### **Review Article**

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# Public health implications of the novel corona virus disease and guidance for dental health care professionals

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#### **ABSTRACT**

The novel corona virus disease (COVID-19) is a pandemic and has been declared as a Public Health Emergency of International Concern. There is a need for consolidation of global guidelines to prevent and reduce the transmission of this disease at individual, community, national and international level. Health care workers on one hand shoulder the responsibility of mitigation and on the other hand are themselves vulnerable, given the possibility of improper case detection and unascertained modes of transmission of this not well- known viral strain. This review provides a synthesis of facts, news and information on published and unpublished forums about COVID-19 and also throws light upon the various standards and protocols for prevention and management of patients through public health action, meticulous precautions recommended in clinical and community settings, as applicable to dental and other health care professionals.

**Keywords:** Dentists, Coronavirus, Guidelines, Public health

### **INTRODUCTION**

Corona viruses are infamously the crowned viruses for causing the most dreadful global epidemics in the past namely, middle east respiratory syndrome (MERS) in 2012 and severe acute respiratory syndrome (SARS) in 2002, and currently, the corona virus disease-19 (COVID-19). These viruses belong to the family called Coronaviridae. The virus's molecular structure comprises of a single stranded plus shaped RNA as its genetic material. Different genomic variant strains of corona viruses have been identified, namely- αCov, βCov, ΥCov and oCov. COVID-19 emerged as a viral infection, a zoonosis, in December 2019 in the city of Wuhan in China. COVID-19 outbreak is considered to be a novel corona virus disease, caused by a novel strain- nCov, whose nucleotide does not show significant similarity to the previously identified types. The nCov strain has been isolated from bats (Rhinolophus affinis bat) and have shown similarities to  $\beta Cov$  strains in Pangolins, in China. Hence, the bats may be considered as primary host and there is a possibility of one or two intermediary hosts for the nCov. The nCov infection manifests as more severe form of pneumonia, with exacerbated symptoms, especially in geriatric and systemically compromised persons as compared to the earlier identified strains.

Apart from the virulence of nCov strains, the other critical aspect of COVID-19 that needs to be heeded is the greater speed of transmission of this infection as compared to the other strains. This calls for faster action. The modes of transmission of COVID-19 are: Person to Person (through direct or indirect contact), Droplet transmission as while coughing or sneezing without respiratory etiquettes, mucous membrane route (eye/oral), saliva, aerosol and rarely, by feco-oral route.<sup>2</sup>

# COVID-19- THE EMERGENT PUBLIC HEALTH EMERGENCY AND RECOMMENDED PUBLIC HEALTH ACTIONS

On the 30<sup>th</sup> of January 2020, the novel corona virus outbreak was declared as a Public Health Emergency of International Concern by the WHO Director-General, Dr Tedros Adhanom Ghebreyesus.<sup>3</sup> WHO, in the year 2005, defined a Public Health Emergency of International Concern (PHEIC) as "an extraordinary event which is determined to constitute a public health risk to other States through the international spread of disease and to potentially require a coordinated international response".<sup>4</sup>

Currently, the COVID-19 has taken epidemic stature, with 88000 infected persons and 3000 deaths globally,

recorded as on 2nd March 2020.<sup>5</sup> On 9th March 2020, the World Health Organization announced that over 100,000 cases of COVID-19 have been reported from100 countries. However, there is an uneven clustering of the disease across the globe with 93% of the cases being reported from four countries. Although the type of response and the intensity of combat measures by each country might differ, the WHO has come up with a consolidated global guidance for tackling the COVID-19 pandemic. The four categories put forth by WHO for the operational purpose are a) countries with no cases b) countries with sporadic cases c) countries with clusters d) countries with community transmission.<sup>6</sup> The response actions have been recommended by the WHO are presented in Table 1.

Table 1: Actions recommended by WHO to countries for combatting COVID-19 pandemic.

