

# COVID-19 Pandemic – Implications, Planning, and Recommendations related to Dental Care Services and Dental Education

Fazal Ghani<sup>1</sup>

<sup>1</sup>Dean Postgraduate Dental Studies, Peshawar Dental College, Peshawar.

## Author's Contribution

<sup>1</sup> Conception of study

<sup>1</sup> Experimentation/Study conduction

<sup>1</sup> Analysis/Interpretation/Discussion

<sup>1</sup> Manuscript Writing

<sup>1</sup> Critical Review

<sup>1</sup> Facilitation and Material analysis

## Corresponding Author

Dr. Fazal Ghani

Dean Postgraduate Dental Studies,

Peshawar Dental College,

Peshawar.

Email: fazalg55@hotmail.com

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## Abstract

During the past few months, our understanding of the transmission, epidemiology, clinical symptoms, and management of Covid-19 has considerably improved. This had made the dental healthcare personnel confident enough and ready to provide safely by implementing efficient prevention and cross-infection control strategies in the dental clinical setting. , At the same time, it is necessary that we must be constantly aware of the continuation of such infectious threats challenging our infection control regimen and preparedness to provide dental treatments and teaching and education. Good infection prevention and control strategies need to be evidence-based and in line with the recommendations of the local and international public health agencies. The disruption in dental services and dental education all over the world resulted in this pandemic has emphasized and resulted in new, innovative and improved infection prevention and control strategies and adoption of alternative teaching, learning and assessment strategies for students. It further reinforces the need for continued research exploring ways for responding better to future contagious disease threats.

**Keywords:** Covid-19 Pandemic, Disruption, Planning, Dental services, Dental education, and training.

## Introduction

During the past few months of the COVID-19 pandemic, important learning related to the nature, etiology, mode, and sources of transmission, incubation period and its high fatality has been made.<sup>1-13</sup> It has reached a level making it possible for the identification of those at high risk of COVID-19 infection<sup>14</sup> and the clinical manifestation, their severity, and possible implications.<sup>14-17,19</sup> Also, we have fairly understood the diagnosis of the COVID-19.<sup>4,7,14,17</sup> Despite these developments, we are still uncertain how we could restore dentistry related activities as we had before the start of the current pandemic. The challenges, we have faced continuing medical and dental education and training and healthcare services are unprecedented. Related to the profession of dentistry, conventional dental education teaching and training as well as dental healthcare have remained halted. These required shifting toward new innovative approaches. Answers to several questions and concerns were needed such as; how to minimize risks of nosocomial infection; how to proceed with the adoption of effective infection control protocols, and; what would constitute the recommended measures to follow. Fortunately, this required the reinforcement of our existing standard guidelines and redesigning of the dental practice setting ensuring infection control in general and especially when treating patients with respiratory ailments inflicted by bacteria and viruses. Furthermore, as the current unique pandemic, originated in Wuhan city in China, their excellent response to control, prevent and manage it as well as how they continued dentistry during and after could provide great insight to us.<sup>20</sup>

During the pandemic outbreak and after, treating dental patients who cough, sneeze, and or even those not having these symptoms has been a great concern. This becomes extremely fearful in the case of patients receiving dentistry with aerosol-generating procedures (AGPs) with the use of a high-speed dental hand-piece or ultrasonic instrument. During many dental procedures extending over a length of time, saliva, or blood is aerosolized to the surroundings. During such procedures, the dental apparatus and the working place also get contaminated. In the absence of proper precautions, infection transmission and spread are likely.<sup>21</sup> Furthermore, dental procedures, generating a large number of droplets and aerosols, the standard protective measures in daily clinical work will never be effective enough to prevent the spread of COVID-19. This remains of special concern in the case of

patients who are in the incubation period; those not knowing they are infected, or those who opt to not disclosing their infection. Therefore, it is of paramount importance to follow an effective infection control protocols must consider the following:

