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The psychological impact of coronavirus on university students and its socioeconomic determinants in Malaysia

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4 **The psychological impact of coronavirus on university students and its socio-**
5 **economic determinants in Malaysia**
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The psychological impact of coronavirus on university students and its socio-economic determinants in Malaysia

Abstract

This article examines the impact of coronavirus disease 2019 (COVID-19) upon university students' anxiety level and finds the factors associated with the anxiety disorder in Malaysia. We collected data from 958 students from 16 different universities using an originally designed questionnaire. The Generalized Anxiety Disorder Scale 7-item (GAD-7) was used to estimate the anxiety. We find that 12.3% students were normal, whereas 30.5% were experiencing mild, 31.1% moderate, and 26.1% severe anxiety. Surprisingly, only 37.2% of students were aware of mental health support which was provided by their universities. Moreover, it was found that gender as male (Odds Ratio (OR)= 0.798, 95% Confidence Interval (CI)= 0.61 - 1.04)) and having internet access (OR = 0.44, 95% CI= 0.24 - 0.80) were alleviating factors for the anxiety. Whereas, age above than 20 years (OR= 1.30, 95% CI= 0.96 - 1.75), ethnicity Chinese (OR=1.72, 95% CI= 0.95 - 3.1), any other disease (OR=2.0, 95% CI=1.44 - 2.79), decreased family income (OR=1.71, 95% CI=1.34 - 2.17), more time spent on watching COVID-19 related news (OR=1.52, 95% CI=1.17 - 1.97), and infected relative or friends (OR=1.62, 95% CI=1.06 - 2.50) were risk factors for anxiety among students. We suggest that the government of Malaysia should monitor the mental health of the universities' students more closely and universities should open online mental health support clinics to avoid the adverse impacts of the anxiety disorder.

Key words: Anxiety disorder; COVID-19; GAD; Malaysia; Students

1. Introduction

Coronavirus Disease 2019 (COVID-19) continues to devastate almost every country in the world. As of 24th October 2020, total deaths have reached 1.2 million and infections 42.6 million¹.

¹ <https://www.worldometers.info/coronavirus/>

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4 The impact of the virus is different in various countries mainly because of the environment, herd
5 immunity, health system, government strategies, and public response. For example, San Marino
6 has maximum per million fatalities (1,237) followed by Peru, Belgium, and Andorra². To avoid
7 the distressing impact of the COVID-19, every country has adopted numerous health, fiscal, and
8 public policies. So far, Malaysia has made tremendous progress in controlling the impact of
9 COVID-19. As a result of the better policies and public responses, as of 11th September 2020,
10 Malaysia has a total 9,628 confirmed cases out of which 9,167 recovered and 128 died (1.33%).
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18 The first case of COVID-19 in Malaysia was confirmed on 25th January 2020 [1]but the cases
19 continued to rise steadily until the end of the February 2020. After the 14th of march the sudden
20 rise in the COVID-19 cases were noted which was believed to be associated with a religious
21 gathering in Kuala Lumpur (Capital city of Malaysia) [2]. Approximately, 16,000 people attended
22 that gathering, eventually leading to a rise in the total cases that were observed during the next two
23 months. The government of Malaysia immediately implemented the Movement Control Order
24 (MCO) commencing from 18th March 2020 to control the spread of the virus [3], which was
25 subsequently relaxed in August 2020. During the period of the MCO gatherings at all places were
26 prohibited including religious services and universities. This was the time when almost all the
27 universities in Malaysia shifted their mode of teaching from physical to virtual.
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37 The sudden change in the mode of teaching due to the potential risk of death caused by
38 COVID-19, isolation, and lockdown have increased the anxiety level and created extreme stress
39 to the general public [4] and students alike [5] The abnormal stress and depression amongst
40 students not only affect their performance but also is associated with heightened self-injury and
41 suicidal attempts [6]. Therefore, it is immensely important to monitor the mental health of the
42 students and assess the risks coupled with preventive factors of the anxiety and associated mental
43 health issues. We selected Malaysia as a case country because of the better possibility of the data
44 collection. Secondly, to date, most of the studies have explored the impact of COVID-19 on
45 students in China, paramedical staff, patients, and even on the general public but the university
46 students in Malaysia are overlooked. Hence, this paper examines the impact of COVID-19 on
47 students' anxiety in Malaysia. As well as it finds the socioeconomic factors which are associated
48 with students' anxiety. The rest of the paper is organized as follows: Section 1.1 reviews the earlier
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4 studies, section 2 explains the data, variables, and methods, section 3 discusses the results, and
5 section 4 concludes the paper.
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7 8 **2. Literature Review** 9

