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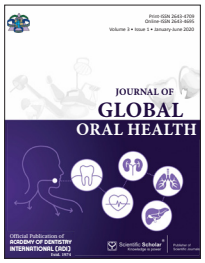

Review Article

Post-COVID-19 clinical setup in pediatric dentistry

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ABSTRACT

The coronavirus disease 2019 (COVID-19) outbreak dramatically turned into a ferocious pandemic, impacting its tentacles on global health sector. This pandemic had affected each and every individual in every walks of their daily routine and activities. The viral spread occurs most predominantly through droplet transmission and direct contact, thereby creating large cluster groups in every parts of the world. Dentistry too had not been away from the COVID-19 impact. It is highly imperative that the standardized existing dental setup proves to be one of the major identifying sources of COVID-19 transmission due to the proximity of dentists and patients in the clinic. This article provides a brief overview. The aim of this article is to recommend infection control strategies and clinical protocol for patient management provides optimum dental care amid this pandemic crisis.

Keywords: Pediatric Dentistry, Pandemic, COVID-19

INTRODUCTION

Coronavirus disease 2019 (COVID-19) marks a significant era from several perspectives. First, it has profoundly affected health globally. Second, there have been numerous socioeconomic consequences. For pediatric dentists, there is a need for revising operating protocols since personnel are in close proximity to patients and are prone to COVID-19 exposure through saliva and aerosols. Such revisions are expected to increase the safety of the patients and the dentists. It is estimated that the COVID-19 pandemic is not expected to end in the short term. The recovery time is expected to be extended. Until the pandemic threat settles down, it is expected that many families will defer dental treatment except for emergency treatment or problems that cause significant pain.

The COVID-19 pandemic had made considerable impacts and after effects in different sectors of our society. Although the advent of vaccine proves to be a boon, the rapid and multifactorial spread of this virus had contributed to long-lasting effects on the existing health-care systems and treatment strategies across the world. The virus had not confined to the health sector alone, its impact has fallen as a logged hurdle to the world economy, thus creating a greater havoc to humanity[1] Dentistry too was not exempted from the clutches of COVID-19 outbreak. The pandemic has forced every individual in adapting to new lifestyle changes and habits for chances of better resistance survival against this deadly pandemic. Pediatric dentistry practices also required sequential and orderly modifications which could be employed to both the dentist and the patients in the routine dental practice considering the fact that the dental personnel are prone to COVID-19 exposure through saliva and aerosols from the working environment. COVID-19 pandemic is expected to continue for a much longer time than expected. Until the pandemic settles down, dental treatment will be sought out only in times of emergency as when needed.[2]

Dental aerosols are considered to be one of the most important potential sources for COVID-19 transmission.[3] In India, the health regulatory bodies including the Dental Council of India in association with the Ministry of Health and Family Welfare (Government of India) had designed clinically applicable guidelines for dental practitioners to continue their practice amid this raging pandemic scenario. The modified clinical practices and settings concerning dental practice for pediatric patients in accordance with COVID-19 affect the behavioral modifications and guidance approaches that have been routinely executed for managing pediatric dental patients.[4] These challenges could lead to deterioration and back logging in maintaining a good rapport between the dental personnel and the children thereby declining the quality and success rate of dental care and treatment provided to pediatric dental patients. Therefore, the objective of this review is to create awareness regarding the changing modalities of pediatric dental practice setup which will continue to be adapted in this pandemic scenario.[5,6]

PERSONAL PROTECTION AND HYGIENE MEASURES FOR DENTAL PERSONNEL

Xu *et al*. in his studies have detailed the role of the oral mucosa in COVID-19 infection, in addition to expressing the ACE2 receptor in salivary glands in the asymptomatic process in infected saliva, thus being one of the main sources of viruses.[6] Contaminated surfaces help the virus survive for 5 days. To prevent the spread of infection, pediatric dentists must maintain personal hygiene. It lies in the hands of the pediatric dentist to make the child patient feel confident, relaxed, and safe about the treatment procedure. In this technologically informative era, patients have a higher awareness of the treatment and associated risks. Hence, it becomes an undeniable responsibility of the pediatric dentist to explain in detail the scheduled treatment plan, expected outcomes, and cost in advance to the child's parents or guardians as this would avoid any doubts and provide a clear well-defined outline to the parents.

Wearing of personal protective equipment (PPE) has been considered the primary safety measure in dental practice in this pandemic scenario. It is mandatory that the dentist wears PPE in the dental operatory to prevent risk of contact and transmission with the patients.[7] Achmad *et al*. in his studies conducted in pediatric dental setup signify that the importance of wearing PPE for pediatric dentists and other health professionals as a precautionary measures against this aggressive pandemic.[7] Paglia *et al*. in his well-phrased study and editorial had explained that the use of proper PPE will minimize the risk of transmission up to a greater extent.[8] Face masks and shields should be worn to prevent spread through droplet transmission and cross-contamination. Double gloving or surgical hand gloving is preferred than conventional gloving which is as precautionary protocol. The nails of working personnel should be trimmed to avoid tearing the gloves as well as preventing debris accumulation. Washing the hands thoroughly with soap or with antimicrobial hand washes before and after every treatment procedure has become the recommended protocol, thereby reducing the exposure risk.[8]

