Critical Review
Community Dental Health

COVID-19: a new turning point for dental practice

Flávio Freitas MATTOS[a]
Isabela Almeida PORDEUS[b]

[a]Universidade Federal de Minas Gerais – UFMG, Dental School, Department of Social and Preventive Dentistry, Belo Horizonte, MG, Brazil.

[b]Universidade Federal de Minas Gerais – UFMG, Dental School, Department of Paediatric Dentistry, Belo Horizonte, MG, Brazil.

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Corresponding Author:
Flávio Freitas Mattos
E-mail: f.f.mattos@uol.com.br

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Abstract: Recent new zoonotic respiratory viruses have infected humans and led to severe acute respiratory syndrome: severe acute respiratory syndrome coronavirus (SARS-CoV), influenza A H5N1, influenza A H1N1 and Middle East respiratory syndrome coronavirus (MERS-CoV). The first SARS-CoV outbreak took place in 2003, in Guangdong, China. A decade later, another pathogenic coronavirus, MERS-CoV caused an endemic in Middle Eastern countries. The latest pandemic coronavirus infectious disease (COVID-19) has been related to the newly isolated severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). For the first time since the acquired immunodeficiency syndrome (AIDS) in the 1980s. Dentistry is facing a new turning point. This critical review aims to discuss the impact of COVID-19 infection on oral health care. In dental practice COVID-19 patients are the main source of infection and symptomatic patients are more contagious. Dentists can be first line of diagnosis of the disease, as they work in close contact with patients and are at the risk of being affected by COVID-19 and all respiratory infections. Several guidelines for dental practice environments have been published by dental associations and regulatory boards. It is already evident that biological, psychological and social effects of the COVID-19 pandemic have present and future impacts on dental practice. Dental schools, regulatory boards, scientific associations, government authorities, and public and private health care services must join efforts to design enduring answers for severe and long-standing viral challenges.

Keywords: COVID-19; Dentistry; Oral Health; Coronavirus; Health Services.

Introduction

Efforts towards global strategies to fight pandemics are of growing relevance since the frequency with which new pathogens and diseases emerge is increasing. Among these new health threats there are zoonotic pathogens which have caused new human diseases and generated pandemics over the past 100 years. Recent new pandemics have strong correlation with human density and the distribution of wildlife biodiversity and global disease emergencies are linked to human practices in highly biodiverse regions of the world.[1,2]

New respiratory viruses of wildlife origin have caused diseases in humans and lead to severe acute respiratory syndrome: severe acute respiratory syndrome coronavirus (SARS-CoV), influenza A H5N1, influenza A H1N1 and Middle East respiratory syndrome coronavirus (MERS-CoV). They can cause acute lung injury, acute respiratory distress syndrome, and pulmonary failure. The first outbreak of SARS caused by a coronavirus (SARS-Cov) took place in 2003, in Guangdong, China. A decade later, another pathogenic coronavirus, the Middle East respiratory syndrome (MERS-CoV) caused an endemic in Middle Eastern countries.[3,4] On December 2019, there was an outbreak of pneumonia in Wuhan, Hubei province, China. The new pneumonia has been related to a newly isolated severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). In a fast-global dissemination, on May 27th, 2020, SARS-CoV-2 and the disease it causes, COVID-19 was already diagnosed in 5,488,825 people and caused 349,095 deaths.[5,6] This critical review aims to discuss the impact of community dissemination of COVID-19 infection on oral health care, approaching it as a new turning point.

