

Corona virus disease bring a new challenge for the dentistry: A review

**Tarun Vyas¹, Shilpa Sunil Khanna², Abhaya Vadlamudi³,
Simerpreet Kaur Bagga⁴, Sunil Kumar Gulia⁵, Monika Marripudi⁶**

¹Senior Lecturer, Department of Oral Medicine and Radiology, R.R. Dental College & Hospital, Udaipur, Rajasthan, ²M.D.S, Department of Oral and Maxillofacial Surgery, Senior Lecturer, Sri Ramakrishna Dental College and Hospital, Coimbatore, Tamil Nadu, ³BDS, Dr. Sudha and Nageswara Rao Siddhartha Institute of Dental Sciences, Chinnoutpalli, ⁴Former Lecturer, Dept of Public Health Dentistry, Dasmesh Institute of Research and Dental Sciences, Faridkot, Punjab, ⁵Senior Lecturer, Oral and Maxillofacial Surgery, SGT University, Gurugram, Badli, Jhajjar, Haryana, ⁶BDS, Drs.sudha and Nageswara Rao Siddhartha Institute of Dental Sciences, Chinnoutpalli, India

ABSTRACT

An outbreak of coronavirus disease 2019 (COVID-19) caused by the 2019 novel coronavirus (SARS-CoV-2) began in the city of Wuhan in China and has widely spread worldwide. While human strains of coronavirus (CoV) are associated with about 15% of cases of the common cold, the SARS-CoV-2 may present with varying degrees of severity, from flu-like symptoms to death. It is currently believed that this deadly CoV strain originated from wild animals at the Huanan market in Wuhan, a city in Hubei province. Bats, snakes, and pangolins have been cited as potential carriers based on the sequence homology of CoV isolated from these animals and the viral nucleic acids of the virus isolated from SARS-CoV-2 infected patients. Common clinical signs of the infection comprises of respiratory symptoms in the form of fever, cough, shortness of breath, and breathing difficulties. In more severe cases, infection results in pneumonia, severe acute respiratory syndrome, kidney failure, and even death. Standard recommendations advocated to prevent spread of infection consist of frequent hand washing, covering mouth and nose when coughing and sneezing. This article, based on our experience and relevant guidelines and research, introduces essential knowledge about CoV in dental settings and provides recommended management protocols for dental practitioners affected areas.

Keywords: Coronavirus-19, dental transmission, management, prevention

Introduction

The epidemic of coronavirus disease 2019 (COVID-19), originating in Wuhan, China, has become a major public health challenge for not only China but also countries around the world. The World Health Organization announced that the outbreaks of the novel coronavirus (CoV) have constituted

a public health emergency of international concern. As of February 26, 2020, COVID-19 has been recognized in 34 countries, with a total of 80,239 laboratory-confirmed cases and 2,700 deaths.^[1] They are also one of the leading causes of human deaths worldwide. CoVs have also been known to cause respiratory diseases in humans.^[2]

Biology of Corona Virus

SARS-CoV-2 belongs to the broad family of viruses known as CoVs. It is a positive-sense single stranded RNA (+ss RNA) virus, with a single linear RNA segment.^[3] The genomic structure

Address for correspondence: Dr. Tarun Vyas,
Senior Lecturer, Department of Oral Medicine and Radiology, R.R.
Dental College & Hospital, Udaipur, Rajasthan, India.
E-mail: tarunvyas14@gmail.com

Received: 10-04-2020

Revised: 10-06-2020

Accepted: 01-07-2020

Published: 25-08-2020

Access this article online

Quick Response Code:



Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_589_20

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Vyas T, Khanna SS, Vadlamudi A, Bagga SK, Gulia SK, Marripudi M. Corona virus disease bring a new challenge for the dentistry: A review. J Family Med Prim Care 2020;9:3883-9.

