

The Relationship between the Duration of Online Learning during the COVID-19 Pandemic and Symptoms of Depression in Medical Students of Pelita Harapan University: A Cross Sectional Study

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Abstract

Introduction: The COVID-19 outbreak that started in Wuhan, China in December 2019 has become a global pandemic. The existence of the COVID-19 pandemic has led to a change in the university learning system into online learning. Online learning that occurs during the COVID-19 pandemic can have an indirect impact on the mental health of students, one of which is depression. Depression that occurs in online learning can be affected by the duration of online learning.

Aim: This study is conducted to determine the relationship between online learning during the COVID-19 pandemic and symptoms of depression in medical students of Pelita Harapan University.

Method: This study used a cross-sectional study to be conducted on 161 students of the Faculty of Medicine, University of Pelita Harapan. Sampling will use purposive sampling method. Collecting data using a questionnaire about the duration of online learning and using the Patient Health Questionnaire-9 (PHQ-9) for depression symptoms. The results of this study analysed using chi square analysis with data processing using SPSS 26.

Results: There were 161 samples that matched the inclusion and exclusion criteria of this study. The majority of the sample was female (52.8%), came from the 2018 class (46.0%), 20 years old (50.3%), residing outside the Greater Jakarta area (57.8%), doing more online learning than 6 hours (57.8%) and experienced mild depression (53.4%). The results showed that there was no significant relationship between the duration of online learning and symptoms of depression (OR 1.273; 95%CI (0.669-2.421); p = 0.565).

Conclusion: There was no significant relationship between the duration of online learning and symptoms of depression. Further studies with large samples and randomized sampling are required to minimize biases in future studies.

Introduction

The Coronavirus Disease-19 (COVID-19) epidemic that began in Wuhan, China in December 2019 has become a global pandemic.¹ In Indonesia, the first two cases were announced on March 2, 2020.² On March 15, 2020, the President of the Republic of Indonesia gave an appeal for all agencies to carry out large-scale social restrictions (PSBB), so that people are encouraged to do all work and education from home due to the impact of the COVID-19 pandemic that has hit Indonesia.³ This policy provides changes to the education system to carry out education online (online). Learning in a network is learning that is carried out using the internet network without direct face-to-face interaction between teachers and students.⁴ Online learning can be carried out synchronously where there is direct interaction between teachers and students through meeting applications such as Zoom, and asynchronous without any interaction between teachers and students, so students can independently access learning materials through their respective school or university websites.⁵ The online learning has been carried out at the Faculty of Medicine, University of Pelita Harapan since March 18, 2020.

Depression is a mental disorder characterized by depressive symptoms, loss of interest and excitement, and reduced energy leading to increased fatigue and decreased activity that lasts for two weeks.⁶ Depression can put a big burden on the patients because it can affect the quality of life, working, and academic performance for

the patients. A systematic review study conducted by Rotenstein et al. 2016 showed that out of 129,123 medical students from 47 countries, the prevalence of medical students experiencing depression was 27.2 percent and 11.1 percent of them had suicidal thoughts.⁷ This shows that depression is a dangerous thing for students because it can reduce quality of life and academic performance for students, as well as depression can increase mortality from suicide.

Several studies have been conducted in 2020 on the relationship between duration of online learning during the COVID-19 pandemic and depressive symptoms in adolescents and college students. Research conducted by Madhav, et al. in United States of America in 2016 showed that the use of screen time in above 6 hours duration have a significant relationship to the onset of depressive symptoms in 4201 adults, in which including adolescents that accessing the digital media for learning purposes.⁸ Research conducted in China by Zhou et al. in adolescent women show that there is no significant relationship between mean duration of online learning over 4 hours in duration with symptoms of depression in this population.⁹ In Indonesia, research conducted by Watyana, et al. shows that there is no significant relationship between students doing online learning and level of stress and depression.¹⁰ This study is conducted to determine the relationship between duration of online learning and symptoms of depression in medical students of Pelita Harapan University

Methods

Samples

The research sample was obtained from all medical students in Faculty of Medicine, Pelita Harapan University in term 2018, 2019, and 2020, both men and women who met the inclusion criteria. They agreed to participate in this study by signing an informed consent. The total of 161 participants were collected from January to March 2021.

Study Design

A cross sectional study was conducted in Faculty of Medicine, Pelita Harapan University from January to March 2021. The research was conducted with online instruments. A consecutive sampling was conducted to collect 161 respondents as minimum sample required based on different proportion calculation method.