Transformative effects of pandemics on the history of health care

The 1918 influenza pandemic was the deadliest event in human history and caused 50 million or more deaths and, for just over a century, all other pandemics and disease emergences have been measured by comparison to 1918 events. Like 1918 pandemic influenza, Covid-19 is associated with respiratory spread, an undetermined percentage of infected people with asymptomatic cases transmit infection to others, and there is high fatality rate.[7]

Pandemics have had devastating and transformative effects on society, economy, and health systems. The human immunodeficiency virus (HIV) is an example of a zoonotic virus which emerged from primates. It spread across Africa by truck routes and sexual practices and the acquired immunodeficiency syndrome (AIDS) became a persistent pandemic.[7] First diagnosed in 1981 and initially restricted to minority groups, AIDS has become one of the biggest world health challenges. The AIDS pandemic revolutionized health care protocols, instituting new protective measures.[8,9,10]

Dentists used to treat patients without gloves, masks or eye protection faced a new scenario. In 1985, The New York Times published an article stating that masks would hinder the dentist-patient relationship.[11] In 1990, the American Dental Association appealed to the courts against the mandatory use of protective equipment, claiming that no professional had contracted the disease. Nowadays, after all accumulated knowledge since AIDS, resistance to the use of protective equipment in dental care seems impossible. Like AIDS did in the 1980s, now COVID-19 raises the awareness of dental aerosols and pushes dentists to review safety standards and to innovate ways to safely deliver care for patients.[11,12]

The control and the end of a pandemic is diffuse and not mainly determined by medical and health considerations. The social pressure of people wanting to return to normal life is determinant. Population becomes inpatient and gradually returns to their regular life, despite the health risks and the number of deaths. Health authorities and governments must reduce the transmission of infection while there is social collaboration. The world will have to deal with COVID-19 pandemic while an effective treatment or vaccine is not available. New developments are necessary and already emerging. They will be tested, improved, and adapted.[13]

Cross infection risk in dental settings

SARS-CoV-2 is a new virus to which the human population has no immunity and the threat it poses is in the fast rate.[13] Initially, knowledge of human to human transmission of SARS-CoV-2 was based on experience from the previous two epidemics caused by coronaviruses (SARS-CoV and MERS-CoV). Now it is known that COVID-19 patients are the main source of infection. The virus is primarily transmitted from an infected person via respiratory droplets or aerosols after coughing, sneezing

(within 1 metre) or close personal contact resulting in the inoculation of mouth, nose or conjunctivae. Transmission may also occur through fomites by contact with surfaces in the immediate environment or with objects used on or by infected people. Four categories of transmission routes have been proposed: (a) symptomatic transmission (direct transmission through contact with a symptomatic individual); (b) presymptomatic transmission (direct transmission through contact with an infected individual before he/she experiences symptoms); (c) asymptomatic transmission (direct transmission from an individual who never experiences noticeable symptoms); (d) environmental transmission (transmission through environmental contamination, not by close contact with other people). There is current evidence that most transmission occurs from symptomatic people to others not wearing personal protective equipment (PPE) and in close contact.[14,15,16,17]

Incubation period varies from 0 to 14 days in human to human transmission, and median incubation period is 5-6 days. A much longer incubation period up to 24 days has been reported in one study in China. Additionally, samples taken from patients recovered from COVID-19 continuously show a positive RT-PCR test, which has never been seen in the history of human infectious diseases. Patients asymptomatically infected or in incubation of COVID-19 may pose serious challenges for disease prevention and control.[18,19,20]

SARS-CoV-2 RNA has been detected in the self-collected saliva of most of 12 infected patients from Hong Kong. Although extrapulmonary detection of viral RNA does not necessarily mean an infectious virus, positive viral cultures of some samples collected from the 12 patients indicated that saliva contained live viruses. Thus, saliva could emit virus even during normal breathing of asymptomatic patients.[21,22] Transmission should be of real concern in dental clinics, environments where it is hard to avoid the generation of large amounts of aerosol and droplets mixing patient's saliva and blood during dental practice.[23]

Surface viability of SARS-CoV-2 and surface disinfection is of great relevance for oral health care. The virus has been described as viable in aerosols (up to 3 hours), on plastic surfaces (up to 72 hours), on stainless steel surfaces (up to 48 hours), on copper (up to 4 hours), and cardboard (up to 24 hours).[24] Various types of biocidal agents are used worldwide for surface disinfection of coronaviruses. Sodium hypochlorite (0.1%) and 62-71% ethanol significantly reduce coronavirus infectivity on surfaces within 1 min exposure time.[25]

