ORIGINAL ARTICLE

Psychological Distress and Quality of Life Among Undergraduate Students in Universiti Teknologi MARA (UiTM) Puncak Alam during the COVID-19 Outbreak

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ABSTRACT

Introduction: During the COVID-19 pandemic, university students are among those who are at risk of developing psychological problems. The study is therefore aimed to determine university students' psychological distress (depression, anxiety, and stress) and quality of life (QoL) during the COVID-19 outbreak. **Methods:** A cross-sectional online survey was conducted, using the 21-item depression, anxiety, and stress scale (DASS-21) to assess the severity of their depressive, anxiety, and stress symptoms and the SF-36 to assess their QoL. **Results:** In total, 59.2%, 67.0%, and 40.4% of the participants experienced mild to extremely severe depression, anxiousness, and stress, respectively. University students reported a lower mean score in all SF-36 domains compared with the non-pandemic norms of the general Malaysian population. The findings of binary logistic regression demonstrated that most socio-demographic factors, such as faculty type, number of siblings, income, and residential area, had an impact on respondents' stress levels. Meanwhile, depression was only affected by the year of study and the number of siblings, while anxiety was influenced by the year of study and the family's income. All the SF-36 domains were observed to be adversely correlated with depression, anxiety, and stress. The vitality (VT), emotional well-being (EW), and social functioning (SF) domains were strongly correlated with depression. **Conclusion:** The COVID-19 outbreak exacerbated university students' psychological distress and reduced their quality of life, necessitating involvement from the appropriate authorities to assist them in dealing with the problem.
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Keywords: COVID-19, Psychological distress, Quality of life, University students

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INTRODUCTION

In December 2019, the coronavirus disease 2019 (COVID-19) was first reported in the city of Wuhan, a populated area of China's Hubei province. It had spread throughout China and has now affected every country across the globe. According to the World Health Organization (WHO), a total number of 112,456,453 confirmed cases with 246,591 new cases and a total of 2,497,514 fatality have been reported as of 26 February 2021 (1). At the time of conducting this research, confirmed cases and fatalities of the outbreak of COVID-19 in Malaysia had grown significantly, with more than 290,000 confirmed cases, including more than 1,000 deaths on 26 February 2021 (2). The unprecedented condition of the COVID-19 outbreak had a severe impact on people all around the globe.

Additionally, educational institutions across the world were equally affected by the unexpected spread of the COVID-19 pandemic. This disruption in the history of global education has been described as "unparalleled" (3). Since not everyone will get the vaccine right away, community prevention measures have become necessary to minimize the transmission of disease and to ease the load on healthcare services (4). For example, social distancing was practiced by maintaining a safe

distance of at least 6 feet from others and closure of the school and campuses were ordered to prevent the spread of COVID-19 among the community. Thus, this condition forced the educational system to shift from conventional face-to-face classes to online classes overnight to decrease the risk of getting COVID-19 (5).

Since the process of teaching and learning must take place amidst the COVID-19 crisis, Universiti Teknologi MARA (UiTM) has adopted the use of Open and Distance Learning (ODL) mode and open educational software and channels. UNESCO describes the ODL as a learning approach that concentrates on opening access to education and training, liberating students from the pressure of time and space, and providing versatile learning opportunities (6). It allows educators in UiTM to teach students remotely as well as reduce education disruption in response to the COVID-19 crisis. The most common online platforms used for teaching and learning in UiTM including uFuture (university system in UiTM develop for e-learning platform), Zoom, Google Meet, or Google Classroom. Although UiTM has indeed implemented the combined face-to-face and online learning method in the classes since several years ago, the commencement of only using virtual learning platforms in the absence of face-to-face classes is even more challenging (7). The uncertainty on academic progression, uncertainty about the future in terms of professions, difficulty adapting to e-learning, economic impacts, separation and lockdown and possible risk of death caused by COVID-19 may adversely affect university students' mental health and quality of life, who are known to be a vulnerable population (8, 9).