Table 1: Rationale for the use of each component of PPE as per the MoHFW

Component	Description	Protection provided
Face shield and goggles	The flexible frame of goggles should provide good seal with the skin of the face, covering the eyes, and the surrounding areas and even accommodating for prescription glasses.	Protection of the mucous membranes of the eyes/nose/mouth using face shields/goggles is an integral part of standard and contact precautions.
Masks	Triple-layer medical mask: A triple-layer medical mask is a disposable mask, fluid-resistant. N-95 respirator mask: To provide the requisite air seal to the wearer, such masks are designed to achieve a very close facial fit.	Triple-layer medical mask: Protection to the wearer from droplets of infectious material emitted during coughing/sneezing/talking. N-95 respirator mask: Protective device with high-filtration efficiency to airborne particles
Gloves	Nitrile gloves are preferred over latex gloves	There is a high rate of allergies to latex and contact allergic dermatitis among health workers.
Gowns	Gowns are considerably easier to put on and for removal. An apron can also be worn over the gown for the entire time the health worker is in the treatment area. Coveralls/gowns have stringent standards that extend from preventing exposure to biologically contaminated solid particles to protecting from chemical hazards.	Gowns are designed to protect torso of healthcare providers from exposure to virus.
Shoe covers	Shoe cover made up of impermeable fabric.	They facilitate personal protection and decontamination.
Head covers	Head covers cover the head	They provide clinical care for patients.

This review is aimed at put forth the basis dental considerations in coronavirus infections

Table 2: Drugs in pipeline for COVID-19

Drug	Potential mechanism of action	Recommended dose	Evidence
Chloroquine	Not clearly known, changes the pH of endosomes and believed to prevent viral entry, transport and post-entry events	Chloroquine phosphate 500 mg BID for 10 days. Chloroquine phosphate: @\$ 1. COVID-19 URTI: 500 mg BID for 5 days. 2. COVID-19 LRTI: 500 mg BID for 10 days	Expert consensus from the Department of Science and Technology and Health Commission of Guangdong province, China Indian Council of Medical Research
Hydroxychloroquine	Not clearly known, changes the pH of endosomes and believed to prevents viral entry, transport, and post-entry events	Hydroxychloroquine 400 mg orally per day for 7–10 days. Hydroxychloroquine: @\$ Loading dose: 400 mg BID day 1, then Maintenance dose: 200 mg BID for 5–10 days. C. Monitor and watch for side effects	Central Clinical Task Force, Korea Indian Council of Medical Research
Remdesivir	Inhibits viral application	Remdesivir for 10 days plus chloroquine for 5 day	Clinical guidance for patients with suspected or confirmed COVID-19 in the Netherlands
Oseltamivir	Inhibits viral replication	Oseltamivir 150 mg BID for 5 days.	Centre for Disease Control and Prevention, Atlanta, MICC Version 1 (March 12, 2020)
Lopinavir/Ritonavir	Blocks viral cellular entry	Lopinavir/ritonavir plus Chloroquine 500 mg 2/day or Hydroxychloroquine 200 mg per day for 10 days.	Italian Society of Infectious and Tropical Diseases (Lombardy Section)

of the CoVs is as follows:5'-leader-UTR-replicase-S(Spike)-E (Envelope)-M (Membrane)-N (Nucleocapside)-3'UTRpoly (A) tail. At the 3' end of the genome, there are accessory genes interspersed within the structural genes.^[4] Some of which have been shown to play important roles in viral pathogenesis.^[5] The S protein is responsible for receptor-binding and subsequent viral entry into host cells, the M and E proteins play important roles in viral assembly, and the N protein is necessary for RNA synthesis.^[4,6] They are responsible for one-third of all the cases of common cold. Although patients with symptomatic COVID-19 have been the main source of transmission, recent observations suggest that asymptomatic patients and patients in

their incubation period are also carriers of SARS-CoV-2.^[7,8] CoVs are named for the crown-like spikes on their surface and belong to the family Coronaviridae within the order Nidovirales. CoVs broadly infect vertebrates including humans, birds, bats, snakes, mice, and other wild animals.^[9,10] Since the mid-1960s, seven known human coronaviruses (HCoVs) have been identified.^[11,12] Four commonly detected HCoVs are 229E, OC43, NL63, and HKU1.