1. COVID-19 is the latest addition to the list of category B infectious diseases that previously included SARS and the highly pathogenic avian influenza (H1N1). However, additional advice for all healthcare workers was the use of protection measures similar to those recommended for group-A infections that are caused by extremely infectious pathogens, such as cholera and plague. As such routine dental care services had to remain discontinued and to reconsider these till the situation of epidemics was in control. However, it was advised that dental clinics may provide restricted services to those having dental emergencies. It was also advised that emergency dental care be provided under the strict implementation of infection prevention and control measures. In the dental care setting, critical measures that could reduce the risk of cross-infection among patients and dental care professionals include; hand hygiene and working area disinfection including all surfaces within the dental clinic. SARS-CoV-2 remains viable on surfaces from few hours to several days with factors influencing this including; the nature of the surface, the humidity, and temperature of the dental environment.<sup>22</sup> Therefore, reinforcement of good hand hygiene and thorough disinfection of all surfaces within the dental clinic should receive immediate attention.
2. Proper use of effective Personal Protective Equipment (PPE) was also advised. The use of facemasks, hand gloves, goggles, face-shields, and gowns can protect skin and mucosa from (potentially) infected blood or secretion. SARS-Cov-2 mainly transmits through the route respiratory droplets and aerosols generated during dental procedures. Therefore, it is recommended to routinely use, in the dental practice setting, particulate respirators (e.g., N-95 surgical masks authenticated by the National Institute for Occupational Safety and Health (NIOSH) or dust mask or FFP2-standard masks set by the European Union).

3. Dental care personnel is also advised to keep themselves aware of the rapidly evolving situation. It is necessary to follow the updated guidelines specifically proposed for working in the COVID-19 pandemic. Such guidelines are regularly updated by local health departments, dentistry-related quality control centers, and professional dental associations. These supplementary measures, when considered will help to ensure the quality of infection control.<sup>23</sup>

### **Understanding Effective Response to COVID-19 Outbreak**

The first-hand experience and effective response to the Covid-19 outbreak that originated in Wuhan, China, can be seen in a recent publication.<sup>20</sup> Before the outbreak, in the year 2019, Wuhan university dental school and the hospital provided dental care including oral and maxillofacial surgery services to some 890,000 patients. The dental school and hospital exist with 1,098 staff and 828 dental students. There existed neither a fever clinic nor the hospital prepared for the provision of care COVID-19 patients. In response to the outbreak, to continue working, undergoing a medical examination was made compulsory in a designated hospital to identify and restrict those with fever, cough, sneezing, or COVID-19-related symptoms. This work-restriction policy also applied to a staff whose close family member had been symptomatic or confirmed with COVID-19. Implementing this policy during the outbreak, identified nine staff with COVID-19 including; 3-doctors, 3-nurses, 2-admin staff, and 1-postgraduate student. Continuing the tracing and screening procedure, no further cases had been identified among staff or patients who had close contact with these COVID-19 infected staff. It was found that all these COVID-19 cases, had no obvious aggregation, except 2 nurses who worked in the same department. Hence cross-infection was considered as unlikely in these cases. Infection transmission and spread were thought to have been prevented with the strict use of medical masks and gloves used during work in clinics by all dental care personnel.<sup>20</sup>

During the period of the Covid-19 outbreak in Wuhan, despite the increasing number of confirmed cases, some 169 staff, under the premise of adequate

protection measures, continuous duty and provided urgent dental care to more than 700 patients. Daily data for each of the dental procedures performed documented as well as the recording of home address, phone numbers of both the patients and their accompanying persons. The recording of these details of patients was to help to trace suspects in case of either staff or other patients coming out as suspected or confirmed COVID-19 cases in the future. The dental hospital also established an online teledentistry platform that also provided consultations to >1,600 patients. A confirmation of the effectiveness of the dental hospital implemented cross-infection policy can be seen from the fact of no further COVID-19 infection among the staff. This also confirms that provided effective cross-infection policy and measures are enforced, the dental setting environment can be considered safe. Following the governmental directives, all students, including those in Wuhan dental school, were asked to not refrain from attending the school. This continued until the current Chinese Spring Festival. During this entire period of sheltering and staying at home, students had been supported to learn online.<sup>20</sup>

