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Epidemiology of dental health: A guidance to manage dental problems in novel coronavirus (COVID-19) pandemic outbreak in India

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ABSTRACT

COVID-19 is a virus belonging to the family of coronaviridae comprising large, single, plus-stranded RNA as their genome. Two out of four genera of coronavirus, α-CoV and ß-CoV cause infection and directly affects respiratory tract in humans. During the global pandemic situation, dental care consultation and management of oral diseases is the biggest challenge for the dentist to treat their patient because of the high chances of transmission of this disease. This article aims to provide basic guidelines for practising during COVID-19 in the dental care settings with preventive and control measures approved by the health department. Furthermore, this also encourages new researchers to explore more relation between COVID-19 and oral health by incorporating technologies practising teledentistry.

1. Background

"Corona Virus Disease (COVID-19)" is the name of existing novel viral pneumonia which is coined by WHO in 2020 whereas the international Committee on Taxonomy of Viruses (ICTV) suggested this novel coronavirus as "Severe Acute Respiratory Coronavirus-2 (SARS CoV-2)" based on phylogenetic and taxonomic analysis of pandemic novel coronavirus.[1] This virus belongs to the family of coronaviridae, of the order Nidovirales, comprising large, single, plus-stranded RNA as their genome.[2,3]

Currently, there are four genera known for coronaviruses i.e. α-CoV, ß-CoV, γ-CoV and δ-CoV.(4,5) Most of the coronavirus is capable to cause the infectious diseases in human and vertebrates where two of them, α-CoV and ß-CoV, mainly infect the respiratory, gastrointestinal, and central nervous system of humans and mammals, while γ-CoV and δ-CoV mainly infect the birds.[2,4–6]

Novel Coronavirus disease (COVID-19) is an infectious viral disease caused by a newly discovered virus genera where most of the people infected with and experience mild to moderate respiratory illness with hyperthermia, dry cough, sore throat, increased work of breathing and muscle pain, confusion, etc. It affects mostly the vulnerable population including older people with compromised immunity, comorbidites such as diabetes mallitus, hypertension, coronary heart diseases, etc. It is transmitted through droplets of saliva or discharge from the nose when infected individual sneezes or coughs. Although at point of time, there is no specific vaccination available to cure this disease but many ongoing clinical trials evaluating its potential treatment globally. However, its transmission can be controlled by protecting yourself and others from infection by washing your hands with soap, using alcohol-based hand rub and avoid touching your face, eyes or mouth and use of face mask.

The pandemic outbreak of (COVID-19) has become a major public health burden globally. On January 30, 2020, India reported its first case in its God's own country, Kerala

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state, which rose to three cases within 3 days confirmed in students who had recently returned from Wuhan, China. On 4 March, 22 new cases came to light, including those of an Italian tourist group with 14 infected members and as time passes, positivity rises exponentially from 3 to 4714 by April, 9^{th} with accounting mortality of 149 Figure 1.[7]

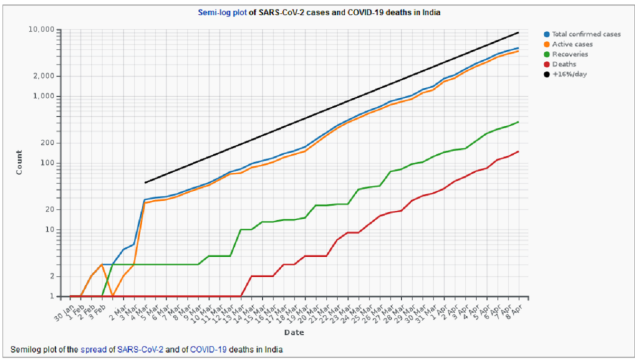

Fig. 1: Semilog plot of the spread of SARS-CoV-2 and of COVID-19 deaths in India.
Source: MoHFW, GoI