To date, data on psychological status and quality of life (QoL) assessment in university students in Malaysia in response to the COVID-19 crisis are lacking. Hence, this study filled the research gap via the following activities: (a) by determining the level of stress, anxiety, depression, and quality of life of university students by using DASS-21 and SF-36 (b) assessing the sociodemographic factor associated with depression, anxiety, and stress levels among university students and (c) correlating stress, anxiety, and depression contribute to the quality of life of university students.

MATERIALS AND METHODS

Study design and participant
This was a cross-sectional online survey conducted in UiTM Puncak Alam Campus, one of the Universiti Teknologi MARA (UiTM) campus located in Selangor, Malaysia. Due to the social distancing restrictions implemented by the government to curb the transmission of COVID-19, the online questionnaire was created in Google Forms. The survey link was shared to undergraduate students through their WhatsApp groups. A snowball sampling strategy was used to recruit study participants, where participants who were initially recruited were encouraged to pass the survey link to other undergraduate students on the campus. The sample size was calculated using Raosoft online sample size calculation. Out of the population of 20,000 undergraduate students, 267 students were eligible to participate in this study (population sample size = 20,000 students, distribution of response = 50%, margin of error = 5%, confidence interval = 90%).

All respondents were informed regarding the purpose of this study before proceeding to fill in the surveys. The respondents took approximately 10 to 15 minutes to complete the questionnaire. Inclusion criteria include those aged 18 years and above, registered as full-time undergraduate students in the university, and proficient in Malay and English. Any student clinically diagnosed with any psychiatric condition was excluded from this study. The study was approved by the Ethics and Research Committee of UiTM [Reference no: REC/08/2021 (MR/703)]. Participation of the students in this study was based on voluntary and informed consent was provided. All the data obtained were kept confidential and anonymous.

Instrument and Measures
The questionnaire used in this study was adopted from previous studies (8, 10-12) and available in Malay and English version. The questionnaire consists of three sections; (1) sociodemographic profiles; (2) depression, anxiety, and stress scale (DASS-21); and (3) short form 36 (SF-36). The information obtained from the first section including gender, faculty, year of study, monthly family income, the total number of lectures per week, residential areas, and the number of siblings.

For the second section, the presence of depression, anxiety and stress among respondents were evaluated using DASS-21. The DASS-21 is a four-point Likert scale in which each item is scored from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). This scale consists of 21 items, which were divided equally into three subscales, depression (seven items), anxiety subscale (seven items), and stress subscale (seven items). The overall score was calculated by adding responses to the individual items and multiplying them by a factor of 2. The total score was categorised into; normal (depression: 0-9; anxiety: 0-7; stress: 0-14), mild (depression: 10-13; anxiety: 8-9; stress: 15-18), moderate (depression: 14-20; anxiety: 10-14; stress: 19-25), severe (depression: 21-27; anxiety: 15-19; stress: 26-33), and extremely severe (depression: ≥28; anxiety: ≥20; stress: ≥34) for each subscale, with the highest scores suggest high levels of negative emotional states. The score of depression, anxiety and stress were then divided into two categories for the purpose of this study; normal [with cut-off scores of ≤9 in depression, ≤7 in anxiety, and ≤14 in stress] and abnormal [with a score of ≥10 in depression, ≥8 in anxiety, and ≥15 in stress]

to obtain dichotomous responses (13). It is necessary to keep in mind that DASS-21 is not a diagnostic tool, instead it is a symptom severity rating that is recognized and widely used due to its reliability, user-friendliness, and ease of administration to the general population (13). The validated Malay version of the DASS-21 had excellent psychometric properties; thus, it is ideal for use in the clinical population of Malaysia (10).

The quality of life was assessed by employing the SF-36 Health Survey for the third section. This scale consists of 36 items, which were divided into eight subscales of physical and mental health. This scale's subscales are physical function, social functioning, role limitations due to physical problems, role limitations due to emotional problems, mental health, vitality, bodily pain, and general health perception. The scale varies between 0 and 100, with the highest score representing the optimum health related quality of life (HRQoL) while the lowest score represents the worst HRQoL. Scale scoring for SF-36 is followed according to RAND instructions. The Malay version of SF-36 was validated, and it shows a satisfactory internal consistency (11).

