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The Impact of Coronavirus on Pediatric Dentistry

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I. INTRODUCTION

The novel coronavirus have created havoc in the world. It had created a public health emergency in 2019 which was announced by WHO (World Health Organisation) who referred it as a pandemic. [1] Human coronaviruses were discovered in 1960s in the UK and US. It was the common cold virus designated as **B814** in 1961 which was inactivated by ether. [2] The novel coronavirus (n-CoV) or the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) allegedly was first found in Hubei province in Wuhan, China in December 2019 and was believed to be originated from bats. [1] The COVID-19 virus is a RNA virus, single stranded with a crown due to the presence of spike glycoprotein on envelope. [3] It is usually transmitted by inhalation or contact with infected droplets and its usual incubation period ranges from 2-14 days. Symptoms include headache, fever, cough, sore throat and breathlessness. Other gastrointestinal symptoms like nausea, vomiting, diarrhoea, anorexia and abdominal pain. Persistent pain or pressure in the chest and bluish lips or face are the emergency warning signs and need immediate attention. [4] These symptoms are mostly mild in people but in elderly with underlying health issues like diabetes, heart and lung problems, it may prove fatal. Sometimes, it progresses to pneumonia, acute respiratory distress syndrome (ARDS) and multi-organ dysfunction. Nowadays, many people are found asymptomatic and that is more often a point of concern. Its diagnosis is made by various tests such as swab test, nasal aspirate, tracheal aspirate, sputum test, blood test, Rapid Antigen Test and rRT-PCR test (real-time reverse transcription polymerase chain reaction test). [5] Among these, rRT-PCR is most reliable and accurate. Radiograph of an individual suffering from coronavirus shows residual frosted glass opacities and subpleural parenchymal bands. CT scan can also be used. [4] Recently, for the detection of coronavirus, FDA approved the use of saliva as it is easy to collect, rapid and inexpensive by Saliva Direct test. [6] So far, the treatment is purely symptomatic. It includes the use of various drugs such as Antivirals like Lopinavir, Ritonavir, Favipiravir, Remdesivir, Antimalarial drugs like hydroxychloroquine, Interferon [7] and Antiparasitics like Ivermectin. [8] Hyperbaric oxygen therapy can also be used in critical patients. [9] Preventive measures include the use of masks, glooves, eye protection, hand washing, social distancing, hand sanitizers and Personal Protective Equipment (PPE) kits. [10]

How Covid-19 Had Impacted Dentistry?

COVID-19 pandemic had impacted all the fields including dentistry. Dentists all over the world had suffered a huge loss due to the non-availability of any government policies to ensure their survival. The Canadian government has set up an Economic Response Plan to cover losses faced by dentists. In UK, the dentists under NHS are receiving funds and the IDA under Irish Government is going to support dental practices to cover COVID-19 loss. [11] Similarly, Indian Government should take certain measures to cover the losses faced by the dentists in India. Moreover, dental schools can also include disaster management programmes in their curriculum. It will guide dentists and dental auxiliaries to help during various medical emergencies. As during Coronavirus pandemic, dentists have already been trained to perform nasopharyngeal and oropharyngeal swabs, as well as saliva sampling procedures. In this way, dentists can play a pivotal role in the early detection of a disease outbreak or bioterrorism attack, and can help reduce the morbidity rate as recently seen in the outbreak of virus. [12]

Risk Assessment For Pediatric Dentists

Practicing dentistry at such a crucial time is quite risky as it involves face-to-face communication with patients, and frequent exposure to saliva, bloodand the handling of sharp instruments. The viral particles can be transmitted in dental settings through inhalation that remain suspended in the air for long periods, direct contact with blood, oral fluidsandaerosols containing particles generated from an infected individualand through indirect contact with contaminated instruments. It is even more hard for pediatric dentists to run their practices as children are usually found asymptomatic and are regarded as the silent carriers of the infection. Besides, children below 5

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years and those with special needs have to be accompanied by their attendants, thus, posing the risk for both pediatric dentists and staff. [13]

