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Recommended infection control protocol in dental health care settings during pandemic Covid-19 with current and future challenges for dental practice

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Abstract

The risk of cross infection may be high between dental practitioners and patients. For dental practices and hospitals in countries/regions that are potentially affected with COVID-19, an effective infection control protocols are urgently needed. This article, based on our personal experience and relevant guidelines and research, introduces the essential knowledge about COVID-19 and nosocomial infection in dental settings and provides recommended management protocols for dental healthcare professionals in potentially affected areas (RED, ORANGE, GREEN zones) and also about their role as frontline warriors during pandemic covid-19 situation. As there is shortage of health care professionals in our country, we suggest our government to utilize dentists along with other health care professionals to contribute during this pandemic and also prepare them for future.

Keywords- covid-19, SARS CoV, MERS-CoV, WHO

Introduction

The pandemic coronavirus disease 2019 (COVID-19) in Wuhan, China, has evolved rapidly into public health crisis **(1).** On January 30, 2020, the World Health Organization (WHO) announced this pandemic had constituted a public health emergency of international concern (Mahase 2020). The novel coronavirus was initially named 2019-nCoV and officially as severe acute respiratory syndrome coronavirus 2 (SARSCoV-2). Globally, as of 10 May 2020, 4,101,992 confirmed, 280,454 deaths, 1,442,985 recovered COVID-19 cases (www.worldometers.info) and in India, 62,939 confirmed, 2,109 deaths, 19,358 recovered (source –Aarogya Setu).

The risk of cross infection may be high between dental practitioners and patients. For dental practices and hospitals in countries/regions that are potentially affected

with COVID-19, an effective infection control protocols are urgently needed. This article, based on our personal experience and relevant guidelines and research, introduces the essential knowledge about COVID-19 and nosocomial infection in dental settings and provides recommended management protocols for dental healthcare professionals in potentially affected areas (RED, ORANGE, GREEN zones) and also about there role as frontline warriors during pandemic covid-19 situation.

Brief about COVID-19:

Viral Etiology: The COVID-19 virus belongs to a family of single-stranded RNA viruses known as Corona-viridae **(2).** COVID-19 viruses are known to be zoonotic or transmitted from animals to humans. **It was first identified as acute respiratory syndrome coronavirus (SARS-CoV) in 2002 and Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in 2012.(3)**

Routes of transmission: SARS-CoV-2 infections spread through respiratory droplets or by contact **(1)** Therefore, coughing or sneezing by an infected person can cause SARS-CoV-2 airborne, potentially infecting individuals in close contact (within a radius of approximately 6 ft). This led to the recommendation of social distancing to minimize community spread of the disease. Another route of transmission is if infected droplets land on inanimate objects located nearby an infected individual and are subsequently touch by other individuals. **(1)**

Pathogenesis: The ability to infect humans is mainly due to the infection of peridomestic animals, which are the intermediate hosts, nurturing recombination and mutation events as well as the development of genetic diversity among coronaviruses **(4).**

Studies have suggested that the spike glycoprotein (S glycoprotein) plays a significant role in host range restriction by attaching virions to the host cell membrane **(5).** Corona viruses primarily replicate in the respiratory and intestinal epithelial cells and subsequently cause cytopathic alterations **(6)**.

Signs & Symptoms: Patients with COVID-19 usually present with clinical symptoms like fever (98%), dry cough (76%), and malaise (70%), dyspnea (55%), fatigue (44%). In addition, less common symptoms such as nausea, diarrhea, reduced sense of smell (hyposmia), and abnormal taste sensation (dysgeusia) have also been reported **(7). Ground glass radio-opacities seen on CT and chest x-rays imaging.(8)**

Notably, about 80% of these patients reported with flulike symptoms and seasonal allergies, which might lead to an increased number of undiagnosed cases **(9).**

Diagnosis and Treatment: The diagnosis of COVID-19 is based on a combination of epidemiologic information (e.g., a history of travel to or residence in affected region 14 days prior to symptom onset). Clinical symptoms, **Radiographic and laboratory tests findings (RT-PCR & naso and oro-pharyngeal swab specimens) (WHO, 2020a) are main diagnostic tools for Covid-19 confirmation.**