Incubation Period

The incubation period of COVID-19 has been estimated at

5–6 days on average, but there is evidence that it could be as long as 14 days.^[13,14] CoVs were first identified in the 1960s. It is not known for how long they have existed. Most of the time they are associated with mild disease, but every few years a highly virulent strain appears. The pathogenesis of these deadly epidemics is unclear

Clinical Feature

The majority of patients experienced fever and dry cough, while some also had shortness of breath, fatigue, and other atypical symptoms, such as muscle pain, confusion, headache, sore throat, diarrhea, and vomiting.^[15,16] Most patients who have died from the virus had other chronic medical conditions, were elderly patients, or were immunocompromised.

Infection Prevention and Control

Standard hygiene

Standard precautions must be followed by all healthcare worker (HCW) s, for all patients and at all times.^[17] This comprises broadly of hand hygiene practices, proper donning, doffing, and disposal of the personal protective equipment (PPE) and maintaining respiratory hygiene and cough etiquettes.^[18] Hand hygiene is recommended with alcohol-based handrubs (ABHR) or soap and water. Printed posters of both the methods should be pasted near all hand hygiene units. Adequate supply of ABHR (60–80% ethanol is recommended) and antiseptic soap solution (chlorhexidine gluconate 2% and alcohol combination) has been seen to be synergistic.^[19] PPE All HCWs involved should have the knowledge of the correct donning and doffing steps, along with appropriate disposal of PPE and be trained in this procedure. Nonpowdered latex-free gloves should be used by all HCWs. Eye protection and face shield should be used.^[20] Respiratory hygiene and cough etiquette must be followed; gowns should be long sleeved and made of nonabsorbable (fluid-resistant) materials. The same gown should not be worn for all patients. In case gowns are not available, waterproof aprons should be used. The WHO recommends the use of medical masks (surgical or procedure masks that may be flat or pleated and are affixed with head straps) and particulate respirators (NIOSH-certified N95, EU standard FFP2 or equivalent) for contact and airborne precautions as well as aerosol-generating procedures, respectively.^[18,21] *Patient transport and stay:* The movement of patients should be minimized within the hospital premises. If such transport is necessary, patients must don either medical masks or particulate respirators, whichever is available. The area to which they are being transported should be alerted about their arrival. A separate corridor should be preferred. In case the patients meet any surfaces, they must be disinfected. Complete inactivation of the virus is seen with 70% ethanol and povidone-iodine with an exposure time of 1 min or 2.5% glutaraldehyde with an exposure time of 5 min. The Central Drugs Standard Control Organization registered disinfectant or 1:100 dilution of household bleach and water will suffice for disinfection of the surface of noncritical patient care equipment.

High-level disinfection and sterilization of semicritical and critical devices, respectively, do not need to be altered for patients with known or suspected COVID-19. When transmission-based precautions are being practiced, the ideal condition is to have single occupancy rooms for every patient. Since that may not be feasible in every scenario, the practice of cohort isolation can be followed with a spatial separation of ≥ 3 feet (or 1 m). There are certain environmental cleaning procedures one needs to keep in mind. Dusting should be avoided; floors should not be carpeted; and rooms should not have upholstery. For environmental cleaning of areas needing airborne precautions, high touch surfaces should be cleaned every day, and as needed, while low touch surfaces can be cleaned on a scheduled basis. Primary focus should remain in adherence to required PPE and additional entry/exit procedures. For undertaking droplet and/or contact precautions, cleaning may be done twice a day, or as needed, for high touch surfaces, with a focus on all surfaces within the patient zone, noncritical patient care equipment, and any surface visibly soiled with blood or body fluids.^[22] Rational use of PPE (Ministry of Health & Family Welfare, MoHFW)^[23]: PPEs are protective gears that are designed to safeguard the health of workers by minimizing the exposure to a biological agent. Components of PPE are protective goggles or face shield, mask, gloves, coverall/gowns (with or without aprons), head cover, and shoe cover. Rationale for the use of each component of PPE as per the MoHFW [Table 1].^[23]