### **Evidence-Based Policy for Continuing Dental Practice**

Whenever a new infection outbreak is suspected such as the case of Covid-19, it becomes necessary to follow the interim guidance on infection prevention and control during the provision of healthcare.<sup>22</sup> With the Covid-19 pandemic, there existed a lack of consensus on the provision of dental services. Clinical observation and experience and use of available relevant guidelines and available research findings suggested that dentists could work provided they followed strict personal protection measures. Further, they must if could avoid or minimize aerosol-generating dental procedures. It is extremely important to reduce the spread of infection by reducing droplets or aerosols production. It is highly beneficial to control the spread of infection with the adoption of the 4-handed technique that includes; hand-washing, PPE use (facemask, goggles, face-shield, and gown) and ensuring disinfection of working instrument and surfaces. To reduce the production of droplets and aerosols during procedures requiring the use of hand-piece and ultrasonic scaler, the use of saliva ejectors with low or high volume aspiration is an absolute requirement.<sup>21, 24-25</sup>

## Patients Evaluation and Screening

During this outbreak and perhaps for a considerable time ahead, dental clinics are to establish pre-check triages. They have to measure and document the temperature of every staff and patient as a routine procedure. Pre-check staff on duty are to ask patients questions about the health status and history of contact or travel.<sup>22</sup> Patients and their accompanying persons will be wearing medical masks and temperature measurements on entry to the hospital. Record of patients having a fever is to be maintained and they are advised medical consultation. In case a patient has been to epidemic regions within the past 14 days, they will have to be advised for at least 14 days of self-quarantine. This shall also apply to staff working in dental clinics. In areas where COVID-19 has spread, all elective/non-emergency dental practices must be postponed.<sup>21,24-25</sup> It has been advised to keep postponing dental procedure based treatments and practices for at least 1 month for convalescent patients with SARS.<sup>25</sup> However, yet it is not clear whether the same also applies to patients with COVID-19.

## Precautions When Performing Clinical Assessment of Patients

There is evidence that using a preoperative antimicrobial mouth rinse will reduce the microbes count in the oral cavity.<sup>21, 26</sup> Procedures that could induce coughing should be deferred (if possible) or performed by exercising extreme caution.<sup>22</sup> The use of a 3-way syringe or any aerosol-generating procedures (AGPs), should be minimized when possible. Intraoral X-ray examination is the most common radiographic technique in dental imaging; but as it can stimulate saliva secretion and coughing,<sup>27</sup> therefore, alternative extraoral radiographic techniques including; panoramic radiography and cone-beam CT, are appropriate during the outbreak of COVID-19.

## Treatment of Dental Emergency Cases including those Suspected of COVID-19

It is likely that during the current outbreak, there will be an increased reporting and exacerbation of dental emergency conditions and high demand for immediate

treatment. While the majority of such cases can be pharmacologically managed using an online teledentistry platform, some will surely require management with dental procedures. In such cases, using rubber dams and high-volume saliva ejectors could certainly help minimize aerosol or spatter during the needed dental procedures. Furthermore, face shields and goggles are essential with the use of high- or low-speed drilling with water spray.<sup>28</sup>

Alternative dental devices can also be used. For example, a carious tooth with symptomatic irreversible pulpitis, pulp exposure could be managed with chemo-mechanical caries removal under rubber dam isolation and a high-volume saliva ejector. A patient for whom a dental procedure is needed will generate an aerosol, he/she has to be scheduled as the last patient in the day to decrease the risk of nosocomial infection. Such patients include; those reporting with a spontaneous toothache because of a cracked tooth without dental decay; those with conditions requiring dental procedures with high-speed hand-piece to access cavity preparation; and those patients wishing to retain their tooth. After the provision of treatment, environmental cleaning and disinfection procedures should be followed.

Although a best practice is to treat all patients in specially designed isolated and well-ventilated or negatively pressured dental operatory rooms. However, at yet many such facilities are unavailable in the country and hence can only consider mandatory for the dental procedures on those suspected with COVID-19. Treatment planning of cases with tooth fracture, luxation, or avulsion is dependent on the age, the traumatic severity of dental tissue, the development of the apex, and the duration of tooth avulsion.<sup>29-31</sup> In case the tooth requires the option of extraction, it is advised to use an absorbable suture. For patients with facial soft tissue contusion, debridement and suturing should be performed and rinsing the wound slowly and using saliva ejector to avoid spraying. Immediate hospitalization is required for patients with life-threatening events such as oral and maxillofacial injuries of a compound and complex nature. So far, it has been preferred to advise chest CT to exclude suspected infection. This is because at yet rapid onsite point of care test for Covid-19 is not widely available in the dental setting and that the RT-PCR test, besides time-consuming, needs a laboratory with pan-coronavirus or specific SARS-CoV-2 detection capacity.<sup>29-31</sup>