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11 A handful of studies attempted to examine the association between COVID-19 and mental
12 health. For instance, Tian et al. (2020) [4] investigated the psychological symptoms of 1,060
13 Chinese citizens during COVID-19 using a symptoms checklist of 90 via an online questionnaire.
14 They found more than 70% of the total sample had a moderate and higher level of an obsessive
15 compulsion disorder, interpersonal sensitivity, phobic anxiety, and psychoticism. Interestingly,
16 people older than 50 years had relatively more symptoms than young people. Moreover, the
17 symptoms were higher among people who had an education level of undergraduate and below,
18 been divorced, or widowed.
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21 Likewise, Cheng et al. (2020) [7] in Chinese Jiangsu province, measured the impact of
22 COVID-19 on the anxiety level amongst 534 pediatric medical staff. Using a self-rating anxiety
23 scale based upon the Pittsburgh sleep quality index, they found that the prevalence of anxiety was
24 14.0% amongst the medical staff. They applied stepwise multiple linear regressions to examine
25 the association between anxiety and other socio-economic factors. It was discovered that having a
26 physical condition and concerns relating to the epidemic were positively associated with anxiety
27 levels. Whereas, positional title, better living style, and education were negatively associated with
28 anxiety level. Similarly, another study conducted by Wang et al. (2020) [8] found that there was
29 significantly higher psychological distress amongst medical staff deployed to Hubei province
30 compared to other medical personnel in China.
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33 Most of the studies have only focused on the general public and medical staff (such [as Pieh et
34 al. (2020), Ferrucci et al., (2020), and Huang and Zhao (2020) [9-11]) but ignored college and
35 university students. However, a few studies have attempted to estimate the impact of COVID-19
36 on the mental health of students. Such as, in China, Cao et al. (2020) [12] examined the
37 psychological impact of the COVID-19 on college students. Using cluster sampling, they collected
38 data from 7,143 students from Changzhi Medical College China. Using GAD-7, they found that
39 21.3% of respondents were experiencing mild, 2.7% moderate, and 0.9% severe anxiety.
40 Furthermore, they applied the ordered logit model and explored that living in urban areas, living
41 with parents, having a steady family income were protective factors against anxiety. Our study
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4 uses the same methods for measuring the anxiety factors associated with this mental health issue.
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6 However, our study covers around 16 universities, which produces more generalizable and
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8 comprehensive estimates, because of the heterogeneity amongst the sample.
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11 Moreover, Kaparounaki et al. (2020) [13] examined the impact of COVID-19 on the mental
12 health of university students in Greece. They collected the data from 1,000 university students and
13 found that 42.5% of the total sample population had anxiety and 74.3% depression. Using similar
14 data, Patsali et al., (2020) found that depression was present in 12.43% and severe distress was
15 present in 13.46% of the sample population. Of concern, they noticed a 2.59% increase in suicidal
16 thoughts. In Malaysia, we could only find one study by Sundarassen et al., (2020) [14] that was
17 conducted in a similar vein. Their study was the closest to us in terms of our research objectives.
18 However, they used Zung's self-rating anxiety scale (SAS) to estimate the anxiety level. Quite
19 surprisingly, they found only 8% of students were experiencing mild to moderate and moderate to
20 severe anxiety, which is substantially different from the findings of other studies, hence this
21 requires further investigation. The basic reason for an extremely low number could be using
22 Zung's self-rating anxiety scale. The anxiety scale has been criticized by earlier studies [15-17]
23 for producing unreliable results. Thus, our study covers a more comprehensive base of 16
24 universities and applies advanced methods to estimates the anxiety amongst students. We further
25 explored the factors which influence the anxiety level.
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38 **3. Methods**