Prevention and Infection Control in Dental Practice

Challenges in dental practice

The typical routes of transmission of novel CoV include direct transmission (transmission of cough, sneeze, and droplet inhalation) and contact transmission (communication with oral, nasal, and eye mucous membranes.^[24] In addition, studies have shown that respiratory viruses can be transmitted from person to person through direct or indirect contact, or through coarse or small droplets, and 2019-nCoV can also be transmitted directly or indirectly through saliva.^[25] Dental patients and professionals can be exposed to pathogenic microorganisms, including viruses and bacteria that infect the oral cavity and respiratory tract. Dental care settings invariably carry the risk of 2019-nCoV infection due to the specificity of its procedures, which involves face-to-face communication with patients, frequent exposure to saliva, blood, other body fluids, and the handling of sharp instruments.

The pathogenic microorganisms can be transmitted in dental settings by inhaling airborne microorganisms, which can remain suspended in the air for long periods of time.^[26]

The high-speed dental handpiece without antiretraction valves may aspirate and expel the debris and fluids during the dental procedures. More importantly, the microbes, including bacteria and virus, may further contaminate the air and water tubes within the dental unit, and thus can potentially cause cross-infection.

Subgingival scaling for treating periodontally compromised teeth with the aid of ultrasonic scalers will produce aerosols containing blood.^[27] A recent study proved that the ultrasonic scalers and tips produced significantly more aerosol compared to a handheld curette, regardless of the scaler type employed.^[28]

Challenge for a radiologist

Orthopantomographs or oblique lateral views may be considered instead of intraoral radiographs for screening, whereas oral mucosa in very sensitive patients may be anesthetized before taking impressions. Digital radiography is difficult to practice dentistry without intraoral radiographs. However, instead of full mouth series, a panoramic radiograph could be done in spite of the poorer resolution and minimize the exposures, use of proper barrier as well disinfection for the image receptor holder and the sensor is a must.^[29] Sedation may also be considered to control gag reflex.

Challenge for conservative and endodontic

The use of rubber dams can significantly minimize the production of saliva- and blood-contaminated aerosol or spatter, particularly in cases when high-speed handpieces and dental ultrasonic devices are used. It has been reported that the use of rubber dam could significantly reduce airborne particles in ~3-foot diameter of the operational field by 70%.^[30] When rubber dam is applied, extra high-volume suction for aerosol and spatter should be used during the procedures along with regular suction.^[31] This is an effective way to reduce aerosol contamination.

Challenge for oral surgery

Dental extraction, minor surgical procedures like biopsy, disimpaction surgeries, etc., to be performed with aseptic and atraumatic technique using manual instrument rather than motorized ones.^[32]

Challenge for an oral medicine specialist

Oral cancer screening/OPMDs: Vital staining of suspicious lesions, LASER ablation of white lesions, intralesional injections, punch biopsies, and lymph node FNAC can also be performed using disposable kits, punch biopsy forceps, syringes, etc., under protective gear.^[33]

Medical waste management

All disposable protective wear as well as the medical wastes like blood/fluids have to be packed into double-layer yellow colored medical waste bags, with “goose-neck” ligation should be used and disposed of and labeled as “COVID -19 Waste.”

There is no doubt of the gravity of the horrendous situation arising from the COVID-19 pandemic worldwide, post-pone elective nonessential procedures are implicated; however, as oral physicians, we still can perform our social and moral responsibility toward our needy patients in these tough times thwarting the newer challenges we face.^[34]

Prevention and Treatment

There is no clear, unified, and effective treatment plan for COVID-19. Suspected and confirmed cases should be isolated and treated in designated hospitals with effective isolation and protective conditions as soon as possible. Suspected cases should be isolated in a single room. WHO suggests that patients with mild symptoms and without underlying chronic diseases (such as lung or heart disease, renal failure, or immunodeficiency) may be cared for in the home environment in isolation.^[35] The various strategies for the prevention of transmission and infection of this respiratory pathogen are shown in the following sections.^[36]

