferred N95 masks, 97 (23.32%) chose cloth masks, and 89 (21.39%) preferred three-layered masks (► **Table 1**). When asked if their children were willing to wear masks, 346 (83.17%) parents said that their children did accept it (► **Table 2**). On asking about how they maintain the oral cavity of their children, 287 (68.99%) parents said that their kids brush their teeth twice daily. Three hundred and fifty-three (84.86%) parents knew that the COVID-19 virus spreads through saliva so it was imperative for them to keep their child's mouth clean; most parents had started using mouth rinses for their children, 158 (37.98%) used salt water, 171 (41.11%) preferred the use of plain water, and only 3 (0.72%) agreed to use povidone-iodine (PVP-I).

Further when parents were asked about what condition they would consider a dental emergency for their child, 237 (56.97%) parents said that they would only consider pain as a dental emergency and 190 (45.67%) would prefer hospital consultation, 138 (33.17%) would prefer an online consultation for the same, and 76 (18.27%) would prefer either hospital or online consultation, whatever is available to them. When asked about their willingness to take their child to a dental clinic or hospital and how long after the lockdown

Table 1 Response to questions evaluating the attitude of parents

Questions asked (416 respondents)	Answers	Results
If yes, how do you feel about the current situation?	Fearful Anxious with each passing day Casual This too shall pass	105 (25.24%) 122 (29.33%) 38 (9.13%) 123 (29.57%)
What is the portal of entry of coronavirus into the body?	Nose, eyes, and mouth Mouth alone None of the above	392 (95.19%) 12 (2.88%) 8 (1.92%)
What type of mouth mask do you think is best suited to protect your child?	2-layered masks 3-layered masks Cloth masks N95 masks	58 (13.94%) 89 (21.39%) 97 (23.32%) 172 (41.35%)
How often does your child brush his/her teeth	Does not brush Once daily Twice daily	5 (1.20%) 124 (29.81%) 287(68.99%)
Are you using a homemade mouth rinse?	Saltwater Povidone iodine Plain water None of the above	158 (37.98%) 3 (0.72%) 171 (41.11%) 84 (20.19%)
What would you consider a dental emergency for your child?	Pain Broken tooth Black spot on the tooth Pus discharge from the oral cavity Halitosis/bad breath	237 (56.97%) 33 (7.93%) 63 (15.14%) 60 (14.42%) 23 (5.53%)
If your child has a toothache, what would you do	Call a dentist and schedule an appointment Call a dentist for an online consultation Give the child a painkiller	250 (60.10%) 141 (33.89%) 25 (6.01%)
Would you prefer online consultation or hospital consultation?	Online Hospital Neither of the above Any of the above	138 (33.17%) 190 (45.67%) 12 (2.88%) 76 (18.27%)
If you decide to take your child to a dental clinic or hospital, how long after the lockdown do you prefer to take your child there?	Immediately after this is over 2–3 mo later 4–6 mo later 6 mo later	182 (43.75%) 118 (28.37%) 27 (6.49%) 89 (21.39%)

Table 2 Response to questions evaluating the knowledge of parents

Questions asked (416 respondents)	Yes	No	Maybe
Are you aware of the coronavirus pandemic?	397 (95.43269)	19 (4.567308)	NA
Have you educated your child about coronavirus?	388 (93.27)	28 (6.73)	NA
Did you know that this virus could transfer through saliva?	353 (84.86%)	25 (6.01%)	38 (9.13%)
Is your child willing to wear a mouth mask?	346 (83.17%)	40 (9.62%)	30 (7.21%)
Are you aware that mouth masks are available in different types?	404 (97.12%)	5 (1.20%)	7 (1.68%)

ceased would they prefer to take their child, 182 (43.75%) parents said that they would take their children to the dentist immediately after the lockdown ceased, while 118 (28.37%) parents preferred to go to the hospital or dental clinic 2 to 3 months later.

The results of the current study highlight that a significant number (56.97%) of parents reach out to the clinician when the dental needs of their child become symptomatic (pain). The need of the hour is to promote preventive oral health care and raise the awareness level among parents and

primary caregivers on the same. Imparting evidence-based information on the significance of oral health on the systemic well-being of children is also vital.

In the present study, 50% of the participating parents had the right attitude in challenging times like the pandemic and appropriate knowledge about the same.

The *p*-value for the chi-squared test was statistically nonsignificant ($p > 0.05$), which was indicative of a lack of association between gender and attitude (► **Table 3**) as well as gender and knowledge (► **Table 4**).

Table 3 Association between the gender and attitude type

Attitude group		Gender of the child		Total	Chi-squared test	df	p-value
		Male	Female				
Positive attitude	Count	250	151	401	0.747	1	0.387
	% of total	60.1	36.3	96.4			
Negative attitude	Count	11	4	15			
	% of total	2.6	1.0	3.6			
Total	Count	261	155	416			
	% of total	62.7	37.3	100.0			

Abbreviation: df, degree of freedom.