Clinically, we should be alert of patients with an epidemiologic history, COVID-19–related symptoms, and/or positive CT imaging results. As there has been no evidence from randomized controlled trials so far to recommend any specific anti-nCoV treatment, so the management of COVID-19 has been largely supportive (WHO 2020a). To control the source of infection is the main approach; use infection prevention and control measures to lower the risk of transmission; and provide early diagnosis, isolation, and supportive care for affected patients (Wang et al. 2020) **(10)**

Dental clinic protocols for preventing nosocomial infections (DCI Advisory 7th May 2020) (11)-

Dentists are responsible for adopting prevention and infection control measures to avoid transmission of

microorganisms during any procedure in their practice. The dental profession is at higher risk, due to the possibility of aerosols produced by saliva droplets. These droplets can be inhaled and come into contact with skin or mucous membranes, Hence efforts need to be taken at all levels by the dentists. Following are the guiding principles will change as the challenges change with the disease progression and needs to update from time to time.(fig.1)

The document is further divided into:

- General Instructions and Instructions for patients to be followed prior to their visit to Dental Clinics
- Instructions for dental staff to be followed prior to visit to Dental Clinics
- Patient waiting area
- Patient management in Dental Clinics
- Patient exit and turn around
- Dental practice closure instructions and dental staff protocol.

Why Dentists Is At Risk

Figure 1: Figure taken from "Transmission routes of 2019-CoV and controls in dental practice" – Peng et al. 2020 (12)

Protocol for prevention of nosocomial infection: Certain specific protocol are discussed here for dental patient management in this epidemic period of COVID-19

Telescreening / Teledentistry and Triaging: A telephonic conversation to identify patients with suspected or possible COVID-19 infection can be performed remotely at the time of scheduling appointments. (fig.2)

Three most important questions should be asked for initial screening of patients-

1- Any exposure to known or suspected COVID-19 patients,
2- Any recent travelling history to an area of high incidence of COVID-19 presentation,
3- Any symptoms of febrile respiratory illness such as cough or fever.

Classification of patients according to dental emergency (DCI Advisory, 2020) (11)-

Emergency (Situations with increase death risk of patients);

- Uncontrolled bleeding
- Cellulitis or diffuse bacterial infections leading to intra-oral or extra-oral edemas, or risk of airway damage
- Trauma of facial bones which may damage the airways.

Urgent (patient require priority care but do not increase the patient's death risk)

- Pulpitis
- Pericoronitis
- Alveolitis
- Periodontal abscess
- Dental care needed for any critical medical procedure
- Cementation of fixed prosthesis or crowns
- Biopsies
- Adjustments of crowns or prosthesis that cause pain and compromise chewing function.
- Changing intracanal medication
- Removal of extensive dental caries or restorations which cause pain
- Mucositis

- dental trauma with avulsion or luxation.

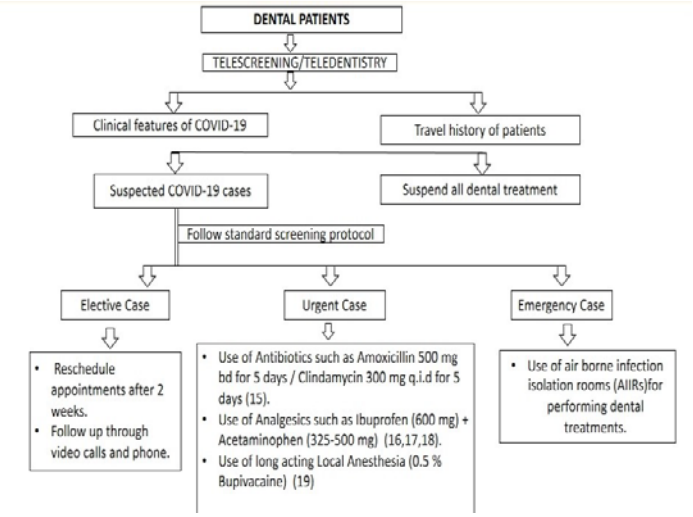

Figure 2: Overview of Dental management Protocol for COVID -19

Safety guidelines to minimize the risk for Exposures; (IDA) (13)