Pre-Treatment Measures To Be Taken

All staff should change into a different clinic clothing once reached and maintain a daily log of temperature (should be checked by infrared thermometer) and any respiratory illness. Hand sanitizers and mask should be made available at the entrance of the clinic for both patients and their attendants. Oxygen saturation with pulse oximeter should be checked. 80% ethanol or 75% 2-propanol as an alcohol based hand rub (ABHR) against SARS-CoV and MERS-CoV, were found to be more efficient. As the patient enters the clinic, look for any signs of respiratory infection and temperature, if found abnormal reschedule the appointments.[4]Such patients should seek advise from the doctors via telecommunication or video conferencing. Physical barriers made of glass or plastic windows should be installed at reception areas to limit contact with infectious patients. [14] Chairs in the waiting area should be kept 6 feet apart. Any readable materials like magazines, articles should be removed to prevent the chances of infection. No accessories should be worn by dentists, staff, patients and attendants. Before entering the operatory, shoes must be removed. [4] Disinfection of the operatory with 1% sodium hypochlorite by mopping for 10 minutes or by fogging with 20% hydrogen peroxide for 45 minutes to be done.[15] As virus stays on stainless steel surfaces for 90 days, copper instruments should be used. Sterilization of instruments with chemicals like Chlorine, e.g., sodium hypochlorite, Phenolic compounds (Water with ortho-phenylphenol, tertiary amylphenol, or O-benzyl–p-chlorophenol), Alcohol-based ethyl or isopropyl alcohol with ortho-phenylphenol or tertiary amylphenol and Ultraviolet-C (UV-C) irradiation lamp can be done. There are many advantages of disinfection with UV light such as no room ventilation required,no residues are left after use and provides a wide action spectrum in a very short time. If possible use disposable instruments and disposeoff cautiously as infected medical waste. HEPA (high-efficiency particulate air) filters should be used in the clinic to reduce the viral load as these help in removal of particulates from the air of the size as small as 0.3 microns quite effificiently from the surrounding air especially in closed rooms. In some asymptomatic patients, virus resides in the salivary glands, hence, all patients must be considered as carriers and aerosol production must be reduced. PPE kits are to be worn by dentists and staff. Surgical masks are to be used by health care professionals and N95 masks while carrying out the procedures.[16]

Precautions To Be Taken During Treatment

Emergency procedures like root canal openings in case of severe dental pain or pulpitis in mixed dentition, elective surgeries for management of dentofacial trauma, cleft lip or palate, cellulitis/facial swellings which produce aerosols using high-speed handpieces, air-rotars, 3-way syringes and ultrasonic scalers should be carried out judiciously. Instead, use anti-retraction or electric friction grip handpieces to prevent debris and fluids from getting aspirated. Low volume suction can minimise aerosol production. For restorative treatments in children, avoid using rotary instruments instead chemomechanical caries removal with BRIX-3000, Carisolv and Papain gel should be preferred and Silver Diamine Fluoride (SDF), GIC and biological restorations can be utilized.[4]If there is need of rotary instrumentation then rubber dam should be used as it reduces airborne particles by 70%. [17] Extra-oral suction should be used. Resorable sutures should be used to limit patient appointments. Extra-oral radiography must be preferred. [4]

Post - Treatment Measures To Be Taken

Post- treatment an appropriate doffing sequence to be followed and PPE should be disposed in double-layered yellow color bags with gooseneck ligation.The bags should be marked and disposed off in accordancewith the Biomedical Waste Management and Handling Rules, 2018.[18] Glasses and face-shields must be washed and disinfected after every procedure. Alcohol based hand rub should be used after every patient. Sterilizable instruments must be cleaned, disinfected and sterilized properly. Disposables should be discarded. Decontamination of operatory should be carried out. Patients who suffered from COVID-19, have completed home isolation and are now tested negative for the disease can receive emergency dental care following CDC guidelines. [19]

II. CONCLUSION

Hence, it can be concluded that the pandemic is not over yet and dental practitioners should be aware of the recent guidelines of various regulatory bodies and must follow proper disinfection protocols to safeguard the community. As recently, a new strain of coronavirus, VUI-2020/01, is found in UK which is 70 times more

infectious than SARS-CoV-2, had already created an emergency in UK and other countries and as a result all went into lockdown again. [20] In India, situation is alarming as second wave of coronavirus had affected many states. Due to the daily surge in coronavirus cases, there is fear among the masses for another nationwide lockdown. Currently, many countries are working for the development of vaccines against COVID-19 infection. According to FDA, **Pfizer-BioNTech**'s two-dose vaccine is found to be about 95% effective whereas **Moderna** two-dose vaccine is 94.1% effective against COVID-19. [21] WHO on 3rd January, 2021 welcomed India's decision giving emergency use authorisation to COVID-19 vaccines, **Serum Institute's COVISHIELD** vaccine, and **Covaxin of Bharat Biotech,** saying it will help to intensify and strengthen its fight against the ongoing pandemic. [22] Thus, dentists can also play a pivotal role in the mass vaccination if trained and recruited by Government bodies. At last as it is rightly said, "Prevention is better than cure" so, we as a dental community should not let our guards down and aware general public about the protocols to be followed.

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