39 *3.1 Data*

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43 We created a Google form which consists of 45 questions (including GAD-7) for collecting
44 data and sent the link through email, WhatsApp, Zoom, Microsoft Teams, Google Meetings,
45 WeChat, and other social media platforms. We collected demographic, social, and economic
46 information from the respondents such as living area, age, gender, education, current semester,
47 number of friends, family income, and so on. Whereas, the question related to anxiety was taken
48 from GAD-7. In total, 958 students from 16 different universities participated in the survey. The
49 respondents were requested to provide their consent to use their information for research purposes
50 only. The participation was voluntary and respondents had the option to exit the survey at any
51 point. Data were collected in July 2020 when the mode of teaching in most of the universities was
52 entirely virtual learning.
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3.2 Variables

The dependent variable “Anxiety Level” was constructed using GAD-7 questionnaire. It is gleaned from the practical self-reporting questionnaire which consisted of 7 items such as feeling nervous, not able to stop worrying, worrying to much about different things, trouble relaxing, being restless, being easily annoyed, and feeling afraid [18]. The GAD-7 is widely used in the literature and its validity has been tested in numerous studies such as Löwe et al., (2008), Barthel et al., (2014), and Seo and Park, (2015) [19-21]. Depending upon the response of the students, four categories of anxiety were created such as 1 means No anxiety, 2 = mild anxiety, 3 = moderate anxiety, and 4 = severe anxiety. Hence, the variable has an order from 1 to 4, where 1 means no anxiety and 4 means severe anxiety. After estimating the anxiety level among students, we applied ordered logit modeling to examine the impact of various socio-economic and demographic variables. The list of our variables of interest along with frequencies and percentages is given in the table 1.

Table 1. List of the variables

Anxiety Level (Dependent Variable)	No Anxiety 118 (12.3%)	Mild Anxiety 292 (30.5%)	Moderate Anxiety 298 (31.1%)	Severe Anxiety 250 (26.1%)
Gender	Male 279 (29.1%)	Female 679 (70.9%)		
Age	Below 20 667 (69.6%)	Above 20 291 (30.4%)		
Ethnicity	Chinese 305 (31.8%)	Malay 603 (62.9%)	Others 50 (5.2%)	
Living Area	Rural 286 (29.9%)	Urban 672 (70.1%)		
Internet Access	Yes 917 (95.7%)	No 41 (4.3%)		
Current semester	Mean 2.93	SD 1.61	Min 1	Max 8
Playing sports	Yes 655 (68.4%)	No 303 (31.6%)		

Number of close friends	Mean	SD	Min	Max
	7.4	5.7	1	28
Living with parents	Yes	No		
	901 (94.1%)	57 (5.9%)		
Persons living in one home	Mean	SD	Min	Max
	5.2	1.88	1	13
Personal expenses monthly (RM)	Below 1,000	Above 1,000		
	794 (82.9%)	164 (17.1%)		
Family income decreased	Yes	No		
	496 (51.8%)	462 (48.2%)		
Any other disease	Yes	No		
	156 (16.3%)	802 (83.7%)		
COVID news time spent more than 30 minutes	Yes	No		
	677 (70.7%)	281 (29.3%)		
COVID infect any relative or friend	Yes	No		
	83 (8.7%)	875 (91.3%)		
University provides mental health support	No	Not sure	Yes	
	105 (10.9%)	497 (51.9%)	356 (37.2%)	

Author's calculations, SD= standard deviation, RM= Malaysian Ringgit.

3.3 Model

The ordered logit model is suitable when the proportional odds assumption satisfies and the coefficients are usually estimated by using the maximum likelihood method. The model has been used in recent studies by [12,14] to estimate the odds ratios. In our case, we had an ordinal dependent variable "Anxiety level" and our objective was to predict the odds ratios. The odds ratios represent the constant effect of an independent variable on the likelihood that one outcome (dependent variable) will occur.