Data Analysis

Data obtained from this study was analysed using the Statistical Package for Social Sciences (SPSS) software Version 26. All the research variables were summarized using descriptive statistics in term of frequencies, standard deviation, percentages, and mean score. To assess the degree of association of each DASS-21 with sociodemographic profiles, chi-square and binary logistic regression were used with a significant value set at 0.05. Correlation between each DASS subscale (stress, anxiety and depression scores) and SF-36 domains were tested using Spearman's correlation. Statistical significance value was set at 0.01 and all p-values were two-tailed.

RESULT

Sociodemographic, DASS-21 and SF-36 analysis

In this study, a total of 267 participants were recruited. The sociodemographic characteristics of the participants are shown in Table I. Among the 267 participants, the majority (77.5%) were females, with most (65.6%) were either in their third or fourth year of study at the time data was collected. More than half of the participants were enrolled in Health Sciences courses (70.8%), where a majority attended six to ten online lectures every week (53.9%). Apart from that, the majority of the respondents were staying in an urban area (69.7%), and in terms of family income, 57.7% of them have a monthly family income of RM1,500 – RM5,000 per month. 55.4% of the respondents have two to four siblings.

Table I: Sociodemographic characteristic of participants

Variable	Frequency	Percentage (%)
Gender		
Male	60	22.5
Female	207	77.5
Faculty		
Health Sciences	189	70.8
Non-Health Sciences	78	29.2
Year of Study		
Year 1	37	13.9
Year 2	55	20.6
Year 3	84	31.5
Year 4	91	34.1
Total number of lectures per week		
≤ 5	79	29.6
6 - 10	144	53.9
≥ 11	44	16.5
Monthly family income		
< RM1500	47	17.6
RM1500 – RM5000	154	57.7
> RM5000	66	24.7
Residential Area		
Urban	186	69.7
Rural	81	30.3
Number of siblings		
< 2	59	22.1
2 – 4	148	55.4
> 5	60	22.5

Based on Table II, 158 (59.2%) of the 267 participants had symptoms of depression, 179 (67.0%) had symptoms of anxiety, and 108 (40.4%) had symptoms of stress. Majority of the participants experiencing moderate depression (25.5%), moderate anxiety (24.7%), and mild stress (15.0%). For SF-36 subscales, the mean physical functioning (PF) QoL, bodily pain (BP) QoL, role-physical (RP) QoL, role-emotional (RE) QoL, emotional well-being (EW) QoL, social functioning (SF) QoL, vitality (VT) QoL and general health (GH) QoL scores were 50.72 (SD = 15.53), 60.65 (SD = 15.45), 38.67 (SD = 18.15), 47.19 (SD= 26.08), 59.82 (SD=16.30), 40.69 (SD=9.65), 50.24 (SD=15.76), and 62.60 (SD = 15.77), respectively, as listed in Table III. When the study population was compared to a reference group consists of a random sample (n=3072), aged 18 to 87 years old, for a representation of the general Malaysian population (12), it shows the mean SF-36 score for university students were significantly lower than general Malaysian

Table II: Depression, anxiety, and stress level based on DASS-21 subscale score

Depression, Anxiety and Stress Scale	Frequency	Percentage (%)
Depression		
Normal	109	40.8
Mild	38	14.2
Moderate	68	25.5
Severe	41	15.4
Extremely Severe	11	4.1
Anxiety		
Normal	88	33.0
Mild	22	8.2
Moderate	66	24.7
Severe	60	22.5
Extremely Severe	31	11.6
Stress		
Normal	159	59.6
Mild	40	15.0
Moderate	38	14.2
Severe	22	8.2
Extremely Severe	8	3.0

Table III: SF-36 score of the study compared with general Malaysian population

SF-36 domains	This study (n=267)	General population (n=3072)	Mean difference
	Mean ± SD	Mean ± SD	
Physical Functioning	50.72±15.53	69.96±17.59	- 19.24
Bodily Pain	60.65±15.45	85.98±17.91	- 8.33
Role- Physical	38.67±18.15	82.03±32.12	- 43.36
Role-Emotional	47.19±26.08	79.23±35.92	- 32.04
Emotional Well-being	59.82±16.30	74.66±17.19	-14.84
Social Functioning	40.69±9.65	83.73±19.28	- 43.04
Vitality	50.24±15.76	66.79±17.68	- 16.55
General Health	62.60±15.77	66.74±19.99	- 4.14

n: number of respondents.

population for all domains (Table III). Overall, the mean score for all domains among university students during COVID-19 pandemic were below 65.0 QoL units which indicated lower QoL.

