Innovations

Covid-19 To "Omicron XE" - Impact and change in the Future of Dentistry

1. Anbu Velusamy
2. Selvanathan MJ Vinola
3. Thirumurugan SV Mahadhevan

Affiliation(s) of author(s)

1.Reader,Department of Orthodontics, Thai Moogambigai Dental college and hospital, Dr. M.G.R.Educational and Research Institute, Chennai, India - 600107

2.Senior lecturer, Department of Conservative Dentistry and Endodontics, SRM Dental College, SRM Institute of science & technology, Ramapuram, Chennai, India -600089.

3.3D Consultant for Healthcare and Research, Infinitive Bioresearch, United State of America

Received: 12.08. 2022 Accepted: 23.08. 2022 Published: 30.08. 2022

Abstract: *The outburst of COVID-19 vigorously soared in cases creating a dreadful pandemic, which resulted in severe catastrophic health and wealth crisis across the globe. With all the career fields striving for survival, dentistry has faced and is still facing its time of strenuous survival due to the various waves'from COVID-19 to Omicron XE.The report provided by the dental academics in Wuhan, China, which outlined the immediate impact of COVID-19 on dental health-care professionals and on the massive impacts it might have on the profession of dentistry, elicited the attention of dentists globally. The pandemic has also highlighted few voids in dental research and the need for widespread knowledge to manage the present crisis and reduce the impact of such outbreaks in the future of dentistry.Despite meticulous and stern global containment and curfew efforts, the incidence of COVID 19 still prevails and has led to the outbreak of the various waves.The aim of this article is to highlight the impact of COVID-19 to Omicron XEand to recommend various futuristic methods of infection control strategies and patient management protocols to provide prime dental treatment with utmost care for the benefit of the patients and dentists.*

Keywords: *1.Biomedical waste, 2.Cross infection, 3.Cross contamination, 4.Covid, 5.Disinfection and Omicron.*

Introduction-

Since the emergence of COVID-19, in the months and years that have passed from December 2019, the dentists have sailed through a tough stream of Covid waves by changing their practice methodology, towards prevention of cross infections being their paramount importance. There have been various variants like Delta, Omicron BA.1 (B.1.1.529), BA.2, BA.3 and BA.2.75 which have made a deleterious effect on cross infection protocols followed in dental clinics causing fear and anxiety in dentists and patients around the globe. COVID-19-related clinical symptoms can vary from case to case but the most common symptoms are fever, continuous dry cough and myalgia or fatigue and in more severe cases, organ dysfunctions such as acute respiratory distress syndrome (ARDS), acute cardiac injury (shock and arrhythmia), acute kidney injury, and even death in severe cases. During the outbreak, it was alarmed by the Occupational Safety and Health Administration (OSHA) and American Dental association (ADA), that dental surgeons are at extreme risk of contracting and transmitting the virus as they work in close proximity to the patient's oral cavity[1]. Thus, the ADA suggested dental practitioners globally to limit their interventions to emergency treatments which made a tremendous impact on the working protocol and on the dentist's economy.Omicron is a variant of the SARS-CoV-2 virus that was first discovered in Botswana on November 11, 2021 and designated a variant of concern by the WHO on November 26. Since this time, it has been transmitted worldwide and replaced Delta to become the dominant variant. Omicron has since continued to evolve to have multiple different lineages, or genetically related subvariants. India has faced the impact of BA 2.75 in the early days of July which is a variant due to the mutation of BA.2. The recent variant is a "recombinant" corona virus which has been names as "Omicron XE", which is the result of recombination of BA.1 and BA.2 [1]. In "Omicron XE" variant, the symptoms aremostly sore throat, cough and myalgia compared to delta variant that produced fatal results. COVID-19 to "Omicron XE" has caused long-term impacts on clinical practice, dental education and dental research therebyeliciting the need for efficient aseptic protocols.

Dental workplace and risk of virus spread:

In clinical practice, contamination of the dental operatory and dental unit surfaceby patient's oral fluids acts as major source of contagion both for the dentist, assistant and patients. Saliva and blood droplets that are deposited on the surfaces and aerosol inhalation generated by rotating instruments constitute high risk for those who occupy or will occupy these environments. Therefore, the use of disinfectants and personal protective equipment (PPE) are of vital importance for proper asepsis of the dental profession [2]. The sudden spread of SARS-CoV-2 has determined the need to modify both preventive and therapeutic protocols in dental practice. Thus, the need to establish a systematic operatory protocol in the clinical operatory to avoid infections and progressive virus spread is mandatory.

