

## COVID-19 AND ITS EFFECTS ON DENTISTRY: BRIEF REVIEW ON ITS TRANSMISSION AND DENTAL INTERVENTIONS

Muhammad Imran, Ali Asif, Azad Ali Azad, Hassam Anjum Mir\*, Qamar Ishfaq, Saad Mansoor

Armed Forces Institute of Dentistry/National University of Medical Science (NUMS) Rawalpindi Pakistan, \*Shifa College of Dentistry, Islamabad Pakistan

### ABSTRACT

COVID-19 is pandemic across the world and with ever growing number of cases in Pakistan, information regarding its transmission, diagnosis and treatment is very important. Dentists are very vulnerable to corona virus infection as shown by WHO data. So it is very important to take stringent preventive measures and only deal dental emergencies to minimize risk to dental health care workers.

**Keywords:** Corona virus, COVID-19, Dental emergencies, Preventive measures.

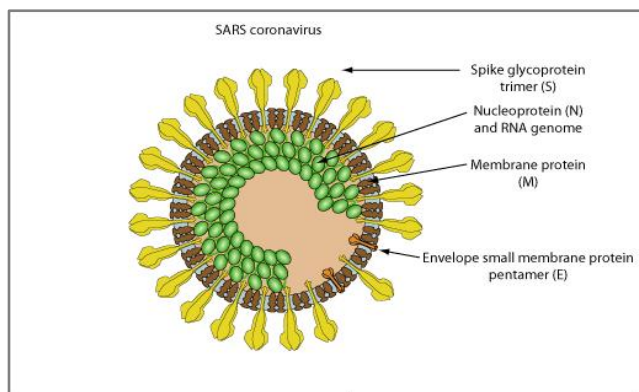
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### INTRODUCTION

Corona virus may be defined as a group of respiratory viruses, having mild to severe signs and symptoms which may lead to respiratory failure. The outbreak of novel corona virus disease (COVID-19) started in Wuhan, China, in December 2019 and has rapidly evolved into a public health crisis worldwide<sup>1</sup>. Novel corona virus belongs to a family of single-stranded RNA viruses known as Coronaviridae<sup>2</sup> (fig-1). This family of viruses is known to be zoonotic or transmitted from animals to humans. There is a strong evidence that this novel corona virus has similarity to corona virus species found in bats and pangolin, confirming the zoonotic nature of this new cross-species viral-mediated disease<sup>3,4</sup>. After a rapid increase in the number of infected cases, on January 9, 2020, the world health organization announced the discovery of a new corona virus. It was first called 2019-nCoV and then was officially named as SARS-CoV-2, which was a new finding in humans<sup>5</sup>.

According to WHO situation report (June 6, 2020) on COVID-19, there are a total of 6,663,304 confirmed cases, with 392,802 confirmed deaths from COVID-19, and this number continues to

increase on daily basis (fig-2). In Pakistan the number of COVID-19 cases are on the rise on daily basis, increasing exponentially across the country, resulting in increased load on the health care system. Up till now (June 7, 2020) a total of



**Figure-1: Diagrammatic representation of SARS-CoV-2 virus.**

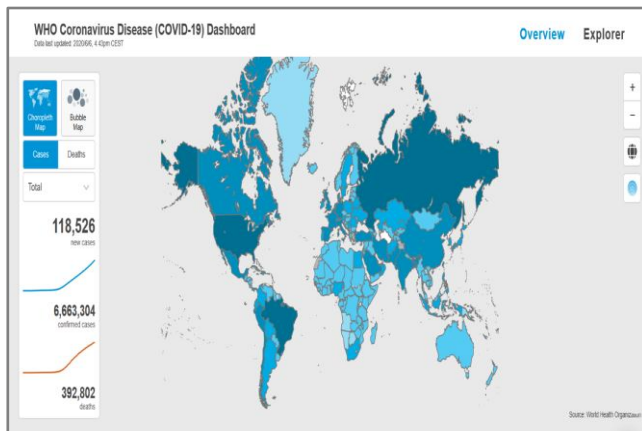
98,943 confirmed cases have been reported, with 63,476 (64.15%) active cases, 33,465 (33.8%) recovered cases and a total of 2,002 (2%) deaths occurring (fig-3). Therefore, proper measures should be taken by every individual for prevention, identification and management for stopping further spread of the virus.

Given to the increased transmission of SARS-CoV-2 and reports of its spread to healthcare providers<sup>5,6</sup>, dental professionals are at a high risk of exposure of COVID-19 and can become potential carriers of the disease. These risks can be attributed to the unique nature of dental procedures,

**Correspondence:** Dr Muhammad Imran, Prosthodontics Dept, Armed Forces Institute of Dentistry, Rawalpindi Pakistan  
Email: [muhammadimran749@gmail.com](mailto:muhammadimran749@gmail.com)  
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which causes aerosol generation, handling of sharp instruments, and close proximity of the provider to the patient’s Oropharyngeal region. If proper precautions are not taken, the dental office may become a potential source to expose the patients to cross contamination. As the understanding of COVID-19 is increasing day by day, it is the need of the hour that dental practices be better prepared to identify and manage patients with COVID-19 infection.

