

## ORIGINAL ARTICLE

# Education Perception, Experience, and Anxiety Level Among Undergraduate Dental Students in Malaysia During the Covid 19 Pandemic

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## ABSTRACT

**Introduction:** This study aims to explore the dental students' educational experience, the protocol consideration after school reopening and their physical health during the COVID-19 pandemic. Secondly, to evaluate the anxiety level of dental students during the COVID-19 pandemic. **Method:** A cross-sectional survey was distributed with a hyper-link, reported as frequencies and percentages. A univariate analysis was used to explore the significant associations between demographic variables and anxiety levels. The risk factor was also identified using regression analysis. A two-tailed  $p < 0.25$  was considered significant. **Results:** A total of 333 respondents participated in the survey. Half of the respondents (42.3%) were comfortable with distance learning but worried about passing their examination and completing their clinical requirements. The transitioning to the online course by the lecturer was documented as effective. Despite missing academic sessions, only 15.3% were willing to replace the loss of educational experience. The majority of students (85.9%) believed that masks should be worn in school, but varied perceptions on wearing gloves and frequent COVID-19 testing. For physical health, mostly concerned about contracting the virus after the school reopens. For their anxiety level, nearly half have mild ( $n=99$ ), moderate ( $n=55$ ), and severe ( $n=36$ ) levels. The factors were mainly associated with gender, household income, type of university, and respondent's accommodation. **Conclusion:** As positive feedback was recorded towards online learning, constant improvement is needed to ensure the possibility of hybrid learning, even after the pandemic. The physical and psychological health of dental students should be a priority, to ensure a smooth transition during these unprecedented circumstances.

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## INTRODUCTION

The novel coronavirus disease 2019 (COVID-19) has spread globally and become the most significant public health crisis in the 21st century. The consequences are mainly the modification of lifestyle, health, well-being, businesses, relationships, work, education, and financial situations resulting from lockdowns, strict isolation, and social isolation (1-4). This was also the case in Malaysia, where cases has risen exponentially around March 2020, causing a long period of isolation during the 'Movement Control Order' (MCO) to control

the viral outbreak (5). While the number of daily deaths and positive cases appears to have reduced substantially by August 2020, the outbreak is still ongoing with a high number of cases reported each day to date (1). Far from over, the emergence of Delta and Omicron variants has caused uncertainty about the duration and intensity of this pandemic since it remained throughout 2021 (6).

Students are affected by the closure of institutions especially when their normal face-to-face routine is shifted to virtually all of a sudden. This is expected to have implications on their learning experience and psychological well-being. They may have a lack of motivation towards their studies; neglect their daily routines, feel uncertain, develop pressures to learn independently, and the potential to drop out of the university (7, 8). Along with the academic stress with

lack of support from family who may experience a range of distresses, unprecedented psychological health may occur and this issue may require investigations and immediate intervention (8, 9).

Previous literature has recorded a negative influence of pandemics on students' psychological well-being (10). In China, 24.9% out of 1210 respondents were afflicted to experience anxiety symptoms that were positively correlated with academic delay and financial effects (11). In Japan, the university showed the most severe depressive states (5%) when compared with Chinese (2.3%) and Korean students (1.3%) (12). In North America, out of 195 respondents, 138 (71%) indicated increased stress and anxiety during the outbreak (9). In France, 11.4% out of 69054 students were in severe distress and 42.8% reported high anxiety during COVID-19 (13). The most recent study in Malaysia has reported that roughly 20% (988 respondents) reported mild anxiety, followed by 6.6% with moderate anxiety and 2.8% experiencing severe anxiety (14). The main stressors are financial constraints, remote online teaching, and concern about their future academic and career. With this percentage reported in some of the continents, immediate attention is necessary to investigate the impact of this pandemic on the students' experience and their psychological well-being (10).

Dental education is not excluded from the impacts of COVID-19. As a result from physical distancing measures, dental institutions have radically shifted from traditional face-to-face teaching and hands-on training to virtual methods via online platforms (14). Despite these best intentions, the nature of a dentistry course still requires preclinical laboratory work and hands-on clinical practice with patients as part of the educational process. Preclinical work with social distancing in the simulation laboratory is critical to help the student compensate for the lost educational time during the lockdown period.