- **Get a sign done at the entrance to the dental practice** which instructs patients having symptoms of respiratory infection e.g., cough, sore throat, fever, sneezing, or shortness of breath then reschedule their dental appointment and call their physician
- **Reschedule appointments** if your patients have traveled outside India in the last two weeks to an area affected by the COVID-19 disease.
- **Take a detailed TRAVEL and MEDICAL history** for confirming and scheduling patients. Do not provide cosmetic treatment to the above patients and report them to the health department immediately.
- **Incorporate questions about new onset of respiratory symptoms for daily assessment of** patients.
- **Take temperature readings** routinely for every patients before performing dental procedures.
- **Take the contact details and address of all patients got treated.**
- **Install physical barriers (e.g., glass or plastic windows)** to limit close contact with potentially infectious patients.
- Make sure the **personal protective equipment (PPE)** being used in appropriate manner.
- **Use a rubber dam** to reduce the risk of possible exposure to infectious agents.
- **Use high-speed evacuation** for those dental procedures producing aerosol.
- **Autoclave hand-pieces** after each patient and for every new patient.
- Have **patients rinse with a 1% hydrogen peroxide** solution before each case.
- **Clean and disinfect public areas** frequently, including door handles, chairs, curtains and bathrooms.
- Post visual alerts icon (e.g., signs, posters) at the entrance and in strategic places (e.g., waiting areas, elevators, cafeterias) to provide patients with instructions about hand hygiene, respiratory hygiene, and cough etiquette).
- Instructions should include how to use tissues to cover nose and mouth
- Provide supplies for respiratory hygiene, cough etiquette including sanitizer (ABHR) with 60-95% alcohol, tissues, and no-touch receptacles for disposal, at entrances, waiting rooms, and patient check-ins.

Figure 3: Proper hand washing technique (Clean care is safer care, WHO,2020)

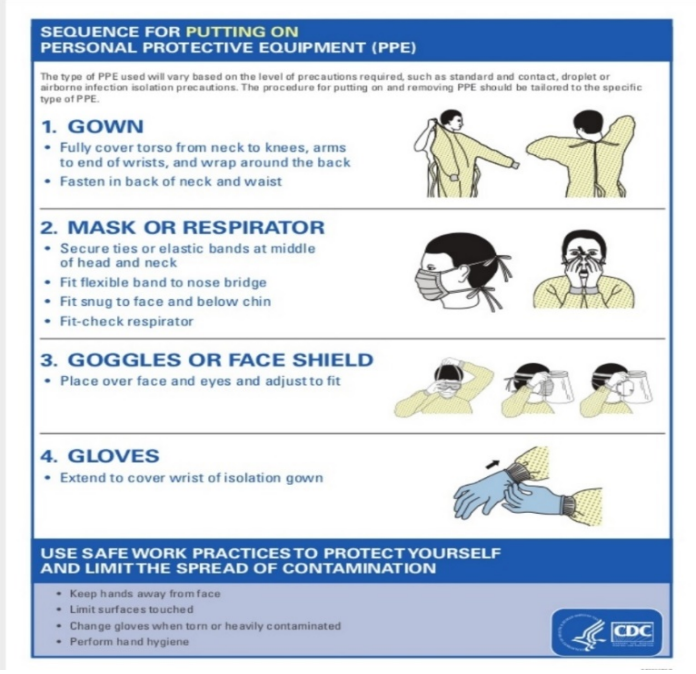

Figure 4: Centers for disease control and prevention recommendation for putting on (Donning) PPE for managing COVID-19 patients.