Depression, Anxiety, and Stress among University Students during COVID-19 Outbreaks

There were two dichotomous responses in this study; normal and abnormal. Those falling in the "mild", "moderate", "severe", and "extremely severe" were considered as abnormal. Others were regarded as normal where they do not feel depressed, not anxious, and not stressed. Findings revealed that 158 (59.2%) participants were depressed, 179 (67.0%) were anxious, and 108 (40.4%) were stressed. Percentage distribution of sociodemographic characteristics and depression,

anxiety, and stress are presented in Table IV.

Table IV: Percentage distribution of sociodemographic characteristics and depression, anxiety, and stress

Variables	Depression		Anxiety		Stress	
	No	Yes	No	Yes	No	Yes
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Gender						
Male	18 (30.0)	42 (70.0)	20 (33.3)	40 (66.7)	29 (48.3)	31 (51.7)
Female	91 (44.0)	116 (56.0)	68 (32.9)	139 (67.1)	130 (62.8)	77 (37.2)
Faculty						
Health Sciences	85 (45.0)	104 (55.0)	60 (31.7)	129 (68.3)	125 (66.1)	64 (33.9)
Non-Health Sciences	24 (30.8)	54 (69.2)	28 (35.9)	50 (64.1)	34 (43.6)	44 (56.4)
Year of Study						
Year 1	15 (40.5)	22 (59.5)	9 (24.3)	28 (75.7)	21 (56.8)	16 (43.2)
Year 2	19 (34.5)	36 (65.5)	24 (43.6)	31 (56.4)	32 (58.2)	23 (41.8)
Year 3	46 (54.8)	38 (45.2)	37 (44.0)	47 (56.0)	52 (61.9)	32 (38.1)
Year 4	29 (31.9)	62 (68.1)	18 (19.8)	73 (80.2)	54 (59.3)	37 (40.7)
Total number of lectures per week						
≤ 5	34 (43.0)	45 (57.0)	21 (26.6)	58 (73.4)	47 (59.5)	32 (40.5)
6 - 10	54 (37.5)	90 (62.5)	52 (36.1)	92 (63.9)	86 (59.7)	58 (40.3)
≥ 11	21 (47.7)	23 (52.3)	15 (34.1)	29 (65.9)	26 (59.1)	18 (40.9)
Monthly family income						
< RM1500	19 (40.4)	28 (59.6)	23 (48.9)	24 (51.1)	19 (40.4)	28 (59.6)
RM1500 – RM5000	55 (35.7)	99 (64.3)	47 (30.5)	107 (69.5)	86 (55.8)	68 (44.2)
> RM5000	35 (53.0)	31 (47.0)	18 (27.3)	48 (72.7)	54 (81.8)	12 (18.2)
Residential Area						
Urban	71 (38.2)	115 (61.8)	55 (29.6)	131 (70.4)	102 (54.8)	84 (45.2)
Rural	38 (46.9)	43 (53.1)	33 (40.7)	48 (59.3)	57 (70.4)	24 (29.6)
Number of siblings						
< 2	28 (47.5)	31 (52.5)	27 (45.8)	32 (54.2)	38 (64.4)	21 (35.6)
2 – 4	48 (32.4)	100 (67.6)	40 (27.0)	108 (73.0)	76 (51.4)	72 (48.6)
> 5	33 (55.0)	27 (45.0)	21 (35.0)	39 (65.0)	45 (75.0)	15 (25.0)

n: number of respondents.

