International Journal Dental and Medical Sciences Research
Volume 4, Issue 2, Mar-Apr 2022 pp 267-274 www.ijdmsrjournal.com ISSN: 2582-6018

Dental Surgeons-A force for ongoing and anticipated upcoming ill winds

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Submitted: 15-03-2022 Accepted: 25-03-2022

ABSTRACT: "Little drops of water make the mighty ocean."
Covid-19 in the last two years has caused a lack of health care workforce globally. Furthermore, we do not know how long this fight against this virus will stay. To address this crisis in a short time interval, one cannot think of creating new sources overnight. This article focuses on the roles of dental specialists to be played using their skills and experiences. An electronic search in PubMed, SCOPUS, and Google Scholar was done, followed by a manual search of the role of dental specialists in general management and of oral manifestation of COVID-19. Even our most minor, sensible participation could bring more significant changes in the upcoming emergencies.
KEYWORDS: Covid-19, Oral manifestations of COVID-19, mucormycosis, vaccination, testing

I. INTRODUCTION

It has been more than a year since India confirmed its first Covid-19 case in the Thrissur district of Kerala in a patient-reported student at Wuhan University.[1] Covid-19 is a communicable disease caused by coronavirus. This virus, having multiple variants and diverse symptoms and an asymptomatic course at times has been creating havoc across the globe.[2] The B.1.617 variant of COVID-19, more commonly known as the double mutant, was detected in India in October 2020. [3] The "double" term indicates the presence of two variants. E484Q and L452R mutations form these variants. The former has similarities to the popular, fast-spreading South African and Brazilian variants. On the contrary, it is later responsible for the virus's invasion into the human body's immune reaction. Recently, a new variant driving the third wave in the country is the Omicron variant.[4] It was reported to the World Health Organization (WHO) from South Africa on Nov 24, 2021. On Nov 26, 2021, the WHO designated it as a variant of concern and named it "Omicron," the fifteenth letter in the Greek alphabet.[5]

II. AIM OF THE LITERATURE REVIEW

This article aims to provide an outlook on dentists' roles and thus provide efficient medical assistance in the ongoing pandemic. Oral specialists and General physicians are pretty different in the purview of their practice yet have comparable basic human science understanding and a great sense of surgical principles. It is laudable that many Indian dentists are presently fighting this challenge on individual levels to provide the best assistance possible. This teamwork has been well modeled by Singapore, National Dental Centre Singapore (NDCS) by employing dental clinicians and volunteers from research laboratories to screen for suspected cases, provide consultations, and conduct swabbing operations.[6] There is a requirement to encourage and guide young professionals in dealing with these new infection control and management protocols. With the emergence of 'Long Covid,' [7] it becomes even more crucial for dental specialists to become actively involved to accomplish early diagnosis and treatment. This participation will bring a positive impression on the minds of budding dentists. Hence, the contribution of this team of dental specialists during this pandemic is going to receive applaud from future generations.

III. PRESENT CHALLENGES

During the second wave of COVID-19 in India, more and more health workers were affected by COVID-19, with significant loss of lives. This has created a Health system breakdown not just in India but also globally. A 2016 study [8] commissioned by the World Health Organization found that the lack of trained health professionals was a major constraint on their ability to achieve

International Journal Dental and Medical Sciences Research
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health delivery to expected levels. Deepanjali Behera et al. [9] suggested the idea of the healthcare community being impacted by this pandemic to the greatest degree in their study. The impact has been psychological, social, and economic, along with loss of life.[10][11] So, to fight this situation, more and more confident professional well versed with COVID-19 protocols has to be actively involved.

IV. ROLES TO BE PLAYED – LITERATURE REVIEW

To review the role of dental specialists during the COVID-19 pandemic, an electronic search in PubMed, SCOPUS, and Google Scholar was done. This was followed by manual searching using oral manifestations of COVID-19 as a base reference to further search articles describing specialists' roles in managing the enlisted manifestations. In addition, two related studies, published till December 2021, were also included in the literature. The search terms used included "COVID-19", "sars-cov-2", "oral manifestations of COVID-19", and " mucormycosis".

Dental specialists can become an essential and critical part of an effective response to the COVID-19 pandemic. With unique skills that may vary between specialists, a perfect service model to be used during a pandemic can be calibrated. The notable roles to be carried out can be categorized as follows: -

A) Oral & Maxillofacial Pathologists:

Oral & maxillofacial pathologists can administer COVID-19 diagnostic tests such as nasopharyngeal and oropharyngeal swabs followed by RT-PCR report listing. [12] As stated by WHO, the only way one can control this pandemic and win this global warlike situation is with 3 T'S, i.e., Test, Test, and Test.[13] Therefore, there is a need to conduct investigations at a faster pace to detect COVID-19 at every dental hospital.

