

COVID-19 Impact on Dental Clinical Education: An Observational Narrative

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KEYWORDS

COVID-19, pandemic, dentistry, online learning, dental education

ABSTRACT

As a means to combat the coronavirus disease (COVID-19) global pandemic, educational institutes were forced to stop the accustomed face-to-face teaching methods and adopt an online scheme to ensure the continuity of the education process. Furthermore, only a minimal period of clinical training was offered to the students during the pandemic and this highlighted the critical need to expand and improve the dental simulation curriculum. This article aims to highlight the impact of COVID-19 pandemic on the students and educators in dental schools. This perspective paper will also discuss the effectiveness of online teaching and the challenges in learning environment at the Faculty of Dentistry, Universiti Malaya during the pandemic, based on observations and published literature.

INTRODUCTION

The coronavirus disease 2019 (COVID-19) was declared a global pandemic in March 2020 [1]. Globally, governments have enacted either total or partial lockdown in an attempt to break the chain of transmission of the deadly SARS-CoV-2 [2] and this has affected most, if not all, aspects of life especially in the field of education [3]. Like many other countries, the Malaysian government officially promulgated the first Movement Control Order (MCO) in March 2020 to control the spread of COVID-19 [4]. Subsequently, significant ramifications affecting the economic and educational sectors were instantly tangible.

Schools and universities have been forced to shut down and embrace online classes as it was the only feasible solution to ensure the continuity of the educational process. However, "virtual learning" [5], as it has been coined, has shown many limitations; not all students have proper internet access, live in a conducive environment, and could afford the needed logistic support to name a few [6]. In an attempt to overcome these hurdles, the

Malaysian government took the initiative by giving free internet to all students [7]. Nevertheless, affordability, the flexibility of learning, accessibility, change of environment, and absence of visual cues are among the points discussed when evaluating the impact of online teaching on the educational process [8].

This article aims to discuss and highlight the impact of the COVID-19 pandemic on dental students, graduates, and educators at the Faculty of Dentistry, Universiti Malaya (FoDUM). This perspective article also underlines the challenges and effectiveness of online education during the COVID-19 pandemic based on observations and published studies.

EDUCATORS AND COVID-19

As lockdowns and home quarantines have become common in our way of living, work from home (WFH) became routine practice. Due to the pandemic, many educators had to replace their face-to-face (F-F) teaching methods with virtual substitutes. Besides the apparent difficulties of online teaching, some educators who were originally technophobes were extra-concerned with dealing with the technology, took more time,

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committed more errors, and generally performed more poorly [9]. Moreover, the sudden outbreak of COVID-19 did not give educators enough time to prepare for adopting an online teaching system properly [8, 10]. As the first local infection was detected in Malaysia in February 2020 and the Prime Minister announced the implementation of a MCO commencing on 18 March in which face-to-face teaching had to be replaced with online methods [4].

WFH has brought several advantages. Flexibility in finishing tasks without strictly complying with office hours is made possible. Additionally, no commuting is required, which not only spared the costs of transportation and petrol, but also resulted in less traffic congestion and environmental pollution [11].

Educators however must be aware that the connection and sense of being part of the teaching and learning community are somewhat missing in online education. Hence, educators need to be more innovative to create an interactive learning environment between facilitators and students. This requires preparation for the course long before the start date as every instruction, which would normally be communicated verbally in an F-F setting with minimal effort, needs to be explicitly and carefully written [12,13]. Moreover, careful and thoughtful planning of the course is needed as there is no room for changes while the course is in progress because instructors are unable to have regular meetings with the students. Also, most communication with the students is in writing, whether through emails or official announcements on an online management system, where there is a lag between posting and reading the announcements. This non-stop nature of online learning was found to be exhausting, time-consuming, and labour-intensive by educators [14].

Challenges in creating a virtual teaching environment

One of the problems concerning online teaching is monitoring the students during the online session [8]. When teaching online, faculty has minimal visual signals, and cues that are filtered through devices such as computer monitors. In physical learning, educators rely on several visual cues, a glance, for example, will reveal who is attentive, taking notes, pondering a difficult concept, or preparing to ask a question. It will also show educators who is frustrated, confused, or bored. However, in online teaching, these cues are filtered through monitors and devices. Consequently, we believe this may cause difficulty in conducting a stimulating teacher-class discussion where natural

spontaneity is substituted by distance and technological demands [14,15]. Therefore, educators will need to provide a logical flow of lessons and extra activities to assess and reinforce the learning abilities [14,16].

Online assessment and examination are another issues on online platforms although attendance and student participation are actively recorded. Also, online assessment offers several conveniences such as, saving students' responses, providing feedback easily, ease of statistical calculations of correct and incorrect answers, effortless analysis of results, and comparing students' answers [17]. However, instructors have reported several obstacles and barriers, such as the difficulty in identifying the students' identities. There is low integrity as there is no proof that the students did the work themselves. Also, in comparison to traditional examinations, cheating is a problem that is difficult to control [18,19].

