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Review Article

Challenges and Implications for Dental Professionals during Novel Corona Virus Disease (COVID-19)

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Abstract

The outbreak of novel coronavirus disease (COVID-19) has influenced every aspect of human life. Medical professionals, especially dentist are at a very high risk of getting infected. Because of close contact with infected patients dental professionals can easily be infected. Due to the characteristics of the hospital settings, the positioning of clinician and patient the risk of cross infection is high. For dental clinics and hospitals which are under the containment zone affected with COVID-19, major infection control protocols are highly recommended. This article focuses on the challenges and implications for a dental professionals during novel Corona virus disease (COVID-19). Dental practitioners need to be aware and prepared for tackling corona disease.

Keywords: Coronavirus; COVID-19; Dental Professionals

Introduction

Novel coronavirus disease (COVID-19) originating in China has affected everyone [1]. Within a few months, in no time COVID-19 has spread globally and on 11th March 2020, the World Health Organization (WHO) has declared it as a pandemic disease [2,3]. The strain of coronavirus was first found in a seafood market in Wuhan, China, mainly originating from bats [1]. On 11th February 2020, WHO used the term COVID-19 to describe the strain of coronavirus [4]. This virus has now spread worldwide and now is a public health problem for not only China but also other countries. This outbreak is still rising and is reaching community spread pattern.

Etiology

It is an orthomyxovirus. According to the reports, COVID -19 is zoonotic which is similar to SARS-CoV and Middle East respiratory syndrome coronavirus (MERS-CoV). It is found to be originated from with Chinese bats (*Rhinolophus sinicus*) being the most probable causative agent [5,6].

Mode of transmission

COVID-19 outbreak started with a single animal-to-human transmission, followed by sustained human-to-human spread, as by findings of genetic and epidemiologic research [5,7]. It has been recently studied and found that its transmission is via respiratory droplets and from one human to other human, forming a chain (The Chinese Preventive Medicine Association 2020). It potentially infects individuals in close contact (within a radius of approximately 6 ft.). This has led to the recent recommendation of social distancing to minimize community spread of the disease.

Source of transmission

The Patients who are infected with coronavirus are the main source of transmission. These symptomatic patients are found to infect people around them. Recent study have also shown that asymptomatic patients and patients in their incubation period are also carriers and responsible for spread of the disease [5,8]. This is the reason it is difficult to identify and quarantine all these patients in time, so that the spread is prevented. Because of this COVID-19

has made its control extremely challenging and dangerous. Studies are still going on to identify whether the patients who are undergoing treatment and are in the recovering phase are a potential source of transmission [8].

Incubation period

The incubation period for coronavirus is 14 days. This duration is important as patients are kept under medical observation and also quarantine of (potentially) exposed persons or people in close relations with the affected patients [9,10].

Symptoms

Patients with corona virus disease have clinical symptoms of fever, dry cough, and myalgia. Less commonly symptoms such as nausea, diarrhoea, reduced sense of smell (hyposmia), and abnormal taste sensation (dysgeusia) have also been reported [11]. In addition, abnormal chest X-ray and CT findings such as ground-glass opacities are typically found in the chest [12]. Some patients have very mild symptoms that resemble flu like or seasonal allergies, these are almost 80% of them, which can lead to ignorance of the symptoms and hence difficult to identify leading to increased number of undiagnosed cases [13]. Asymptomatic patients, who have virus infection but there are no symptoms are also infectious and can act as "carriers" and they are reservoir for re-emergence of infection. Severe forms of this disease have a male predilection with the mean age of 56 years with pre-existing chronic illnesses such as cardiovascular disease or immunosuppression. The higher-risk patient has symptoms typical of pneumonia or acute respiratory distress syndrome [14].

Diagnosis

The diagnosis is very complex. Firstly, history of travel to or residence in affected region should be mentioned. Patient temperature, clinical symptoms, CT imaging findings, and laboratory tests are taken. The diagnosis tests include reverse-transcription polymerase chain reaction (RT-PCR), real-time RT-PCR (rRT-PCR) and reverse transcription loop-mediated isothermal amplification (RT-LAMP). For these tests swab are collected known as nasopharyngeal and oropharyngeal swab tests. In the absence of vaccines and drugs the to control of coronavirus is difficult. Hence to lower the risk of transmission early diagnosis, isolation, quarantine and supportive care for affected patients must be considered [15]. Many clinical trials of drugs are being carried out to investigate interventions that are potentially more effective (e.g. lopinavir, remdesivir) to fight against the COVID-19.

