Short communication

Challenges and strategies adopted in dental education during COVID-19 pandemic: An institutionalized experience

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Abstract

The unprecedented outbreak of COVID-19 in 2020 has significantly affected the curriculum delivery and clinical dental practice in dental schools. Many dental schools across the globe were temporarily closed to prevent the spread of the virus. On 18th March 2020, Malaysia for the first time declared a total lockdown resulting in switching to an online learning platform with live lectures,live interactive sessions, online group discussions, pre-recorded theoretical lectures, case presentations, and electronic learning tutorials. In addition, all elective dental treatment was deferred, and only emergency dental procedures were carried out with strict standard operating procedures (SOPs). The dental curriculum across the dental schools are similar with regard to their contents, however, each dental school has had its own modification of the educational process with regard to Teaching and learning methodology. The common statergy adopted by all dental school was the cease of practical and clinical sessions, and the introduction of online teaching-learning activities. At Faculty of Dentistry SEGi University, we addressed some of the challenges that encompass various dimensions of teaching-learning and safety of students,and concurrently bringing in an innovative student-centric approach to education and their well-being. This paper aims to provide insight into the various challenges encountered during this pandemic, strategies adopted to overcome them at our institution, and a brief insight into future opportunities in teaching and learning in dental education.

Keywords: Dental Education, Dentistry, Online learning, Curriculum

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Introduction

The emergence of the new Corona Virus called SARS-Cov-2 in December 2019 and the World Health Organization's (WHO) announcement on 11th March 2020, COVID 19 as a pandemic has prominently affected dental education and delivery of patient care. The gravity of the pandemic has led to the implementation of lockdown measures and restricted academic face-to-face activities to curb the spread of infection by the Malaysian government.[1,2] This unprecedented disruption challenged the long-held beliefs in the dental education system, teaching and learning methods in dental schools and forced them to implement the new norms.[3, 4] Many dental schools around the globe have adopted online teaching and deferred preclinical and clinical training to avoid face to face contact among the dental staff, students and patients. Additionally, dental students, unlike other medical students, are highly vulnerable to contracting the virus owing to the nature of their clinical training akin to aerosol-generating

procedures and, proximity to the patient's oral cavity, which in turn has led to fear and anxiety among the dental students in addition to the various other academic and non-academic challenges.[5]

Although our school has successfully switched to online teaching, it was challenging to reinstate the preclinical and clinical training while ensuring safety among dental students, staff and patients. This affected their ability to apply gained knowledge and develop critical thinking in a clinical setting. Undoubtedly, switching to online learning and the lack of adequate clinical training during this pandemic has affected their competencies, thus resulted in underconfidence in performing dental procedures. Therefore, it was imperative to adopt a strategies that allowed online teaching and provided adequate clinical training by adopting the strict SOPs and guidelines for the dental practice.[5] Many dental schools have adopted unique ways of tackling these issues by implementing various innovative teaching and learning methods. The following section highlights some of the key challenges and strategies adopted by our faculty to overcome this pandemic.

Challenges and strategies used (Table 1)

1. **Mental health and well-being of dental students**

With the spread of COVID-19, the effect of lockdown on psychological well-being has been profound. Many dental students at our faculty expressed stress and anxiety, affecting their studies during the pandemic. The most common concern was isolation, the lockdown's unpredictability, and its implications on their immediate future.

To overcome the anxiety, we attempted to incorporate app-based meditation into the students' learning time (for some of them) for one month to improve their resilience and reduce stress. As a result, there was a positive impact on students with regards to resilience, awareness of thought patterns, emotions, and reactivity levels. The current generation is technology-friendly, and the same platform could be used to perform remote psychological support. This small approach made a huge difference to the cohort in terms of well-being and positive psychology approaches. [6]

Furthermore, we implemented the Online Mentor-Mentee Program (OMMP) to provide academic, moral, and psychological support to students. OMMP involves trained, committed, and empathetic faculty members as mentors who guide and support students in academic and personal matters using online virtual platforms. This program provided moral and psychological support to students and enabled them to communicate, socialize, and enhance their professional networking skills and confidence.[7]

Similarly, dental faculty members have been under significant pressure as they are expected to adapt to unfamiliar new methods of teaching quickly, assessment, comply with dynamic policies set by the university and professional bodies, and at the same time, keep students engaged and motivated during the pandemic. Additionally, online teaching and work from home culture resulted in difficulty in prioritizing their personal and professional schedules. Therefore, it was incumbent to provide essential training for dental faculty members to adapt to the new normal teaching strategies and reprioritize their professional goals and assigned responsibilities.[8]