In this article, we will summarize recommendations for diagnosing and managing patients with COVID-19, along with prevention of trans-



**Figure-2:** Statistical data obtained by WHO from all over the world was compiled up till June 6, 2020 and has been represented by marking the regions being affected on the world map, along with the total number of cases infected by the SARS-CoV-2 virus, total number of new cases present and the total number of deaths occurring.

mission of COVID-19 in dental office and procedures that may or may not be done during pandemic situation. We anticipate that as time passes new information regarding COVID-19 will be provided by WHO and the dental community worldwide, which will enable us to provide optimum dental treatments to our required population.

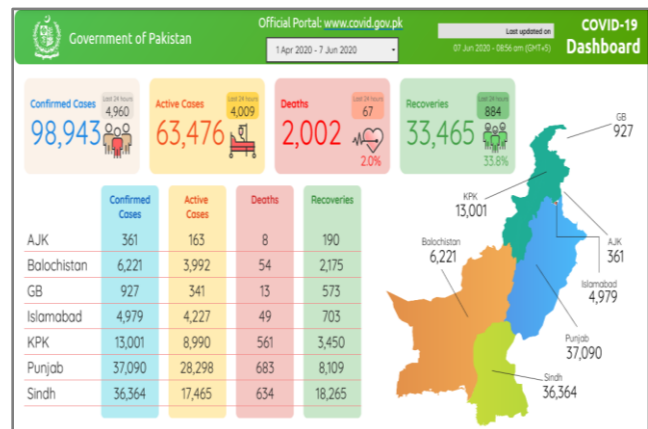
**Epidemiologic Characteristics**

Source of Transmission: Main source of transmission of the infection are the symptomatic COVID-19 patients<sup>7</sup>, recent studies and observations suggest that asymptomatic patients as well

as patients in the incubation period of the infection are also carriers of SARS-Cov-28. Due to this feature of COVID-19, it has become extremely difficult to control its spread among population.

Routes of Transmission: SARS-CoV-2 infections usually spread through droplets or by contact<sup>1</sup>. Therefore, coughing and sneezing is considered one of the sources for spreading the infection from an infected person.

In addition, studies have proven the presence of SARS-CoV-2 in saliva of the affected patients<sup>9,10</sup>. Therefore, there is always a potential for transmission of COVID-19 via aerosol which



**Figure-3:** Statistical data collected by the government of Pakistan up till June 7, 2020, regarding the total number of confirmed cases in which COVID-19 have been detected, along with the number of active cases, patient’s recovered from COVID-19 and number of patients who died in Pakistan.

may contribute to nosocomial spread in dental office setting<sup>11</sup>. Practicing dentistry involves the use of rotary dental and surgical instruments, such as ultrasonic scalers, hand-pieces and air-water syringes. These instruments produce a visible spray that contain particle droplets of water, saliva, blood, microorganisms, and other debris. Surgical masks although do protect against droplet spatter, but are not capable of providing complete protection against inhalation of airborne infectious agents<sup>12</sup>.

Incubation Period: According to World Health Organization the incubation period of SARS-CoV-2 is 5 to 6 days, which may range

from 1 to 14 days<sup>13</sup>. It is now considered as the duration for observation and quarantine of exposed patients.

**Signs and Symptoms:** SARS-CoV-2 virus presents with mild to severe symptoms, presenting themselves on 5th to 6th day post exposure. According to WHO common signs and symptoms presenting in COVID-19 are fever, cough, tiredness whereas other symptoms may include muscle aches and pain, fatigue, chills, headache, conjunctivitis, sore throat, loss of taste and smell, rash on skin, discoloration of fingers or toes, nausea, vomiting and diarrhea. Serious presentation of the infection may include difficulty in breathing or shortness of breath, chest pain or pressure, and loss of speech or movement<sup>14,15</sup>.

**Complications:** Most people with SARS-CoV-2 suffer from mild to moderate symptoms, the disease may progress to severe medical complications and lead to death in some people. Complications may present as pneumonia and trouble breathing, organ failure in several organs, heart problems, acute respiratory distress syndrome<sup>16</sup>, blood clots, acute kidney injury and additional viral and bacterial infections.

**Risk Factors:** SARS-CoV-2 virus according to recent studies are affecting people of all ages, especially those who are in close contact with an infected or an asymptomatic patient of COVID-19<sup>7,8</sup>. People who are at a higher risk of exposure include health care workers as well as the patients coming or admitted in the hospitals. COVID-19 may act more severely in patients of older age, those who are suffering from an underlying debilitating condition, any systemic illness or comorbidity.