We had four levels of our dependent variable such as no anxiety, mild anxiety, moderate anxiety, and severe anxiety. The model can be characterized as follows,

$$y^* = \sum_i^k \beta_k x_{ki} + \varepsilon_i = z_i + \varepsilon_i \quad (1)$$

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4 Where y^* is our unobserved dependent variable and x_{ki} represents the list of independent
5 variables, ε_i is the error term, and β_k shows the coefficients which we have estimated. Please note
6 that there is no intercept here it means we have estimated m-1 odds ratios that the dependent
7 variable takes on with respect to a particular value identified in equation 1.
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10 11 12 **4. Results and discussion** 13

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15 Table 1 shows the frequencies of anxiety levels among students. Surprisingly, almost 57% of
16 our sampled students were experiencing moderate or severe anxiety during COVID-19, whereas,
17 almost 62% of the students did not know whether their institutions were providing mental health
18 support. Perhaps, universities might not have anticipated the sudden surge in anxiety levels,
19 however, this might have serious repercussions on learning experiences.
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24 The results of the ordered logit model are presented in Table 3. We have only elaborated the
25 significant results where p-value was less than 0.10. We found that the odds of being at the higher-
26 level of anxiety decreases (OR=0.798 95% CI = 0.61 to 1.04) if the students were male. In other
27 words, male students were less likely to develop a higher level of anxiety in comparison with
28 female students. Perhaps, female students are more sensitive to the COVID-19 situation than
29 males. Furthermore, the odds of being at the higher-level anxiety increases by 1.3 times (95%CI =
30 0.96 to 1.75) if the students were above 20 years old in comparison to those whose age was below
31 20 years. Perhaps older students take the impact of coronavirus more seriously which may lead to
32 an upsurge in anxiety level. Interestingly, the odds of being at a higher level of anxiety increases
33 by 1.7 times (95% CI = 0.95 to 3.09) if the students were of Chinese ethnicity in comparison to
34 other ethnicities (Indian, Bengali, Arabian, and Indonesian).
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46 Moreover, having internet access helps to reduce anxiety amongst students. We found that the
47 odds of being at a higher level of anxiety decreases (OR = 0.45, 95% C. I = 0.25 to 0.80) if students
48 have internet access. Perhaps, the students can have more entertainment options at home which
49 may lead to reduce anxiety. Secondly, due to the lockdown or MCO outdoor sports and other
50 activities were banned, hence, in this situation having internet access could be a significant factor
51 to control anxiety level. Most importantly, students during the MCO period were taking online
52 classes, therefore, having an internet connection helps them to concentrate on the study, which
53 means they would be thinking less of COVID-19.
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4 Undoubtedly, COVID-19 has affected economic activities adversely and because of the
5 lockdown which has led to personal income reducing significantly. This might have a severe
6 impact on the welfare and the anxiety level of individuals. We found that the odds of being at the
7 higher-level of anxiety increase by 1.7 times (95% C.I = 1.34 to 2.17) if students' family income
8 diminishes because of the coronavirus. Almost 52% of the students reported that their family
9 income has reduced because of the low economic activities and lockdown which was the result of
10 COVID-19.
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18 Furthermore, having any other disease may increase the level of anxiety among students. Our
19 study found that the odds of being at the higher level of anxiety increase by 2.0 times (95% C.I =
20 1.44 to 2.79) if students have any other pre-existing disease. Perhaps pre-existing diseases have a
21 cumulative effect on fear and lead to a higher level of anxiety. Likewise, spending more than 30
22 minutes weekly on watching the coronavirus related news can significantly increase the anxiety
23 level among students (OR=1.51, 95% CI = 1.2 to 1.97). Additionally, having an infected friend or
24 relative can significantly increase the anxiety level amongst students. We found that the odds of
25 being at the higher level of anxiety increases by 1.62 times (95% C.I = 1.06 to 2.46) if students'
26 friends or relatives were infected by COVID-19. The likelihood of having anxiety decreases if the
27 students live with their parents and reside in urban areas. In addition, as the number of close friends
28 increases, anxiety decreases. However, these results were not significant. Perhaps, future larger
29 sample size studies may explore some more interesting exploratory discoveries in our study that
30 may lead to more definite and significant findings. Secondly, the data were collected in July 2020,
31 when the curve of the COVID-19 in Malaysia was getting flatter. Perhaps, data collection in some
32 other time periods may produce slightly different results.
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Table 2. Results of the ordered logit model