Furthermore, the educational activities in the dental school pose a greater risk of infection among the students considering the ease of virus spread through nasopharyngeal and salivary secretions of the affected patients, difficulty to space out the students, and potentially can create a virus-laden aerosolized environment (15). Therefore, to address the challenges caused by the COVID-19 pandemic, the Malaysian Dental Council (MDC), Ministry of Higher Education (MOHE), and Ministry Of Health (MOH) encouraged dental schools to follow policies and guidelines and make safe decisions for the faculty, students and patients (16). A comprehensive standard operating procedure for infection control has been implemented to prevent cross-contamination between patients and professionals (2, 16). Furthermore, dental schools have made some modifications to the requirements and competency assessments to suit with the current situation (1, 16).

As dental schools are cooperating well with the new educational environment, limited information is available to explore the dental students' experience, perception, and the impact of this pandemic on their psychological well-being. Having a deep understanding of students' perspectives and collecting their views are vital for universities, faculty, and policymakers to provide a robust dental education in a new reality. A study from Malaysia from a public university has concluded that undergraduate dental students were able to adapt to online learning, however, they were concerned about their physical and mental health (17). Findings from another study stated that the COVID-19 pandemic significantly impacted dental education and students were generally concerned about their mental health, financial health and academic performance (18). However, as compared to other studies, this study involved dental students from all thirteen public and private universities in Malaysia and more detailed analysis were done regarding the factor that impacted the most on their psychological health during the COVID-19 pandemic. The first objective of this study is to explore the dental students' educational experience, the protocol consideration after school reopening as well as their concern for their physical health during the COVID-19 pandemic. Secondly, to evaluate the psychological health of the dental students during the COVID-19 pandemic through the Generalized Anxiety Score (GAD-7).

## **MATERIALS AND METHODS**

### **Study design and sample size**

This study was designed as a cross-sectional study and in compliance with the guidelines of strengthening the Reporting of Observational Studies in Epidemiology (STROBE) (19). Ethical approval was obtained from the Universiti Teknologi MARA (UiTM) Human Ethics Advisory Committee (Ref No: REC/04/2021(UG/MR/423). The target sample size involved dental undergraduate students from all 13 dental schools in Malaysia (six public dental schools and seven private dental schools). The respondents in the target population were recruited by proportionate sampling according to the number of dental students in the university using a sample size calculator from Epi Info™ Companion for Android (Version 1.4.3). A total of 346 respondents were recruited in this study after adding the 30% non-response rate. A total of 333 out of 346 recruited participants responded (90% response rate). The data were collected between 1st June 2021 to 30th July 2021.

### **Questionnaire**

The survey was delivered through an online questionnaire from the study by Hung et al. 2020, that was adapted and reviewed by a panel of experts for content validation for the reliability, ambiguity, clarity and simplicity of the questions (4). A cover letter was delivered through WhatsApp messages and e-mailed

together with a hyperlink that redirected respondents who agreed to participate in the study via Google Forms.

The questionnaires comprised of five structured sections related to demographic information which includes gender, region, source of household income, type of institution, ethnicity and among others. They were also inquired about their educational experience, the protocol consideration after school reopening as well as their concern about their physical health during the COVID-19 pandemic in sections two, three, and four respectively. To ensure the respondents are focused during the pandemic, the survey items had a statement with 'During the COVID-19 Pandemic' (4). The last section focused on the students' psychological health concerns through the GAD-7 questionnaire. Respondents reported their symptoms using a Likert scale ranging from not at all (0) to nearly every day (3) within the two weeks, with a total score recorded from 0 to 21(20). The GAD-7 recorded has an excellent internal consistency (Cronbach's alpha = 0.911) and is a validated screening instrument for measuring anxiety levels (11).