Covid protocol at the Dental clinic entry:

The preventive measure starts when a patient enters the dental clinic. The need for examining their body temperature is the first requisite when the patient enters the dental office. If the body temperature exceeds 37.3 ◦ C, it is suggested the treatment be postponed [3]. The next protocol is encouraging the patients and their attendees to wash their hands with soaps at the entry point followed by usage of sanitizer. Once done, the patient should be provided with a kit consisting of a hair cap, mask and shoe covers. The patient should be informed to wear the shoe cover and the new mask while entering the clinic. The same applies to all the attendees accompanying them.

Dental reception and waiting room:

Patients should be provided a registration form which contains their demographic details and physical health status. There should be a column to mention any recent occurrence of fever, cold, viral infections or positive

Covid report. In patients with a cured COVID-19 infection, the American Dental Association (ADA) guidelines propose to reschedule dental treatment at least 72 h after the resolution of the symptoms, or 7 days after the appearance of initial symptoms, such as fever controlled without antipyretics [4]. The ADA and the Centers for Disease Prevention and Control (CDC) recommend keeping the waiting room empty, without magazines, and avoiding the overlap of two or more appointments. If this is not possible, the minimum distance between one patient and the other must be 2 m (6 feet) in each direction. In extreme situations, for health protection, it is advisable to ask patients to wait in their vehicle, if possible, or nearby to the dental clinic and inform them by telephone call or message when it is their turn [5]. As per pediatric dentistry is concerned, persons accompanying minor age patients are asked to come to the appointment in the smallest possible number, wear a protective mask, wait in the waiting room, and not attend the patient's treatment to avoid the risk of aerosol inhalation [2].

Clinical Operatory:

The dental chair should be draped with a protective disposable cover for each patient. Sodium hypochlorite, commonly known as bleach, is most frequently used as a disinfecting agent. It is a broad-spectrumdisinfectant that is effective for the disinfection of viruses, bacteria, fungi, and mycobacterium. The appropriate concentration of sodium hypochlorite for disinfecting general liquid biological waste is 5000 ppm, approximately 0.5%. There are different concentrations of sodium hypochlorite for different uses. Alcohol or bleach (0.05% sodium hypochlorite) can be used toclean spittoon, operatory chair and floor.The instruments should be cleaned, UV treated and sterilized thoroughly. Use of UV cabinet in the operatory will be of immense help in maintaining the instruments unsoiled and sterile. UV disinfectant lights can be installed on the ceilings for frequent usage after each operatory procedure. Use of disposable mouth mirror, probe and tweezer is advisable. The use of anti microbial mouthwashes prior to commencement of treatment can be carried out. Pragmatic and technical recommendations for correct clinical practice are the implementation of anti-retraction dental handpieces, four-handed work, the use of a rubber dam, and large-volume cannulas for aspiration.The significance of oral rinses just before dental treatment has been researched by various researchers. Costa et al., in a study in 2019, highlighted how the use of chlorhexidine at 0.12% and 0.20% alters the amount of bacteria, viruses, and fungi present in the oral biofilm, reducing the risk of cross-contamination due to aerosol [6]. Peng et al. proposed rinsing with 1% hydrogen peroxide or, alternatively, with 0.2% povidone-iodine since the virus is sensitive to oxidation [7].

Dentists and Dental assistants:

Regardless of the type of treatment planned, dentists, hygienists and dental assistants, must follow rigid protocols related to dressing and PPE. Hair caps, protective goggles, surgical masks or N95, disposable surgical gowns, special footwears, and protective visors are essential [6-8]. According to the "EN ISO 374-5.2016" regulation, for medical protection gloves to be considered functional against microorganisms, such as bacteria and fungi, must pass the penetration test, which analyzes air and water transition through material pores, seams, holes, and other structural imperfections [9]. It is mandatory the dental personal check these validations while buying supplies. The PPE should be used as asserted in the instructions in the user manual and must be disposed of as special waste. It is always recommended to check the integrity of the PPE, and if any negative findings, eliminate the PPE immediately [10]. Donning and doffing the PPE should be done religiously following each step. The dentists or dental assistants have "reasonable diligence" on which they base their decision of replacing the PPE.