Association between sociodemographic and DASS-21

Statistical analysis showed that year of study and number of siblings at home is associated with depression; while study year and monthly family income were associated with anxiety. Meanwhile, faculty, monthly family income, number of siblings, and residential areas were associated with stress (Table V). Other sociodemographic characteristics, including gender and the total number of lectures per week, were not associated with DASS subscale scores. Interestingly, those who studied health sciences (OR = 0.43, 95% CI = 0.228-0.821) were less likely to report stress compared to non-health science students. Findings also showed that students with a monthly family income of less than RM1,500 (OR = 11.61, 95% CI = 4.032-33.408) as well as those with a monthly family income of RM1,500 – RM5,000 (OR = 3.30, 95% CI = 1.498-7.283) were 11 times and three times likely to be stressed than students with a family income of more than RM5,000, respectively. Surprisingly, the odds of students living in an urban area having stress were more than four times than those living in rural areas (OR = 4.18, 95% CI = 1.962-8.913). Additionally, students with two to four siblings (OR = 2.58, 95% CI = 1.117-5.944; OR = 3.03, 95% CI = 1.425-6.455) were more likely to develop stress and depression. Besides, university students in year 1 (OR = 0.17, 95% CI = 0.041-0.703), year 2 (OR = 0.32, 95% CI = 0.107-0.923), year 3 (OR = 0.16, 95% CI = 0.068-0.383) were less likely to develop depression. Finally, those who were in year 2 (OR = 0.25, 95% CI = 0.087-0.690), year 3 (OR = 0.24, 95% CI = 0.100-0.559), and with a monthly family income of less than RM1,500

Table V: Results of binary logistic regression estimating the odds ratio of depression, anxiety, and stress

Variables	Depression		Anxiety		Stress	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Gender						
Male	1.86	0.912-3.793	0.90	0.457-1.786	1.99	0.989-4.008
Female	1		1		1	
Faculty						
Health Sciences	0.51	0.261-1.006	1.07	0.557-2.064	0.43*	0.228-0.821
Non-Health Sciences	1		1		1	
Year of Study						
Year 1	0.17*	0.041-0.703	0.92	0.222-3.779	1.09	0.264-4.469
Year 2	0.32*	0.107-0.923	0.25*	0.087-0.690	1.02	0.374-2.758
Year 3	0.16*	0.068-0.383	0.24*	0.100-0.559	0.596	0.266-1.337
Year 4	1		1		1	

CONTINUE

Table V: Results of binary logistic regression estimating the odds ratio of depression, anxiety, and stress (CONT.)

Variables	Depression		Anxiety		Stress	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Total number of lectures per week						
≤ 5	0.57	0.218-1.491	0.94	0.346-2.567	1.20	0.454-3.147
6 - 10	1.57	0.710-3.464	0.76	0.341-1.693	1.83	0.755-4.442
≥ 11	1		1		1	
Monthly family income						
< RM1500	1.83	0.729-4.572	0.38*	0.150-0.953	11.61*	4.032-33.408
RM1500 – RM5000	1.74	0.869-3.493	1.09	0.508—2.315	3.30*	1.498-7.283
> RM5000	1		1		1	
Residential Area						
Urban	1.9	0.912-3.494	1.21	0.618-2.352	4.18*	1.962-8.913
Rural	1		1		1	
Number of siblings						
< 2	1.61	0.628-4.125	0.69	0.270-1.764	1.13	0.408-3.152
2 – 4	3.03*	1.425-6.455	1.85	0.844-4.060	2.58*	1.117-5.944
> 5	1		1		1	

CI: confidence interval.
*Statistically significant at p-value < 0.05.

(OR = 0.38, 95% CI = 0.150-0.953) were less likely to develop anxiety.

Correlation between QoL and DASS-21

All the SF-36 domains were observed to be adversely correlated with depression, anxiety, and stress (Table VI). The vitality (VT) (p<0.01, r =-0.655), emotional well-being (EW) (p<0.01, r =-0.559), and social functioning (SF) (p<0.01, r =-0.611) domains were strongly correlated with depression. Meanwhile, all SF-36 domains were not strongly correlated with stress and anxiety.