(CDC, March 17,2020)

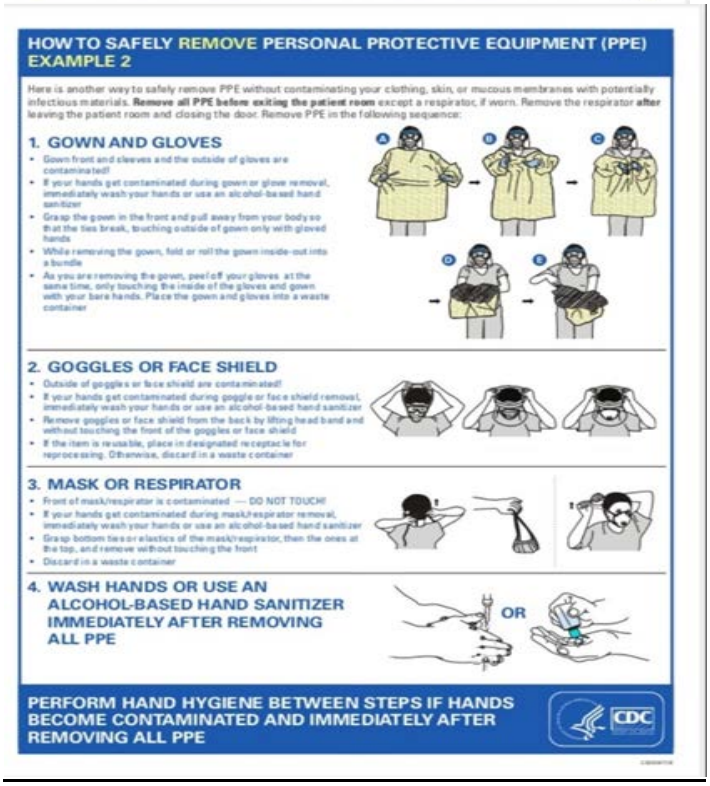

Figure 5: Centers for disease control and prevention recommendation for removal of PPE(Doffing) for managing COVID-19 patients. (example 1&2) (CDC, March 17,2020)

Figure 6: COVID-19 Social distancing from IDPH. **(IDPH, March 13, 2020)**

Impact of pandemic COVID-19 on dentists and dental clinics (14)-

Out of 2.7 lakh dentists registered with DCI, only 7,239 dentists are employed by the government and it is just 2.7 % of the whole dentists in the country (NHP, 2018). It is estimated by the analysts that 20 % of the private dental clinics may have to be closed if the current situation persists beyond may.

Discussion on The Financial Problems Facing By The Dentists

This COVID-19 pandemic resulted in serious financial problems faced by the dental healthcare professionals due to shut down of clinics. The majority of the dentists are self-employed, running their own clinics. They have to pay salary to their assistants, paying their clinic's rent, maintenance bills, electricity bills etc.

During these lockdown period most of the dental clinics are closed and dentists are facing a major financial hardship these days. In opening dental clinics, there is an increase in cost of dental treatment, but raising the charge of procedures on patients is not a good option as they are already suffering from economic crisis. As dental interventions are currently limited to urgencies, management become highly expensive due to limited patients appointment and use of PPE and other protective measures.

Solution to current problems

- Utilization of dental healthcare professionals in COVID-19 screening program like other medical healthcare professionals for gaining 2-way benefits (utilization of manpower of dental health care professionals for government services)
- Utilization of dental colleges and hospitals for training purposes of such pandemic condition.
- Deciding a fixed rate of every dental procedure by the government or local health authorities while using PPE and other protective measures.
- Adding all the dental treatment procedures under Ayushman Bharat scheme.(for low socioeconomic patients)
- Promotion of all the dental insurance schemes.
- Strict action against all the quacks doing dental practice without following the government protocols
- Provide PPE and other safety and protective resources at subsidy rates.

Conclusion

In this paper we have presented about etio-pathogenesis, signs and symptoms and infection control protocol for dental health care settings for covid-19 and what are the various challenges faced by dental healthcare professionals during this pandemic condition and some novel solution for those problems. As there is shortage of

health care professionals in our country, we suggest our government to utilize dentists along with other health care professionals to contribute during this pandemic and also prepare them for future.

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