2. Alternative teaching methods

After the implementation of the lockdown measures, online instruction replaced all the didactic classroom-based components of the curriculum using synchronous and asynchronous approaches. The faculty members utilized a variety of technological platforms to facilitate the delivery of virtual lectures, conduction of group discussions, seminars, PBL, and case studies. Many alternative teaching methodologies have been conducted to enhance student engagement. One such teaching methodology we adopted was using the Microsoft Whiteboard tool to ideate, create, and collaborate visually. This tool was used to teach periodontal surgery principles kinesthetically, including flap designs and incision principles. This mode of teaching demonstrated positive feedback in understanding these topics through remote access.[9] Moreover, emphasis was given to Online Peer Assisted Learning and Guided self-directed learning for effective utilization of available time. [5]

3. Patient care and teledentistry consultations

Due to the high-risk COVID-19 transmission in the dental clinics, elective dental treatment was suspended, and students and faculty members rendered only emergency treatment by following stringent SOPs. To address the patients' concerns, we have adopted the teledentistry consultations by students and faculty members to provide online patient consultations. Such consultations served as compensatory training for students for their canceled clinical sessions, external clinical training, and inadequate clinical exposure. Currently, Teledentistry is being used for online consultation, diagnosis, triaging, and monitoring of patients. Although this technique lacks the essential psychomotor assessment for students, it has proven to be very beneficial for ensuring continuity of patient care, prioritizing patients' needs, and potentially alleviating anxiety caused by significant delays in scheduling their appointments. Besides this, it also reduces the use of PPE and other precious clinical resources during the pandemic.[10] Additionally, patients were informed regarding the flexibility in operating our clinics through social media platforms and faculty websites and they were reassured regarding the measures taken to ensure their safety during dental appointments by year five students and faculty members.

We have redesigned the patient reception and waiting areas to reduce the close contact and ensure prompt physical distancing. Besides this, proper triage and pre-entry checkpoint for all patients, faculty, and students before entering the clinic was prepared. The use of hydrogen peroxide mouthwashes, rubber dams, and high-volume suction also was reinforced, as they minimized aerosol production.[11]

4. Achieving the Minimum Clinical Experience (MCE) and Expected Clinical Experience (ECE)

Adequate clinical training and hands-on experience with the patient are critical components in providing competent dental care with high confidence. In all the dental faculties in Malaysia, it is being guided by the achievements of MCE and ECE. MCE consists of quantitative (minimum number of requirement) and/or qualitative measurements according to rubrics of clinical assessment, whilst ECE comprises of expected clinical and procedural experiences prior to the final professional examination / graduation. Therefore, to give adequate clinical training, particularly for year five students, our dental program was resilient enough to extend

the end dates corroborated by the Dental Deans' Council, and additional clinical sessions were provided to complete their quota after the theoretical examination. Additionally, the Dean's caucus has revised and standardized the MCE and ECE requirement for dental students for graduation requirements with strict regulations and guidelines.

5. Assessments

Many dental schools have creatively used a variety of online tools during the pandemic not only for teaching but also for assessment. The assessment structure was redesigned and the question paper pattern was modified for ease of conducting the online examinations. We have conducted semester examinations and professional examinations using Blackboard, an online learning platform for teaching and learning. This platform provides a viable option for conducting various assessments. It is possible to incorporate different types of questions such as multiple-choice questions, Modified essays questions, short answer questions, virtual oral examinations, and video production for assessment.[12]

Numerous online platforms such as Kahoot, Socrative, etc. are also available to conduct regular assessments during the online classes. Despite the successful experience with online teaching -learning and online theoretical examination, it remains challenging to conduct clinical examinations. Assessment of the clinical competency, psychomotor skills, and patient management skills are the vital component of students' learning that cannot be compromised. Thus, we conducted the Objective Structure Practical Examination (OSPE) and Objective Structure Clinical Examination (OSCE) with stringent SOPs and physical distancing measures for all the students.

6. Research

Due to the repeated lockdowns, both basic laboratory-based and clinical-oriented research projects have been negatively affected, leading to a significant hindrance to the research productivity of faculty members. This has led to the delay in the completion of ongoing student and staff research projects and the termination of a few research projects. On the contrary, the scope for online research projects and manuscript writing and publication activities has been positively impacted during the lockdown as faculty and students utilize the time usually spent in the clinic and for patient care.[13]

Research related to COVID-19 has also been on the rise, and it may be an opportunity for researchers to pursue research in this domain even during the pandemic. To effectively utilize the available time and inculcate a positive attitude toward research, and innovation, our year 4 students were given an online research project which faculty members supervised to enhance their research skills during the lockdown.[14]

Furthermore, community-based MPU projects were carried out using online platforms and various social media sites such as Facebook and Instagram, which benefited students, patients, and the community. These webinar intended to make dental knowledge accessible to all ages through the comfort of one's home. The groups that took part, used the official SEGi Students Dental Society page along with the aid of the SEGi Students Council to have live real-time discussions with the objective of educating all viewers on the importance of oral care, and the feedback was quite encouraging.