Mental health risk for health workers

It is already evident that the effects of the COVID-19 pandemic include mental health implications. Research priorities are required to monitor and report rates of mental health issues and to develop better understanding and new interventions to be adopted across the general population and vulnerable groups, such as health workers. China, the country where the pandemic started, has seen significant impacts on health professionals and health services. The suspension of non-emergency dental treatment may bring negative consequences on patients' oral health and treatment needs.[26,27] USA dental schools are dealing with increased anxiety in students, faculty, and patients, who must adjust to new teaching methods while fearful for their safety and health .[28]

While it is too early to thoroughly evaluate the psychological impacts of COVID-19, previous experience from the 2003 SARS outbreak can be a predictor. High levels of perceived stress among health professionals have been reported, even in nursing students, despite their reported confidence in infection control procedures.[29] Experience shows that health care services and systems should care about workers' mental health. Post-traumatic stress disorders symptoms among health professionals have been positively associated with levels of fear. Individuals with greater family responsibilities may have increased levels of fear and worry related to an infectious disease.[30]

A highly contagious disease may generate post-traumatic stress disorder symptoms resembling those caused by extreme stress situations such as terrorist attacks. What heavily impacts mental health is the

fact that the risk of contagion does not have a definite moment of occurrence. The source of post-traumatic response is not only rooted in the contagion but also in its prevention and chronic stress produced might extend for up to 12 months after situation resolution.[31,32] Patients and professionals with common flu symptoms may develop stress, fear, mental distress, and worsen psychiatric symptoms. Even though most COVID-19 cases are asymptomatic or mild, psychiatric implications can be significantly high.[33]

Oral health professionals have been reported to be at greater risk of COVID-19 infection, based on three physical job attributes from the United Sates Department of Labor (daily physical proximity, daily exposure to disease and infections, and daily contact with others).[34] The lack of full knowledge of a highly transmissible respiratory disease, its inadequate testing, limited treatment options, insufficient PPE and medical supplies are sources of stress and may overwhelm health systems. During and after the pandemic, emergency and nonemergency dental patients will be treated in oral health care settings by professionals with little or no mental health training. Covid-19 mental health consequences on health workers should be addressed at organizational level through official public and local planning. Assessment and intervention for psychosocial concerns are necessary in working environments and should include mechanisms for their identification, referral, and treatment.[35,36]

Dealing with COVID-19 pandemic in oral health services

Pharmacological and non-pharmacological interventions can be adopted to deal with the new pandemic. At least three types of non-pharmacological interventions have been used at population level to deal with its first wave: (a) increased alertness and hygiene; (b) identification and isolation of infected people; (c) lockdown. Dentists can be first line of diagnosis of the disease, as they work in close contact with patients and cross infection control measures are essential to avoid the spread of respiratory diseases. Due to the nature of dental procedures and the large number of droplets and aerosols which could be generated, today's standard protective measures in daily dental clinical work are not effective enough to prevent the spread of COVID-19.[13,37]

Several guidelines for dental practice environments have been published by dental associations and regulatory boards. They have recommended the suspension of non-emergency dental treatment while providing emergency dental services only. Ideally, dental procedures which can generate aerosols should be performed in negative pressure environments or with the use of High Efficiency Particulate Arrestance (HEPA) Filters. A synthesis of recently published recommendations for emergency oral health care is listed in Figure.[38,39,40,41,42,43,44]

After COVID-19 pandemic, the School and Hospital of Stomatology, Wuhan University, China has destined specific building floors for the provision of emergency dental care and rooms are separated into colors according to risk of contagion. Yellow rooms are used for triage and as waiting areas. Orange rooms are single chair clinics where asymptomatic patients are treated with reduced production of droplets and aerosols. Red rooms are single chair isolation facilities where COVID-19 suspected, confirmed or recovered patients (until one month after hospitalization) are treated. In red rooms droplets and aerosols can be produced. Separate entrances for red rooms are provided for patients and staff and the entire isolation area is immediately disinfected after each patient.[37] Other countries are also taking precautions. In the United Kingdom, the National Health Service is establishing local dental urgent care systems where dental offices will receive suspected or confirmed COVID-19 patients, with specific PPE.[44] USA dental schools have postponed direct patient care.[28]