Category	Recommended actions
A) Countries with no cases B) Countries with sporadic cases C) Countries with clusters	Case detection, treatment, isolation, follow up
D) Countries with community transmission	<ul> <li>Case detection, treatment, isolation, follow up</li> <li>Closing of schools</li> <li>Cancellation of mass gatherings</li> <li>All other measures to prevent transmission</li> </ul>
Common for all countries	<ul> <li>Preparedness and execution of emergency response mechanisms</li> <li>Public health communication, education to mass regarding the risk, and community engagement</li> <li>Case detection, surveillance and contact tracing</li> </ul>
	- Promotion of hand hygiene, respiratory etiquettes and social distancing
	<ul> <li>Laboratory testing</li> <li>Quarantine systems in place at airports and public transport stations</li> </ul>
	- Integrated approach steered by an all- government stewardship

## IMPLICATIONS OF RISK AND GUIDELINES FOR DENTAL HEALTH CARE PROFESSIONALS

Initially, risk levels of the novel COVID-19 infections were reported as mild, outside of China. However, recently, the British Dental Association announced the risk level to the population of United Kingdom has escalated from 'low' to 'moderate'. Similarly, the risk levels are expected to rise in many other parts of the world with increased spread of the infection. The governments all over the world have been struggling to plan and implement strategies for all eventualities.

Dental health care professionals hold the key to interrupt the spread of the infection in the capacity of experts, communicators and by responsible breakers in the transmission pathway of COVID 19 infection. The center for disease control and prevention strongly recommends all health care workers, including dentists and staff, receive the flu vaccine, and personnel experiencing a flulike illness should not report to work.<sup>8</sup>

The Australian Dental Association was one of the first professional dental associations to come up with the clinical and epidemiological criteria for identification of a corona virus infected patient. Dental patient with suspected corona virus infection may be expected to present with flu-like symptoms, cough or shortness of breath. It is most likely that he/she has most probably travelled from China, Thailand, Japan, Republic of Korea, Hong Kong, Taiwan, Singapore, Malaysia or Macau in the last 14 days. All professional dental bodies around the globe are now in consensus to postpone or reschedule any non- urgent dental appointments.

According to the guideline for the diagnosis and treatment of novel coronavirus pneumonia (the 5th edition) released by the National Health Commission of the People's Republic of China, following infection control and safety measures are recommended for dental procedures.<sup>10</sup>

Patients with known or suspected COVID-19, presenting with febrile symptoms should not be appointed for visit in the clinic. In the eventuality that the infected patient visits the clinic, the dentist or oral health care provider should be able to identify the patient and not treat the patient and immediately quarantine the patient. The case should be immediately notified to government health authorities. A contact-free forehead thermometer must be used to measure the body temperature of the patient. The dentist and the auxiliary personnel should abide by strict infection control protocol and should be equipped with personnel protection materials. Hand hygiene protocols must be strictly followed. In case, a pre-examination mouth-rinsing may be required for a patient, 1% hydrogen peroxide or 0.2% povidone iodine are recommended as opposed to chlorhexidine mouthwash as chlorhexidine is not effective against nCov. Frequent disinfection of all surfaces in the clinic is recommended.

The Royal College of Dental Surgeons of Ontorio, has come up with guidelines for dentists working in community-based settings. <sup>11</sup> The three cardinal principles of action elucidated in the said guidelines are screen, assess and implement.

Salient aspects of screening in this context include screening over the phone, collection of a detailed history regarding recent travel to high risk parts of the world tracking co-travellers and co-habitant's information.

If the patient reports a true emergency, determine the nature of the emergency and consider whether your practice has the capacity to safely conduct a clinical dental examination. If the patient is a patient under investigation, call your local public health unit to report the case and determine next steps.

If a patient is found to be positive on arrival at the setting, the following procedures should be followed.