Table 4 Association between gender and knowledge type

Knowledge group		Gender of the child		Total	Chi-squared test	df	p-value
		Male	Female				
Below 50%	Count	15	12	27	0.638	1	0.425
	% of total	3.6	2.9	6.5			
Above 50%	Count	246	143	389			
	% of total	59.1	34.4	93.5			
Total	Count	261	155	416			
	% of total	62.7	37.3	100.0			
	% of total	62.7	37.3	100.0			

Abbreviation: df, degree of freedom.

Discussion

COVID-19 is an infectious transmissible disease and the fact that it is transmitted through aerosols from one person to another makes it more infectious. Dentists, in general, work in a closed setting where aerosol generation is rather inevitable; hence, the risk to both patients and dentists in the dental operatory is of concern during this pandemic. The only way to control the spread of this infection is by taking necessary precautions. This questionnaire was designed during the COVID-19 pandemic lockdown to assess the knowledge and attitude of parents residing in the Mangalore taluk toward COVID-19, owing to limited studies being done in this area.

Individuals must be aware of the general protocols and the guidelines issued in the interest of public health by the respective governments during pandemics. Owing to the nature of the spread of the virus, health care professionals must guide and educate the people of the community. The first step is to assess the level of knowledge and attitude of the parents toward oral health of their children and then take the required actions to educate them. This questionnaire study comprised demographic data indicating that a majority of the participants had male (62.74%) children; 37.26% parents had female children.

Parents play an important role in the lives of children; hence, parental health, beliefs, and attitudes have a direct bearing over the child's health⁷. Parents enrolled in our study had children between the age of 6 and 12 years. This is the

age when children are most dependent on their parents for their oral health care needs. An impressive 93.23% of the parents had educated their children about the COVID-19 pandemic. This helped us understand that most of the parents practiced self-directed learning and so most parents had educated themselves regarding the COVID-19 pandemic. When asked how they felt about the pandemic, the majority of the parents were anxious and believed that this phase would pass. This questionnaire study was conducted during the pandemic's first wave when most people were still learning about this pandemic, while some others were busy settling down with the new setting of children being at home. This time reflected a stressful new reality where familial lives were severely impacted due to fear of the virus and adjusting to life amidst school closures, quarantine, and stay-at-home orders. These realities gravely impacted parents' lives as these changes moved childcare, schoolwork, and recreational pursuits into the home, whereas earlier these activities were typically outsourced and parents were able to effectively balance their lives.⁸ Evaluating the parental awareness and attitude on the use of masks during the pandemic, our survey drew the following conclusion. Regarding the kind of masks they would prefer to wear, most parents (41.35%) chose N95 masks, whereas 23.32% of parents preferred cloth masks. This is in accordance with the World Health Organization guidelines; children who are in general good health can wear a nonmedical or fabric mask. Adults providing the mask should ensure that the fabric mask is the correct size and sufficiently covers the nose, mouth,

and chin of the child; hence, an N95 mask is not mandatory. The parents' knowledge in terms of the type of mask is as per the guidelines.⁹ Parents have been making sure that their children brush twice daily. It is imperative to do so as ACE2 is the cellular receptor for SARS-CoV2. Keeping the oral cavity clean helps in warding off the virus. In the review article where evidence was gathered to highlight the rationale, safety, recommendations, and dosage of PVP-I gargle/mouth rinse as an effective method to decrease the viral loads during the pandemic, it was seen that prophylactic use of 0.5% PVP-I as mouth rinse was safe and *in vivo* studies have proven its virucidal efficacy against SARS-CoV2. The authors concluded by saying that the use of PVP-I gargle/mouthwash is a simple, inexpensive, and safe adjunct that can be used to reduce the risk of cross-transmission of SARS-CoV-2 viral particles to the community and health care professionals.¹⁰ In our study, most of the parents suggested the use of salt water as a mouth rinse; however, since the study was done during the pandemic, most parents were unaware of the use of PVP-I.

The COVID-19 pandemic has affected people's lives and lifestyles drastically. With changes in working patterns due to the imposition of lockdown, serious changes have been observed in the family dynamics including their dietary patterns. An increase in the amount of immobility and confinement to homes further led to an increase in food intake, especially ultra-processed and calorie-dense foods.¹¹ Another cause of the increased amount of food intake could be due to stress. A lot of families face financial difficulties, and parental stress could lead to stress on the children and an increased amount of inattention toward the child during these periods.