Nonpharmacological interventions/precautionary measures

- Isolation at home
- Voluntary quarantine at home
- Social distancing of at least 2 m or 6 feet
- Temporary closure of schools, universities, and work places

Pharmacological interventions

Specific protection through chemoprophylaxis or immunoprophylaxis includes [Table 2].^[37]

- Antiviral agents
- Chloroquine-HydroxyChloroquine
- Vaccination

Nonpharmacological interventions

Due to the characteristics of dental settings, the risk of cross infection can be very high between patients and dental practitioners. For dental practices and hospitals in areas that are (potentially) affected with COVID-19, strict and effective infection control protocols are urgently needed.^[27] Various practical strategies that can be implemented to block virus transmission during dental diagnosis and treatment includes practicing hand hygiene for at least 20 s with warm water and soap and 60–80% isopropyl alcohol or ethanol, use of PPE for the dental professionals, mouth rinse before dental procedures, rubber dam isolation, antiretraction hand piece, disinfection of the clinic settings, and proper management of medical waste.^[38]

Definitive medical countermeasures are not expected to roll in the market for general public utilization for at least 1–2 years. Hence, till then, the nonpharmacological measures hold the prime importance to prevent further waves of COVID-19.^[39]

Pharmacological interventions

However, severe cases should be hospitalized, and critical cases should be admitted to the ICU as soon as possible. At present, there is no evidence-based medicine to support the effectiveness of antiviral drugs for COVID-19. The previous experience of treating SARS-CoV, MERS-CoV, or influenza infections guides the selection of antiviral agents for COVID-19. The current guideline of the NHC recommends IFN- α , lopinavir/ritonavir,

and ribavirin as antiviral therapy. In Huang's study^[40] 38 of 41 patients were given antiviral therapy. The Jinyintan hospital has launched a randomized, controlled trial of the anti-HIV drug combination of lopinavir and ritonavir. In Chen's study,^[7] 75 patients received antiviral treatment, including oseltamivir, ganciclovir, and lopinavir/ritonavir, and the duration of antiviral treatment was 3–14 days. Arbidol combine with LPV/r might benefit to delay of the progression of lung lesions and lower the possibility of respiratory and gastrointestinal transmission for decreasing the viral load of COVID-19 and containing a high fecal concentration.^[41] Chloroquine phosphate, an old drug for treatment of malaria, is shown to have apparent efficacy and acceptable safety against COVID-19-associated pneumonia in multicenter clinical trials conducted in China. In light of the urgent clinical demand, chloroquine phosphate is recommended to treat COVID-19-associated pneumonia in larger populations in future.^[42] Favilavir, formerly known as Fapilavir, was the first antinovel CoV drug that has been approved for marketing by the National Medical Products Administration since the outbreak. The drug was developed by Zhejiang Hisun Pharmaceutical Company and is expected to play an important role in preventing and treating the epidemic.^[43] In conclusion, our results show that HCQ (Hydroxychloroquine) can efficiently inhibit SARS-CoV-2 infection in vitro. In combination with its anti-inflammatory function, we predict that the drug has a good potential to combat the disease. This possibility awaits confirmation by clinical trials. We need to point out, although Hydroxychloroquine is less toxic than CQ (Choroquine), prolonged and overdose usage can still cause poisoning. Also, the relatively low SI of HCQ requires careful designing and conducting of clinical trials to achieve efficient and safe control of the SARS-CoV-2.^[44]

Vaccines

There is a considerable global investment and effort toward the development of a vaccine. Various clinical trials are going on around the world, and we hope that the results of the ongoing trials give us more insight on prophylaxis and help in better prevention and thus decreasing the transmission of this widely spreading disease.^[45]

