

## Impact of COVID-19 Pandemic on Dental Education and Management

Arigbede AO

Faculty of Dentistry, College of Health Sciences, University of Port Harcourt, Rivers State, Nigeria.

Correspondence: Arigbede AO

Email: [abiodun.arigbede@uniport.edu.ng](mailto:abiodun.arigbede@uniport.edu.ng)

### Abstract

**Objective:** The coronavirus disease is a highly infectious disease of global concern. It poses a severe threat to the lives of patients, hospital staff, students, and their trainers. The impact of Covid-19 pandemic on dental education and management is diverse and deep. This study is designed to highlight the effects of COVID-19 pandemic on dental education and management.

**Materials and Methods:** The Medline and google databases were searched for relevant publications by combining the following mesh terms, COVID-19, dental education, impact and residency. Relevant information was extracted from all the selected papers. Personal experience as a trainer, clinician and administrator was included in the report.

**Results:** Because of the pandemic, patients flow nosedived, routine clinical procedures, academic activities, students/residents' rotation were suspended, and some of the students/ residents had their examinations or time of graduation postponed. The use of virtual platform became the norm for learning and meeting. A new and broader PPE protocol was prescribed when carrying out dental procedures. Residents and students must ensure physical distancing, even as it relates to the hanging of clothes in the changing room. Blended and self-directed learning was brought into the fore of medical education.

**Conclusion:** Government and professional bodies should make conscious efforts to cushion the adverse effects of corona pandemic on dental education and to consolidate the positive impacts.

**Keywords:** COVID-19, Coronavirus Disease, Impact, Dental Education.

### Introduction

The coronavirus disease otherwise called COVID-19 is a rapidly spreading disease caused by the novel virus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was first reported in the city of Wuhan, China in December 2019, but the World Health Organization (WHO) declared it a pandemic mid-March 2020<sup>1,2,3</sup>. The disease triggered, an unbelievable number of fatalities, and the devastations impacted on health, education, and economy was huge and global<sup>1,2,4</sup>. Sports, entertainment, and agricultural sectors were all affected. COVID-19 took the world by storm in the early January of 2020<sup>5</sup> but the disease was not

reported in Nigeria until 27th February 2020 when a case was reported by the Lagos State Government<sup>6</sup>. The highly infectious disease<sup>7</sup> has continued ever since to increase sporadically, locally and worldwide to the extent that by the third quarter of the year, the end was still not in sight.

The quantum of scientific information that emanated following a global and frantic search for a detailed account of the nature of the disease soon after the pandemic was declared showed that this systemic condition was bound to invade the sphere of dental education and management. The impact of the disease on dental education and administration is multifarious and diverse. The operating field of dental

surgeons is the oro-facial region; this suggests that dentists may be exposed to the coronavirus in infected patients through close contacts, respiratory droplets and aerosol-generating procedures. This informed why dentists are described as very- high-risk professionals<sup>8,9</sup>. Professional training in dental surgery and dental specialties are hospital-based programmes. Being a technical and specialized programme, the course rests on a tripod of learning and the arms of the tripod are, didactic, technical, and clinical services/research exposure.

**Impact on Dental Education:** The COVID-19 pandemic has an immediate impact on clinical practice and academic activities worldwide. Patients' flow nosedived almost to a halt during the peak of the pandemic because of the combined effect of lockdown and the fear of cross-infectivity during oral health care utilization. A similar decline in the volume of patients had been reported<sup>3</sup>. The dental undergraduate and residency programmes are structured and time-bound<sup>10</sup> and there are basic requirements and benchmark relating to the tripod highlighted above which the students and trainees must meet<sup>11</sup>. The disruption extended to more than one of the tripod arms during the pandemic, tilted the balance of the tripod strongly enough to make the students and residents suspend or repeat their posting with the attendant loss of time and resources. This report corroborates the previous findings on this subject<sup>9,12</sup>. The General Dental Council in the UK recognizing the inevitable delay in graduation of students came up with plans to minimize this unavoidable development<sup>9</sup>.

