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**Psychological Responses in Academic Life amidst the COVID-19 Outbreak:
An Undergraduate Dental Student Perspective in Indonesia**Sri Pandu Utami^{1,5}, Rheta Elkhaira^{2,4}, Intan Batura Endo Mahata^{3,6}, Valendriyani Ningrum^{3*}

1. Department of Pediatric Dentistry, Faculty of Dentistry, Baiturrahmah University, Padang, Indonesia.
2. Department of Oral Biology, Faculty of Dentistry, Baiturrahmah University, Padang, Indonesia.
3. Department of Preventive and Public Health Dentistry, Faculty of Dentistry, Baiturrahmah University, Padang, Indonesia.
4. School of Science and Technology, Kwansei Gakuin University, Kobe Sando, Japan.
5. Faculty of Dentistry, Hasanuddin University, Makassar, Indonesia.
6. Department of Public Health, Medical Faculty of Andalas University, Padang, Indonesia.

Abstract

The study aims to analyse the psychological responses and associated factors in academic life during the COVID-19 outbreak among undergraduate dental students in Indonesia.

A cross-sectional study was conducted to analyse the psychological responses of undergraduate dental students and related factors during the COVID-19 outbreak through quantitative approaches. The study involved sociodemographic data (gender, marital status, and types of housemates), academic factors (academic year, learning system, and learning method during the pandemic), internet access factor, psychological assessment (Depression Anxiety and Stress Scale-21, Indonesia Version). An online survey was completed by 427 undergraduate dental students in Indonesia.

The study showed that among 427 students who participated in this study, 130 (30.4%) screened for depression, 248 (58.1%) screened for anxiety, and 129 (30.2%) screened for stress. Students who were male ($p < 0.05$), used conventional learning systems ($p < 0.05$), and lived separately from their parents ($p < 0.01$) had a correlation with anxiety. The conventional learning system was a significant mediator explaining the path from universities outside Java Island to psychological stress ($p < 0.05$).

These survey results clearly illustrate that an overwhelming majority of undergraduate dental students in Indonesia have experienced psychological distress during the early phase of COVID-19 outbreak. The study reveals that gender, types of housemates, and academic factors were the risk factors of a psychological distress among the undergraduate dental student. The role of the university in curriculum and policy to minimise psychological distress.

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Introduction

Coronavirus is a type of virus that causes disease in animals and humans. Several types of viruses are known to cause respiratory tract infections in humans, ranging from cold coughs to more serious diseases that can lead to death.

Coronavirus disease 2019 is caused by a new type of coronavirus (COVID-19; WHO, 2020). The COVID-19 infection was first reported in China at the end of December 2019. The COVID-19 outbreak in 2020 is not yet under control, with a high risk of spreading globally¹. The condition causing varying degrees of illness. Patients often present without fever, and many have no abnormal radiological findings².

The COVID-19 pandemic is an international public health problem³. In response, the Indonesian Ministry of Education adopted an online learning policy starting on March 27, 2020, to reduce COVID-19 transmission in all educational institutions. Compulsory physical

***Corresponding author:**

Valendriyani Ningrum
Department of Preventive and Public Health Dentistry,
Faculty of Dentistry, Baiturrahmah University,
Padang, Indonesia.
E-mail: valend888@gmail.com

distancing is a regulation that has been adopted in a number of nations, including Indonesia. According to this regulation, dental academic institutions are required to make necessary and timely changes to continue to provide education and maintain student enrolment. Teaching and learning activities were quickly switched to an entirely online learning model⁴. Pandemic settings, disparities in the curriculum employed (i.e., problem-based learning vs. traditional learning), unequal internet access, and shifts in learning methods from offline to online are all regarded as contributing factors in dentistry programs in Indonesia that need to be investigated further. The situation has had major effects on all aspects of life, including emotional effects such as anxiety, stress, and depression⁵⁻⁹. Previous research revealed that 11.7%, 33.6% and 11.7% of pharmacy students had clinically significant depression, anxiety, and stress respectively¹⁰. Cao's study on Changzhi Medical College medical students reported that higher levels of anxiety are associated with factors strongly associated with COVID-19, in which 0.9% of respondents experienced severe anxiety, 2.7% experienced moderate anxiety, 21.3% experienced mild anxiety and 78.1% experienced no anxiety¹¹. In Malaysia, of 983 respondents, 20.4%, 6.6%, and 2.8% experienced minimal to moderate, severe, and the most extreme levels of anxiety, respectively. The main stressors include financial constraints, remote online teaching, and uncertainty about the future of academic programs and careers¹².