A study conducted to investigate the impact of pandemic-associated stress on food parenting practices, including interactions surrounding snacks, and child diet showed that stress associated with the COVID-19 pandemic may be linked to child snack intake with potential impacts on child obesity risk and suggested several modifiable points of intervention within the family context. Improper food consumption practices can enhance the occurrence of dental decay.¹²

It was also observed that the majority of families (>75%) made sure that children had regular breakfast, lunch, and/or dinner times, while less regularity was noted for snacks, potentially implying that parents provided snacks at random times or following certain cues, for instance, to manage emotions or as a reward for good behavior.¹² It is a known fact that frequent amount of consumption of fermentable carbohydrates leads to increased periods of pH drop in the oral cavity due to bacterial fermentation of carbohydrates leading to a disharmony between the demineralization and remineralization equilibrium leading to the formation of caries.¹³ Once this process is allowed to progress, it leads to the formation of cavitation, eventually causing pain and distress, impairing the quality of life and the nutritional status in young children.

In our study, most parents considered pain as a dental emergency, which shows that most parents know conditions

like dental pain may occur and need to be addressed. However, one limitation of the study was the lack of details about the child's existing dental health issue. This would have given us a better idea regarding the parental attitude and awareness about their child's existing dental health status. Studies done to investigate the impact of a child's dental pain, caregiver's fear of SARS-CoV-2, and parental distress on oral health-related quality of life (OHRQOL) of preschoolers during the nationwide COVID-19 pandemic lockdown have shown greater parental distress and fear of COVID-19 among caregivers, higher self-perceived dental pain among children, and caries experience are associated with poor OHRQOL of preschool children.¹⁴ However, most parents felt positive about taking their children to a dentist as soon as the pandemic ceased, which was a very positive response showing that the parents do realize the importance of maintaining good oral hygiene during the COVID 19 pandemic. Also, statistically, it was observed overall knowledge of the parents was above 50% and they had a positive attitude toward their child's oral health and well-being during the COVID-19 pandemic. One of the main limitations of the study was that the parents in the study group belonged to the lower and higher middle-class population in which the majority are well educated and are aware of all the precautionary measures they should take to ensure their families' safety.

In our study, the attitudes of the parents were positive and the level of awareness was above average regarding the oral health of healthy children during the COVID-19 pandemic.

Authors' Contributions

This manuscript has been read and approved by all the authors and the requirements for authorship as stated earlier in this document have been met, and each author believes that the manuscript represents honest work.

Conflict of Interest

None declared.

References

- Ciotti M, Ciccozzi M, Terrinoni A, Jiang WC, Wang CB, Bernardini S. The COVID-19 pandemic. *Crit Rev Clin Lab Sci* 2020;57(06):365–388
- John TJ, Wear WES, Seshadri MS. Our "Law" and "Their" Lives.:17 (See the coronavirus section of the Worldometer). Accessed May 3, 2020 at: <https://www.worldometers.info/coronavirus/>
- Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet* 2020;395(10223):507–513
- Checchi V, Bellini P, Bencivenni D, Consolo U. COVID-19 dentistry-related aspects: a literature overview. *Int Dent J* 2021;71(01):21–26
- Sabino-Silva R, Jardim ACG, Siqueira WL. Coronavirus COVID-19 impacts to dentistry and potential salivary diagnosis. *Clin Oral Invest* 2020;24(04):1619–1621
- Wang C, Wu H, Ding X, et al. Does infection of 2019 novel coronavirus cause acute and/or chronic sialadenitis? *Med Hypotheses* 2020;140:109789
- Brondani M, Donnelly L. The HIV and SARS-CoV-2 parallel in dentistry from the perspectives of the oral health care team. *JDR Clin Trans Res* 2021;6(01):40–46

- 8 Lewis H. The coronavirus is a disaster for feminism: pandemics affect men and women differently. *Atlantic* 2020;19(03):
- 9 Guha S, Herman A, Carr IA, et al. Comprehensive characterization of protective face coverings made from household fabrics. *PLoS One* 2021;16(01):e0244626
- 10 Chopra A, Sivaraman K, Radhakrishnan R, Balakrishnan D, Narayana A. Can povidone iodine gargle/mouthrinse inactivate SARS-CoV-2 and decrease the risk of nosocomial and community transmission during the COVID-19 pandemic? An evidence-based update. *Jpn Dent Sci Rev* 2021;57:39–45
- 11 Pietrobelli A, Pecoraro L, Ferruzzi A, et al. Effects of COVID-19 lockdown on lifestyle behaviors in children with obesity living in Verona, Italy: a longitudinal study. *Obesity (Silver Spring)* 2020;28(08):1382–1385
- 12 Brazendale K, Beets MW, Weaver RG, et al. Understanding differences between summer vs. school obesogenic behaviors of children: the structured days hypothesis. *Int J Behav Nutr Phys Act* 2017;14(01):100
- 13 Azevedo TD, Bezerra AC, de Toledo OA. Feeding habits and severe early childhood caries in Brazilian preschool children. *Pediatr Dent* 2005;27(01):28–33
- 14 Samuel SR, Kuduruthullah S, Khair AMB, Shayeb MA, Elkaseh A, Varma SR. Dental pain, parental SARS-CoV-2 fear and distress on quality of life of 2 to 6 year-old children during COVID-19. *Int J Paediatr Dent* 2021;31(03):436–441