Lecturing and research in universities that were opened at the time of the pandemic were suspended and the institutions were shut in line with the directive of the Federal Government. This followed the advice given by the Association of African Universities to the government of each African state<sup>5</sup>. Routine clinical dental services were also summarily suspended in most dental clinics and centres during the pandemic permitting the dental surgeons to attend to only emergencies. This was in line with the local and international guidelines on safety and prevention of spread of COVID-19 in the clinical environment<sup>6,13,14</sup>. Suspension of academic and clinical activities during the period of the pandemic has been widely reported<sup>8,9,10,12</sup>. The implication was that many students and trainees were not able to finish their programme and graduate as scheduled on account of inability to meet up with the curriculum requirements as it relates to clinical, laboratory, didactic and research exposures<sup>11</sup>. A survey carried out among academics and students in higher education in Africa showed that 83% of the

respondents indicated that COVID-19 pandemic disrupted academic activities in their institutions<sup>5</sup>. The Nigerian Dental Association reported that 80% of private dental clinics shut down during the pandemic<sup>6</sup>. The suspension of academic and clinical activities was borne out of concern for safety of patients, students, and members of staff<sup>10,12</sup>.

The disease particularly at the initial phase precipitated palpable fear and emotional distress among health care providers including residents and students and their family members who understandably feared for the lives of their loved ones. The Nigeria Centre for Disease Control reported that as at July 2nd, 2020, about 812 health care workers have been infected in Nigeria and 230,000 globally<sup>15</sup>. Some of these individuals who contracted the disease in the line of duty painfully succumbed to the disease. Anxiety associated with possibility of cross-infectivity of coronavirus has been reported among patients, students, and staff<sup>3,8,16</sup>. More than half of respondents in a survey involving physicians revealed that their health and well-being was a top concern<sup>17</sup>. In the revised Hippocratic oath<sup>18</sup> physicians are required to attend to their own health and well-being and to respect their teachers, colleagues and students. It behooves dental education administrators and hospital managers to ensure that not only the safety of patients and non-clinical staff are prioritized but also that of clinicians across board and their highly vulnerable students. A case report of where residents were given free access to the services of clinical psychologists in the US during the pandemic has been reported<sup>2</sup>. The closure of schools and routine clinical services were preemptive actions to preclude threat to the lives of clinicians and students generally.

Physical distancing which has been described as the most effective preventative strategy against COVID-19 forbids students and trainees from gathering for the usual in-person lectures, seminars, clinical exposure/ practice and so on<sup>12</sup>. This development caused a long term and widespread disruption of medical education and clinical services, and it has provoked stakeholders to brainstorm on how best to ensure an uninterrupted, vibrant and, qualitative medical training that produces a steady stream of competent clinicians<sup>10</sup>. It has been suggested, therefore, that medical curriculum should be flexible in terms of delivery and administration without compromising standard<sup>16</sup>. The dental academics were forced to embrace the long overdue blended learning. All presentations, lectures, seminars, and journal reviews were transferred to virtual learning platform<sup>3,10,16</sup> and all and sundry were forced to acquire the required skills. This is not new, as faculty

have been reported to scramble to learn and teach online during the pandemic<sup>8</sup>. This informed why it was advised that technology on teaching and learning should be employed only after adequate training of staff in remote teaching<sup>8</sup>. Flipped classroom technique has also been tried<sup>8</sup>. Flipped classroom is a type of blended learning whereby the traditional learning environment is reversed by delivering instructional content online while learning activities that are traditionally considered homework are moved into the classroom<sup>21</sup>. Students listen to online presentations, participate in online discussions, and carry out independent research at home while in the classroom, the facilitator engages the students on concepts, application and practice<sup>21</sup>.

Blended learning is one of the available students-centred learning methods that enable students to learn at their own pace and construct their own learning. The method combines online and classroom learning activities for effective and in-depth learning and optimization of the available meagre resources. Virtual delivery of educational content is combined with live interaction with learners in such a way that personalizes learning and provoke thoughtful reflection<sup>19,20</sup>. The learners have opportunity to listen to the presentations as many times as possible and at any time for that matter<sup>19,20</sup>. The method was used to teach practical and clinical procedures to residents in the Hospital for Special Surgery (HSS), USA during the pandemic and the learning activities were recorded and made accessible to the residents for references purposes<sup>2</sup>. Virtual research meeting was also reported by Crosby and Sharma during the pandemic<sup>3</sup>. This method could also be employed to decongest theatre and other crowded learning spheres. The challenge before the educational managers would be the financial implications of maintaining the telecommunication system. One of the major limitations of blended learning is the huge cost involved<sup>20</sup>.