## Recommendations for Dental Education & Teaching during the COVID-19 Outbreak

The Covid-19 pandemic has presented significant medical and dental education-related challenges. The benefits, in terms of enhanced mutual trust and facilitation of mutual trust and cooperation with open communication among students, clinical teachers, and administrative staff are well known.<sup>32-33</sup> Keeping in mind the experience with SARS and relevant highly pathogenic infectious disease, it would be prudent to adopt the following as related to dental education during this outbreak.<sup>33-37</sup>

1. To avoid the unnecessary aggregation and associated risk of infection, it is necessary to resort to emergency remote teaching, learning and assessment and considering online lectures and tutorials, case studies, and problem-based learning activities associated risk of infection.<sup>33-34</sup> The universal availability of internet, smart devices, and their applications make it fairly easy and feasible for students to listen to and review lectures from any location. It is perhaps the best time that we encourage our students to do self-learning, take fully the benefits of using online learning resources, and to explore the latest academic developments and innovations.
2. The current outbreak has created enough crisis highlighting a shortage of the needed frontline health professionals on one side and laying of completely the entire dental workforce on the other side. This highlights the need for preparing dental health professionals for their re-deployed roles and to be able to volunteer during any possible crisis. Hence the need for adequate training of the future dental workforce and appropriate continuing education programs to help prepare our dental workforce for additional roles. The need for such additional training can be seen from the call made to dental health professionals to join for additional roles to tackle the surge in COVID-19 cases.<sup>37-38</sup>
3. We all have been engulfed so quickly without any preparation that almost all of us including our students have been subjected to the fear and pressure associated with this new and highly lethal disease. This necessitates institutions including dental schools to

consider and provide psychological services to those who need them.<sup>39</sup>

## Conclusion

1. Necessary learning made regarding the many aspects of the Covid-19 pandemic has provided some guidance about the new possible approaches to continuing dental healthcare service while keeping safe, dental healthcare personnel, and patients. With the implementation of efficient strategies to prevent, control, and stop the spread of COVID-19, most of us now feel confident in continuing our work safely.
2. We must also remain constantly updated and aware of new infectious threats that would challenge our infection control regimen in the dental settings, our preparedness for the provision of dental health care services, and dental teaching and education.
3. The current pandemic emphasizes the need for drastic changes in the dental curriculum with the inclusion of topics of crisis management, volunteering, more focus on microbiology, innovative design dental operatory and dental hospital, teledentistry, and innovative virtual dental education and training that allows remote teaching and learning. All this highlights the need for more research leading to new knowledge to use for a better and effective response to future disasters and contagious diseases.

## References

1. Chan JF, Yuan S, Kok KH, To, KK, Chu, H, Yang, J, Xing, F, Liu, J, Yip, CC, Poon, RW, 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;395(10223):514–523. DOI: 10.1016/S0140-6736(20)30154-9
2. Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, Wang W, Song H, Huang B, Zhu N, et al. Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. *Lancet* 2020; 395(10224):565–574. DOI:https://doi.org/10.1016/S0140-6736(20)30251-8
3. The Chinese Preventive Medicine Association. An update on the epidemiological characteristics of novel coronavirus pneumonia (COVID-19). *China J Epidemiol* 2020;41(2):139–144.
4. Del Rio, C, Malani, PN. 2019 novel coronavirus-important information for clinicians. *JAMA* 2020;[epub ahead of print 5 Feb 2020]; in press. DOI:10.1001/jama.2020.1490.
5. Holshue ML DeBolt C, Lindquist S, Lofy KH, Wiesman J, Bruce H, Spitters C, Ericson K, Wilkerson S, Tural A, et al. First