PROTOCOL FOR OLD/EXISTING PEDIATIRC PATIENTS

Teleconsultation and telescreening

Telephone screening is the one most avidly encouraged step for communication between the patient and the dentist or reception office. It is mandatory that the present medical history and past history, particularly pertaining to symptoms of severe acute respiratory illness (fever AND cough and/or shortness of breath), must be analyzed carefully taking the present condition of pandemic.[8] Bharadwaj *et al*. had detailed in his review the need for online or phone dental screening the need to evaluate emergency dental conditions.[9] Ferrazzano *et al*. in his studies had claimed the potential and practical advantages with regard to online screening and teleconsultation stating that such practices will considerably reduce the risk of subsequent exposures.[10] Positive responses to any of these should be alarmed and care should be postponed for 3 weeks till the patient becomes asymptomatic except in dental emergencies.[10]

Pre-appointment consultations

The child's age defined informative booklets, pamphlets, or digital visual communication can be sent or mailed to the parents and the patients in addition to the pre-appointment letter. The "tell-play-prepare" concept may be employed before an appointment to guide the necessary and expectant behavior from the child during their visit to the dental clinic. Video consultations and webinar sessions can help the pediatric dentist communicate the procedures to the patient and the parents as well as this would help in developing a positive attitude in the child as well as would help in building good rapport with the pediatric dentist. Shah *et al*. have narrated in his clinical study and review that practice of triage by utilizing advanced telemedicine facilities including video call applications and video monitoring would be beneficial in the management of suspected as well as unexposed pediatric patients, thereby minimizing the risk of unwanted exposure.[11]

Dental history and triage

The dental clinics should execute web-based sessions along with the necessary consent form from parents or guardians explaining in detail the treatment plan for the child. The

dental treatment should be analyzed and decisions should be made according to the emergency of the treatment needed and signifying the risk-benefit ratio associated with each type of treatment.[11] Jurema *et al*. signified that pre-appointment sessions should focus on guiding and monitoring families regarding the child's eating habits and adequate motivation should be provided emphasizing the need for maintaining adequate oral hygiene through the video calling applications.[12] Pre-appointed patients should only be entertained in the clinic whose history, problems, and procedures have already been identified through previous telephone and remote electronic or web-based systems.[12]

THE CLINICAL SETUP TO BE FOLLOWED AMID THE PANDEMIC

Pediatric dental patients will definitely find the PPE attire visually uncomfortable, and this can have a negative impact on the consultation and treatment modalities. Hence, children should be given adequate and detailed awareness regarding the dentist's unique appearance during the pre-appointment consultation sessions. It is highly suggested to have modified PPE kits with vibrant and attractive colors, designs, patterns, and other appropriate modifications to make them visually acceptable and child friendly.[12] Acharya *et al*. also confirmed through his studies the fact that all urgent cases have to be performed with extreme care for the child as well as the parents by utilization of PPEs as well it also relies on both the parents and the dentists to prepare the child mentally prior and during their visit creating a familiarization of the child regarding the PPE's worn by the dentist and dental personnel, thereby reducing the child's anxiety.[13] Colorful protective suits are nowadays available which can be utilized to instill a pleasant environment for the child. Conventional treatment strategies in dentistry require a viable non-verbal communication such as hand signaling patterns, facial expressions, and body language. Since the onset of COVID-19 pandemic verbal communication had been stressed and preferred for pediatric dental treatment, the personal protective attire of the dentists will restrict the facial visibility.[13]

CLINIC ENTRANCE, RECEPTION, AND WAITING AREA

Visual alert signs should be displayed at the entrance of the facility about the COVID-19 pandemic and the necessary precautions on the need of maintaining respiratory hygiene, social distancing, and need for the disposal of contaminated and soiled items in designated trash bins.[12] To reduce the risk of transmission, it is recommended that the child be accompanied by a single companion whenever possible. Amorim *et al*. had critically explained and highlighted the fact that the children must be accompanied with only minimum of persons and should enter the clinical setting only by wearing masks and shoe covers with their body temperature being checked at the vital registry along with proper hand hygiene maintenance.[14] Installation of glass barrier or plastic barrier at the reception desk will reduce the risk of transmission. It is mandatory that three-layered masks, sanitizers, paper tissues, and pair of disposable gloves be provided at the registration desk. Appropriate setting up of hand hygiene stations will reduce the risk of spread and contamination up to a great extent.[15] Chairs in the waiting lobby should be arranged at 1 m apart signifying the importance of social distancing. All nearby areas should be free from all forms of possible fomites such as books, magazines, newspapers, toys, TV remotes, and similar articles. Contactless payment methods are preferred over the conventional direct cash payment as this too reduces transmission rates. Specific and determined rooms should be provided for donning and doffing of PPE used by the dental personnel.[15]