The use of zoom, google classroom, You Tube teaching video, mobile apps, and other virtual learning platforms, are the alternatives to in-person teaching and learning being used worldwide during the pandemic<sup>2-5,8,10,16</sup>. These media were received with much enthusiasm by residents and students in Nigeria, as it gives them the opportunity to attend online classes along with their counterparts abroad and in other centres in Nigeria and to interact real time with experts they otherwise do not have access to in the comfort of their home or office. This is now a regular practice in our dental schools and hospitals. A previous report observed that technology now plays an increasingly important role in medical education

and acquisition of core clinical skills<sup>10</sup>. Rose stated that the profound effects of COVID-19 on medical education may forever change how future physicians are educated<sup>12</sup>. Faculty who are reluctant to embrace technology-driven learning are now left with no choice other than to join the train as it is no longer a luxury but a necessity<sup>8,10</sup>. With the limited physical infrastructure in our dental schools coupled with the students' and residents' population, attempts to enforce physical distancing during presentations, seminars, lectures, clinical demonstrations, and other academic activities are waste of efforts. Virtual learning naturally resolves the challenge of how to manage crowded classes which has been reported in many places during the pandemic<sup>5,22</sup>.

It should however be emphasized that virtual learning complements and not substitutes situated learning. Competency-based learning can only be achieved when the students actively participate in real life clinical procedures and decision-making process. In situated learning, effective learning is believed to take place in an authentic environment of practice, where learners engage in increasingly more complex tasks within social communities<sup>23</sup>. Lave and Wegner who developed the situated learning theory (SLT) argue that knowledge and skills should be learned in the same environment it is used. Thus, virtual learning can only complement situated learning in theatre, clinic, and social community environments<sup>24</sup>. The COVID-19 pandemic has indeed brought to the fore the need for application of self-directed learning (SDL) in medical education. SDL is said to be of increasing importance in the development and maintenance of professional competence<sup>25</sup>. It is now clear to all educators that teacher-centred approach and classroom learning is sometimes impossible and therefore unreliable. This has stimulated many students and facilitators in our environment to actively engage SDL. The method can be used effectively with problem-based learning. This mode of learning was used during the pandemic in the HSS<sup>2</sup>.

Impact on Management of Dental Education: The pandemic also provoked reactionary and preemptive decisions as it relates to dental education management. Dental schools / hospital managements now leverage on the successes of virtual learning to reach out to their diverse audience viz, students, patients, staff, and other stakeholders. Dental consultations to some extent, meetings, academic activities, and other official engagements requiring face-to-face contacts are increasingly done online. Many hospitals used telemedicine as part of the measures to ensure physical distancing<sup>2</sup>. The challenge now is how to secure, maintain and pay for functional telecommunication facilities and stable

internet services by all the parties involved. The European Medical Students' Association while commenting on the use of the virtual platform for teaching and learning by European universities during the pandemic highlighted technical failure, internet connection challenges and inability to pay for the required gadgets by some students as limitations of this system<sup>26</sup>. Infrastructural and funding challenges have been recognized and pointed out as the main reasons why universities in sub-Saharan Africa are lagging in Science, Technology, Engineering, and Mathematics (STEM)<sup>5</sup>.

As part of the preventive measures against the coronavirus disease, the management of dental education is forced to install handwashing and hygiene facilities at the entrance of faculty building block, dental centre, and students' hostel. New protocols for personal protective equipment (PPE) during clinical procedures were also introduced and have been accepted as the norms in some centres. Before the pandemic, PPE was limited to scrubs/clinical coat, surgical face mask, hand gloves and sometimes goggles. The new protocol now includes long sleeve scrubs/clinic coat, surgical face mask/N95 face mask, face shield, hand gloves, and aprons.