- case of 2019 novel coronavirus in the United States. *N Engl J Med* 2020; 382:929-936. DOI: 10.1056/NEJMoa2001191
6. Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, Li J, Zhao D, Xu D, Gong Q, 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(10226):809-815.doi:10.1016/S0140-6736(20)30360-3.
7. World Health Organization. 2020c. Questions and answers on coronaviruses (accessed 08 June 2020). <https://www.who.int/news-room/q-a-detail/q-a-coronaviruses>.
8. Zhu H, Wang L, Fang C, Peng S, Zhang L, Chang G, Xia S. Clinical analysis of 10 neonates born to mothers with 2019-nCoV pneumonia. *TranslPediatri* 2020;9(1):51-60. DOI:10.21037/tp.2020.02.06.
9. Rothe C, Schunk M, Sothmann P, Bretzel G, Froeschl G, Wallrauch C, Zimmer T, Thiel V, Janke C, Guggemos W, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. *N Engl J Med* 2020; 382(10):970-971 doi:10.1056/NEJMc2001468.
10. 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(5):2000062. DOI: 10.2807/1560-7917.ES.2020.25.5.2000062.
11. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, Ren R, Leung KSM, Lau EHY, Wong JY, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 2020 Mar 26;382(13):1199-1207. DOI: 10.1056/NEJMoa2001316. Epub 2020 Jan 29.
12. Malik YS, Sircar S, Bhat S, Sharun K, Dhama K, Dadar M, Tiwari R, Chaicumpa W. Emerging novel coronavirus (2019-nCoV)— current scenario, evolutionary perspective based on genome analysis and recent developments. *Vet Q* 2020; *Vet Q* 2020; 40(1): 68-76. DOI: 10.1080/01652176.2020.1727993
13. Centers for Disease Control and Prevention. 2020. Disease burden of influenza; (accessed 08 June 2020)]. <https://www.cdc.gov/flu/about/burden/index.html>.
14. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, Wang B, Xiang H, Cheng Z, Xiong Y, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA* 2020;323(11):1061-1069. DOI:10.1001/jama.2020.1585JAMA 2020;
15. Guan W-J, Ni Z-Y, Hu Y, Liang W-H, Ou C-Q, He J-X, Liu L, Shan H, Lei C-L, Hui DS, et al. Clinical characteristics of 2019 novel coronavirus infection in China. *medRxiv* 2020; DOI:10.1101/2020.1102.1106.20020974.
16. Yang Y, Lu Q, Liu M, Wang Y, Zhang A, Jalali N, Dean N, Longini I, Halloran ME, Xu B, et al. Epidemiological and clinical features of the 2019 novel coronavirus outbreak in China. *medRxiv* 2020; DOI:10.1101/2020.1102.1110.20021675.
17. National Health Commission of China. An update of novel coronavirus pneumonia outbreak as of 24:00 on February 25, 2020. (Accessed 26 Feb 2020). [http://www.nhc.gov.cn/xcs/yqtb/list\\_gzbd.shtml](http://www.nhc.gov.cn/xcs/yqtb/list_gzbd.shtml).
18. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, Qiu Y, Wang J, Liu Y, Wei Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet* 2020; 395(10223):507-513. DOI:[https://doi.org/10.1016/S0140-6736\(20\)30211-7](https://doi.org/10.1016/S0140-6736(20)30211-7)
19. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395(10223):497-506.Doi:[https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5)
20. Ming L, Hua F, Bian Z. Coronavirus disease 2019 (COVID-19) - Emerging and future challenges for dental and oral medicine. *J Dent Res* 2020;99(5) 481-487. <https://doi.org/10.1177/0022034520914246>
21. Kohn WG, Collins AS, Cleveland JL, Harte JA, Eklund KJ, Malvitz DM. Centers for Disease Control and Prevention - 2003. Guidelines for infection control in dental health-care settings.2003. <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5217a1.htm> (Accessed 08 June 2020).
22. World Health Organization. 2020a. Clinical management of severe acute respiratory infection when novel coronavirus (2019-nCoV) infection is suspected: interim guidance [accessed 2020 Feb 17]. [https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected) (Accessed 08 June 2020).
23. Li ZY, Meng LY. Prevention and control of new coronavirus infection in department of stomatology. *Chin J Stomatol (Zhonghua Kou Qiang Yi Xue Za Zhi)* 2020;55(0): E001. DOI:10.3760/cma.j.issn.1002-0098.2020.0001.
24. Li R, Leung K, Sun F, Samaranayake LP. Severe acute respiratory syndrome (SARS) and the GDP. Part II: implications for GDPs. *Br Dent J* 2020;197(3):130-134. doi: 10.1038/sj.bdj.4811522
25. Samaranayake LP, Peiris M. Severe acute respiratory syndrome and dentistry: a retrospective view. *JADA* 2004;135(9):1292-1302. DOI: <https://doi.org/10.14219/jada.archive.2004.0405>
26. Marui VC, Souto MLS, Rovai ES, Romito GA, Chambrone L, Pannuti CM. Efficacy of preprocedural mouth rinses in the reduction of microorganisms in aerosol: a systematic review. *JADA* 2019;150(12):1015-1026e1. DOI: 10.1016/j.adaj.2019.06.024.
27. 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(11):2637-2655. DOI: 10.1007/s00330-010-1836-1.
28. Samaranayake LP, Reid J, Evans D. The efficacy of rubber dam isolation in reducing atmospheric bacterial contamination. *ASDC J Dent Child* 1989;56(6):442-444.
29. Andersson L, Andreasen JO, Day P, Heithersay G, Trope M, DiAngelis AJ, Kenny DJ, Sigurdsson A, Bourguignon C, Flores MT. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth. *Pediatri Dent* 2017;39(6):412-419. DOI: 10.1111/j.1600-9657.2012.01125.x.
30. DiAngelis AJ, Andreasen JO, Ebeleseder KA, Kenny DJ, Trope M, Sigurdsson A, Andersson L, Bourguignon C, Flores MT, Hicks ML. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations of permanent teeth. *Dent Traumatol* 2012;28(1):2-12. DOI: 10.1111/j.1600-9657.2012.01125.x.
31. Malmgren B, Andreasen JO, Flores MT, Robertson A, DiAngelis AJ, Andersson L, Cavalleri G, Cohenca N, Day P, Hicks ML, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 3. Injuries in the primary dentition. *Dent Traumatol* 2012;28(3):174-182. DOI: 10.1111/j.1600-9657.2012.01146.x.
32. Park SW, Jang HW, Choe YH, Lee KS, Ahn YC, Chung MJ, Lee K-S, Lee K, Han T. Avoiding student infection during a Middle East respiratory syndrome (MERS) outbreak: a single medical school experience. *Korean J Med Educ* 2016;28(2):209-217. DOI: 10.3946/kjme.2016.30.

