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Review Article

Dentistry & COVID-19: Spreading facts not myths

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ABSTRACT

Dental professionals are trying to adapt to the new norms, while the medium to long-term impact of COVID-19 on dentistry needs further investigation. The COVID-19 risk mitigation strategies include strict adherence to infection control practices (use of hand sanitizers, facemask and maintaining social distancing), reducing the amount of aerosol production in the dental setting, and managing the quality of air in the dental treatment rooms by reducing the use of air conditioners and improving air exchange. Among several potential transmission sources in the spreading of the COVID-19, dental services have received a high volume of attention. The aim of this article was to review the available literature on the relevant aspects of dentistry in relation to COVID-19 and to discuss potential impacts of COVID-19 outbreak on clinical dentistry, dental education and research. Although the coronavirus pandemic has caused many difficulties for provision of clinical dentistry, there would be an opportunity for the dental educators to modernize their teaching approaches using novel digital concepts in teaching of clinical skills and by enhancement of online communication and learning platforms. This pandemic has also highlighted some of the major gaps in dental research and the need for new relevant knowledge to manage the current crisis and minimize the impact of such outbreaks on dentistry in the future.

1. Introduction

The COVID-19 pandemic has become a public health concern. It was discovered in 2019 in China which reached the level of pandemic throughout the sphere over a short period of time. Every single aspect of individual's life and health has been affected by this novel corona-virus. Numerous preventive measures like wearing masks, maintaining 6 feet distance, washing hands regularly etc. has been implemented to avoid the increasing cases of COVID. Covid-19 was declared an emergency at community level by the WHO on 30^{th} of January, 2020. On March 11, WHO Director-General Tedros Adhanom Ghebreyesus declares the global COVID-19 outbreak a pandemic.

Numerous symptoms are related to COVID-19, fever, continuous dry cough and myalgia being the most common among all. In most of the severe cases consolidative opacities in pulmonary region present bilaterally have been reported during investigations of Covid infected patients.[1] Additional symptoms included production of sputum, headache, diarrhea and hemoptysis.[2–4] On February 11, World Health Organization assigns the novel corona virus its official name: COVID-19 (corona virus disease - 19). The international Committee on Taxonomy of Viruses (ICTV) suggested the name "SARS CoV-2" instead of 2019-nCoV due to the phylogenetic and taxonomic analysis

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of this novel corona virus. SARS (Severe Acute Respiratory Syndrome) and Covid-19 differ from each other in terms of transmissibility and severity pyramids. Rate of transmission of Covid-19 is higher as compared to the SARS.[5]

The most common mode of transmission is contact with the infected individual which further leads to involvement of individuals at community level.[6] It has been reported that loss of smell along with taste sensation are the initial changes that may occur in individuals affected by this Covid-19. 5-6 days time period is considered to be the incubation period of this virus but it may extend till 14 days, thus 2 weeks quarantine period was the most appropriate duration and was adopted universally.[7]

Corona viruses are enveloped viruses with a positive sense single-stranded RNA genome (26-32 kb). They belong to Nidovirale order, Coronaviridae family, α-CoV, β-CoV, γ-CoV, and δ-CoV genre. The virus affects the individual symptomatically as well as asymptomatically the latter being more dangerous as the patient exists in the community without any symptoms. Various modes of transmission like fecal-oral, aerosol spread, through fomites are still under investigation. The dental setting and production of aerosol increases the risk of cross- infection between the patients and dentists. This article focuses on the relevant aspects of dentistry in relation to COVID-19 and also to discuss potential impacts of the novel coronavirus pandemic on clinical dentistry, dental education and research.

2. COVID-19 Implications on Health Care Providers

The health care systems have been severely challenged since the widespread of virus. The need of medical care has increased since the outbreak of this deadly virus. Numerous hospitals have increased their health care facilities including the number of beds and intensive care services. Despite of finite manpower resources available, health-care providers have been working for extra hours since long to meet the increasing demands. The over-time and extra working hours has led to reduced job performance and fatigue-related errors which could harm patients.[8]

3. Role of Dentist in COVID-19 Pandemic

The fields of practice of dentists and physicians have different scopes, though numerous similarities have been found in the training curriculum. Despite of their thorough knowledge about dentistry, they are also well-versed with the medical subjects like anatomy, physiology, microbiology and biochemistry to deal with the complications of medically compromised individuals in dental practice. In addition to this, many dental practitioners would have undergone basic cardiac life support training. Thus, the robust training of clinical medicine in dentistry strengthens the candidature of dentists to volunteer services for COVID-19 control and spread. The dental practice has been affected significantly since the outbreak of Covid-19. A large amount of aerosols and droplets mixed with the patient's saliva or blood are produced during various dental procedures.[9] It has been reported in previous literature that dental professionals are at high-risk as the virus has been detected in saliva of infected individuals.[10] The significantly reduced workload during this time, coupled with robust training in a medical setting, makes the dentist a prime candidate to volunteer in the fight against COVID-19.