Importance of Family Physician in COVID-19

Family physicians have always been the backbone of health care workers and those who are clinically practicing. Family physicians are those who own a professional responsibility to provide comprehensive health care service and hold a broad array of capabilities. COVID-19 pandemic poses a great challenge within the primary care and mandates family physicians to be abreast of the newest updates, preventive measures, latest epidemiological trends, and available treatment modalities to guide their patients and to clarify the immediate concerns of other care givers.^[46,47] Family physician can do side by side minor surgery, lockdown guidance and misinformation related to COVID-19, and solve stigma problem to novel CoV. Nowadays, through various telecom services like Skype, zoom, Facebook, etc., it is possible for the family physicians to engage with the patients

via telemedicine for both COVID and nonCOVID-related issues. Concerning symptoms like high-grade fever, shortness of breath and cough can be easily discussed over a phone or a video call and patient can be guided directly to a COVID19 testing center thereby avoiding unwarranted personal visits to doctors office; patient has or her not stand for long period of time not waste their time and getting proper treatment and for telemedicine concept was introduced.^[47] Tele consultation through teledentistry can take place in either of the following ways—"Real-Time Consultation" and "Store-and Forward Method." Real-time consultation involves a video conference in which dental professionals and their patients, at different locations, may see, hear, and communicate with one another.^[48]

Summary and Conclusion

The microbe that felled one child in a distant continent can reach yours today and seed a global pandemic tomorrow. It has once again proved its relevance with the emergence of CoV disease 2019 (COVID-19) as the latest pandemic that is affecting human health and economy across the world. So, it is very necessary to maintain social distancing, mental distancing. One of the important work of family medicine they should practice with pride and family doctors should come as a frontliner. It is essential to strengthen biomedical research, improve healthcare delivery system, establish a permanent "watch-dog" body and create an improved communication and coordination mechanism for the diverse agencies responsible for mitigating the broader adverse consequences of pandemics. This will require not only national efforts but a coordinated global response through international agencies and development partners.

Ethical approval

This research did not need any informed consent because we did library research. References and quotations were written based on the journal guideline.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Meng L, Hua F, Bian Z. Coronavirus Disease 2019 (COVID-19): Emerging and future challenges for dental and oral medicine. *J Dent Res* 2020;99:481-7.
2. Assiri A, Al-Tawfiq JA, Al-Rabeeh AA, Al-Rabiah FA, Al-Hajjar S, Al-Barrak A, *et al.* epidemiological, demographic, and clinical characteristics of 47 cases of Middle East respiratory syndrome coronavirus disease from Saudi Arabia: A descriptive study. *Lancet Infect Dis* 2013;13:752-61.
3. Weiss SR, Navas-Martin S, Coronavirus pathogenesis and the emerging pathogen severe acute respiratory syndrome coronavirus. *Microbiol Mol Biol Rev* 2005;69:635-64.