STERILIZATION AND DISINFECTION

The clinic assistants should be well trained to undertake sterilization, storage, and quality testing sterilization as per the standard guidelines advocated by the regulatory bodies and manufacturer's instructions.[15] Sufficient air circulation has to be maintained with natural air through a frequent and easeful opening of windows and utilization of exhaust blowers to extract the room air into the atmosphere. The use of a ceiling fan should be avoided while performing procedure generating aerosols. Indoor portable air cleaning system equipped with high-frequency particulate air filter (HEPA) and UV light can be used as a precautionary protocol. In a recent study conducted in pediatric dental clinic setting by Miller *et al*., he justifies the fact that the treatment of any suspected COVID-19 patient, if required, must preferably utilize a negative pressure/airborne infection isolation room. Furthermore, a portable HEPA filter with negative ion generator may be considered as available precautionary equipment which can be widely installed in dental clinic setups.[16] Fumigation systems have to be employed in cost-effective and timely manner, thus enhancing a safe and virus free environment. High-volume suction and evacuators should be used, thereby reducing the transmission rate. The water supply lines attached to dental chair units should be equipped with anti-retraction valves to clear the treatment debris which can act as possible source of transmission.[16]

ENVIRONMENT AND SURFACE DISINFECTION

The cleaning staff is advised to clean the clinic floors by following a two-step cleaning procedure using a mixture of detergent and freshly prepared 1% sodium hypochlorite with a contact time of 10 min after every patient at approximately 2 h intervals. Ti *et al*. had advocated in his study that there might be backflow of pathogens with the use of handpieces in

the water tubes of the dental chair as a result purging should be done appropriately such that all sterilizable instruments must be timely cleaned, disinfected, and sterilized and there should be a time lapse of at least an hour between subsequent appointments to perform thorough decontamination.[17]

The rest of the clinic surfaces are advised to be cleaned and sterilized using freshly prepared 1% sodium hypochlorite for a time period of 10 min before and after finishing daily work, sensitive electronic equipment should be wiped with alcohol rub/spirit (60–90% alcohol).[17]

PROCEDURES RECOMMENDED

Majority of the dental treatment procedures have the potential to produce aerosols and must be avoided as much as possible. Some advisable recommendations for reducing viral spread include the use of rubber dams, high-volume saliva ejectors, and the four-handed dentistry technique.[17] Bahramian *et al*. had specifically advised in his studies and conducted stating that preventive strategies such as fluoride mouth rinses and varnishes can be adequately advised according to the child's needs and treatment requirements.[18] Preventive home care strategies and the use of minimally invasive dentistry are recommended treatment protocols to reduce the risk of infection. The use of biological approaches for caries management in both primary and permanent dentition might be more appropriate and reduces the risk up to a great extent under the current and near future scenario of COVID-19.[18] These modified treatment approaches include Pit and Fissure sealant application, atraumatic restorative procedures, Hall technique, application of silver diamine fluoride, chemomechanical caries removal, inhalational sedation, and general anesthesia strategies with regard to medically compromised children whenever needed.[18] Banihani *et al*. had clearly explained in his review that minimal intervention techniques had to be applied in caries management to reduce the risk of contamination and spread of infection.[19] Similarly, in studies conducted by Cagetti *et al*., he had undeniably confirmed the use of non-invasive treatments such as fluorides, varnishes, sealants, resin infiltration, and atraumatic restorative treatments to reduce generation of aerosol and chairside time.[20]

POST-TREATMENT DISINFECTION

As the patient leaves the dental operatory, it relies on the clinic assistant to collect and segregate all used instruments immediately and rinse them in running water to remove as per standard sterilization protocol.[20] All water outlets and handpiece should be thoroughly flushed with the disinfectant solution for a period of 30–40 s. The water containers attached to the working dental chair unit should be removed and washed thoroughly and disinfected with 1% sodium hypochlorite using clean cotton or gauge piece and then reattached back to the dental chair.[21] The results obtained in studies conducted by Kampfg *et al*. who stated that ethanol at concentrations between 62% and 71%, 0.1–0.5% sodium hypochlorite, and 2% glutaraldehyde reduced coronavirus infectivity within 1 min exposure time. A comparable effect is expected against the SARS-CoV-2 and these agents should be used for appropriate surface disinfection.[22] Kampfg *et al*. also stated that hydrogen peroxide vaporizer can also be used to decontaminate the operatory.[22,23] Finally, the dental chair has to be disinfected along with all other auxiliary parts within 3′ of distance using 1% sodium hypochlorite and clean and sterilized cotton/gauge piece. The teleconsultation has to be followed up for further review and needed appointments.[24,25]

CONCLUSION

COVID-19 pandemic has had serious impacts on pediatric dental practice and management. However, the existing protocols claim to carry out treatment only in times of emergency and elective procedures in the wake of this pandemic. With COVID-19 now being the new normal, pertaining practices and management will continue until the entire pandemic scenario ceases. A hybrid value-based system that combines both health-care maintenance and management has to be adopted to prevent the forthcoming challenges that we encounter during this pandemic. Routine evaluation and reevaluation of the infection prevention program, including adherence to infection prevention practices, should be established. Further progress and with ease of restrictions in the public scenario, pediatric dentistry is also found to extend new approaches highlighting preventive treatment strategies as the prime mode of treatment.

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Declaration of patient consent

Patient consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

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