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Prevention of COVID-19 Infection among Dental professionals

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Abstract
Prevention of infection is very important in dentistry. During the past two months, Coronavirus disease 2019 (Covid-19) has emerged as a rapidly spreading viral disease in many Asian, African, Middle East countries as well as Europe and North America. Various guidelines have been laid down and measures have been taken by the health professionals, government organizations and authorities like WHO to combat its massive spread. However, dental professionals and health care workers are exposed to patients suffering from any type of transmissible disease. This article addresses the real risk of cross transmission of corona virus among dentists, briefly discussing the literature on corona virus and guidelines by the author on preventive measures and role of dentists in prevention of coronavirus infection.

Keywords: Covid - 19 virus, dental professionals, cross infection, prevention

1. Introduction

History of Corona Virus

With a decline in new cases in China but the number of infected individuals have increased several folds in other countries such as South Korea, Italy, Iran and India. India is reporting at 57,306 cases on 08/05/2020.[1]

The name corona virus is derived from the word crown as there are crown like surface projections on the surface of this virus when seen under electron microscopy.[2] The novel coronavirus infection has emerged as a new pandemic disease resulting in SARS severe acute respiratory syndrome) type of illness.[3,4] The transmission of corona virus from animals to humans resulted in Southern China due to lack of biosecurity measures in animal cultivation and intake, exotic food habits and poor controls and norms of wet markets.[5,6] Cases of crossover infection of corona viruses from animals to humans have occurred in the past resulting in severe illness and mortality. SARS coronavirus had the mortality rate of 11% and MERS-CoV had the fatality rate of 34%.[7, 8]

The mortality rates is estimated to be 5·6% for China and 15·2% (12·5–17·9 %) outside of China.[9] Because of alarming levels of spread and severity, and by the alarming levels of inaction", the Director-General of WHO characterized this coronavirus disease as a pandemic, on 11th march, 2020. [10] Complete information about how the virus is spreading is still unknown and the current knowledge is currently based on similar coronaviruses.

2. Mode of Transmission

Epidemiological records in China suggest that up to 85% of human-to-human transmission has occurred in family clusters and thousands of health-care workers have become infected, with an absence of major nosocomial outbreaks.[11,12] Cases of Covid-19 infection are increasing exponentially since the outbreak with an epidemic doubling time of 1.8 day.[13] Reports suggest that infection is transmitted through large droplets when symptomatic patients cough or sneeze and this can occur before onset of symptoms also. Infected droplets can spread about 1-2 meters and deposit on surfaces.[14] Infection is acquired by either inhalation of infected droplets or contact of contaminated surfaces with nose, mouth or eyes. It is also hypothesized that the virus may be present in stool and contaminated water supply, so aerosolization and deco oral route of transmission is also a possibility. [15] Trans placental transmission is not found yet however, neonatal transmission resulting in neonatal disease has been reported.[16]

The incubation period of virus varies from 2 to 14 days with a mean of 5 days. The virus enters the respiratory tract via Angiotensin receptor 2 (ACE 2).[17] Care takers of old age homes are at higher risk of acquiring this illness as evident from a series of death reports in US.[18] So a person to person transmission has become the primary mode of transmission of this virus which has occurred in health care facilities, work- places, homes, as well as public transportation. The most important route being direct or indirect mucosal contact with droplets or fomites infected with

Covid-19.[19]
There is high possibility of transmission of bacterials and viral infections in dental practice. Saliva and blood are major sources of cross contamination during dental treatment. There are many aerosol generating procedures in dentistry like in cavity preparation, ultrasonic scaling, tooth preparation, etc. so droplet contact should be avoided and air borne precautions should also be considered.[19] Coronavirus is physically stable in the environment, so protective measures by the public is necessary to break the chain of infection. Early recognition of the disease along with isolation of suspected cases is the primary measure to prevent nosocomial spread.[20]

3. Clinical Presentation
Recently, the WHO reported that the time between onset of symptoms and death may ranged from about 2 weeks to 8 weeks.[21] Recognition of signs and symptoms of any infection is very crucial for steps to be taken to reduce cross transmission in health practice. Reports illnesses from corona virus disease varies from mild cough and fever to shortness of breath and even deaths. Early symptoms of the disease are fever, cough and shortness of breath. Emergency warning signs like difficulty in breathing, persistent pressure or pain in chest, confusion or inability to arouse and bluish lips or face need urgent medical attention.[22] Any health care professional with even mild symptoms of cough, sore throat and fever should be tested for Covid-19. Coronavirus is physically stable in the environment, so protective measures by the public is necessary to break the chain of infection. Early recognition of the disease along with isolation of suspected cases is the primary measure to prevent nosocomial spread.[20]