Infection control in hospital/clinic

Disinfection of hospital/Clinic

COVID-19 virus can potentially survive in the environment for several hours and days. The premises and the working areas which are contaminated with the virus or are potentially affected, they are to be properly cleaned before using it again. The majority of bio burden must be removed and equipment, dental instruments should be disinfected and environmental surfaces must be cleaned

Environment and surface disinfection

- **On the floors:** A 2 step cleaning procedure is recommended. It is done using detergent and freshly prepared 1% sodium hypochlorite. The procedure is carried out with contact time of 10 minutes. Moping of the floor should be performed in a specific manner. Moping should start from the end and far corner of the room and moving towards the door as moping continues. The frequency of moping should be after every patient.
- **Other surfaces:** A Freshly prepared 1% sodium hypochlorite is recommended. The contact time of 10 minutes should be considered. Damp dusting must be performed. It should be done in straight lines that overlap one another. The frequency should be daily before starting any work, after each and every procedure performed and after finishing the daily hospital/clinic work.
- **Fogging:** It is most important and very effective. When a large area is contaminated and has to be disinfected it is used. It is 'No-touch surface disinfection'. The product used is commercially available hydrogen peroxide. The amount used is 11% (w/v) solution which is stabilized by 0.01% of silver nitrate. Out of which a 20% working solution is prepared. The working solution volume is 1000ml per 1000 cubic feet. After performing fogging in the room one should exit the room and close the room for about half an hour. it is done for the aerosols/droplets to settle down. After performing this regular 2 Step surface cleaning must be performed. The effective time for fogging is usually 45 minutes. After the procedure is completed the rooms can be opened, windows can be opened, the fans can be switched on for aeration. The wet surfaces can be dried or cleaned with a sterile cloth or clean cloth (other surfaces).

Protection

Hand hygiene

After contact with patients, hand wash with soap and water for at least 20 seconds or use an alcohol-based hand sanitizer with at least 70% alcohol if soap and water are not available (These recommendations already are a part of Standard Precautions). Before and after any direct patient contact and between patients, immediately after gloves are removed. Before working with an invasive device, after touching patient especially with blood, body fluids, secretions, excretions, non-intact skin, and contaminated items. During working on patient, when moving from a contaminated to a clean body site of the patient. After contact with inanimate objects in the immediate vicinity of the patient Hand wash in sequence (step by step) is shown in figure 1 as recommended by IDA (Indian Dental Association).

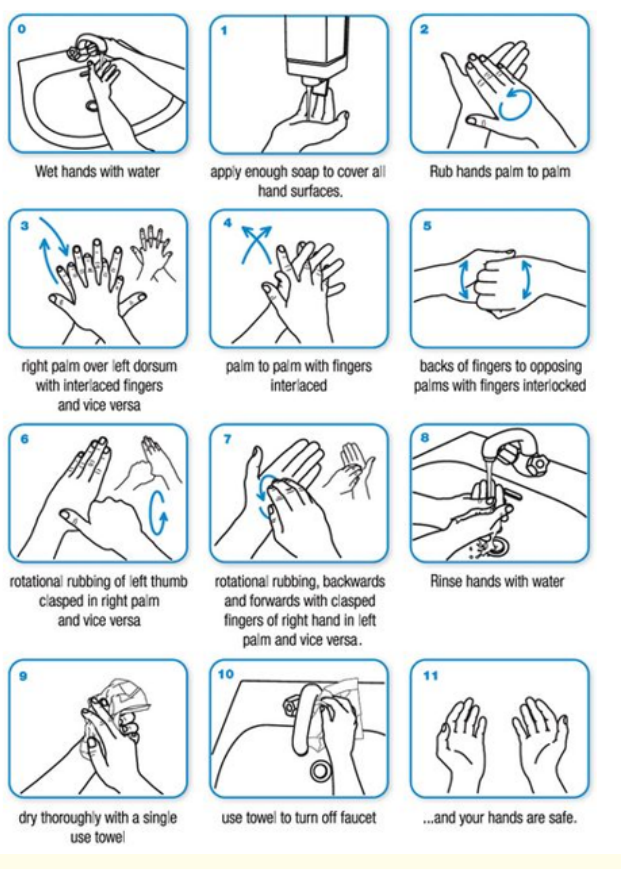

Figure 1: Hand wash sequence (step by step) - IDA recommendations.

Personal protective equipment (PPE)

PPE is worn by the medical professionals to protect the skin and prevent soiling of clothing during working on patients that generate splashes or sprays of blood, body fluids, secretions, or excretions. Sequence for putting on personal protective equipment is shown in figure 2 as recommended by CDC-Center for Disease Control and Prevention. Remove soiled gown as soon as possible and perform hand hygiene as shown in figure 3 recommended by CDC- Centre for Disease Control and Prevention.