The transmission increased during March, were linked to people with a travel history to affected countries were reported. Looking into the situation, COVID-19 pandemic outbreak was declared across the nation and provisions of the Epidemic Diseases Act, 1897 was invoked in the entire country with name as "Janta Curfew", where educational institutions, private multi-nation companies and many commercial establishments were shut down. India even suspended all tourist visas, as the majority of the confirmed cases were linked to other countries.[8] India could have witnessed a surge of approximately 31,000 cases of a disease in a couple of weeks between March 24 and April 14 without lockdown, as suggested by Shiv Nadar University.[9]

2. What is Oral Health?

Oral health is a key indicator of overall health, well-being and quality of life. It encompasses a range of diseases and conditions that include dental caries, Periodontal disease, Tooth loss, Oral cancer, Oral manifestations of HIV infection, Oro-dental trauma, Noma and birth defects such as cleft lip and palate. The Global Burden of Disease Study 2017 estimated that oral diseases have affected 3.5 billion people worldwide, with untreated dental caries being among the most prevalent non-communicable diseases. According to the International Agency for Research on Cancer, the incidence of oral cancer was within the top three of all cancers in some Asian-Pacific countries in 2018.[10]

3. Burden of Oral Health Problem

In many developing countries, access to oral health services is limited due to deprived public infrastructure and unethical practices and other reasons where teeth are often left untreated/ extracted because of patient's negligence. In Asia, the age-standardized incidence rate per 100,000 population ranges from 0.7 in China to 4.6 in Thailand and 12.6 in India. The high incidence rates relate directly to risk behaviours such as smoking, use of smokeless tobacco (e.g. betel nut) and alcohol consumption. At present, the distribution and severity of oral diseases vary among different parts of the world and within the same country or region.[11]

4. Epidemiology of COVID-19 and Oral Health

To current scenario where dentists were not allowed to practice usual dental service delivery expectations for any dental emergencies, this document aims to encourage and evolve with an inductive approach for the management of dental problems during dental emergencies. It can be used in conjunction with the state health board and other local procedure that has been established and can encourage a consistent managing the patients based on their Cov-19 situation.

One of the main aspects pointed out to epidemiology is its integration in dental public health practices. There is a dearth of reported dental burden in the available literature where researchers can prove the spurious relationship between coronavirus and dental conditions. With a huge gap lies between the populations' inadequate knowledge and decision making establishing effective preventive measures. Following triad would help to understand the causal relationship between the two Figure 2;

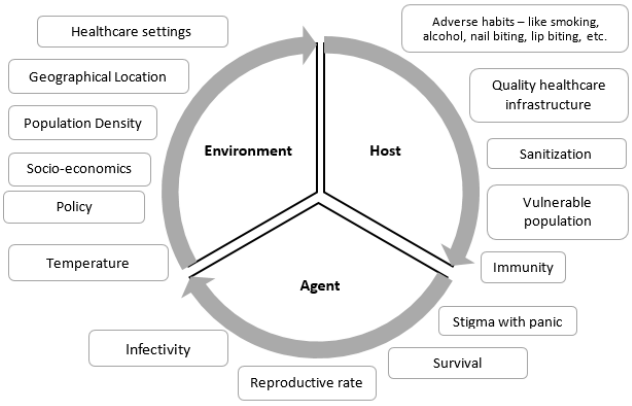

Fig. 2: Epidemiological triad of COVID-19 and dental problems

5. Probable Route of Transmission in Dental Settings

An infected person visiting dental settings can be dangerous for the doctor as well as for technicians and other dental staffs. Probable spread of COVID-19 can be either through sneezing/coughing of a patient or as a carrier of infection from outside. This can be better understood describing how

this infection is transmitted from one infected person to a larger group of individuals causing "Community spread Figure 3. This describes how this infection is transmitted from one infected person and can be transmitted into a group of individuals causing "Community spread". Dental professionals can be exposed to infections that can infect the oral cavity and respiratory tract. Dental care settings always carry a risk of COVID-19 infection due to specific dental procedure where face-to-face communication with patients and frequent exposure to blood, saliva, other body fluid and handling sharp dental instruments is involved. This virus can be easily transmitted through inhalation of airborne microorganisms that can remain for a suspended period in the air for long when comes in contact with blood, any fluid material or other infected patient contact of nasal, conjunctival, oral mucosa with the droplets and/ or any aerosols containing microorganisms generated from an infected person. These can be easily propelled while treating the patient.