Challenges due to resources in household

The world turned to the present digital technologies to provide solutions during the pandemic. The advanced digital channels have made WFH possible. However, the massive use of those channels has caused the online platform to crash and educational activities were disrupted [20]. Also, in a single household, some educators had to share their internet connection with their children; who have their online classes. Consequently, this will slow down the internet service reaching each user. Moreover, the infrastructure of many rural areas could not support high-speed connectivity [3,20]. At the commencement of the first MCO in Malaysia, 37% of the students did not have their own digital devices. Parents and children had to share devices as many could not afford to buy devices for each individual in the family which negatively affected the productivity during WFH period [21].

To bridge the digital gap, support families, and ensure efficient virtual learning, the Malaysian government announced students were eligible to apply for special data plan packages. Also, students were eligible for a free daily 1GB of data. Students from low-income families (B40) were also provided with laptops from the government and government-linked companies in 2021 [20].

The stress caused by virtual learning

Prolonged screen time practiced due to online classes and the surge in telecommunication during the pandemic led to more intense stress-related symptoms [22]. These symptoms can appear as

psychological, cognitive, or musculoskeletal disorders that may negatively affect an individual's quality of life or everyday function [23]. Also, many educators are required to, in parallel to online teaching, take care of their children and other family members who are present at home indefinitely due to the lockdown.

Among the psychological impairments are depression and sleep disturbances [24,25]. Furthermore, anxiety levels, development of mental health problems, and burn-outs are more prevalent in students and employees who frequently use computers and online applications, especially amongst extroverted personalities [25-27]. The symptoms were manifested in changes in eating habits, difficulty concentrating, and increased consumption of tobacco [28]. Other than the direct correlation between screen-time and psychological disorders, the change in the accustomed lifestyles has had its impact as well. The closure of schools and universities, postponement or cancellation of exams, and halting graduation ceremonies have further impacted the psychological well-being of students and staff [29].

Neck pain due to the continuous hunching over smartphones is the most prevalent physical harm. The prolonged and distorted positioning may also lead to ligaments, tendons, and muscle damage to the vertebral column [30,31].

Data security breaches

A data breach is a concern among many users. The platforms on which all learning activities are conducted are subject to privacy breaches, from hacking up to adware or even ransomware. This could result in the unauthorised alteration and/or destruction of educational properties such as identity theft, impersonation, and improper authentication [32].

STUDENTS AND THE COVID-19

Dentistry is an already stressful profession, and dental students face similar stress, amalgamated with academic pressure which seems to be constantly increasing [33]. Students face extensive coursework, the need to learn difficult clinical steps, and deal with patients who may be difficult to manage. Students also faced a global health crisis, school closures, interruptions in their curriculum flow, and challenges to improving and practicing their clinical skills. Students needed to adapt to the new standard operating procedures (SOPs) sanctioned by either the government or the

Ministry of Health or face a hefty penalty for those who failed to follow [4]. Violators of the MCO were subject to up to 6 months of prison and a fine amounting to RM1000 [34].

Some students have voiced their concerns about their health when schools and clinics reopen, also how well the proposed protocols will combat the ever-spreading disease [35-37]. A study conducted on 366 dental students reported more than half of the students expressed their concerns about contracting the virus after resuming F-F contact at universities and majority had fears of being infected while providing health care services, during class interactions, or from the school buildings [38].

Students have been greatly impacted by the shift to online classes. The absence of physical interaction has diluted the sense of belonging and responsibility of students. It was proven that when students have a high level of social presence and view their experience as personal, professional, satisfying, and fulfilling, they are more likely to engage their cognitive presence, resulting in improved learning [39]. Social interactions contribute significantly to the satisfaction and motivation of online learners [40].

Nevertheless, some of the benefits of online teaching include its convenience, as the sessions can be conducted anywhere and at any time. Furthermore, multiple delivery platforms offer advanced teaching tools without additional charge. However, this requires stable access to a high-performance device and a reliable internet connection. Some may argue that online education has created excitement and new challenges for both learners and educators [3]. A survey of medical students and faculty members showed that 70.7% of respondents claimed that the pandemic had enhanced their confidence in online medical education's efficacy, despite several challenges [41]. On the other hand, dental students in Universitas Indonesia preferred the classroom for group discussion over online learning, as they found it challenging to communicate and less satisfactory [42]. Furthermore, Amir LR et al. [42] also reported that most junior students only preferred online teaching over classroom teaching when their curriculum is based on introductory dental science courses and laboratory activities.