### Data Analysis

Data were analyzed using SPSS version 26. Descriptive statistics analysis was conducted to explore the demographic distribution of the respondents. The continuous variables were reported in means and standard deviations (SD). The respondents' questionnaire data that were the ordinal and categorical variables were reported as frequencies and percentages. For objective two, a univariate analysis (Pearson's Chi-Square) was used to explore the significant associations between demographic variables and the psychological health levels during the COVID-19 pandemic. A two-tailed p-value <0.05 was considered as significant. Among the variables, simple and multiple logistic regressions were performed to identify the factors associated with anxiety levels that were dichotomized into (code 0= no anxiety, code 1 = anxiety) (3). Simple logistic regression provided preliminary results on potential associated factors (p-value <0.25) to be included into the multiple logistic regression analysis.

## RESULTS

### Demographics Analysis

A total of 333 responses (90% response rate) with a mean age of 22.6 (SD=1.74) were received. Most of the respondents were Malay (80.2%), female (76.6 %), and studying in public universities (81.1%). The respondents were mainly from M40 (47.4%), followed by B40 (28.2%) and T20 (24.3%). During the two periods of MCO (Movement Control Orders) 57.7 % of students stayed in their family houses, 22.5 % stayed in the campus accommodation while the remaining students rented a house with a dental student friend (17.4%), non-dental student friend (1.5%), and rented alone (0.9%). Further demographic details are shown in Table I.

Table I: Demographic details and the anxiety levels of the students

Demographic Variables	Value
Age in years – mean (SD) [range]	22.6 (1.74) [16]
Gender – n (%)	
Male	78 (23.4)
Female	255 (76.6)
Ethnicity – n (%)	
Malay	267 (80.2)
Chinese	49 (14.7)
Indian	11 (3.3)
Others	6 (1.8)
Household income – n (%)	
B40	94 (28.2)
M40	158 (47.4)
T20	81 (24.3)
Year of studies- n (%)	
1 <sup>st</sup> year	18 (5.4)
2 <sup>nd</sup> year	47 (14.1)
3 <sup>rd</sup> year	131 (39.3)
4 <sup>th</sup> year	95 (28.5)
5 <sup>th</sup> year	42 (12.6)
Type of university – n (%)	
Public university	270 (81.1)
Private university	63 (18.9)
Current accommodation – n (%)	
Family's house	192 (57.7)
On campus accommodation	75 (22.5)
Rented house with dentistry friends	58 (17.4)
Rented house with non-dentistry friends	5 (1.5)
Rented house alone	3 (0.9)
Source of your COVID-19 infection – n (%)	
Never been diagnosed	319 (95.8)
From unknown source	8 (2.4)
From family or relatives	5 (1.5)
From patients	1 (0.3)
Students' anxiety levels – n (%)	
Normal	144 (43.2)
Mild	99 (29.7)
Moderate	54 (16.2)
Severe	36 (10.8)

### Assessment of Educational Experience During COVID-19

Most of the students were neutrally comfortable (42.3%) about online teaching and were concerned (34.5%) about the quality of online teaching. They were also extremely concerned about passing the examination (43.5%) and completing their degree on time (49.8%). Nearly 39.3% often have difficulty focusing on schoolwork and 33% often have difficulty finding the motivation to study. Regarding the effectiveness of the school's response towards the COVID-19 pandemic, the majority has neutral (44.4%) opinion and thought that their school was somewhat effective in transitioning to the online course (46.8%). Opinions about the lecturer's clinical experience during school closure showed a neutral (42.6%) response. Out of all the responses, 46.3% felt that the lecturer/professors were somewhat effective in teaching online during school closures, 33.0% feels sometimes they were effective, 14.4% were extremely effective while 3.6% and 0.6% were somewhat effective and extremely ineffective respectively.

### Assessment of Protocol Considerations After School Reopens

When the students were asked about their willingness to replace the loss of educational experience by canceling their break, only 15.3% were willing to do so. Only small respondents (7.5%) were also willing to attend school for 12 hours a day to replace the lost session. When the alternative of coming 6 days a week are suggested, 33.3% of respondents were probably willing to make up for their educational experience lost. When the school reopens, 85.9% felt that everyone should wear masks in school. For wearing gloves, an even distribution was recorded where 24.0% thought that everyone should often wear gloves and 20.1% believes that they should be worn occasionally. Opinions about testing for COVID-19 also varied, with 36.6% thought daily testing should be done occasionally and 23.1% often favored for weekly testing.