Once the dental professional exposed to an infection they can turn symptomatic over the incubation period and spread the infection to the group where they meet others. Since the reproducibility rate of COVID-19 is 2 to 3 which means each new case could produce 2-3 new secondary cases. This could lead to a community spread in the geographic area.

However, breaking this chain can be a possible preventive measure to stop further spread of the infection in the community if an infected individual can "self-quarantine" and maintain "social distancing" for a period in which the infectivity rate of the virus comes down.

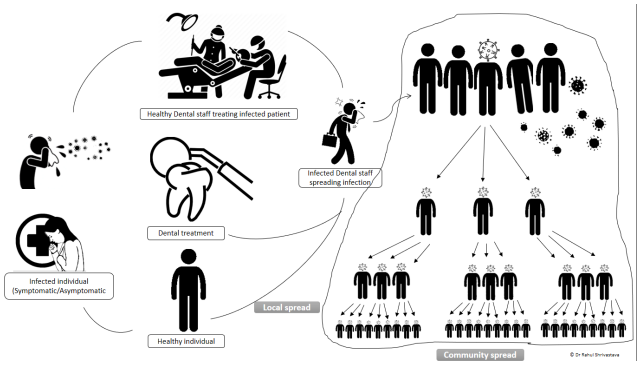

Fig. 3: Illustration of probable transmission of COVID-19 from an infected individual to community spread thrugh a dental care settings

6. General Principles to follow

1. Dental care settings should prioritize the most urgent care need for assessment of patient.
2. As far as possible consultation should be provided either via phone call or social platforms like telegram, whatsapp, email, etc, practising teledentistry to avoid transmission of COVID-19 at dental care settings.
3. During the clinical treatment of any emergency cases, COVID-19 status must be established and recorded as per the local health board system protocols.
4. As far as possible, the patient should be advised to call back within 72 hours of the consultation if their symptoms have not resolved and treatment options should be avoided.
5. Following the local health guidelines for the prevention of COVID-19 transmission should be strictly incorporated while treating emergency cases
6. Appropriate record to be maintained for such cases and report to the concerned local authority.
7. Only approved ICT materials should be used for disseminating the information.
8. Liaising with local pharmacists to make sure recommended drugs are available to your patients immediately.

7. Recommendations for Dental Practice

Due to the scarce information on approved protocols related to dental care settings, interim guidelines on infected person and control during healthcare is recommended when COVID-19 infection is suspected (WHO 2020). Some of the probable recommendations can be referred to prevent the spread of COVID-19 by strictly and intense use of personal protection measures and avoid or minimize any minor/major dental surgical modalities that can produce droplets/aerols in dental settings. Saliva ejectors with high/low volume could be used for the production of droplets and aerosols.[12]

8. Future Scope

With all facts and figures encountered, it is clear that this COVID-19 pandemic is of major public health burden globally. With the use of technologies like teledentistry and robotic surgeries can be very useful in handling such situations which has proved its efficiency in treating the patients. As a new approach in managing the prevention and control of oral diseases where prevention and control of contagious diseases can be taken care of, this could further explore a new field in population-based informatics with ease of surveillance for the risk of transmission and control of this fatal COVID-19 disease in dental patients in developing countrie.

9. Conclusion

COVID-19 is highly infectious disease causing global public health burden of disease. With proper prevention and control strategies, the transmission can be controlled in the community. Medical professionals including the dentist are more prone of getting this infection from an infected patient while treating in the dental care settings. Extra care to be taken while treating any emergency cases

following the guidelines issued by Ministry of Health & Family Welfare, Government of India and maintaining the records and reporting to the local authority for such cases. This article will help researchers to explore more in the field of teledentistry where usual dental consultations are not possible during COVID-19 pandemic situation. With advanced technology-oriented surveillance and management of oral disease could be helpful for way forward for teledentistry in rural and tribal areas where the population are deprived of getting even basic services.

10. Source of Funding

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11. Conflict of Interest

There is no conflict of interest declared by the author.

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