Ideally, dental treatment should be provided in individual patient rooms whenever possible but specific guidelines for collective dental practices have been published. To prevent the spread of pathogens, dental facilities with open floor plans should adopt easy-to-clean floor-to-ceiling barriers between chairs. They enhance portable HEPA air filtration systems. Rooms must measure at least 97 ft^2 and dental chairs should be 6ft apart.[40,43]

A new professional-patient relationship arises, and dental settings should balance the need to

Environmental Measures	Treatment and Professional Measures	Patient Measures
Manage the operating area as potentially affected by infectious and highly contagious diseases. Use clinical waste containers without manual contact.	Reinforce hand hygiene.	Identify potentially infected patients through telephone or teledentistry before they reach the practice. Ensure patients` temperature is 100.4°F or 38.0°C maximum before treatment.
Consider all surfaces in the waiting room at risk	Operating staff should wear N95 or FFP2 masks. Administrative staff should wear surgical masks and be protected by physical barriers. Ensure cleaning staff wears appropriate PPE.	Make alcoholic disinfectant and masks available to patients in the waiting room and stimulate its use. Reinforce respiratory etiquette.
There should be no more than one patient in the waiting room. When the presence of more than one person is necessary, the waiting room should present at least 13 ft^2 per person who should stay 6 ft apart.	Wear disposable gloves.	Use antimicrobial mouthrinses prior to treatment (1% hydrogen peroxide solution or 0.2% depovidone solution).
Consider all surfaces, chairs, and doors as potentially infected. Extra items such as magazines and toys must be removed.	Wear full face shields or goggles.	Schedule a COVID-19 infected or suspected person as the last patient of the day.
Frequently sanitize the air conditioning system. Aerosol producing procedures must be conducted with closed doors.	Wear disposable impermeable long sleeve overshirts tightened at the wrists.	Ask patients to preferably attend dental appointments unaccompanied.
Provide adequate periodic air exchange.	Wear disposable surgical caps.	---
Reinforce the regular application of appropriate disinfectants on work surfaces, supplies and equipment located within 6ft of patient at the end of treatment.	Wear disposable shoe covers.	---
Have work surfaces empty and protected by protective film.	Use high-volume saliva ejectors.	----
Cover any information technology equipment with protective film.	Minimize aerosol generation and use dental dam for aerosol-generating procedures.	---
Clean and disinfect the environment 15 minutes after a patient without suspected or confirmed COVID-19 has left.	Provide close health status monitoring for oral health care, cleaning and administrative staff.	---
Wait enough time for air changes to remove potentially infectious particles when a known COVID-19 patient leaves the dental setting before cleaning and disinfecting.	---	---
Consider the use of a portable HEPA air filtration unit while patient is actively undergoing, and immediately following, an aerosol-generating procedure.	---	--
Adopt safe standard procedures for cleaning, packing and sterilizing dental instruments.	---	---

Figure 1. Oral health care measures commonly recommended after COVID-19.

provide services while minimizing risk to patients and dental healthcare personnel. Regardless of the degree of community spread, dentists must screen all people who enter the dental setting for symptoms of COVID-19. Dental treatment should be provided after considering both the risk of delaying care and the risk to professionals of healthcare-associated disease transmission. Health professionals must adopt new tools such as remote treatment via chat, video conversation, and teledentistry.[40]

During social distancing times dental professionals are limited to delivering emergency treatment. When routine oral health care is reestablished services will have to deal with new costs, particularly those related to health and safety issues. It urges dental associations and regulatory boards to raise discussions and to

advocate long-term social security strategies and financial education.[45] Public oral health services are facing particularly challenging times. Changes in clinical routines, refurbishment of dental settings and expenditure with PPE will raise services costs. At the same time, the association of populations with untreated needs, job losses, and lower income will increase demand on public health systems and call for innovative public policies.