4. Criteria for Testing:
Sample collection fro testing is done with nasopharyngeal and oropharyngeal swabs ans aspirates. Respiratory precaution has to be taken for sample collection and preservation in transport media.[23] The diagnostic tests for this virus are based on Nucleic Acid Amplification Assays, Antigen Detection Assays and Antibody Detection Assays.
According to the current testing strategy by Indian Council of Medical Research (ICMR), health care workers managing respiratory distress / SARS illness should be tested when they are symptomatic. Testing is being done at CSIR, DBT, DRDO, Govt. medical colleges, etc. free of cost.[24]

5. Measures for Infection Control:
Since the virus is enveloped, physically intact, it remains viable on surfaces for days in suitable atmosphere.[25] The following measures can be adopted by dentists to prevent further spread of corona virus and reduce the chances of cross transmission from patients to dentist or vice-versa.

5.1 Chemical disinfectants which are effective against corona virus are household bleach, sodium hypochlorite, hydrogen peroxide etc. Viral load is reduced by more than 3 logs within 5 min.[26] For cleaning of floors of dental hospitals and clinics, no sweeping should be done. The floors should be mopped with detergent water, then plain water and in the last with 1 % hypochlorite solution.

5.2 Respiratory samples containing the virus is found to be infectious for around 7 days at room temperature. Viability of corona virus is more on plastic/disposable gowns than that on cotton gown surfaces. This can be due to absorbent nature of cotton. So, it should be preferred.

5.3 Risk of infection through card of patients and other papers is very less as the virus cannot be recovered after the drying of a paper form even with a high inoculum.[26]

5.4 Standard precautions should be applied routinely in all health-care settings (hospital or private clinics) for all patients (symptomatic or asymptomatic). Standard precautions are: most importantly, hand hygiene; and second, use of personal protective equipment (PPE). Gowns, shoe cover, gloves, face mask, eye protectors, head cap should be worn properly to avoid direct contact with secretions and body fluids of the patients. Sharp and needle stock injury should be strictly avoided and taken care of. Correct sequence of donning and doffing of PPE should be followed along with biomedical waste management. Safe disposal of wastes and used PPE should be done in assigned area and colour coded bins. There should be regular checking and certification by administrative and regulatory bodies.

5.5 When Performing An Aerosol Generating Procedure*:* use PPE (full gowns, double gloves, eye shield, and particulate respirators like N95. The procedure should be performed in a well ventilated room. This means negative pressure rooms with minimum of 12 air changes per hour or 160 liters/second/patient in facilities with natural ventilation. People in the room should be minimised to only very necessary individuals.[27]

5.6 Any person showing any respiratory symptoms like coughing, sneezing or runny nose should be encouraged to follow respiratory hygiene. That is, nose and mouth should be covered with either medical mask or cloth mask. If no mask is available then at least disposable tissues or even flexed elbow can be used to cover nose and mouth while coughing and sneezing. Thorough hand washing should be done if hands come in contact with respiratory secretions.

5.7 Hand Hygiene
- It includes cleansing of hands with soap and water or the use of an alcohol-based hand rub (ABHR), containing at least 70% alcohol for inactivating corona virus.
- If there is visible soiling of hands then soap and water is required for washing.
- ABHR are preferred if soap and water is not there and there is no visible soiling.
- Hand hygiene is an essential and repeated step in donning and doffing of PPE. Wearing PPE doesn't mean that hand hygiene is not required.[28]

Unintentional touching of eyes, nose or mouth by gloved or ungloved hands by HCWs. Touching ones face with contaminated hands can result in self inoculation of virus and one can get infected.
Cleaning and disinfection protocols should be followed vigorously and consistently. This should be checked and ensured

by all working in that area. All the surfaces in the working environment should be cleaned with detergent water and disinfectants (such as sodium hypochlorite). This is an effective and sufficient procedure for surface disinfection. Laundry, food service utensils and medical waste should also be managed in accordance with safe routine procedures and infection control measures.[29, 30]

6. Conclusion

The fact that dentists are susceptible to many nosocomial infections and cross transmission of diseases is often neglected. Reporting of health associated infections in dentists is very less, along with documentation and publications.[31]

Reports suggest that healthcare-associated infections are under-reported in literature from the developed world.[32,33] So the situation may be worse even worse in developing nations.

Therefore, healthcare-associated infections are under-reported in literature from the developed world [32, 33]. The potential threats of COVID-19 is still underestimated. As long as accurate data are absent, the dental team should be fully aware of the risk of dissemination of this potentially hazardous virus and ensure that efficient cross-infection control procedures are being followed.[34]

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