Respiratory droplets from coronavirus infected person can contaminate materials, such as clothing<sup>27</sup>. In this regard, dental education administrators must pay attention to staff and students' changing rooms where clinic wears and/ or mufti lie virtually upon one another because of the closeness of the hangar. Staff and students are now required to maintain a safe distance when they hang their wares. Another impact of the disease is that lecture, seminar, and patients' waiting rooms may now, henceforth, be bigger than usual in case there is a need to enforce physical distancing. Similarly, dental clinic design will soon begin to include isolation section, and besides, common waiting rooms for patients attending different specialty clinics will be discouraged to limit physical interaction. The need for physical distancing is considerably taken into consideration now, more ever than before, when patients are being given an appointment and when staff and students' rotation are being planned. The coronavirus disease also exposed the knowledge gaps of health care providers in infection prevention and control. The curriculum of undergraduates and residents would have to be modified to accommodate in-depth practical-oriented exposure in this area.

Dental clinic design in most centres is either the open hall or enclosed design. The open hall design enables supervising consultants to have a panoramic view of the clinics. Staff, students and patients are under the watchful eyes of the senior doctors. Students and

residents that require immediate assistance and feedback could be easily spotted and addressed. The patients that need assistance could also be easily sighted. However, the sight of a patient in distress during an operative procedure may provoke fear in others. Besides, many dental procedures are aerosol-generating, the combined effects of aerosol generated in more than one chair make the risk of cross-section higher in this design. Privacy and low cross-infection probability are the characteristics of the enclosed system. The scare and impression made by the SARS-CoV-2 would considerably dissuade dental school administrators from requesting for the open hall design henceforth.

The coronavirus disease may invariably impact on the number of candidates aspiring to study dentistry. Candidates planning to study dentistry may reconsider their position considering the reported heightened risks of contracting the virus among dental practitioners and the mortality among the health care providers generally. For those who are interested, the selection of where to study the course may also be influenced by the pandemic. Lack of diversity among students and staff had been recognized in African universities before the advent of COVID-19<sup>5</sup>. The coronavirus pandemic would surely make it worse. Parents and guardians are set to get more involved in the selection of university their wards choose to attend or work. Those who have practised dentistry for years may decide to retire early or limit their clinical practice. This is because the older individuals, particularly those who have one underlying disease or the other, are vulnerable to the condition.

The coronavirus pandemic also disrupted the graduation timeline of the final year students and residents. Students and residents who had prepared for the respective professional examinations physically, mentally, and financially were left traumatized because the examinations were postponed for safety reasons. These potential graduates could not participate in several employment opportunities that cropped up soon after the lockdown. Doughty and Moshkun<sup>9</sup> as well as Alzahrani et al<sup>11</sup> have previously reported that the pandemic precipitated postponement of examinations and interviews<sup>9</sup>. Some of these individuals would have to make fresh arrangements for accommodation during the extended period they would stay in school or hospital to complete the programme. Many institutions may not entertain students exchange and / or attachment programmes until a drastic and widespread improvement in the rate of coronavirus infection is achieved.

## Conclusion

Government and professional bodies should make conscious efforts to cushion the adverse effects of corona virus pandemic on dental education and to consolidate the positive impacts. This request corroborates the previous appeal by the Association of African Universities that African governments should support higher education institutions and use COVID-19 pandemic as an opportunity to strengthen the educational institutions by making them much more resilient to unforeseen crises.