### Assessment of physical health concerns after school reopens

Out of all respondents, 49.8% were concerned about their physical health, with more than half were extremely concerned that they might be contracting

COVID-19 from providing patient care in the clinics. 35.1% of respondents were extremely concerned about contracting the virus from attending face-to-face classes, and 42.9% were extremely concerned about contracting it from interacting with people in the campus buildings.

### Level of anxiety and factors influencing dental students' anxiety during the COVID-19 pandemic

Table I also shows how the psychological health of the respondents was affected to varying levels during the COVID-19 pandemic. Of the 333 respondents, about one-third (n=144) had no symptoms of anxiety, whereas the remaining respondents has mild (n=99), moderate (n=55), and severe (n=36) levels of anxiety. The results from the chi-square analyses for the relationship between the respondents' demographic variables and anxiety levels are presented in Table II.

From the simple logistic regression analysis, three variables were found to be potentially significant (p<0.25) which were gender, type of university and current accommodation. These variables were included in the multiple logistic regression analysis, and two variables were found to be significant (p<0.05) which

**Table II: Univariate analysis of the students' anxiety level and the relation to demographic variables using Chi-Square test**

Variables Demographics	Students' anxiety levels				Chi Square Test	p-value
	Normal, n (%)	Mild, n (%)	Moderate, n (%)	Severe, n (%)		
Gender- n (%)					5.851	0.121
Male	41 (52.6)	23 (29.5)	10 (12.8)	4 (5.1)		
Female	103 (40.4)	76 (29.8)	44 (17.3)	32 (12.50)		
Ethnicity- n (%)					4.567	0.6
Malay	110 (41.2)	84 (31.5)	45 (16.9)	28 (10.5)		
Chinese	24 (49.0)	13 (26.5)	6 (12.2)	6 (12.2)		
Indian & others	10(58.8)	2 (11.8)	3 (17.6)	2 (18.2)		
Household income- n (%)					8.476	0.205
B40	40 (42.6)	34 (36.2)	10 (10.6)	10 (10.6)		
M40	69 (43.7)	47(29.7)	24 (15.2)	18 (11.4)		
T20	35 (43.2)	18 (22.2)	20 (24.7)	8 (9.9)		
Year of studies- n (%)					2.225	0.527
Preclinical years	29 (44.6)	17 (26.2)	9 (13.8)	10 (15.4)		
Clinical years	115 (42.9)	82 (30.6)	45 (16.8)	26 (9.7)		
Type of university- n (%)					6.345	0.096
Public university	112 (41.5)	86 (31.9)	40 (14.8)	32 (11.9)		
Private university	32 (50.8)	13 (20.6)	14 (22.2)	4 (6.3)		
Current accommodation-n (%)					14.067	0.029
Family's house	97 (50.5)	47 (24.5)	30 (15.6)	18 (9.4)		
On campus accommodation	23 (30.7)	31 (41.3)	14 (18.7)	7 (9.3)		
Rental house	24 (36.4)	21 (31.8)	10 (15.2)	11 (16.7)		
Source of COVID-19 infection-n (%)					1.207	0.751
Never been diagnosed	136 (42.6)	96 (30.1)	52 (16.3)	35 (11.0)		
Have been diagnosed	8 (57.1)	3 (21.4)	2 (14.3)	1 (7.1)		

are gender and living on campus. The odds of having anxiety is lower among females (aOR= 0.57; 95% CI= 0.33-0.97) whereas the odds of having anxiety for those who stayed on campus is lower than other types of accommodation (aOR=0.54; CI=0.30-0.97) (Table III).