Studies suggesting identification of Coronavirus in oral fluids can aid in early and easily accessible diagnosis. This suggestion of the presence of this virus in oral fluid is attributed to the communication of the oral cavity with the upper and lower respiratory tract. In addition, it may also be due to infections involving major and minor salivary glands and the release of infectious particles through salivary ducts in the oral cavity. There is a lot of scope of research regarding saliva as diagnostic fluid in COVID-19, keeping in mind the challenges of diagnosis using saliva in viral disorders. Salivary diagnostics available for viral disorders include HIV, hepatitis C virus, and human papillomavirus. [14] India's first ICMR approved saliva-based home testing kit was recently launched on Dec 21, 2021, which can detect all types of variants, including Omicron. [15] In addition, recently, Yale University has also proposed the utility of saliva test even to predict the severity of COVID-19, which can act as a powerful tool in the ongoing war. [16]

Materials required in sample collection, packaging, and transport include sample vials and Virus Transport Medium (VTM), adsorbent material, a leak-proof secondary container, Hard frozen gel packs, and a suitable outer container with minimum dimension 10*10*10 cm. [17] Collection material varies according to the specimen type. The collection is followed by the transport of specimen at 4° C and stored at the appropriate temperature until processing is carried out. (Figure 1) The sealing of sample vials is done with para films and covered with absorbent material. A leak-proof, zip-lock pouch should be used to keep the request letter and referral form.

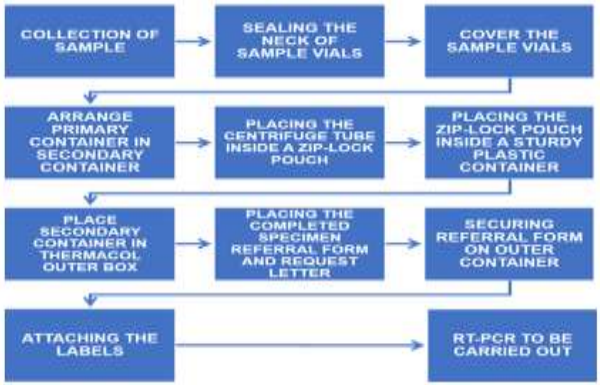

Figure 1 Sequence of collection, storage, and processing of COVID-19 sample

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Volume 4, Issue 2, Mar-Apr 2022 pp 267-274 www.ijdmsrjournal.com ISSN: 2582-6018

B) Public Health Dentist

Vaccine hesitancy refers to postponing or denying vaccines despite the availability of vaccine services; it is complex and context-specific and varies across time, location, and vaccine type. [18] (Figure 2) The recommendations to increase coronavirus disease 2019 (COVID-19) vaccination rates can be performed by Public Health dentists by addressing vaccine hesitancy. [19] [20] This could be achieved by doing campaigns involving two-way communication, influencing people's thinking towards vaccines, and encouraging those who got the opportunity to get vaccinated in early phases to talk about their experiences. [21][22][23] (Figure 3)

In addition, according to the Bloomberg Tracker,[24] which maps vaccination trends globally, 1.75 billion vaccines administered accounts for 16.6% of the world's total vaccination and shows a difference between 56.6 % fully vaccinated and 69.7% partially vaccinated. (as of Feb 18, 2022). This phenomenon of incomplete vaccination is suspected of generating more mutant strains, which ultimately will fail the success of vaccination programs.

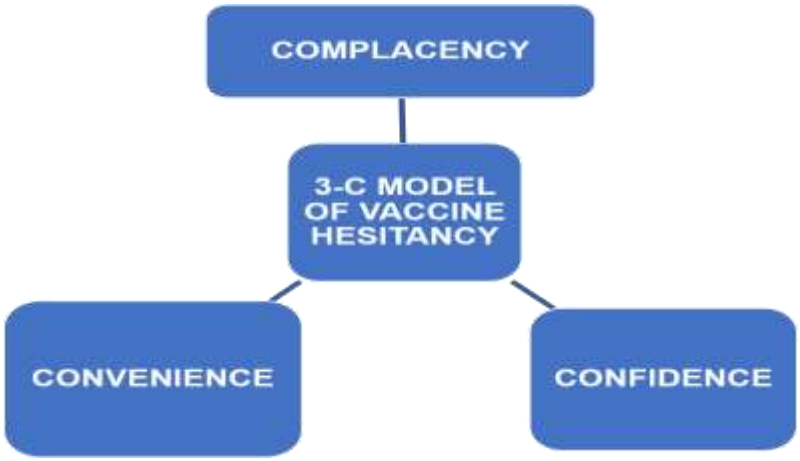

Figure 2 3-C MODEL.[25]