Table VI: Correlation between quality of life and DASS-21

Domains for Quality of Life	Depression		Anxiety		Stress	
	r	p-value	r	p-value	r	p-value
Physical Functioning	-0.349	<0.01*	-0.066	0.281	-0.243	<0.01*
Role-Physical	-0.196	<0.01*	-0.007	0.908	-0.072	0.240
Role-Emotional	-0.432	<0.01*	-0.030	0.620	-0.314	<0.01*

CONTINUE

Table VI: Correlation between quality of life and DASS-21 (CONT.)

Domains for Quality of Life	Depression		Anxiety		Stress	
	r	p-value	r	p-value	r	p-value
Vitality	-0.655	<0.01*	-0.278	<0.01*	-0.424	<0.01*
Emotional Well-being	-0.559	<0.01*	-0.305	<0.01*	-0.030	<0.01*
Social Functioning	-0.611	<0.01*	-0.270	<0.01*	-0.045	<0.01*
Bodily Pain	-0.344	<0.01*	-0.162	<0.01*	-0.298	<0.01*
General Health	-0.240	<0.01*	-0.118	0.054	-0.249	<0.01*

r: correlation coefficient.

*Correlation is significant at p-value < 0.01 (2-tailed).

DISCUSSION

This study investigated the depression, anxiety, and stress among university students in UiTM Puncak Alam, as well as its association with sociodemographic factors, and its correlation with SF-36 during the COVID-19 pandemic. According to the findings, 59.2%, 67.0%, and 40.4% of the participants experienced mildly to extremely severe depression, anxiousness, and stress, respectively. These results were similar to previous studies conducted among Chinese and Spanish university students (14, 15), all of which indicated that the COVID-19 outbreak has put a strain on their mental health. Anxiety was identified to be most profound among university students, followed by depression and stress. It is believed that university students' anxiety is related to the virus's consequences (16). The rising number of infected people (17) and various social media platforms showing terrible, shocking, and misleading news reports had heightened students' anxiety. Since everyone had to stay at home and all teaching and learning platforms shifted to e-learning; students were affected both psychologically and emotionally since they had lost touch with human presence (18). Not only that, our study shows that QoL among students was impaired since the average score of all domains of quality life are low. As a comparison to the norms of the SF-36 domain scores in the non-pandemic affected general population (12), the QoL levels reported in this study were relatively low. Samlani et al. (19) supports this in stating that the seriousness of the COVID-19 pandemic had disrupted the quality of life of university students.

In our analysis, we found that students in the field of health sciences seemed to be less likely stressed compared to non-health science students. This is in line with previous studies where 9% to 12% of health students experienced stress compared to those who were not in the health field (25% to 38%) (20, 21). However, this outcome contrasts with the data reported by Ibrahim

and Rosdi (22) who used a similar study population. This is because Ibrahim and Rosdi (22) sampled accounting students to represent non-health sciences students while this study recruited students taking any major in the non-health sciences field available on this campus. As such, they might experience different levels of stress as each programme have different courses and assessments (23). In this study, the discrepancy between health science and non-health science students may be due to several factors. The first being that health science students may be able to manage their time for e-learning and be more familiar with the use of it thus may have fewer adjustment difficulties. They also may have been more informed about what to expect from the progression of the COVID-19 pandemic compared to their non-health sciences counterpart (24). A lack of understanding regarding COVID-19, its transmission, and control measures could lead to negative consequences and fear of the unknown (25), hence explaining the higher stress levels among non-health science students in our study.

Apart from that, this study also reported that students who were living in urban areas experienced higher stress than those who came from rural areas. This finding is consistent with the results of a previous study by Tadesse et al. (26). Such a phenomenon could be attributed to the existing built environment in urban areas. Residences in urban areas are built to withstand high density population, making it crowded and compact, which perhaps contributes to a high prevalence of COVID-19 compared to those in rural areas. While masking was made mandatory, physical distancing is more difficult to observe in high density populations and those who reside in urban areas may have a higher risk of stress than those who reside in rural areas since the majority of positive cases were found in the urban area (20).