4. Fehr AR, Perlman S. Coronaviruses: An overview of their replication and pathogenesis. *Methods Mol Biol* 2015;1282:1-23.
5. Zhao L, Jha BK, Wu A, Elliott R, Ziebuhr J, Gorbalenya AE, *et al.* Antagonism of the interferon-induced OAS-RNase L pathway by murine coronavirus ns2 protein is required for virus replication and liver pathology. *Cell Host Microbe* 2012;11:607-16.
6. Song Z, Xu Y, Bao L, Zhang L, Yu P, Qu Y, *et al.* From SARS to MERS, thrusting corona viruses into the spotlight. *Viruses* 2019;11:59.
7. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, *et al.* Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. *Lancet* 2020;395:507-13.
8. Rothe C, Schunk M, Sothmann P, Bretzel G, Froeschl G, Wallrauch C, *et al.* Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. *N Engl J Med* 2020;382:970-1.
9. Weiss SR, Leibowitz JL. Coronavirus pathogenesis. *Adv Virus Res* 2011;81:85-164.
10. Balasuriya UBR, Barratt-Boyes S, Beer M, Bird B, Brownlie J, Coffey LL, *et al.* List of Contributors, Editor(s): N. James MacLachlan, Edward J. Dubovi, Fenner's Veterinary Virology (Fifth Edition), Academic Press, 2017, Pages xvii-xviii, ISBN 9780128009468, <https://doi.org/10.1016/B978-0-12-800946-8.00040-4>.
11. Su S, Wong G, Shi W, Liu J, Lai ACK, Zhou J, *et al.* Epidemiology, genetic recombination, and pathogenesis of coronaviruses. *Trends Microbiol* 2016;24:490-502.
12. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, *et al.* A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med* 2020;382:727-33.
13. Rodríguez-Morales AJ, MacGregor K, Kanagarajah S, Patel D, Schlagenhauf P. Going global-Travel and the 2019 novel coronavirus. *Travel Med Infect Dis* 2020;33:101578. doi: 10.1016/j.tmaid. 2020.101578.
14. Backer JA, Klinkenberg D, Wallinga J. Incubation period of 2019 novel coronavirus (2019-nCoV) infections among travellers from Wuhan, China, 20-28 January 2020. *Euro Surveill* 2020;25:2000062. doi: 10.2807/1560-7917.Es.2020.25.5.2000062.
15. Guan W-J, Ni Z-Y, Hu Y, Liang W-H, Ou C-Q, He J-X, *et al.* Clinical characteristics of 2019 novel coronavirus infection in China. medRxiv 2020. doi: 10.1101/2020.1102.1106.20020974.
16. Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, *et al.* Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: A retrospective review of medical records. *Lancet* 2020;395:809-15.
17. Juneja D, Nasa P, Singh O. Physician staffing pattern in intensive care units: Have we cracked the code? *World J Crit Care Med* 2012;1:10-4.
18. World Health Organization. Infection Prevention and Control of Epidemic and Pandemic Prone Acute Respiratory Diseases in Health Care WHO/CDS/EPR/2007.6. Geneva: WHO; 2007.
19. Centers for Disease Control and Prevention. Guideline for hand hygiene in health-care settings: Recommendations of the healthcare infection control practices advisory committee and the HICPAC/SHEA/APIC/IDSA hand hygiene task force. In: Gerberding JL, Fleming D, Snider DE Jr., editors. *Morbidity and Mortality Weekly Report*. 1st ed.. Atlanta: CDC; 2002. p. 3-56.
20. Lu CW, Liu XF, Jia ZF. 2019-nCoV transmission through the ocular surface must not be ignored. *Lancet* 2020;395:e39.
21. World Health Organization. Home Care for Patients with Suspected Novel Coronavirus (nCoV) Infection Presenting with Mild Symptoms and Management of Contacts. Geneva: WHO; 2020.
22. Centers for Disease Control and Prevention. Best Practices for Environmental Cleaning in Healthcare Facilities in Resource-Limited Settings. 1st ed.. Atlanta, GA: US Department of Health and Human Services, CDC; Cape Town, South Africa: Infection Control Africa Network; 2019.
23. Harrel SK, Molinari J. Aerosols and splatter in dentistry: A brief review of the literature and infection control implications. *J Am Dent Assoc* 2004;135:429-37.
24. Lu C-W, Liu X-F, Jia Z-F. 2019-nCoV transmission through the ocular surface must not be ignored. *Lancet* 2020;395:e39.
25. Belser JA, Rota PA, Tumpey TM. Ocular tropism of respiratory viruses. *Microbiol Mol Biol Rev* 2013;77:144-56.
26. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *J Hosp Infect* 2020;104:246-51.
27. Barnes JB, Harrel SK, Rivera-Hidalgo F. Blood contamination of the aerosols produced by *in vivo* use of ultrasonic scalers. *J Periodontol* 1998;69:434-8.
28. Harrel SK, Barnes JB, Rivera-Hidalgo F. Aerosol and splatter contamination from the operative site during ultrasonic scaling. *J Am Dent Assoc* 1998;129:1241-9.
29. Vandenberghe B, Jacobs R, Bosmans H. Modern dental imaging: A review of the current technology and clinical applications in dental practice. *Eur Radiol* 2010;20:2637-55.
30. Samaranayake LP, Reid J, Evans D. The efficacy of rubber dam isolation in reducing atmospheric bacterial contamination. *ASDC J Dent Child* 1989;56:442-4.
31. Samaranayake LP, Peiris M. Severe acute respiratory syndrome and dentistry: A retrospective view. *J Am Dent Assoc* 2004;135:1292-302.
32. Malmgren B, Andreassen JO, Flores MT, Robertson A, DiAngelis AJ, Andersson L, *et al.*; International Association of Dental Traumatology. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 3. Injuries in the primary dentition. *Dent Traumatol* 2012;28:174-82.
33. Vardavas CI, Nikitara K. COVID 19 and smoking: A systematic review of evidence. *Tob Induc Dis* 2020;18:20.
34. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. *Int J Oral Sci* 2020;12:9.
35. World Health Organization. Home care for patients with suspected novel coronavirus (nCoV) infection presenting with mild symptoms and management of contacts: interim Guidance (in Chinese). 2020. Available from: [https://www.who.int/publications-detail/homecarefor-patients-with-suspected-novel-coronavirus-\(ncov\)-infection-presenting-with-mild-symptoms-and-management-of-contacts](https://www.who.int/publications-detail/homecarefor-patients-with-suspected-novel-coronavirus-(ncov)-infection-presenting-with-mild-symptoms-and-management-of-contacts).
36. Oriol M, Clotet B. Use of antiviral drugs to reduce COVID-19 transmission. *Lancet Global Health* 2020;8:e639-40.
37. Singh AK, Singh A, Shaikh A, Singh R, Misra A. Chloroquine and hydroxychloroquine in the treatment of COVID-19 with or without diabetes: A systematic search and a narrative