Figure 3 Components of communication

C) Oral Medicine & Radiology Specialists

Duties to be performed by the Oral Medicine & Radiology specialist include patient triage, monitoring vital signs, administering oxygen and injectables, writing prescriptions for mild cases, and referring moderate and severe cases to specialized hospitals. (Table 1)

While in duties at the outpatient department, the oral medicine specialist now has two aspects to look for. Firstly, identifying and diagnosing the oral manifestations of COVID-19 such as dry mouth, unspecified vesiculobullous

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lesions, dysgeusia, amnesia, COVID-19 tongue, gingivitis, and opportunistic infections. [26][27] With equal gender predilection and latency period of 4 days before and 12 weeks after the onset of disease showed good treatment results with chlorhexidine mouthwash, nystatin, oral fluconazole, topical or systemic corticosteroids, systemic antibiotics, systemic acyclovir, artificial saliva, and photobiomodulation therapy. Kawasaki lesions were noted to have the longest latency period. [28] Secondly, detection of clinical signs of 'Long Covid' in post covid patients and followed by referral to a concerned specialist. [7]

Table 1 Post COVID syndrome categories

Long COVID syndromes	Critical features for the diagnosis
Post-covid neuropsychiatric syndrome. [29]	Cognitive impairment, delirium, extreme fatigue, and clinically relevant mood symptoms
Post-covid fatigue syndrome. [30]	Physiological, behavioral, and psychological manifestations include fever, fatigue, hypersomnia, musculoskeletal pain, anorexia, mood disturbance, and cognitive impairment.
Post-covid cardio-respiratory syndrome. [31]	Palpitations, chest pain, cough, shortness of breath
Post-covid hepato-biliary syndrome. [32]	Jaundice, abnormal LFT
Post-covid gastrointestinal syndrome. [33]	Diarrhea, nausea, abdominal pain, prolonged OT/PT
Post-covid genito-urinary syndrome. [34]	overactive bladder, proteinuria, haematuria
Post-covid dermatological syndrome. [35]	Urticaria rash, confluent erythematous/ maculopapular/ morbilliform rash, papulovesicular exanthema, chilblain-like acral pattern, livedo reticularis, purpuric vasculitic pattern
Post-covid musculoskeletal syndrome. [36]	Myalgia, arthralgia, fatigue
Post-covid autoimmune syndrome. [37]	Persistent fever, increased level of inflammatory markers, rash, abdominal pain, vomiting

D) Oral & Maxillofacial Surgeons

Oral and maxillofacial surgeons are competent in performing intubation, profound sedation, and general anesthesia services when required in covid patients.

Successful endotracheal intubation can be done with step-wise guidelines of 7 P's of emergency intubation (Figure 4). Preparation includes assessing the difficulty of the patient's airway, establishing IV access adequately, and monitoring telemetry, pulse oximetry, and blood pressure continuously. Preoxygenation includes the high flow of oxygen for 3-5 min. Pretreatment includes administration of IV Fluid and anxiolysis. [38] Induction is followed by paralysis. The positioning phase is important, and one must use minimal bag-mask ventilation to keep oxygen saturation adequate. After adequate sedation and paralysis, placement can be done. Direct Laryngoscopy is followed by inflation of endotracheal tube with 10 ml air remove stylet. Confirm placement with quantitative or calorimetric methods of end-tidal CO2 detection and auscultation in lung and epigastric region. At last, chest radiography is performed. [39] Tip should be > 2 cm but < 5 cm from carina on chest radiography. Post-intubation management involves securing the endotracheal tube, connecting the endotracheal tube to a mechanical ventilator, and evaluating and managing potential post-intubation complications. [40]