The present study, nonetheless, does not report statistically significant different levels of depression, anxiety, and stress according to gender, which suggests that both genders were equally psychologically affected by the COVID-19 pandemic. Our results align with a previous study that showing no gender differences in the prevalence of psychological distress (27). On the contrary, Browning et al. (28) surveyed 2,534 respondents in seven United States universities; and found that gender difference is significant in experiencing psychological distress during the COVID-19 outbreak. In their study, female students are generally more prone to depression and anxiety disorders than male students. It may be due to the fact that uncertainty tolerance threshold of women is less than the threshold of men, which generates excessive stress and anxiety (24).

Our study also revealed that the stability of family income was a significant factor in students' experiencing stress during the COVID-19 pandemic. Students from low- and middle-income families were more likely to develop stress than students with a family income of more than RM5,000. This might be due to increased psychological

and economic pressure (29). Similarly, a study from Kentucky found that stress was more common among low-income students (30). Owing to the internet's expensive cost, students from low-income families also have minimal to no access to reliable computers or the internet. For instance, they have difficulty accessing e-learning due to limited internet access and rely solely on their mobile phones to learn. This leads them to be left out of their lectures and has an impact on their academic success. Even among middle-income families, there is often only one computer at home for everyone to share. Hence, it could lead to an increased level of stress among them.

Nevertheless, low-income students have a lower risk of developing anxiety during the COVID-19 crisis. One possible reason for this could be due to excessive screen time or social media. Excessive screen time during the pandemic may have a detrimental influence on mental health (28). Students who handled COVID-19 anxiety with excessive use of smartphones and other screen-based technology will accidentally discover more about the virus from the news, which drives anxiety, thus leading to continued coping through more screentime, causing a negative loop. Roy et al. (31) support this, stating that more than two-thirds of participants felt worried after reading posts about the COVID-19 pandemic on several social media channels, and about 46.0% of participants expressed their worries about the COVID-19 pandemic being discussed on news channels and in print media. Since low-income students still lack reliable home internet, thus a low level of anxiety among low-income students might be due to inadequate access to the daily reports of COVID-19 (death and new cases).

Moreover, students that have two to four siblings were more prone to develop stress and depression. One of the possible explanations might be that they needed to juggle household chores and caretaking duties of younger siblings while concurrently attending online learning (24). It is also more challenging for them to study in peace and concentrate on online learning in a noisy environment at home as their siblings may make some noise and disturb them when having online classes. They may also be responsible for teaching and helping their younger siblings with virtual learning at home.

Overall, this study also reports that final year students were more likely to develop anxiety and depression during this pandemic. The probable explanations are academic evaluations, and the shift in learning methods, putting a strain on the students. They need to handle a heavy workload within a specific period of time. For example, fixed assessments, including the excessive number of assignments, tests, and final year projects. Additionally, they would undoubtedly feel worried regarding the uncertain future and the possible global recession that is expected to succeed the COVID-19

pandemic (32). This includes worrying about future employment opportunities after graduation. Therefore, the stress produced by these dramatic changes faced by final year students directly increases the risk of developing anxiety and depression. This study also indicated that first-year students experienced higher anxiety than second-and third-year students. This is similar to previous research that reported the rates of moderate-severe anxiety increased 39.8% among first-year students during the pandemic (33). First-year students face uncertainty as they embarked on their first year of university amidst the COVID-19 pandemic. They have missed typical university experiences due to the pandemic, which has altered studying and other social aspects of university life. These unusual circumstances may cause increased anxiety for them during their first university year, which only consist of online distance learning and socially distanced events.