Conclusions

Looking back in time it is noticeable that today's pandemic is the most recent severe respiratory viral disease of zoonotic origin to strike the world. The first 2003 SARS-CoV outbreak mostly affected China. A decade later, another coronavirus disease, MERS-CoV, became endemic in Middle Eastern countries. Since December 2019, COVID-19 has left China and crossed all international borders. In few months, oral health care services have been challenged and provided emergency changes for emergency times. Beyond that, for the first time since the 1980s, dentistry is facing a new turning point. Dental schools, regulatory boards, scientific associations, government authorities, and public and private health care services must join efforts to design enduring answers for severe long-standing viral challenges.

References

1. Morse SS, Mazet JA, Woolhouse M, Parrish CR, Carroll D, Karesh WB, et al. Prediction and prevention of the next pandemic zoonosis. Lancet. 2012 Dec;380(9857):1956-65. https://doi.org/10.1016/S0140-6736(12)61684-5
2. Kessler R, Peterson H. Global disease hotspots 2.0. New York: EcoHealth Aliance; 2020 [cited 2020 Apr. 9]. Available from: https://www.ecohealthalliance.org/2017/10/global-disease-hotspots-2-0
3. Zhong NS, Zheng BJ, Li YM, Poon LL, Xie ZH, Chan KH, et al. Epidemiology and cause of severe acute respiratory syndrome (SARS) in Guangdong, People's Republic of China, in February, 2003. Lancet. 2003 Oct;362(9393):1353-8. https://doi.org/10.1016/S0140-6736(03)14630-2
4. Wang N, Shi X, Jiang L, Zhang S, Wang D, Tong P, et al. Structure of MERS-CoV spike receptor-binding domain complexed with human receptor DPP4. Cell Res. 2013 Aug;23(8):986-93. https://doi.org/10.1038/cr.2013.92
5. World Health Organization – WHO. Coronavirus disease 2019 (COVID-19): situation report – 79. Geneva: World Health Organization; 2020 [cited 2020 May 28]. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200408-sitrep-79-covid-19.pdf?sfvrsn=4796b143_2
6. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. Lancet. 2020 Feb;395(10223):470-3. https://doi.org/10.1016/S0140-6736(20)30185-9
7. Morens DM, Daszak P, Taubenberger JK. Escaping Pandora's box: another novel Coronavirus. N Engl J Med. 2020 Apr;382(14):1293-5. https://doi.org/10.1056/NEJMp2002106
8. O'Brien SJ, Goedert JJ. HIV causes AIDS: koch's postulates fulfilled. Curr Opin Immunol. 1996 Oct;8(5):613-8. https://doi.org/10.1016/S0952-7915(96)80075-6
9. Greene WC. A history of AIDS: looking back to see ahead. Eur J Immunol. 2007 Nov;37(S1 Suppl 1):S94-102. https://doi.org/10.1002/eji.200737441
10. Halepas S, Ferneini, EM. A pinch of prevention is worth a pound of cure: proactive dentistry in the wake of COVID-19. J Oral and Maxillofa Surg. 2020 Jun;78(6):860-1. https://doi.org/10.1016/j.joms.2020.03.036
11. Goldstein AR. High emotions in the dentist's chair. The New York Times. 1985 May 26 [cited 2020 Apr 26]. Available from: https://www.nytimes.com/1985/05/26/opinion/high-emotions-in-the-dentist-s-chair.html
12. Saeed SG, Bain J, Khoo E, Siqueira WL. COVID-19: finding silver linings for dental education. J Dent Educ. 2020 Jun; 10.1002/jdd.12234. https://doi.org/10.1002/jdd.12234
13. Nadanovsky P, Santos AP. Strategies to deal with the COVID-19 pandemic. Braz Oral Res. 2020;34:e068. https://doi.org/10.1590/1807-3107bor-2020.vol34.0068
14. Ferretti L, Wymant C, Kendall M, Zhao L, Nurtay A, Abeler-Dörner L, et al. Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing. Science. 2020 May;368(6491):eabb6936. https://doi.org/10.1126/science.abb6936