Biomedical waste disposal:

The disposal of used instruments, materials, tissue samples, tooth, soiled gloves, cotton and gauze should be discarded by proper protocol of biomedical waste management (BMWM). According to the World Health Organization (WHO), nearly 85% of waste generated by the hospitals is general waste and about 15% of waste is biomedical waste, composed of 10% of infectious wastes and 5% of non-infectious wastes like radioactive and chemical wastes [11].Proper BMWM includes vital steps, such as segregation, collection, storage, transportation, treatment, and final disposal, of waste generated in health care settings [12].Adequate knowledge, attitude, and practice of health care workers are key factors for having a successful BMWM system, as they are important preconditions to safeguard the community and the environment from being contaminated with infectious substances.

Conclusion:

In conclusion, COVID-19 to Omicron XE has made long-term impacts on clinical practice, dental education and dental research. Contingency planning for modifying clinical practice in dentistry and optimization of cross-infection control protocols has to be employed strictly. The use of systematic aseptic protocols will highly help the dentists, patients and those associated with the fraternity by reducing the risk of cross-infection. Further investment in relevant dental research fields should be carried out to enhance the invention of different instruments or material which could aid in reducing cross infection. Ethanol between 62% and 71% and sodium hypochlorite between 0.1% and 0.5% are considered to be the best among the surface disinfectants. It is in the hands of the dentists and their team in building a clinical operatory to the best of its disinfectant protocols so as to reduce cross contamination for the betterment and well being of the society.

References:

1. *Luzzi, V.; Ierardo, G.; Bossù, M.; Polimeni, A. COVID-19: Pediatric Oral Health during and after the Pandemics. Appl. Sci. 2020, 10, 1–8.*

2. *Peng, X.; Xu, X.; Li, Y.; Cheng, L.; Zhou, X.; Ren, B. Transmission routes of 2019-nCoV and controls in dental practice. Int. J. Oral Sci. 2020, 12, 1–6*

3. *Meng, L.; Hua, F.; Bian, Z. Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. J. Dent. Res. 2020, 99, 481–487.*

4. *American Dental Association. ADA Interim Guidance for Minimizing Risk of COVID-19 Transmission.United States of America. 2020. Available online www.ada.org (accessed on 14 July 2022)*

5. *Costa Marui, V.; Silveira Souto, M.L.; Silva Rovai, E.; Romito, G.A.; Chambrone, L.; Mendes Pannuti, C. Efficacy of preprocedural mouthrinses in the reduction of microorganisms in aerosol. A systematic review. JADA 2019, 150, 1015–1026.*

6. *Peng, X.; Xu, X.; Li, Y.; Cheng, L.; Zhou, X.; Ren, B. Transmission routes of 2019-nCoV and controls in dental practice. Int. J. Oral Sci. 2020, 12, 1–6.*

7. *Yang, Y.; Soh, H.Y.; Cai, Z.G.; Peng, X.; Zhang, Y.; Guo, C.B. Experience of Diagnosing and Managing Patients in Oral Maxillofacial Surgery during the Prevention and Control Period of the New Coronavirus Pneumonia.Chin. J. Dent. Res. 2020, 23, 57–62.*

8. *International Organization for Standardization. ISO 374-5:2016. Protective Goves against Dangerous Chemicals and Micro-Organisms. Part 5: Terminology and Performance Requirements for Micro-Organisms Risks. Available online: www.iso.org (accessed on 14 July 2022).*

9. *Lo Giudice, R. The Severe Acute Respiratory Syndrome Coronavirus-2 (SARS COV-2) in dentistry. Management of biological risk in dental practice. Int. J. Environ. Res. Public Health 2020, 17, 3067.*

10. *College Gm, & Hospital-32 C (2014) Manual For Biomedical Waste Management. Nigerian Jornal of Medical Sciences. pmid:25593667*

11. *Sehgal RK, Garg R, Dhot PS, Singhal P (2015) A study of knowledge, attitude, and practices regarding biomedical waste management among the health-care workers in a multispeciality teaching hospital at Delhi. International Journal of medical science and Public Health 4: 1536–1541.*

Email address: maryvins@srmist.edu.in