## DISCUSSION

Dentistry is known to be one of the stressful professions in the healthcare industry (10, 15). In the dental education itself, the period of learning theory, adapting to communication skills, and exposure to extensive clinical training has caused dental students to face a similar stressor (8, 10, 21). With the global pandemic, dental students are vulnerable to additional stress when they have limited preclinical and clinical exposures during school closures (8, 10, 15). The disruption also caused anxiety which lead to the deterioration of their psychological health and impaired their concentration in learning, especially when it was done remotely (8). Therefore, this cross-sectional study allows collecting information from dental students related to their educational experience, the experience with school protocol, and health concern after the school reopens. Furthermore, their anxiety level and factors associated

with it were also explored.

For the educational experience, students generally rated positive feedback for remote teaching during COVID-19. This finding has mostly concurred with the previous studies, which record a good response from online learning (4, 22, 23). With this positively rated response, this crisis has created an opportunity for the dental faculty to leverage technology by delivering lectures and practical preclinical videos remotely (24). Furthermore, learning through an online platform has shown to have several advantages, such as less time traveling and facilitating note-taking through the pre-recorded class (23). While these may enhance dental education, the pandemic has negatively affected the student's thoughts towards passing their dental exam and whether they can complete their degree within the allocated time. This feeling was mainly due to dental education's practical nature, the completion of dental requirements that need physical attendance and the need for communication with patients for them to be able to graduate (8, 23). Furthermore, the loss of supporting network from friends, a non-conducive study environment, staying at home orders may cause the difficulty to focus on school work. They may also lose their motivation because they

**Table III: Simple and multiple logistic regression analysis of contributing factors associated with anxiety (anxiety=1 or no anxiety=0) the students**

Variable	Simple Logistic Regression		Multiple Logistic Regression	
	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Gender				
Male*	1		1	
Female	0.61 (0.37,1.018)	0.059	0.57 (0.33,0.97)	0.039
Household Income				
T20*	1			
M40	0.98 (0.57,1.69)	0.946		
B40	1.03 (0.56,1.87)	0.93		
Year of Studies				
Preclinical*	1			
Clinical	0.93 (0.54,1.61)	0.803		
Type of University				
Public*	1		1	
Private	1.46 (0.84,2.52)	0.181	1.42 (0.80,2.52)	0.229
Current Accommodation				
With family*	1		1	
On campus	0.56 (0.31,0.99)	0.048	0.54 (0.30,0.97)	0.042
Renting	1.29 (0.64,2.60)	0.474	1.32 (0.64,2.74)	0.454
Have been diagnosed with COVID-19				
No*	1			
Yes	1.79 (0.61,5.29)	0.289		

were mainly overwhelmed, distressed, and feel tired to participate in the theoretical learning activities (22). Therefore, it is recommended to use a platform with a live chat function, allowing for more case discussion rather than lectures or one-way communication to keep the audience's attention. (25) Additionally, modification of clinical requirements, adjustment of the academic calendar, and eligibility criteria for the final examination is an alternative to allow graduation on time (22, 26).

Concerning the protocol of school reopening, respondents were surprisingly unwilling to replace their missing session. Despite expressing their concern about their clinical examinations, most of the respondents are not keen to add an extra day or work on Saturday. However, these findings could be biased due to the distribution of the respondents, where they were mainly from public universities who received scholarships and funding. Their concern about paying extra tuition fees is less as compared to private students. If a crisis persists, it may positively impact the commitments of private funding students who are willing to replace their session within the allocated time to prevent additional fees and vice versa for public university students (4, 27, 28). To overcome the lack of motivation, proper mentoring and support by the lecturer would be paramount for students to be well-prepared for the challenges ahead or tasks that need to be completed (28). Weekly emails with the heartfelt motivational message from counselors, technical and emotional support from the university administration an effective interaction could alternatively develop students' full readiness to perform (29).

As for the student's perception of the preventive measures after the school reopens, the use of a mask was mostly preferred after the school reopens, which is mostly similar to other previous studies (4, 23, 27). On the other hand, the use of gloves and frequency of COVID-19 testing were less recognized as preventive measures to avoid the spread of the COVID-19 virus. This could be influenced by the period of this study itself where proper guidelines were not established yet for the students to understand the risk factors of the disease (27). Furthermore, the response might present information bias due to the non-availability of self-testing, which refers to the tendency of the respondents to choose their opinion based on polymerase chain reaction (PCR) test or antigen rapid test (RTL) that undoubtedly involves higher costs and inflicts pain during testing (30).