Factors	OR	Std. Error	t value	p-values	C.I 95%	
					Lower	Upper
Gender (Male)	0.798*	0.137	-1.653	0.098	0.610	1.043
Age above 20 years	1.297*	0.153	1.694	0.090	0.960	1.752
Ethnicity Chinese	1.719*	0.300	1.805	0.071	0.953	3.097
Ethnicity Malay	1.215	0.287	0.678	0.498	0.691	2.133
Ethnicity Others (reference)						
Area Urban	0.831	0.132	-1.406	0.160	0.641	1.076
Internet access (Yes)	0.446***	0.300	-2.686	0.007	0.245	0.799
Current semester	0.970	0.042	-0.713	0.476	0.894	1.054
Playing sports (Yes)	1.053	0.132	0.390	0.697	0.812	1.365
Number of close friends (log)	0.972	0.077	-0.366	0.715	0.837	1.130
Living with parents Yes	0.668	0.276	-1.458	0.145	0.388	1.148
Persons living in one home	1.042	0.033	1.247	0.212	0.977	1.112
Expenses above 1,000 RM (yes)	1.252	0.159	1.410	0.159	0.916	1.713
Family income decreased (Yes)	1.706***	0.123	4.342	0.000	1.341	2.173
Any other diseases (Yes)	2.001***	0.168	4.135	0.000	1.442	2.785
COVID news time spent more than 30m	1.515***	0.133	3.131	0.002	1.169	1.966
COVID infect any relative or friends	1.624**	0.219	2.217	0.027	1.059	2.499
Residual deviance	2467.97					
Akaike information criterion (AIC)	2505.97					
Observations	958					

Note: authors calculations, OR= Odd Ratios, C.I = Confidence Intervals, and *p<0.1; **p<0.05; ***p<0.01

5. Conclusion

The COVID-19 outbreak continues to create chaos in almost every country As of September 11th 2020, no vaccination against the virus is available in the market. However, several scientific groups are in the process of developing a potential vaccine. In response to controlling the virus, every country has taken various steps such as lockdowns, quarantines, social distancing, isolations, and MCOs. The fear of death due to COVID-19 and government measures to control the spread of the virus have affected the mental health of citizens and students in particular. The psychological impact of COVID-19 in Malaysian students is a relatively unexplored phenomenon. We explored

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4 the anxiety amongst students in Malaysia and found that around 57% of the students were
5 experiencing moderate to severe anxiety. Surprisingly, only 37% of students were aware of mental
6 health support services which are provided by their institutions. Additionally, gender as male and
7 internet access were a protective factor against anxiety, despite the potential for the internet to
8 increase anxiety through constant worrying news reports. Whereas, age above 20 years, ethnicity
9 as Chinese, decreased family income, a pre-existing disease, spending more than 30 minutes
10 weekly on watching or reading COVID-19 related news, and having an infected family or friends
11 were viewed as the major risk factors for anxiety.
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20 Treatment of anxiety involves various interventions including the medication, counselling, and
21 therapy, the combination of all of these usually being more effective. We suggest higher education
22 institutions should assist universities to open mental health support (both psychiatric and
23 psychology based) clinics on every campus, with online access. These services should be provided
24 on both an informal and formal basis as well because those students who are unable to visit the
25 clinic physically can get mental support on call or chat. It is also important to regularly monitor
26 the mental health condition of the students. The financial packages or support can help families to
27 maintain their income which eventually lowers the anxiety level. It can also lead to greater
28 economic productivity in lockdowns. Hence, we suggest the government should also consider
29 providing financial support to the families working from home during lockdowns and higher
30 stringency regimes. Moreover, sports clubs and student societies can also reduce anxiety amongst
31 students by operating within the context of social distancing. These concerns should be addressed
32 by the Ministries of Education and Quality Control. Our policy suggestions can lower the anxiety
33 amongst students and can help the policy setters in formulating the adequate policies. Our results
34 are likely to be of interest to education policy setters around the globe as the majority of students
35 around the world have experienced very similar issues during Covid-19 lockdowns as teaching has
36 been online, and so they confront common issues.
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51 **Ethical Statement**

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54 We hereby declare that; The paper reflects the authors' own research and analysis in a truthful and
55 complete manner. The results are appropriately placed in the context of prior and existing research.
56 In addition, no animal or human were harmed, no blood samples were collected, no clinical trials
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4 were carried out, identity of the respondents kept confidential, and prior consent from the
5 respondents were taken.
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10 This research did not receive any specific grant from funding agencies in the public,
11 commercial, or not-for-profit sectors
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14 **Declaration of Competing Interest** 15

16 Authors have no conflicts of interest to disclose
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