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Novel Corona Virus: To live with it or deal with it and how

[1]Dr. Karuna P. Manglani, Post graduate student, Department of pediatric and preventive dentistry, Hitkarini dental College and hospital, Jabalpur, Madhya Pradesh

[2]Dr. Deepak P. Bhayya, Prof and head, Department of pediatric and preventive dentistry, Hitkarini dental College and hospital, Jabalpur, Madhya Pradesh

[3]Dr. Prabhat Kumar, Associate professor, Department of pediatric and preventive dentistry, Hitkarini dental College and hospital, Jabalpur, Madhya Pradesh

[4]Dr. Saurabh T iwari, Reader, Department of pediatric and preventive dentistry, Hitkarini dental College and hospital, Jabalpur, Madhya Pradesh

[5]Dr. Neetu khatri, Post graduate student, Department of pediatric and preventive dentistry, Hitkarini dental College and hospital, Jabalpur, Madhya Pradesh

[6]Dr Swarnika Parihar, Post graduate student, Department of pediatric and preventive dentistry, Hitkarini dental College and hospital, Jabalpur, Madhya Pradesh

Corresponding Author: Dr. Karuna P. Manglani, Post graduate student, Department of pediatric and preventive dentistry, Hitkarini dental College and hospital, Jabalpur, Madhya Pradesh

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Abstract

In late December 2019, massive numbers of unexplained pneumonia cases were reported in Wuhan, China. The agent was then named as the Novel corona virus and lead to the beginning of a disastrous pandemic. Transmission of this virus occurs primarily through droplets or contact routes. Aerosols, the inevitable agent of the dental practice cause huge risk of transmission. This article describes measures and modifications that can be adopted by oral health-care personnel to minimize the risk of cross-contamination during the corona virus pandemic.

Keywords: Coronavirus, SARS-CoV-2, Pandemic, Aerosol, COVID-19, Transmission.

Introduction

In December 31, 2019, hospitals reported a cluster of cases with pneumonia of unknown cause in Wuhan, Hubei, China, attracting great attention nationally and worldwide.[1] The causative virus has been named as severe acute respiratory syndrome coronavirus 2 (SARS-

CoV-2) and the relevant infected disease has been named as coronavirus disease 2019 (COVID-19) by the World Health Organization, respectively.[2] The changes brought about by the virus have led to a reorientation or reordering of not only the economy, but also the health care, relationships, lifestyles, and more. In general, the target population n for the virus has been the elderly and those with any serious underlying comorbidities affecting systemic health.[3] Given that the widespread transmission of SARS-CoV-2, healthcare providers are at an increased risk of contracting the infection and becoming potential carriers of the disease. According to Occupational Safety and Health Administration (OSHA), dental health care personnel (DHCP) are placed in very high exposure risk category as dentists work in close proximity to the patient's oral cavity.[4] In general, a great deal of knowledge has been shared on various platforms about the Novel corona virus. But what we are not certain about is the departure of this virus and how are we going to serve our profession at the same time considering and following the protective regimens for us and our patients.

Transmission

It appears that the COVID-19 outbreak started with a single animal-to-human transmission, followed by sustained human-to-human spread. The virus is thought to spread mainly from person-to-person when in close contact with one another (within about 6 feet) through respiratory droplets produced when an infected person coughs, sneezes, or talks. Droplet transmission is via larger respiratory particles, generally above 5 μm diameter, which are subject to gravitational forces. These tend to travel no more than one meter. A two-meter limit on contact is therefore precautionary. Contact transmission occurs because once the virus is on a surface, it will remain there and will be a potential source of infection for hours or even days. [5,6]

The possible COVID-19 transmission routes include: inhalation of airborne microorganisms that can remain suspended in the air for long periods; direct contact with blood; contact of conjunctiva, nasal or oral mucosa contact with contaminated surfaces.[7] The COVID-19 outbreak is a reminder that all dental and other health professionals must always be diligent in protecting against the spread of infectious disease. It has been observed in one study that asymptomatic patients and patients in their incubation period are also carriers of SARS-CoV-2. [8] The most important concern in dental clinics is the transmission of 2019-nCoV via droplets and aerosol because, despite all of the precautions taken, it is almost impossible to reduce droplet and aerosol production to zero during dental procedures.[9]

COVID-19 and its association with Children

Most reports of children infected with SARS-CoV-2 demonstrate family contact with a proven diagnosis of the infection. It suggests that children are just as likely to get infected as adults but have fewer symptoms or risk of developing disease seriously. Signs and symptoms include different stages as asymptomatic, mild, moderate, severe and critical. Flu syndrome such as fever, cough, nasal congestion, runny nose, sore throat, but there may also be an increase in respiratory rate, wheezing, and pneumonia. Gastrointestinal symptoms such as vomiting and diarrhoea can occur, being more common in children than in adults. The prevalence of severe and critical disease was 10.6% n in children aged <1% at diagnosis; 7.3% in children aged 1-5 years; 4.2% 6-10 years; 4.1% 11-15 years and 3% 16-17 years. [5,10]

COVID-19 and Pediatric Dental Treatment

While the transmission pathways are common to the treatment of any dental patient, pediatric patients present additional risks of transmission: the use of removable orthodontic appliances or auxiliary elements in fixed orthodontic therapies, such as the use of intermaxillary elastic bands, entails risks of contamination if handling is not carried out with due precautions. Another problem is related to the difficulty for the child to use/endure personal protective equipment (PPE) during medical visits. Finally, the very presence of caregivers, with whom the pediatric dentist must unavoidably interface, will increase the risk of infection. The forms of contagion are defined as: (a) those who live in the same household with a confirmed infection; (b) those with direct or face-to-face contact (for any period of time) with an infected person or with their biological fluids, without having adequate protection measures; (c) those who are within 2 meters of a person with a confirmed infection for more than 15 minutes; (d) be informed by a public health institution that there has been contact with a confirmed case. The American Dental Association (ADA) recommends control measures for respiratory infections, along with precautions for contact, and thus prevent transmission of COVID-19 and all flu-like illnesses in a dental care setting.[10,11]