7. Faculty Development Program and Collaboration

During this pandemic, several physical conferences, continuing education activities, and scientific meetings have been canceled. Alternatively, online conferences, summits, seminars, workshops, have been successfully conducted using online platforms at national and international levels. Their popularity and wide acceptance are attributed to their ability to overcome the place constraints of traditional settings, allowing professionals across the world to share ideas by utilizing technology that is readily available and accessible.[15] At SEGI university, we have successfully organized an online National Dental Students' Scientific Conference (NDSSC) 2021 to encourage dental students to interact, compete, and build fellowships with peers from other dental schools in Malaysia. Additionally, it also provided the platform for presenting their research projects online.

Future prospective in dental education

Although the pandemic has led to a plethora of challenges, it also brought many positive outcomes in dental education. Pandemic crises forced the majority of dental schools to challenge their conventional teaching and learning in dental education and swiftly adapt to online to ensure the continuity of teaching and learning. This was facilitated by the currently available online innovative technologies, which are expected to persist even after the pandemic. The most significant favorable outcomes that have emerged are the unpreceded level of connection and communication within the dental education community. This was reflected in enhanced educational cooperation, research collaborations, and freedom to create and share learning content.

Besides this, dental schools have gained invaluable learning experience in managing the unprecedented crisis and prepared dental educators for future unforeseen challenges in future. This also could bring an array of opportunities for students and dental faculty members to pursue online dental courses from different parts of the world.[16]

Albeit currently available technologies may suffice the theoretical teaching, they are still not equipped to completely replace the conventional hands-on clinical training offered in dental schools; nonetheless, few clinical domains can be tested online and there is scope for adopting the several alternative domains that may be a part of future of dental education. Present innovative technologies such as haptic, virtual reality, and augmented reality needs further enhancement and must be affordable and portable. These platforms mimic patients and aid in the virtual continuity of clinical education and assessment during crises time. [17] Dental schools must use this opportunity to embrace various applications and software focused on complex clinically based scenarios that can be used in virtual group discussions to improve student's decision-making and diagnostic skills. Concurrently, dental faculty members must focus on designing the various online modules, courses, and assessments for dental students. [18]

Pandemic crises have reflected the potential gaps in our existing curricula and scope for improvement. Dental schools must adopt stringent infection control protocols, and this topic must be comprehensively introduced into the dental curriculum. Teaching and practicing Teledentistry was also proposed as a potential solution to increase the acceptability with

patients. Teledentistry may persist after the current pandemic passes, particularly in oral medicine and surgery discipline therefore it is justified to inculcate this into dental curricula.[19]

Conclusion

The COVID-19 pandemic challenged the traditional curricular delivery methods and enabled dental schools to rethink alternative curricular delivery models and concurrently provided many opportunities. The majority of the challenges posed by COVID-19 were tackled creatively by dental educators by using new technological platforms. However, at present clinical training cannot be replaced with the existing technology.

Table 1: Summary of key challenges and strategies adopted by our faculty during the COVID-19 pandemic

Area	Challenges	Solutions
Teaching and learning		
Method of curriculum delivery	Unable to conduct face-to-face teaching of Didactic components such as theory classes, CBL, PBL, Seminars, Group discussions.	Switched to online using Microsoft Teams, Zoom, WebEx, Google meet, Blackboard
Preclinical practical's	Dental anatomy and tooth carving session	Live demonstrations of Online tooth carving sessions through online platforms and hands-on training sessions for students
	Preclinical prosthetic teeth setting	
	Sim lab exercises: cavity preparation, and crown cutting	Faculty members prepared the Pre-recorded videos of cavity preparation, and crown cutting and uploaded them in Blackboard.
Clinical sessions		Postponement of the clinical session to year 3 and 4. For Year 5 students, clinical sessions were conducted with stringent SOPs. Teledentistry consultations by students and faculty members to provide online patient consultation.
Demonstration of clinical and preclinical procedures	Unable to give a face to face demonstrations	Live demonstration sessions or prerecorded videos of clinical procedures such as scaling, crown cutting, impression procedures, orthodontic wire bending, preventive procedures, Lymph node examination, TMJ examination, intraoral

		and extraoral radiographic techniques…etc were uploaded to Blackboard by faculty members.
External clinical posting	MOH clinical posting	Conducted online for year 5 students
Assessment		
Mode of conduction		Conducted online using Blackboard
Short/ Formative assessment		Online Socrative, Kahoot ..etc
Graduation ceremonies		Conducted online
Examination Meetings		Conducted online
Patient Care		
Elective care		Rescheduled and Teledentistry was conducted
Emergency care		Provided with strict SOPSs or through teledentistry
Research		
Basic and clinical research		Conducted online
COVID-19 research		Increase in research activities related to Oral manifestations of COVID-19 and COVID-19 vaccine side effects.
Writing and publication		Increased, particularly in the field of systematic reviews, Cochrane Reviews, and metanalysis.

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