**Diagnosis:** Investigations carried out to diagnose SARS-CoV-2 infection, depend upon whether the patient is asymptomatic or is symptomatic. In case the patient is asymptomatic only going for complete blood count and PCR test to detect viral RNA is sufficient. If the patient is symptomatic further investigations may be required to detect the pattern of progression of disease and to stabilize the patient, such as C-reactive

protein, erythrocyte sedimentation rate, renal function tests, liver function tests and serum electrolytes. Depending upon severity for moderate and severe cases further investigation such as Electrocardiogram, levels of D-Dimers, Ferritin and Procalcitonin, and chest radiograph may be required.

**Prevention:** Steps to prevent and slow down the transmission of COVID-19 in general population recommended by WHO are given in various publications<sup>17,18</sup>.

### **Effects on Dental Intervention**

The spread of COVID-19 is increasing day by day, thus increasing the risk for health care professionals providing their services to general population, thus compelling the dentists to provide only a limited number of treatments to the patient. According to ADA, dental interventions have been divided into “dental emergency” and “non-emergency routine” procedures. The dentists have strongly been advised to provide treatment to patients suffering from dental emergencies or requiring urgent dental care.

Dental emergencies are potentially life threatening and require immediate treatment, such as any patient suffering from uncontrolled bleeding, facing infections such as cellulitis or a diffuse tissue bacterial infection with intra-oral or extra-oral swelling<sup>19</sup>.

Urgent dental care normally requires immediate management of conditions involving severe dental pain from pulpal origin, abscesses, pericoronitis or 3rd molar impactions, alveolar osteitis, tooth fracture resulting in painful symptoms or causing soft tissue trauma, tooth avulsion/luxation, biopsy of abnormal tissue and final crown/bridge cementation if temporary restoration has been lost or fractured. Other urgent dental care may involve extensive grossly carious teeth or defective restorations which may result in pain, suture removal, denture adjustments if required especially in oncological patients going through radiotherapy/chemotherapy or if the denture is causing problems during function<sup>19</sup>.

Routine or non-urgent dental procedures are those which may be postponed without any threat to the patient and may be managed later on. It may include periodic recall visits and radiographs, routine dental scaling and polishing procedures, teeth whitening, extraction of asymptomatic teeth, restoration of asymptomatic carious lesions, pit and fissure sealant procedures, aesthetic dental procedures including crown and bridges, veneers and orthodontic treatment<sup>19</sup>.

### **Guidelines for Dental Healthcare Professionals**

Dental health care professionals who are in close proximity to the oropharyngeal region during the treatment, are at the highest risk of exposure from COVID-19 and also will pose a threat of spreading the infection to the community if proper steps for infection control are not adopted. The steps that may be taken to avoid exposure to the health care professional, staff and community, following procedures should be adopted:

Before arrival of the patient, always call before hand and inquire the patient regarding if they have developed fever or any symptoms of COVID-19, advise them regarding the use of cloth mask before coming to the facility and also to limit the number of people accompanying them<sup>18,23</sup>.

Upon arrival to the facility, ask the patient and visitors accompanying to wear their face-masks, check the temperature of all individuals and also take a brief history concerning the symptoms of COVID-19 and any recent travel history before letting them enter into the facility.

Once inside, ask them to seat themselves in the visiting area where individual seats should be placed separately, keeping the seats 2 meters apart between individuals. Maintain the required distance between them at all times. During the time in the facility ensure everyone is using a face mask. Always keep the appointments to a minimum or having sufficient time gap between them to limit the number of visitors within the facility<sup>20</sup>.

For treatment, call the patient into the procedure room. Ask the patient to clean his/her hands and use the recommended mouthwash prior to the commencement of any dental procedure. The health care professional and the staff should protect themselves using personal protective equipment which includes respirators or facemasks, eye protection goggles or face shields, gloves, disposable or reusable gowns, head cover and shoe covers<sup>22</sup>.

Always ensure that the dental unit, counter tops being used and any surface that might come in contact is properly protected by disposable covers, cling sheets or adhesive tapes.

During treatment, limit the movement of the patient outside or within the room. Whenever performing any procedure that might produce any aerosols it is strongly recommended to use a high volume suction in a dental surgery which is well-ventilated and has an effective air purification system<sup>21</sup>. Use of rubber dam helps in isolating the oral cavity and preventing salivary contamination of the instruments and aerosols being generated<sup>24</sup>. Use of disposable instruments and using rotary instruments with non-return valve should always be considered.

Once the treatment is completed, again ask the patient to wash their hands before leaving. After which the whole dental surgery is disinfected along with replacing the protective coverings and tapes. Proper disposal of medical waste and placement of instruments in the sterilization room should be done. Contaminated gowns, gloves and face shields should be properly disposed off and replaced before calling any other patient for treatment<sup>23</sup>.

### **CONCLUSION**

In these extraordinary times, extraordinary measures need to be taken by all dental professionals. Being at the high-risk of get infected with SARS-CoV-19, the dental health care works must modify their practice and follow guidelines to ensure their own safety. Majority of the elective dental procedures can be post-poned, however, by following a triage and taking all the precau-



tions patients in acute need of dental treatment may be facilitated.

### CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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