33. Ghani F. Covid-19 Outbreak – Immediate and long-term impacts on the dental profession. *Pak J Med Sci* 2020;36(COVID19-S4): S1-S4.  
DOI: <https://doi.org/10.12669/pjms.36.COVID19-S4.2698>
34. Patil N, Chan Y, Yan H. SARS, and its effect on medical education in Hong Kong. *Med Educ* 2003;37(12):1127–1128.  
DOI: 10.1046/j.1365-2923.2003.01723.x.
35. Ghani F. Remote teaching and supervision of graduate scholars in the unprecedented and testing times. *J Pak Dent Assoc* 2020; Covid-19 Special Issue): in press
36. Elangovan S, Mahrous A, Marchini L. Disruptions during a pandemic: Gaps identified and lessons learned. *J Dent Educ* 2020;1–5 (Ahead of publication).  
<https://doi.org/10.1002/jdd.12236>
37. California\_Health\_Corps. Health professionals, California needs you! 2020; <https://covid19.ca.gov/healthcorps/#top>. (Accessed 08 June 2020).
38. Conselho\_Federal\_de\_Odontologia. CFO esclarece dúvidas sobre ação “O Brasil conta comigo – Profissionais da Saúde”. 2020; [http://website.cfo.org.br/cfo-esclarece-duvidas-sobreacao-o-brasil-counta-comigo-profissionais-da-saude/?doing\\_wp\\_cron=1586793615.7902309894561767578125](http://website.cfo.org.br/cfo-esclarece-duvidas-sobreacao-o-brasil-counta-comigo-profissionais-da-saude/?doing_wp_cron=1586793615.7902309894561767578125). (Accessed 08 June 2020).
39. Wong JG, Cheung EP, Cheung V, Cheung C, Chan MT, Chua SE, McAlonan, GM, Tsang KW, Ip MS. Psychological responses to the SARS outbreak in healthcare students in Hong Kong. *Med Teach* 2004;26(7):657–659.  
DOI: 10.1080/01421590400006572.