## References

1. Nakamura K, Ide S, Saito et al. COVID-19 can suddenly become severe: a case series from Tokyo, Japan. *Global Health & Medicine*. DOI:10.35772/ghm.2020.0105. Accessed July 10, 2020.
2. Morse KW, Wessel LE, Premkumar A, James EW, Nwachukwu BU, Fufa DT. At the US Epicenter of the COVID-19 Pandemic, an Orthopedic Residency program Reorganizes. *HSSJ*. DOI 10.1007/s11420-020-0976. Accessed July 10, 2020.
3. Crosby DL, Sharma A, Insights on otolaryngology residency training during the COVID-19 pandemic. *Otolaryngology Head and Neck Surgery*. 2020;163(1). DOI:10.1177/0159982-0922502. Accessed July 10, 2020.
4. Alzahrani SB, Alrusayes AA, A, Aldossary MS. Impact of COVID-19 pandemic on dental education, research, and students. *IJSHR*. 2020; 10(6): 207-212.
5. Mugo K, Odera N, Wachira M. Surveying the impact of COVID-19 on Africa's higher education and research sector. *Africa Portal*. June 20, 2020. Accessed July 10, 2020.
6. Eshikena E. COVID-19 Pandemic: impact on oral healthcare. Press Release by the Nigerian Dental Association. Available @ [nigdentallaso.org/nda-covid-19-pa](http://nigdentallaso.org/nda-covid-19-pa). Accessed July 10, 2020.
7. Desai BK. Clinical implications of the COVID—19 pandemic on dental education. *J Dent Educ*. 2020;84(5): 512.
8. Iyer P, Aziz K, Ojcius DM. Impact of COVID-19 on dental education in the United States. *J Dent Educ*. 2020;1-5. DOI:10.1002/jdd.12163. Accessed July 10, 2020.
9. Doughty F, Moshkun C. The impact of COVID-19 on dental education and training. *Dent Update*. 2020; 47: 527-528.
10. Wayne DB, Green M, Eric G. Neilson EG. Medical education in the time of COVID-19. *Science Advances*. 05 Jun 2020: eabc7110 DOI: 10.1126/sciadv.abc7110. Accessed July 10, 2020.
11. Alzahrani SB, Alrusayes AA, A, Aldossary MS. Impact of COVID-19 pandemic on dental education, research, and students. *IJSHR*. 2020; 10(6): 207-212.
12. Rose. S. Medical Student Education in the Time of COVID-19 *JAMA*. 2020;323(21):2131-2132. Accessed July 10, 2020.
13. Givi B, Schiff BA, Chinn SB, et al. Safety Recommendations for Evaluation and Surgery of the Head and Neck During the COVID-19 Pandemic. *JAMA Otolaryngology–Head & Neck Surgery*. 2020. Accessed July 10, 2020.
14. Guiding principles to protect resident and fellow physicians responding to COVID-19. [Press release]. April 13, 2020. <https://www.ama-assn.org/delivering-care/public-health/guiding-principles-protect-resi-dent-fellow-physicians-responding>. Accessed July 10, 2020.
15. Nigeria launches COVID-19 online course on infection prevention and control (IPC). A publication of Nigeria Centre for Disease Control. July 4, 2020. [ncdc.gov.ng/news/258/Nigeria](http://ncdc.gov.ng/news/258/Nigeria). Accessed July 15, 2020.
16. Wong RY. Medical education during COVID-19: Lessons from a pandemic. *BCMJ*. :2020; 62 (5) 170-171.
17. Jain , Chisick L. COVID-19 is Infecting Our Clinical Acumen. *J Gen Intern Med*. DOI: 10.1007/s11606-020-05997-7. Accessed July 10, 2020.
18. Cook M. New Hippocratic Oath Approved for Doctors. *BioEdge*. November 4, 2017. [Bioedge.org/mobile/view/new](http://Bioedge.org/mobile/view/new). Accessed July 15, 2020.
19. Kaur M. Blended learning-its challenges and future. *Procedia-Social and Behavioral Sciences*. 2013; 93:612-617.
20. Lalima, Dangwai KL. Blended learning: An Innovative Approach. *Universal Journal of Educational Research*. 2017;5(1):612-617.
21. Mary J. Blended and flipped: Exploring new models for effective teaching and learning *IJETST*. 2016;3(11):4784-4787.
22. COVID-19 updates and resources. Liaison Committee on Medical Education. Updated March 25, 2020. <https://lcme.org/covid-19/>. Accessed July 10, 2020.
23. Besar Pengrian Hajah Siti Norainna binti Pengrian Haji. Situated Learning Theory: The key to Effective Classroom Teaching? In *HONAI: Int J Educ Soc Pol Cul Stud*. 2018;1(1): 49-60.



24. Drew C. Situated Learning Theory (Lave & Wenger)-Pros & Cons (2020). Available @ [Helpful-professor.com/situated](http://Helpful-professor.com/situated). Accessed July 10, 2020.
25. Kaufman DM, Mann KV. Teaching and learning in medical education: How theory can inform practice. In: Swanwick T, ed. *Understanding Medical Education: Evidence, Theory, and Practice*. WILEY Blackwell. 2014. 7-29.
26. Yurttas IS, Aktar I, Bardak M, Goeschl S. Institutional report for COVID-19 impact on medical education. A publication of European Medical Students' Association. Accessed on July 12, 2020.
27. Cohen J. Wearing medical scrubs in public in the age of coronavirus. *Forbes*. [Google.com/amp/s/www.forb](https://www.google.com/amp/s/www.forb). Accessed on July 15, 2020.