COVID-19 diagnostic tests such as nasopharyngeal and oropharyngeal swabs can be administered by the dentists with license. Dentists with their detailed understanding of head and neck anatomy can accurately and atraumatically perform these procedures. The procedure of collecting the swab may cause irritation to the oral and nasal mucosa increasing the risk of releasing contaminated droplets and aerosols to the environment. They can also provide assistance and volunteering along with their medical counterparts. In this era of social-distancing and mouth masks online platforms should be developed to promote oral health and hygiene maintenance. The practice of teledentistry should be enhanced and encouraged during this pandemic. Dental clinics should be well equipped with facilities to control aerosol spread of infections, such as negative pressure rooms and high-volume excavators, which can further offer help to augment the capacity for COVID-19 screening. In this regard, global health authorities as well as health ministries from the respective countries should provide clear standard infection control procedures for dentists.[11–13]

Duties including patient triage, monitoring vital signs, administering oxygen and injectables, and writing prescriptions can also be provided by the dental practitioners. Additional duties that include administration of local anesthesia and suturing can also be provided by dentists. In addition, oral surgeons and dentist anesthesiologists are competent in performing intubation, deep sedation and general anesthesia services.[14]

4. Dentistry and Pandemic

Production and spread of aerosols are the prime and major reason that further leads to transmission of the disease. A lot of air-borne pathogens are produced during dental procedures causing consequent spread of the illness to dental health workers and subsequent patients.[9,15] Also dental patients can carry the COVID-19 virus asymptomatically at the time of dental treatments.[16] The droplets released from the dental treatment can survive for several hours in the air and ultimately be a potential source of multiple transmissions.

The Center for Disease Control (CDC) has proposed certain protocols for infection control mainly focusing on the blood-borne infections but the air-borne infection

protocols are not well stated yet.[17] Not only this, the pandemic has adverse effects on the economy of the dental community as well. The fear and apprehension of visiting dental clinics has increased among the patients since the outbreak of Covid-19. New health promotion strategies and policies are mandatory to be implemented to bring back patients to dental clinics so that needful treatment is done.[18] The dentists around the globe need to unite together to combat the spread of this virus.

5. Protective Measures in Dentistry

It is mandatory to include protective measures and certain guidelines to control infection in dental setting. Dental offices will only be considered safe and infection free once the guidelines are implemented and followed strictly.

Teledentistry must be followed which should include tele-screening and tele-communication with the patients. The in-office appointments should only be allowed after tele-consultations. Proper history including history about any symptoms resembling a cold, flu, or even stomach/digestive issues, as well as about any recent travel should be verified over tele-communications. If the patient needs to visit dental office, they should be encouraged to wear masks and also to visit the clinics alone. There must be an appropriate interval between patients' appointments in order to allow for enough time for disinfection and airing of the dental office which will help significantly to reduce possible aerosol contact between patients.

The waiting area should be made free of all common decorative, promotional, or unnecessary devices/ tools such as pamphlets, magazines, books, etc. The reception area should be disinfected at regular basis and should also have good ventilation. Immediately after entering the dental office one must sanitize his/her hands. For better information of the previous history of the patients questionnaires should be incorporated including questions of having a fever in the past 14 days, any reduced sense of smell or taste, having flu-like symptoms, cough, difficulty breathing, body ache or diarrhea, history of traveling to high risk areas or contact with people who have recently travelled to high risk areas.

Intraoral radiographs are used most commonly for the purpose of diagnosis. Extra oral radiography including panoramic tomography, CBCT's, or oblique lateral views should be used instead of intraoral radiograph as it reduces the chances of contact with the patient's saliva.[19] In cases where intraoral radiographs are necessary pre-radiographic disinfectant mouthwashes such as peroxides are advised as well as the plastic disposable covers should be used to avoid infection through cross-contamination. The attention must be drawn towards the ventilation of the radiographic room.[20]

One of the most common mode of indirect transmission is touching the infected surfaces therefore regular hand sanitization must be followed and hygiene must be maintained. Not only the patients, dentists as well as the staffs of clinics should follow the recommended measures and guidelines. It is recommended that the hands should be washed after removing the gloves as well due to the permeability of latex gloves.[21,22] The system of washing hands before and after wearing latex gloves was recommended even before the SARS outbreak. It is also recommended that HCW's do not wear any jewelry or watches to the dental practice if possible, and to remove them before seeing any patients.

A key role in the prevention and protection against Covid-19 is the correct utilization of PPE kits. Wearing masks, shields, goggles, disposable caps, gloves, and protective clothing should be made compulsory for all dental health professionals in the operatory for the purpose of infection control. All the chair side personnel including the clinic staff not dealing with the patients directly should use N95 masks. The donning and doffing of PPE kits should be well-understood by the patients. The donning sequence of PPE includes washing hands, wearing gown, face mask, scrub hat, face shield, and surgical gloves. The doffing sequence is as follows: first remove surgical gloves in the formats recommended, face shield, scrub hat, and face mask, and finally the body gown and then subsequent surgical hand washing. Few studies have reported that surgical masks are equally efficient as N95 masks.[23,24]

If possible, it is recommended to increase the number of treatments per session in order to minimize the number of patient appointments. For disinfection another method that can be used is fogging or aerosol disinfection. Hydrogen peroxide and hypochlorous acid can be used as vapor disinfectant. The recommended method for hydrogen peroxide is 20% (w/v) working solution of hydrogen peroxide (stabilized by 0.01% of silver nitrate) prepared. The amount of solution required is approximately 1000 mL per 1000 cubic feet.

6. Conclusion

Covid-19 has affected numerous aspects of our life including the dental practice as well. Dentists should stick to the new protocols and follow the newly proposed guidelines in order to prevent the infection. It is recommended that all dental practitioners and dental axillaries keep themselves updated as new scientific data evolves regarding COVID-19. Four-handed dentistry should be encouraged. Pandemics rarely occur, and practical experience gained will be a lifelong lesson for the volunteer. In fact, the fighting spirit of a volunteer working in risky operations instills a high moral esteem and self-confidence. The dangers of this crisis are devastating and clear. The change in the usual dental practice is the need of an hour. Non-emergency dental cases should be postponed or delayed to reduce the aerosol production during dental procedures.

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8. Conflict of Interest

The authors declare no conflict of interest.

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