Challenges due to interruption of clinical sessions

With the total lockdowns enacted by the government in many states, the clinical sessions were constantly interrupted [4]. The suspension of F-F education by the Ministry of Higher education

led to students struggling to achieve the minimum number of clinical requirements set by the Malaysian Qualification Agency for graduation [43]. To graduate from dental schools, other than passing the final written examinations, students need to fulfil minimum clinical experience (MCE) and expected clinical experience (ECE), and demonstrate competency skills which are set by the Malaysian Dental Council (MDC) and Dental Dean Council (DDC). MCE is a quantitative measurement (minimum number) and is a prerequisite to competency assessment [44]. This ensures the minimum competency is met. ECE is the expected level of clinical experience of dental students, however, a competency test is optional. [45] MDC and DDC amended the MCE and ECE making them more achievable during the lockdown. For example, restorative procedures and root canal treatments on extracted teeth were accepted as a replacement for actual patients, and the required scaling and polishing cases were decreased from 10 patients to 7. Students were expected to perform 3 indirect restorations before COVID, this was reduced to 1 [46]. Despite these efforts in helping dental students realise their graduation requirements during the pandemic, students faced a difficult task that many did not achieve.

Furthermore, it was noticed students faced difficulties getting new patients or ensuring patient compliance in their clinical sessions. Some patients refused to continue the treatment, and many requested to postpone the treatment [47].

Modifications where face to face is mandatory

In general, those related to dental procedures; dental personnel or patients, are at greater risk of contracting COVID-19 infection, as many dental procedures are aerosol generating and there is a need for close proximity between the patient and the dentist [48]. Unfortunately, teaching clinical dentistry cannot be carried out on digital platforms only as dental students require to develop adequate psychomotor skills [49]. Recognising this fact, DDC and universities requested the governments to grant exceptions to dental students to return to their faculties for their practical and clinical sessions. Priority was for final year students as they had limited time to finish their minimal requirements and graduate. Consequently, on the 1st of July 2020 final year, final year students were allowed to recommence their sessions followed by students from first to fourth year on the 20th of July 2020 [45].

The Faculty's Health and Safety Committee made a lot of effort in ensuring that the students can

continue the clinical training safely by providing a suitable environment. Led by the Infection Control Committee, online channels were utilised to communicate the SOPs to students, educators, nurses, and administrative staff. The faculty entry points were reduced from six to two, temperature screening was performed at entry points, and alcohol hand-rubs were made available. Elevators were limited to only 4 at a time and infographic posters were placed on-site as a regular reminder of the SOPs. Furthermore, to limit airborne transmission of pathogens and SARS-CoV-2 during dental care and especially Aerosol Generating Procedure (AGP), FoDUM modified its polyclinics and installed HEPA filters. Self-contained dental treatment units (Pods) were built in polyclinics with barriers between adjacent cubicles to isolate dental chairs from each other making it safe to perform AGP within the pods. Moreover, 1-hour interval period between AGP sessions was mandatory to allow mechanical/natural ventilation and air change. Two different doors were assigned for entry and exit to decrease overcrowding. Also, the Faculty's Health and Safety Committee made sure enough personal protective equipment (PPE) was available which includes a 3-ply face mask or surgical mask or N 95/ KN 95 face mask, face shield, disposable gloves, gown, head and shoe covers. Rules were implemented that all students and staff must don PPE before entering polyclinics. Also, student to supervisor ratio was reduced from 1:5 to 1:1 or 1:2 [50].

Educators are still struggling to plan the best way to reach the intended clinical learning outcomes. The ongoing modus operandi follows local and international guidelines to limit the spread of infection, which is arguably effective in that aspect. However, these measures may prove inefficient to resolve the unprecedented situations during the ongoing pandemic due to the high cost to maintain the current SOPs, and limited clinic spaces, creating a huge backlog of patients due to postponed elective dental care.

Financial concerns of students during the pandemic

Students were worried about their financial situation; some were also anxious that they might not meet their financial obligations in the coming months [38]. Another major concern among students, especially final-year students, was finding a job after graduation, this was not a surprising finding as unemployment rates reached its highest during the pandemic [51].

The heavy repercussions of the pandemic affected both locals and international students. The broader economic impacts of the pandemic have led to significant hardships for the student sector especially international students who were stranded in their country of study [49]. Students resorted to finding part-time work to support their difficult situation however, as most economic sectors were already struggling, it was almost impossible for them to find a part-time job [49,52]. Furthermore, due to the pandemic mayhem, it was observed that some students did not receive their scholarships on time. It is likely students had to rely on their savings or support from their family members, which we believe will only raise more concerns and anxiety, as many families have been impacted by the pandemic. The lockdowns led to wage cut, delayed promotions, and even job terminations [22,53]. Furthermore, unexpected learning costs such as buying high-speed internet and the need to buy personal devices for the process of virtual learning have added to the unprecedented burdens. In an attempt to elevate the financial burdens, the Ministry of Higher Education in Malaysia provided a 20% fee discount to local students in public higher education institutes [54].