Teaching in dentistry is not only about learning theory but also about practical learning. Practical learning using online channels has unique challenges. Among 697 dental students in Saudi Arabia, 60.64%, 37.02%, and 34.92% reported increased level³ of depression, anxiety, and stress, respectively. Significant differences in mental health outcomes for gender, university, and survey time were evident¹³.

In a pandemic situation, analysing the psychological condition of dental faculty students during the COVID-19 crisis and quarantine is crucial to developing measures and implementing psychological interventions that are properly adapted to this situation. Such efforts may help mitigate the potential adverse effects on education and mental health among undergraduate dental students. The aim of this study was to analyse psychological responses

and associated factors in academic life during the COVID-19 outbreak among undergraduate dental students of Indonesia.

Materials and methods

Study design and study population

A cross-sectional survey with random sampling was conducted to analyse the psychological responses of undergraduate dental students and related factors during the COVID-19 pandemic by collecting quantitative and qualitative data. The study was performed on 582 Indonesian undergraduate dental students, and 427 final participants completed the survey. Data collection was conducted at the beginning of the 2020–2021 academic year. To minimise face-to-face contact and to facilitate participation by all students in Indonesia, we used an online survey that was shared on WhatsApp social network groups. All participants provided informed consent at the beginning of the survey by responding to an agree–disagree question to verify their willingness to participate in the survey. Independent variables included demographic information (gender, marital status, and types of housemates), academic factors (academic year, learning system, and learning method during the pandemic), and another related factor (internet access).

Study instruments

The study instruments included questions on sociodemographic information and the Indonesian version of the Depression, Anxiety and Stress Scale with 21 items (DASS-21)¹⁴ to screen for psychological distress¹⁵. Items consist of statements relating to the previous week, and respondents are asked to read these statements and rate the level of negative emotions. More severe emotional distress is shown by higher ratings.

Data analysis

The DASS-Depression, DASS-Anxiety, and DASS-Stress measures' distributions were compared to established cutoff points to detect scores above the threshold (DASS-Depression 5, DASS-Anxiety 4, and DASS-Stress 8)¹⁶. The main survey results were analysed using IBM SPSS 20; we used Spearman correlation. All analyses were two-tailed with a 0.05 significant level. Then, we conducted path analysis to identify the unique contribution of relevant predictors to the DAS total using PLS Smart.

Ethical Consideration

This study was conducted in accordance with the ethical standards of the Helsinki Declaration. Participation from students was voluntary; students were able to withdraw without any risk at any time. This study protocol was accepted by the Faculty of Medicine, Indonesia Islamic University Ethical Committee as provided for in Decision No 9/Ka.Kom.Et/70/KE/XI/2020.

Results

Subject Characteristics

The study was completed by 427 (76.7%) of 582 undergraduate dental students in Indonesia. Most participants (84.1%) were female and lived with their parents (86.2%). Half of the participants (51.5%) were academic seniors studying on Java Island (54.1%). Java Island is more developed than other areas in Indonesia, including its education programs. Of all respondents, 91.6% used virtual learning during the pandemic. The proportion of students who used a problem-based learning system was 55.5%, and 51.5% of subjects reported having unstable internet connections (Table 1).

Proportion of Undergraduate Dentistry Students Screened for Psychological Distress.

The distribution of psychological distress (depression, anxiety, and stress) is shown in Tables 1 and 2. Among the 427 students who participated in this study, 130 (30.4%) screened for depression, 248 (58.1%) screened for anxiety, and 129 (30.2%) screened for stress. The highest percentage of depression was reported among participants who were male (35.3%), were single (30.5%), lived separately from their parents (30.7%), were above the second year (31.8%), were studying on Java Island (31.6%), used face-to-face learning methods (40%), used a combination PBL and conventional learning system (31.3%), and had unstable internet connections (36.4%). The highest percentage of anxiety was reported among study participants who were female (59.9%), single (58.4%), living with parents (61.4%), in their first year (61.2%), studying on Java Island (59.3%), using the face-to-face learning method (60%), using a combination learning system (63.1%), and having a less stable internet connection (61.4%). The highest percentage of stress was reported among study participants who were female (30.9%), single (30.3%), living with their parents

(31.5%), above the second year (32.3%), studying on Java Island (30.7%), using face-to-face learning method (40%), using PBL learning methods (33.2%), and having unstable internet connection (33.3.1%) (Table 2).