15. World Health Organization – WHO. Advice on the use of masks in the context of COVID-19-Interim guidance. Geneva: World Health Organization; 2020 [cited 2020 June 11]. Available from: https://www.who.int/publications/i/item/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak
16. Shereen MA, Khan S, Kazmi A, Bashir N, Siddique R. COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. J Adv Res. 2020 Mar;24(24):91-8. https://doi.org/10.1016/j.jare.2020.03.005
17. Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. Lancet. 2020 Feb;395(10223):514-23. https://doi.org/10.1016/S0140-6736(20)30154-9
18. Jin Y, Yang H, Ji W, Wu W, Chen S, Zhang W, et al. Virology, epidemiology, pathogenesis, and control of COVID-19. Viruses. 2020 Mar;12(4):e372. https://doi.org/10.3390/v12040372
19. Kolifarhood G, Aghaali M, Mozafar Saadati H, Taherpour N, Rahimi S, Izadi N, et al. Epidemiological and clinical aspects of COVID-19: a narrative review. Arch Acad Emerg Med. 2020 Apr;8(1):e41. https://doi.org/10.22037/aaem.v8i1.620
20. Bai Y, Yao L, Wei T, Tian F, Jin DY, Chen L, et al. Presumed asymptomatic carrier transmission of COVID-19. JAMA. 2020 Feb;323(14):1406-7. https://doi.org/10.1001/jama.2020.2565
21. Gu J, Han B, Wang J. COVID-19: gastrointestinal manifestations and potential fecal-oral transmission. Gastroenterology. 2020 May;158(6):1518-9. https://doi.org/10.1053/j.gastro.2020.02.054
22. To KKW, Tsang OTY, Chik-Yan Yip C, Chan KH, Wu TC, Chan JMC, et al. Consistent detection of 2019 novel coronavirus in saliva. Clin Infect Dis. 2020;ciaa149. https://doi.org/10.1093/cid/ciaa149
23. 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 Mar;12(1):9. https://doi.org/10.1038/s41368-020-0075-9
24. van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A, Williamson BN, et al. Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. N Engl J Med. 2020 Apr;382(16):1564-7. https://doi.org/10.1056/NEJMc2004973
25. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. J Hosp Infect. 2020 Mar;104(3):246-51. https://doi.org/10.1016/j.jhin.2020.01.022
26. Holmes EA, O'Connor RC, Perry VH, Tracey I, Wessely S, Arseneault L, et al. Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. Lancet Psychiatry. 2020 Jun;7(6):547-60. https://doi.org/10.1016/S2215-0366(20)30168-1
27. Yang Y, Zhou Y, Liu X, Tan J. Health services provision of 48 public tertiary dental hospitals during the COVID-19 epidemic in China. Clin Oral Investig. 2020 May;24(5):1861-4. https://doi.org/10.1007/s00784-020-03267-8
28. Iyer P, Aziz K, Ojcius DM. Impact of COVID-19 on dental education in the United States. J Dent Educ. 2020 Jun;84(6):718-22. https://doi.org/10.1002/jdd.12163
29. Wong JG, Cheung EP, Cheung V, Cheung C, Chan MT, Chua SE, et al. Psychological responses to the SARS outbreak in healthcare students in Hong Kong. Med Teach. 2004 Nov;26(7):657-9. https://doi.org/10.1080/01421590400006572
30. Wu P, Fang Y, Guan Z, Fan B, Kong J, Yao Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. Can J Psychiatry. 2009 May;54(5):302-11. https://doi.org/10.1177/070674370905400504
31. Lee TM, Chi I, Chung LW, Chou KL. Ageing and psychological response during the post-SARS period. Aging Ment Health. 2006 May;10(3):303-11. https://doi.org/10.1080/13607860600638545
32. McAlonan GM, Lee AM, Cheung V, Cheung C, Tsang KW, Sham PC, et al. Immediate and sustained psychological impact of an emerging infectious disease outbreak on health care workers. Can J Psychiatry. 2007 Apr;52(4):241-7. https://doi.org/10.1177/070674370705200406
33. Ornell F, Schuch JB, Sordi AO, Kessler FH. "Pandemic fear" and COVID-19: mental health burden and strategies. Br J Psychiatry. 2020;42(3):232-5. https://doi.org/10.1590/1516-4446-2020-0008
34. Lu M. These are the occupations with the highest COVID-19 risk. Geneva: World Economic Forum; 2020 [cited 2020 June 11]. Available from: https://www.weforum.org/agenda/2020/04/occupations-highest-covid19-risk/
35. Pfefferbaum B, Schonfeld D, Flynn BW, Norwood AE, Dodgen D, Kaul RE, et al. The H1N1 crisis: a case study of the integration of mental and behavioral health in public health crises. Disaster Med Public Health Prep. 2012 Mar;6(1):67-71. https://doi.org/10.1001/dmp.2012.2
36. Pfefferbaum B, North CS. Mental health and the Covid-19 pandemic. N Engl J Med. 2020 Apr 13;NEJMp2008017. https://doi.org/10.1056/NEJMp2008017
37. Meng L, Hua F, Bian Z. Coronavirus Disease 2019 (COVID-19): emerging and future challenges for dental and oral medicine. J Dent Res. 2020 May;99(5):481-7. https://doi.org/10.1177/0022034520914246
38. Chinese Stomatological Association. [Guidelines of clinical dental care during the COVID-19 epidemic]. [cited 2020 April 21]. Chinese. Available from: http://www.cndent.com/archives/66974