- If the patient presents without an emergency, it is required to isolate the patient and assess him. The whole setting has to be sanitized and contact of other patients should be avoided. It is important to maintain droplet precautions by keeping a distance of two metres from the patient.
- If the patient presents with a true emergency, safety precautions should be in place to manage COVID-19, including access to and ability to safely use N95 masks, face shields, gowns and gloves. If necessary, a limited clinical dental examination needs to be conducted to determine the nature of the emergency and provide limited care. No procedures involving aerosol generation should be done.
- If a patient is asymptomatic, but reports a positive travel history, treatment may be deferred up to 14 days as a precautionary measure about possible exposure and should be advised to contact their local Public Health Unit for further direction.

An asymptomatic patient with a travel history to an
affected area in the past 14 days, but with no known
exposure to COVID-19 cases, may be treated like
any other patient. If there is no emergency, the
patient may be asked if they wish to reschedule their
appointment to a date beyond the 14-day period.

## CHALLENGES AND CONSTRAINTS IN RESOURCE AND RESEARCH

Despite clear guidelines released promptly by health agencies across the world, there are challenges along the way to deal with, that would require time, resource and strategies that are scientifically backed. One of the immediate challenges is the decreasing supply of personnel protection materials viz. masks and gloves. The dentists' trade unions in several countries have reported shortage of masks. Given the fact that China is the leading manufacturer of face masks and that there is a surge in panic-buying amongst the consumers, the supply seems to be hit. Even in the developed countries, viz. the UK, there seems to be a lot of dependence on central stockpiles and dentists are hit by unfair rationing. 12

WHO has made efforts towards mobilizing personnel protection materials to at least 47 countries; it is said to have shipped half a million sets, but the supply does not seem to be commensurate to the demand. It has been estimated that front line responders would require 89 million masks, 30 million gowns, 1.59 million goggles, 76 million gloves and 2.9 million litres of hand sanitizers. To meet the said targets, global manufacture of these materials must increase by 40 percent.<sup>13</sup>

Another important challenge is that currently no vaccine is available, which could be used effectively against this new outbreak. Since, the month of March 2020, n Cov has been re- named as SARS-CoV-2, following major break- through by researchers by cryo-electron microscopy, in decoding the structure. The virus particles have been found to be spherical and have proteins called spikes protruding from their surface. These spikes attach to human cells and eventually fuse with the cell membrane. The viral genes can then enter the host cell and replicate manifold. The n COVID/SARS-CoV-2 spikes have been observed to bind to receptors on the human cell surface called angiotensin-converting enzyme 2. Major research has been undertaken by a collaborative team at the University of Texas at Austin and the National Institute of Allergy and Infectious Diseases (NIAID) Vaccine Research Center (VRC). This team have isolated a piece of the genome predicted to encode for its spike protein based on sequences of related coronaviruses and have worked on the cell culture to produce large quantities of protein for analysis. The said research was funded by NIH's NIAID and published on February 19, 2020, in Science.<sup>14</sup>

As a result of the research, detailed 3D view and analysis of the virus have become possible. However, it was

observed that 2002 SARS virus antibodies could not successfully bind to SARS Cov-2 spike protein. indicating that the strategies of potential vaccine for novel corona virus needed further investigation. Subsequently, several research organizations and bio-pharmaceutical companies around the globe are in a race for working for newer strategies for discovering the new vaccine against the corona virus. Trials have been initiated, volunteers have been recruited and different strategies viz. artificial mRNAs are being tested.<sup>15</sup>

#### **CONCLUSION**

It is said that there is nothing international like health and no common enemy like disease. It is the responsibility of every global citizen to contribute to the collective combat of the COVID- 19 pandemic. The way forward in research will certainly be working on vaccine candidates targeting the SARS-CoV-2 spike protein. Having mentioned that, it is also true that no quantum of research and public health measures or professional mechanisms would be fruitful without a strong political will. Strengthening preparedness, communication for a cause and mutual support at micro and macro-social levels can only mitigate the horror of this sudden outbreak.

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