Correlation Between the Depression, Anxiety And Stress Scale with Independent Variables

The Spearman correlation test was used to analyse the independent variables with subvariables of DASS-21, including the depression, anxiety, and stress scales (Table 3). The results showed that the anxiety scores had a direct correlation with gender ($p < 0.05$), learning system ($p < 0.05$), and residence during the pandemic ($p < 0.01$). Students who were male, used a conventional learning system, and lived separately from their parents had a correlation with anxiety. Depression, anxiety, and stress were correlated with each other ($p < 0.01$). In addition, the strongest correlation was found between anxiety and stress.

Table 4 shows the nonsignificance of the path of internet access \rightarrow psychological stress having a p value of 0.81. The paths of learning system \rightarrow psychological stress, university area \rightarrow psychological stress, university area \rightarrow internet access, and university area \rightarrow learning system were statistically significant and had a p value of less than 0.05. All fit indices were within acceptable limits (goodness-of-fit = 0.47; standardized root mean square residual = 0.018, below 0.08; normed fit index = 1.00, higher than 0.90). Therefore, the theoretically proposed model showed a reasonably good fit for the data.

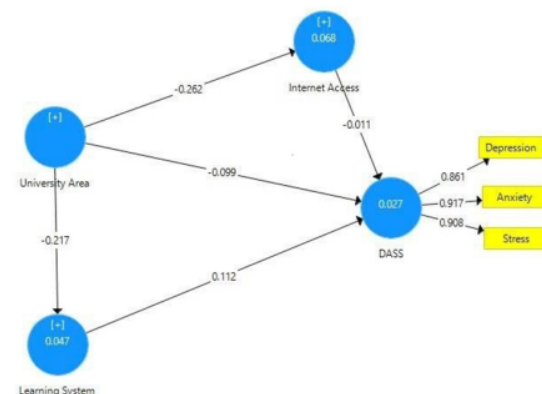


Figure 1. Factors Associated with DASS among Undergraduate Dentistry Students.

The final multivariable model (Figure 1) indicated that the learning system and place of education were the factors significantly associated with ($p < 0.05$) psychological distress in the participants. We found that the learning system (non-PBL) was a significant mediator explaining the path from university location (universities outside Java) to psychological stress ($p < 0.05$).

Discussion

Our results showed that several undergraduate dental students screened for depression, anxiety and stress. Similar results³ so recently found psychological effects on depression, anxiety, and stress among 60.64%, 37.02%, and 34.92% of the dental students from different faculties of dentistry in Saudi Arabia, respectively¹³. Research conducted at Al-Farabi Private College in Saudi Arabia also showed that approximately 85% of participants encountered anxiety and stress during the pandemic period¹⁷. Additionally, studies in the United States of America^{18, 19} and New Zealand²⁰ revealed increased levels of stress among dental students during the pandemic.

Male participants were more affected by psychological disorders than female participants, reflecting the outcomes of other studies^{21, 22}. This result might show that females are more receptive and³ verbal towards stimuli than males. In contrast, other studies have reported that female students present significantly³ more anxiety than do male students, with clinical factors, such as technical skills, being the most stressful for female students^{13, 18, 23}. Conventional learning, traditional learning or non-PBL showed significantly more psychological effects than PBL. The results were congruent with some previous studies, possibly because PBL students were more likely than their non-PBL counterparts to apply deep processing, self-control, and external regulation^{24, 25}. Although students face many challenges, the transition to online must be supported during this COVID-19 crisis. Digital learning can last for an indefinite period, and feedback from students can help with⁹ relevant modifications²⁶. A previous study showed that the majority of students agreed that E-learning was satisfactory in acquiring knowledge, but not effective in acquiring clinical and technical skills²⁷.