- review with a special reference to India and other developing countries. *Diabetes Metab Syndr* 2020;14:241-6.
38. "COVID-19 Waste" Label Must On Coronavirus Related Biomedical Waste. Available from: <https://www.ndtv.com/india-news/covid-19-waste-label-must-on-coronavirus-related-biomedical-waste-2205757>.
 39. Sahu KK, Kumar R. Preventive and treatment strategies of COVID-19: From community to clinical trials. *J Family Med Prim Care* 2020;9:2149-57.
 40. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, *et al*. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395:497-506.
 41. Deng L, Li C, Zeng Q, Liu X, Li X, Zhang H, *et al*. Arbidol combined with LPV/r versus LPV/r alone against Corona Virus Disease 2019: A retrospective cohort study. *J Infect* 2020;81:e1-5.
 42. Gao J, Tian Z, Yang X. Breakthrough: Chloroquine phosphate has shown apparent efficacy in treatment of COVID-19 associated pneumonia in clinical studies. *Biosci trends* 2020;14:72-3.
 43. C. Daily, First antiviral drug approved to fight coronavirus. [Feb. 17, 2020]. 2020. Available from: <http://global.chinadaily.com.cn/a/202002/17/WS5e49efc2a310128217277fa3.html>.
 44. Liu J, Cao R, Xu M, Wang X, Zhang H, Hu H, *et al*. Hydroxychloroquine, a less toxic derivative of chloroquine, is effective in inhibiting SARS-CoV-2 infection in vitro. *Cell Discov* 2020;6:16.
 45. Agrawal S, Goel AD, Gupta N. Emerging prophylaxis strategies against COVID-19. *Monaldi Arch Chest Dis* 2020;90. doi: 10.4081/monaldi. 2020.1289.
 46. de Sutter A, Llor C, Maier M, Mallen C, Tatsioni A, van Weert H, *et al*. Family medicine in times of 'COVID-19': A generalists' voice. *Eur J Gen Pract* 2020;26:58-60.
 47. Sahu KK, Mishra AK, Martin K, Chastain I. COVID-19 and clinical mimics. Correct diagnosis is the key to appropriate therapy. *Monaldi Arch Chest Dis* 2020;90.
 48. Clark GT. Teledentistry: What is it now, and what will it be tomorrow? *J Calif Dent Assoc* 2000;28:121-7.