According to Beard et al. (34), it was found that the presence of psychological disorders could contribute to a lower QoL for populations. The present study also shows that psychological distress (depression, anxiety, and stress) is inversely correlated with quality of life. This means that an increase in psychological distress leads to a decrease in quality of life among the students during the COVID-19 pandemic. Depression disorders were associated with worse mental functioning on the following factors: vitality (VT), emotional well-being (EW), and social functioning (SF) in this study. Lower vitality among university students represents less energy and greater fatigue and a persistent high level of depression during e-learning could further aggravate the risk of fatigue. Sleep irregularities is one of the major causes of fatigue in those who suffer from depression. Saad et al. (35) supports this, highlighting that insomnia and disruptions in the sleep-wake cycle were common among students and were exacerbated by the increase in depressive symptoms that occurred throughout the pandemic. Students' everyday activities have been disrupted by substantial changes in their living habits, such as physical activities, online class schedules, and the usage of technological devices, which has exacerbated sleep issues. It was discovered that young individuals who followed-up on the updates regarding the pandemic for over three hours per day have greater levels of depression, which causes an increase in levels of cortisol in the body and a decrease in melatonin synthesis, thus disrupting normal biological sleep rhythm (36). Despite an increase in bedtime, the amount of time spent actually sleeping was considerably lower, indicating poor sleep efficiency and difficulties falling asleep (35).

In regards to social functioning, students who felt their normal social activities had been hampered had a greater prevalence of depressed symptoms (37). A positive social interaction allows them to feel appropriate support from their peers, friends, and society, which is

beneficial to their physical and mental development. The current COVID-19 outbreak has resulted in social isolation to some extent, and social interactions among friends, relatives, and neighbourhoods are affected, which is harmful to university students' physical and mental health. Since they never previously experienced social isolation, university students are at risk of having a lower quality of life. Increased loneliness resulting from social isolation has been suspected as a risk factor for depressive symptoms (38, 39). Previous research conducted by Loades et al. (40) and Rauschenberg et al. (41) had confirmed social isolation and loneliness due to measures including home confinement, social distancing, and quarantine to curb this pandemic elevates their risk of psychological distress such as depression, with a longer period of loneliness regarded as a significant predictor of adverse mental symptoms.

A low initial level of well-being is a predictor of depressive illnesses that could be induced by problems in daily life or traumatic experiences (42). With respect to emotional well-being or mental health domain, mental health among university students in this study deteriorated during this pandemic due to the presence of depression, causing their quality of life to worsen. The current study's finding is in line with other research showing a significant increase in depression levels as the pandemic was progressing (43, 44). This is because the depressed students faced mood disturbance caused by study disruption, social isolation, and social distancing during the pandemic. In particular, the prevalence of major depressive illness is higher among university students who have struggled to adapt to remote learning (45). Thus, leading to the overall deterioration of mental health.

Based on the findings of this study, we can highlight a few recommendations to improve the psychological state and QoL of university students during the COVID-19 crisis. The emphasis on online psychological interventions should be strengthened because it could be a valuable tool that help curb psychological distress. Hence, the Ministry of Higher Education (MOHE), together with higher education institutions (HEIs) should set priorities in arranging online counselling and telepsychiatry services which allows therapists or counsellors to give psychological support and advice via video conferencing, online chat, or emails. The MePlusMe programme that promotes psychological well-being, boosts mood and everyday functioning, and improves university students' study skills, is an example of a successful online psychosocial intervention for university students (46). Moreover, they can provide options for university students to join online social support groups, enabling them to share similar problems and gain social assistance. Further, since this study reveals that emergency online learning leads to significant psychological distress among students, all-inclusive teaching and learning methods during

pandemics must be deliberated quickly (24). The Youth and Sports Ministry should urge youth organisations to foster a supportive and enabling environment for at-risk youths who need more emotional assistance in order to feel more connected to the community.

CONCLUSION

In conclusion, this study illustrates that the COVID-19 pandemic greatly impacted the psychological state and the QoL of the university students in UiTM Puncak Alam. Year of study, faculty type, monthly family income, residential areas and number of siblings significantly predicted psychological distress. All the SF-36 domains were observed to be adversely correlated with depression, anxiety, and stress levels. Although the level of depression, anxiety and stress can vary among individuals and throughout the year, this study provides an insight into mental health among university students during the COVID-19 pandemic where the findings can be used to identify students who may be struggling in a pandemic or future crises. Therefore, the involvement of the relevant parties to assist students in coping with the situation is necessary so that their educational performance and health are not negatively impacted.

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