²⁸. In addition, previous studies showed that students living alone presented more stress than did those living with parents, similar to our findings. The risk of anxiety or depressive disorders was increased by a lack of family support and living in noisy environments^{13, 23}. Another study has shown that social support is one of the factors that reduces emotional disturbance during the isolation of COVID-19 patients²⁹.

³ To the best of our knowledge, this study is the first in Indonesia to investigate the psychological effect of the COVID-19 outbreak on undergraduate dental students. This study has several limitations. First, making cause-effect inferences is impossible in a cross-sectional study¹ design. The study's data collection stage was completed within 21 days. Given the time sensitivity in this emergency, we sought to investigate students' psychological symptoms and related causes so that the results of the study could identify dental students' immediate needs and provide recommendations for the early adoption of effective intervention policies¹ protect their mental well-being. In addition, the voluntary nature of the sample may have contributed to bias in the selection, and the respondents may not adequately represent the entire population. Finally, we used a self-report questionnaire to determine psychological symptoms that did not depend on medical examination by mental health practitioners to meet as many participants as possible during this emergency period and to eliminate face-to-face interviews. Notwithstanding these limitations, the results of this research are important to identify the early psychological effects of COVID-19 in dental students from different areas across the country. Most importantly, our findings will assist faculty members of dentistry in Indonesia in minimising the psychological effects of the largest pandemic on dental students. One of the innovative solutions for continuing dental¹³ education remotely through the use of manikin and virtual reality/augmented reality (VR/AR) simulation devices together with haptic technology can be of great help for skills training. This solution can be considered for use in dental education in Indonesia³⁰.

Conclusion

Our findings show that most students had

psychological problems during this period. Students who were male, used conventional learning systems, and lived separately from their parents indicated that they had experienced anxiety. The university policy regarding internet access and the formulation of the ideal curriculum for pandemic situations positively affect undergraduate dental students' psychology.

Acknowledgements

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Declaration of Interest

The authors report no conflict of interest.

Variables		<i>n</i>	%
Gender	Female	359	84.1%
	Male	68	15.9%
Marital Status	Single	423	99.1%
	Married	4	0.9%
	Widowed	0	0.0%
Residence during Pandemic	Separate from Parents	59	13.8%
	Living with Parents	368	86.2%
Academic Year	First Academic Year	134	31.4%
	Second Academic Year	73	17.1%
	Above Second Academic Year	220	51.5%
	Year		
Education Area	University in Java Island	231	54.1%
	University in Other Islands	196	45.9%
Learning Method during Pandemic	Face-to-face	5	1.2%
	Virtual	391	91.6%
	Face-to-face and Virtual	31	7.3%
Learning System	Conventional Learning	32	7.5%
	Problem-Based Learning	235	55.0%
	Combination Conventional and PBL	160	37.5%
Internet Access	Unstable	27	6.3%
	Less stable	220	51.5%
	Stable	180	42.2%
Depression Severity	Normal	297	69.6%
	Mild	64	15.0%
	Moderate	41	9.6%
	Severe	11	2.6%
	Extremely Severe	14	3.3%
Anxiety Severity	Normal	179	41.9%

	Mild	92	21.5%
	Moderate	72	16.9%
	Severe	49	11.5%
	Extremely Severe	35	8.2%
Stress Severity	Normal	298	69.8%
	Mild	58	13.6%
	Moderate	35	8.2%
	Severe	20	4.7%
	Extremely Severe	16	3.7%

Table 1. Characteristics of Participants (n: 427).