39. Collège National dês Chirurgiens-Dentistes Universitaires en Santé Publique. [Recommandations face à l'épidémie Covid 19]. 2020 marrs 18 [cited 2020 Apr 21]. French. Available from: http://www.dentairesantepublique.fr/recommandations-face-a-lepidemie-covid19/
40. Center for Disease Control and Prevention – CDC. Interim infection prevention and control guidance for dental settings during the COVID-19 response. 2020 [cited 2020 May 28]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html
41. American Dental Association – ADA. COVID-19 safety and clinical resources. 2020 [cited 2020 Apr 21]. Available from: https://success.ada.org/en/practice-management/patients/safety-and-clinical?utm_source=cpsorg&utm_medium=covid-cps-virus-lp&utm_content=fb-safety-clinical&utm_campaign=covid-19
42. Agência Nacional de Vigilância Sanitária – Anvisa. Nota Técnica GVIMS/GGTES/ANVISA Nº 04/2020. Orientações para serviços de saúde: medidas de prevenção e controle que devem ser adotadas durante a assistência aos casos suspeitos ou confirmados de infecção pelo novo coronavírus (SARS-CoV-2). 2020 Mar 31 [cited 2020 April 03]. Available from: http://portal.anvisa.gov.br/documents/33852/271858/Nota+T%C3%A9cnica+n+04-2020+GVIMS-GGTES-ANVISA/ab598660-3de4-4f14-8e6f-b9341c196b28
43. Thomé G, Bernardes SR, Guandalini S, Guimarães MCV. Manual de boas práticas em biossegurança para ambientes odontológicos 2020. Brasília, DF: Conselho Federal de Odontologia; 2020 [cited 2020 Apr 21]. Available from: http://website.cfo.org.br/wp-content/uploads/2020/04/cfo-lanc%CC%A7a-Manual-de-Boas-Pra%CC%81ticas-em-Biosseguranc%CC%A7a-para-Ambientes-Odontologicos.pdf
44. NHS England, NHS Improvement Coronavirus. Primary care. 2020 [cited 2020 Apr 21]. Available from: https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/issue-3-preparedness-letter-for-primary-dental-care-25-march-2020.pdf
45. Pereira LJ, Pereira CV, Murata RM, Pardi V, Pereira-Dourado SM. Biological and social aspects of Coronavirus disease 2019 (COVID-19) related to oral health. Braz Oral Res. 2020 May;34:e041. https://doi.org/10.1590/1807-3107bor-2020.vol34.0041