The complete change in normalcy by the pandemic and the financial impacts have changed student dropout rates, especially for students from lower income background. The expectancy of college students to complete a traditional 4-year degree has dropped from 71% to 53% [55]. Risk of student dropout tripled according to a study conducted in South Africa, with the highest rates among the poorer households [56]. Student dropout rates in Malaysia showed the same trend, as one of the main reasons for university student dropouts were financial constraints [57]. Naturally, deciding dropout is a gradual process. Students would not suddenly decide to abandon their plans. However, the persistent uncertainties and financial burdens has led to these increased rates.

DISCUSSION

With the current situation of unsettled COVID-19 cases in Malaysia, it may require more time to resume normal teaching. Even though it is the job of educators to ensure adequate students' performance, it is also critical to consider work commitment from their viewpoint. Confinement; due to lockdowns, is a different environment for them, and the latest transition to online learning was a particularly unique pedagogical experience.

Students welcomed the new platform of e-lectures and discussion boards to some extent. However, they also felt it is not a competent replacement for face-to-face clinical practice, and they agree that they are missing many educational opportunities [58].

It is observed, that dental students in particular cannot completely substitute F-F classes for virtual classes as students must learn to perform several clinical steps, develop psychomotor skills, learn patient management, how to handle and apply the different dental materials, complete their graduation requirements, and become more comfortable in a dental setting. This cannot be achieved by simulation or watching videos online. Studies show that students are less comfortable with their clinical skills because of the virtual education system adopted during the pandemic [43]. Students are less confident whether they can successfully perform in clinics post-graduation. Furthermore, students feel their clinical training during the pandemic was inadequate. New and improved dental simulation using virtual reality and computer simulation has been created and acquired by several universities [59]. However, these systems can only better prepare a student for clinical training and is not a complete replacement.

From an educator's view, online education has provided the freedom to deliver classes from any place. It saved the cost and time of commuting, some even moved away from the city to a more relaxing and slow-paced atmosphere. However, using online platforms could also mean being always available, educators found virtual learning as non-stop and labour intensive. They often spend their weekends and after-hours replying to correspondence and preparing for the coming course, which takes a longer time to prepare [12, 14]. Besides, some educators are required to, in parallel to online teaching, take care of their children and other family members who are present at home indefinitely due to the lockdown.

The financial impact of the pandemic has been catastrophic. Businesses have been closed. Employees have lost their jobs, and been subjected to wage cuts or promotional delays. This has only raised the level of anxiety. Psychological stress due to financial concerns is a common by-product of the pandemic. Caretakers had to take from their savings to provide for themselves and their families. Students as well felt they would not be able to pay the tuition fees in the coming semesters, and due to the high unemployment

rates, felt they would not find a suitable job after graduating [49, 53].

It is, therefore, beneficial to create new and perhaps more adaptive teaching methods or strategies with a greater level of technology on online learning platforms without any F-F contact at these unprecedented times [60]. Several studies concluded that digital classrooms could be successfully used in tertiary education to have an appropriate technical environment and to support them [61]. According to Soo and Hup (1998), there is a list of websites that might be beneficial for online teaching [62]. These websites provide links to tutorial videos, study materials, lecture notes, articles, and interactive software for various dental disciplines. Even though this was two decades ago, it shows that dental educators have not fallen behind other healthcare careers when it comes to using technology.

In the future, more studies need to be conducted to improve the quality of online teaching and, at the same time, to broaden the learning activities available online. Ultimately, educators and students need to take actions and anticipate the various possibilities to minimise the detrimental effects of such pandemics on dental education, and to prepare for any similar catastrophes in the future. The duration of this F-F teaching cessation remains uncertain and dental colleagues must consider the possibility of the emergence of

another wave of COVID-19. Therefore, Dental colleges must seek an efficient, powerful as well as cost-effective strategy to ensure the continuation of practical skills in dental education.

CONCLUSION

The COVID-19 pandemic had greatly impacted our dental education system. The shift to virtual learning during lockdowns has made the continuity of education possible; however, it was hindered by many challenges and problems. Financial burdens, physical and psychological stress, poor resources, security breaches are among the main challenges to an efficient online learning process. Also, for dental students in particular F-F learning was irreplaceable for clinical training. Nevertheless, frequent interruptions, reduced number of patients, and difficult SOPs greatly impacted the process. This caused a significant decrease in the period of clinical training for students in terms of procedures performed and consequently highlighted the critical need to expand and improve the dental simulation curriculum.

DECLARATION OF INTEREST

None declared.

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