		Depression				Anxiety				Stress			
		Normal		Yes		Normal		Yes		Normal		Yes	
		N	%	N	%	N	%	N	%	N	%	N	%
Gender	Female	253	70.5%	106	29.5%	144	40.1%	215	59.9%	248	69.1%	111	30.9%
	Male	44	64.7%	24	35.3%	35	51.5%	33	48.5%	50	73.5%	18	26.5%
Marital Status	Single	294	69.5%	129	30.5%	176	41.6%	247	58.4%	295	69.7%	128	30.3%
	Married	3	75.0%	1	25.0%	3	75.0%	1	25.0%	3	75.0%	1	25.0%
	Widowed	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Residence during Pandemic	Separated from Parents	42	71.2%	17	28.8%	37	62.7%	22	37.3%	46	78.0%	13	22.0%
	Live with Parents	255	69.3%	113	30.7%	142	38.6%	226	61.4%	252	68.5%	116	31.5%
Academic Year	First Academic Year	94	70.1%	40	29.9%	52	38.8%	82	61.2%	91	67.9%	43	32.1%
	Second Academic Year	53	72.6%	20	27.4%	34	46.6%	39	53.4%	58	79.5%	15	20.5%
	Above Second Academic Year	150	68.2%	70	31.8%	93	42.3%	127	57.7%	149	67.7%	71	32.3%
Education Area	University on Java Island	158	68.4%	73	31.6%	94	40.7%	137	59.3%	160	69.3%	71	30.7%
	University on other island	139	70.9%	57	29.1%	85	43.4%	111	56.6%	138	70.4%	58	29.6%
Learning Method during Pandemic	Face to face	3	60.0%	2	40.0%	2	40.0%	3	60.0%	3	60.0%	2	40.0%
	Virtual	275	70.3%	116	29.7%	167	42.7%	224	57.3%	276	70.6%	115	29.4%
	Face to face & Virtual	19	61.3%	12	38.7%	10	32.3%	21	67.7%	19	61.3%	12	38.7%
Learning System	Conventional Learning	22	68.8%	10	31.3%	18	56.3%	14	43.8%	28	87.5%	4	12.5%
	Problem-Based Learning	165	70.2%	70	29.8%	102	43.4%	133	56.6%	157	66.8%	78	33.2%
	Combination Conventional & PBL	110	68.8%	50	31.3%	59	36.9%	101	63.1%	113	70.6%	47	29.4%
Internet Access	Unstable	22	81.5%	5	18.5%	16	59.3%	11	40.7%	18	66.7%	9	33.3%
	Less stable	140	63.6%	80	36.4%	85	38.6%	135	61.4%	147	66.8%	73	33.2%
	Stable	135	75.0%	45	25.0%	78	43.3%	102	56.7%	133	73.9%	47	26.1%

Table 2. Depression, Anxiety, and Stress Characteristics of Undergraduate Dentistry Students.

		Depression Scale	Anxiety Scale	Stress Scale
Spearman's rho	Gender ¹	0.029	-0.100*	-0.040
	Academic Year ²	-0.025	-0.041	-0.031
	Marital Status ³	-0.068	-0.059	-0.066
	Education Area ⁴	-0.074	-0.081	-0.032
	Learning Method during	0.020	0.061	0.036

Pandemic ⁵			
Learning System ⁶	0.069	0.117*	0.071
Internet Access ⁷	-0.067	0.026	-0.044
Residence during Pandemic ⁸	0.045	0.161**	0.128**
Depression	-	0.587**	0.702**
Anxiety	0.587**	-	0.745**
Stress	0.702**	0.745**	-

Table 3. Spearman correlation between the depression, anxiety and stress scales and other variables.

** Correlation is significant at the 0.01 level (two-tailed).

* Correlation is significant at the 0.05 level (two-tailed).

1 1=female; 2=male.

2 1=first and second academic years; 2=above second academic year

3 1=single; 2=married

4 1=university on Java island; 2=university on other islands

5 1= face to face and combination; 2=virtual only

6 1= non PBL; 2=PBL

7 1= nonstable; 2=stable

8 1=separate from parents; 2=living with parents

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	P Values
Path Coefficients				
Internet Access -> DASS	-0.011	-0.014	0.047	0.81
Learning System -> DASS	0.112	0.115	0.048	0.02*
University Area -> DASS	-0.099	-0.101	0.049	0.04*
University Area -> Internet Access	-0.262	-0.258	0.046	0.00**
University Area -> Learning System	-0.217	-0.216	0.045	0.00**
Indirect Effects				
University Area -> Internet Access -> DASS	0.003	0.003	0.012	0.81
University Area -> Learning System -> DASS	-0.024	-0.025	0.012	0.03*

Table 4. Path Analysis.

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- 1** [Rümeysa Yeni Elbay, Ayşe Kurtulmuş, Selim Arpacioğlu, Emrah Karadere. "Depression, Anxiety, Stress Levels of Physicians and Associated Factors In Covid-19 Pandemics", Psychiatry Research, 2020](#) 157 words — 5%
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