Strategies to control the transmission of COVID-19 in a dental setup / hospital

Zhang et al, provided the effective measures taken to reduce infection among health professionals and made suggestions to improve job security during the outbreak of the COVID-19 epidemic. This contributes to the rapid detection, the effective classification or triage and the isolation of infected health personnel. Therefore, guidelines and procedures should be established to detect infectious diseases at an early stage to timely determine pathogens, transmission routes, diagnosis, and treatment among healthcare professionals.[11]

Modifications in the patient and staff entrance:

- Thermal screening of the all the people entering the hospital's premises to be done and 6 feet distance to be maintained in the queue.
- Biometric attendance to be avoided to avoid the contamination caused due to touch.
- Thorough examination for the temperature with a thermal scanner and oxygen saturation with a pulse Oximeter respectively to be done.
- The above mentioned examination should be done with the examiner inside the fully packed glass cabin.
- Self-declaration form to be filled by all the people visiting hospital. This resolves legal issues as well as social stigma issues.
- A detailed history of patient who has history of recent travel to any epidemic regions or has been quarantine for 14 days along with fever, cough, sneezing, or COVID-19 related symptoms or contact with a close family member who is confirmed with the infection is advised to undergo a medical examination in a designated hospital.
- Preferably the Digital Payments should be considered to avoid the contamination because of the use of cash notes.

Modifications in the waiting area

- Sitting should be rearranged for social distancing protocols. Use of tapes or printouts to block out some seats can be done.
- Magazines and newspapers that are kept, should be replaced with audio visuals on the awareness, spreading and prevention from the virus. Posters / chart for the awareness of people about hand hygiene steps, cough etiquette, et cetera should be pasted.

Modifications in the outpatient department(OPD):

- A separate room for OPD and procedures should be made compulsory respectively.
- The child should be accompanied by a minimum number of people. Only one of the parents must be allowed during the examination if the patient is not cooperative.
- The use of computers instead of the paper work for inputting data in patient case papers during the examination and procedures should be encouraged.
- Chlorhexidine, the most commonly used mouthwash in dental studies, is not effective against the SARS-CoV-2 virus.[10] Studies have shown good results of rinse with dedicated antiseptic solutions like Povidone iodine to reduce the oral bacterial load, should be given to the patient before the examination.
- The use of personal protective equipment, including masks (*e.g.*, N-95 masks authenticated by the National Institute for Occupational Safety and Health), gloves, gowns, and goggles or face shields are recommended to protect skin and mucosa from (potentially) infected blood or secretions during routine dental practice.

Modifications in the dental setup:

- Alternate dental chairs should be used.
- Use of the dental chairs facing towards the window for the concern of cross ventilation.
- In a multi-chair clinic setup, each one of the chair should be separated from the other with the help of cabinets.
- Removal of any attractive accessories hanging on or around the dental chairs. Example: toys, which is very frequent in the department of pediatric and preventive dentistry.
- All contact surfaces like arm rest, light handle, tray handle etc. wrapped in barrier film. These barrier films must be changed or disinfected after every patient.
- Installation of class H14 type of the Expensive High Efficiency Particulate Arrestor (HEPA) must be done in the dental operator for absorption of aerosol particulates.

Modifications in the procedures done specially associated with the Pediatric dental treatment:

- Use of rubber dams or high-volume saliva ejectors can reduce the production of droplets and aerosols. Further use of preoperative antimicrobial mouth rinse with 0.2% povidone-iodine could reduce the number of microbes in the oral cavity.
- Aerosol-generating procedures, such as the use of a 3-way syringe, ultrasonic instruments and highspeed handpiece should be minimized as much as possible. Use of disposable (single use) devices such as mouth mirror, syringes and blood pressure cuff to prevent cross contamination.
- Chemo-mechanical caries removal under rubber dam with high volume saliva ejector after local anesthesia can be done in case of symptomatic irreversible pulpitis to reduce the pain. Use of the high vacuum suction is the need of the hour in current scenario.
- Use of the silver diamine fluoride (SDF) for caries mineralization and halls technique for crown placement should be incorporated in the pediatric dental practice as essentials of minimally invasive dentistry.
- In case of tooth extraction, absorbable suture is preferred. Child with facial soft tissue contusion, debridement and suturing should be performed. It is recommended to rinse the wound slowly and use the saliva ejector to avoid spraying.

- Four handed dentistry is a necessity in this pandemic for saving time, man power and hassle.

Future prospects

Scientists from every corner of the world are working on developing the vaccine for the COVID-19 virus. Perhaps the vaccine development is not the answer for all the questions of inevitable chances of the transmission. So the health care workers must be more focused on delivering the quality of health services including the dental procedures, adequate disinfection and sterilization protocols, increase patient awareness for safety and comfort, rather than the quantity of the patients and tight appointment schedules.

Conclusion

Among the health care workers, dentists are at most verge of getting infected by the transmission of the COVID-19 virus. So to control and to an extent avoid that, we are in the need to be up-to-dated with information about the prevention protocols being shared on various levels. But no data on the internet at this very day claims to be fully efficient in protecting us from this uninvited virus. Let us not forget that our 100% protection might not be the actual 100% protection needed. The most forgotten aspect in this story is our own immunity. And no surprise that we, the health care workers can't serve being unhealthy. A strong immune system is worth the many protective regimens possible.

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