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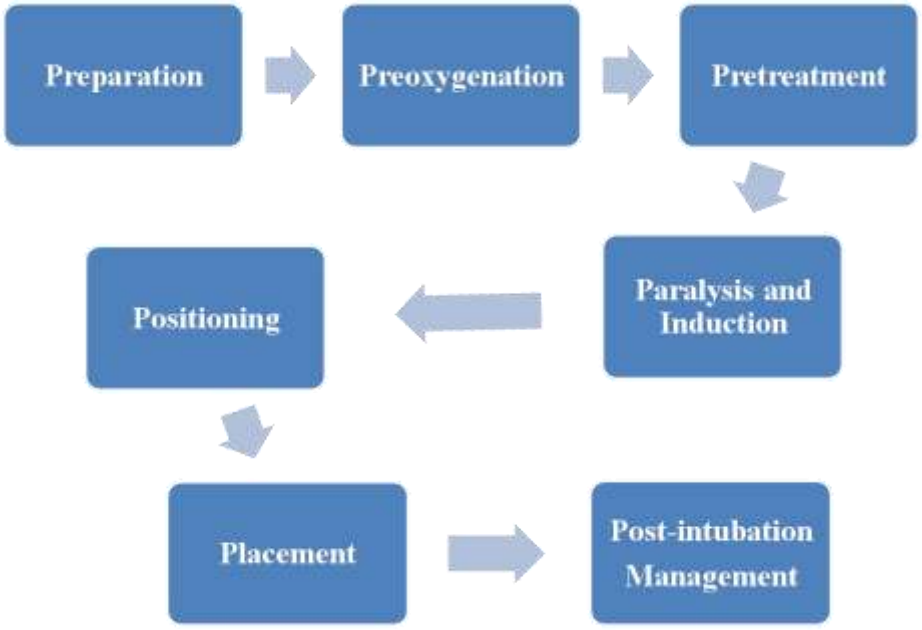

Figure 4 7 P's of emergency intubation

E) Pedodontists

The role of these specialists is crucial in the ongoing third wave of COVID-19 in India, which is affecting children to a greater extent. Meanwhile, with the launch of vaccines for this age group, delivery of vaccines in this age group can be well handled by pedodontists with their incredible sense of understanding about child psychology and behavior management. Moreover, one may even expect long-term oral manifestations of pulmonary diseases and cardiovascular diseases in affected younger individuals, which are to be addressed by pedodontists. A three-week-old baby has died from Covid-19 in Qatar, the country's public health ministry said in a statement on Jan 16, 2020, another fatality in a string of rare infant deaths around the globe from the disease. However, the data do not show a similarly steep rise in coronavirus infections among hospitalized children of other ages, and federal health officials were considering the possibility that Omicron may not be as mild in young children as in older children.[41]

F) Oral & Maxillofacial Prosthodontists

COVID-19 infection with its destructive pathogenesis has caused an increased incidence of enervating fungal diseases like Mucormycosis. It removes critical maxillofacial structures post-surgery, leading to loss of function and psychological impairment. Here, the role of a prosthodontist has to be considered, especially in Rhino cerebral type mucormycosis. A prosthodontist must be well-versed with post maxillectomy defects classification systems such as Armani's classification, Liverpool classification, and many other documented classifications.[42] Prosthodontics therapy by providing an obturator prosthesis that supports the patients through different stages of healing with an acquired surgical defect after maxillectomy is arbitrarily divided into three phases. This includes surgical obturation, interim obturation, definitive obturation.[43] The application of recent technologies such as 3D computer-aided designing and manufacturing, intraoral scanner and CBCT data, Smartphone-integrated stereophotogrammetry (SPINS) 3D scanner, and future perspectives of tissue engineering in maxillofacial reconstruction can also be of great assistance in the therapy.

G) PERIODONTIST

According to a theory, Corona virus causes inflammation in the body, which in turn causes insulin resistance, a feature of type 2 diabetes. Another theory suggests that Coronavirus infects the pancreas and triggers the immune system to attack beta cells of the pancreas.[44] Studies have consistently shown the association of diabetes with periodontitis. The magnitude of the increased risk of periodontitis is related to the level of glycaemic control, and the risk increases exponentially as glycaemic control worsens. [45] On the contrary, a/c to a study, periodontitis was associated with a higher risk of ICU admission, need for assisted ventilation, death of COVID-19

patients, and increased biomarkers' blood levels linked to worsening the disease outcomes.[46] Thus, periodontists need to address this double-edged sword with the utmost attention.

V. CONCLUSION

It would be depressing to look closely at the statistical data regarding the loss of healthcare workers in India and the all-over world. In the last spikes of the pandemic, alternative medicine professionals were allowed to work as front-line soldiers. However, unfortunately, the skills of dental specialists were not taken into account. So, in this article, we have tried to put forth our ideas and have presented a model which can act as a strength in the current and coming phases of the crisis as the war against the pandemic is still on. Amidst the pandemic crisis, it is high time to investigate this model and thus set examples to be looked upon by generations of the dental fraternity ahead.

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