The respondents in this study showed a negative perception about COVID-19 with mostly concerned on the risk of getting infected. The fear of contracting the disease was similarly reported among dental students and dental professionals, especially when it is related to aerosol generating procedures (AGP) (10, 15). Furthermore, the presence of the virus in saliva for as long as 29 days after patient's recovery could also

worsen the perception of contracting the virus from patients. (15) Fortunately, the use of personal protective equipment (PPE) and high volume suction among dental personnel resulted in a low infection rate (16, 31, 32). As they are limited evidence relating to dental aerosols and viral transmission, dental schools should re-evaluate the clinical policies with the assumptions of continuous infection risk even in the future (31, 32). Additionally, the dental school should continuously provide an efficient tracking of potentially infected lecturers, students, and staff (27). On a positive note, this threat has encouraged the need for further investigations into the risk of dental aerosols, and various approaches to mitigate these risks. Furthermore, as COVID-19 has lived in the community for nearly two years, most dental schools have already identified the gaps to improve the school preparedness for future pandemics (14, 24, 27, 31).

Few studies have reported the feeling of fear and stress due to public health emergencies (8, 11). The stress level was previously measured with various levels including the stress scale (DASS), state-trait anxiety inventory (STAI), dental environment stress (DESS), and psychological general well-being (PGWB) and GAD score (8, 10, 11). In this study, the GAD score was preferred because they allow the assessment of anxiety at a certain time and is appropriate for psychological variations, such as pandemics (20). From the GAD score, the survey indicated nearly half of the respondents experience various levels of anxiety which is ranging from mild to severe. The anxiety level from this study was mainly associated with gender, type of university, and respondents' accommodation. The odds of anxiety was 57% lower among female students, which is contradictory to other studies where, generally females have a higher risk to have anxiety in comparison to males regarding COVID-19 according to studies by Savitsky et al and Debowska et al (33, 34). However, there is one report which suggests men tend to have more depression and anxiety compared to women regarding the impacts of COVID-19 on their life; especially in employment and loss of income while women are more anxious about the physical symptoms of the disease. (35) Moreover, the females are more articulate with their worries and emotions than males which are more prone to avoid expressing their emotions (3, 36). Our study might have selection bias as the respondents in this study are predominantly female students. Students who studied in a private university has a slight increased risk to have anxiety aOR=1.47 during the pandemic. However, this finding is not statistically significant. This may due to the financial concerns of the university fees that are still imposed and the inability of completing their studies on time (3, 18). Students staying in campus have 54% lower odds of getting anxiety in comparison to those who stayed with their family. This may be due to the concern of not being able to focus on their studies at home due to the presence of other family members. Students may be concerned that they will contract the

coronavirus from other family members or infecting them and vice versa (37).

For the limitation of our study, our results were recorded within a certain period of the COVID-19 pandemic. As this is a cross-sectional study, the response may present biased and varied according to a different phase of pandemic, different countries, and regions (32). Moreover, the recency bias was increased when too much information was provided too quickly, especially during the COVID-19 pandemic (27). Therefore, it might negatively affect the respondent's perception about the clinical education, practice, and anxiety level during the COVID-19 pandemic. Nonetheless, this survey has presented different perceptions and anxiety levels of dental students in Malaysia, which may reinforce the education during unprecedented circumstances. Further research on the specific reasons for the dental students to have anxiety during the COVID-19 pandemic should be investigated to get a deeper understanding of this phenomenon.

## CONCLUSION

Most dental students have positive feedback towards online learning, thus constant improvement is needed to ensure the possibility of hybrid learning, even after the pandemic as it is becoming the new reality in dental education. More than half of the dental students involved in this study has varying levels of anxiety from mild to severe. In this study, female students and those who stayed on campus has lower odds to have anxiety during the COVID-19 pandemic. The physical and psychological health of dental students should be a priority, to ensure a smooth transition to the regular rigorous standards of education and clinical training for dental students.

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