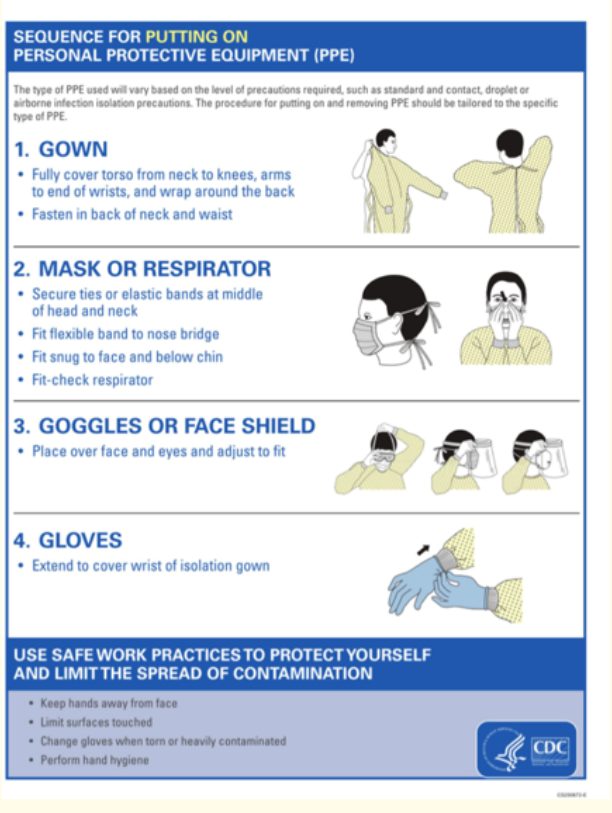

Figure 2: Sequence for putting on personal protective equipment is shown in figure 2 as recommended by CDC - Centre for Disease Control and Prevention. From: https://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf.

Discussion and Conclusion

Since December 2019, the newly discovered coronavirus (COVID-19) has caused the outbreak in China (Wuhan) to the entire world. Corona virus enters host cells through human cell receptor

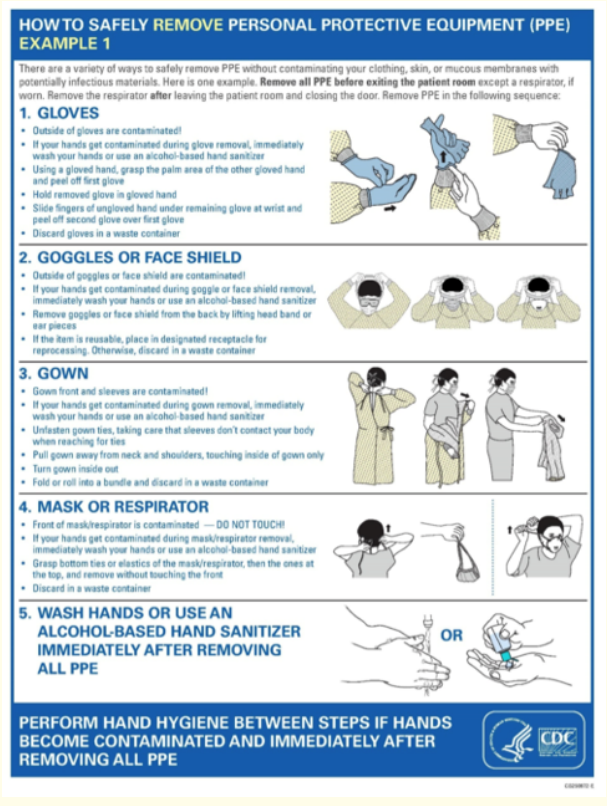

Figure 3: Sequence of removal of PPE kit as recommended by CDC- Centers for Disease Control and Prevention From: https://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf.

ACE2, the same with SARS, but with higher binding affinity [16]. The rate of the increasing number of cases and evidence that the human-to-human transmission suggests that the virus is more contagious than SARS-CoV and MERS-CoV [10,16-18].

By mid-February 2020, a large number of infections of medical staff have been reported [19] and the specific reasons for the failure of protection need to be further investigated.

The rampant spread of corona virus (COVID -19) worldwide increases the likelihood that medical health care professionals, especially the dentists are at higher risk for infection and have to face many challenges. Because of the close proximity while working on patients, the risk increases. Universal precautions are very important to minimize the spread of this virus and its associated disease. As presented in this review, we have summarized the challenges and possible precautions for prevention of transmission of disease.

In conclusion, health care professionals have the duty to protect their patients, public and maintain high standards of care and infection control in their hospital or clinic. This new emerging virus - COVID 19 threat could become a less pathogenic, less virulent with milder symptoms, if we follow the precautionary measures as the virus is predicted to persist in our population. The dental practitioner will use this mini review as a starting point and continue to update themselves with useful information as this outbreak continues.

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