Data Collection Method

Data was collected using several questionnaire methods. The sociodemographic information such as name, age, gender, batch, have diagnosed with depression in 2 years before, consumed anti depressive medications, residence in Greater Jakarta area or outside Greater Jakarta area, Chronic illnesses or COVID-19 history, duration of online learning and duration of non-academic online activities were collected using a self-administered questionnaire. Perceived stress data was collected using the Perceived Stress Scale-10 questionnaire (PSS-10), and the depressive symptoms were collected using Patient Health Questionnaire-9 (PHQ-9). The answers regarding the duration of online learning and

non-academic online activities were classified with the cutoff of 6 hours based on the research that Madhav, et.al. conducted in United States.⁸ The Perceived Stress Scale-10 questionnaire answers are classified into mild stress (0-13), moderate stress (14-26), severe stress (27-40).¹³ The PHQ-9 questionnaire consist of 9 questions regarding the depressive symptoms based on Diagnosis and Statistical Manual of Mental Disorders-V (DSM-V) diagnostic criteria for major depressive disorder, the score can classified into no depression (0-4), mild depression (5-9), moderate depression (10-14), and severe depression (15-27).¹¹ The exclusion criteria for this study are having diagnosed with depressive symptoms since 2 years prior to this study, consuming anti-depressant medications, having history of chronic illnesses or COVID-19 infection, and have a severe perceived stress.

This study has been approved by Ethical Committee Faculty of Medicine, Pelita Harapan University No 195VK-LKJ/ETIK/XII/2020.

Statistical Analysis

All of the collected data were analyzed using Microsoft Excel 2019 and Statistic Package for Social Sciences 26th version (IBM SPSS 26). The relationship between online learning duration and depressive symptoms in medical students of Pelita Harapan University were analyzed using Chi square test. Other variables such as duration of non-academic online activities and residence are also analyzed using Chi square tests. The result said to be significant if the p-value below 0.05 ($p \leq 0.05$) in two tailed hypothesis testing.

Results

Demographical Data and Respondent Characteristics

Table 1. Demographical Data and Respondent Characteristics (N=161)

Variable	Frequency (n)	Percentage (%)
Gender		
Men	76	47.2
Women	85	52.8
Age (Year)		
18	23	14.3
19	52	32.3
20	81	50.3
21	4	2.5
22	1	0.6
Batch		
2018	74	46
2019	50	31.1
2020	37	23
Residence		
Greater Jakarta	68	42.2
Outside Greater Jakarta	93	57.8
Online learning Duration		
> 6 hours	93	57.8
≤ 6 hours	68	42.2
Non-Academic Online Activities Duration		
≤ 6 hours	24	14.9
> 6 hours	137	85.1

In this study, 161 respondents were obtained who were active pre-clinical students of the Faculty of Medicine, Pelita Harapan University. The respondents have met the inclusion criteria. Respondent characteristics can be seen in **table 1**. The majority of respondents in this study were female respondents as many as 85 people

(52.8%), aged 20 years as many as 81 people (50.3%), respondents from the 2018 batch were 74 people (46.0%), and resided outside the Greater Jakarta area as many as 93 people (57.8%), duration > 6 hours as many as 93 people (57.8%) and doing non-academic online activities with a duration of ≤ 6 hours as many as 137 people (85.1%).

Description of the Depressive Symptoms in Medical Students of Pelita Harapan University

Table 2. Description of the Depressive Symptoms Level Based of PHQ-9 Result (N=161)

Depressive Symptoms	Frequency	Percentage
	(n)	(%)
No Depression	61	37.9
Mild Depression	86	53.4
Moderate Depression	11	6.8
Severe Depression	3	1.9

The level of depressive symptoms was assessed based on the PHQ-9 scoring. The description of the depressive symptoms level in medical students of Pelita Harapan

University can be seen in **table 2**. The majority of the respondents have mild depressive symptoms as many as 86 people (52.4%).

Bivariate Analysis

The Relationship Between Online Learning Duration and Depressive Symptoms in Medical Students of Pelita Harapan University

Online Learning Duration	Depression				Total	OR (95% CI)	p-value
	No Depression		Depression				
	n	%	n	%	N	%	
≤ 6 hours	28	41,2	40	58,8	68	100	1,273
> 6 hours	33	35,5	60	64,5	93	100	(0,669-2,421)
Total	61	37,9	100	62,1	161	100	

Table 3. The relationship between online learning duration and depressive symptoms in medical students of Pelita Harapan University

In this study, statistical analysis assessed using the Chi squared test to obtain a p value of 0.568 ($p > 0.05$). This shows that

there is no significant relationship between the duration of online learning and depressive symptoms.

The Relationship between the Duration of Non-Academic Online Activities and Symptoms of Depression in Medical Students of Pelita Harapan University

Table 4. The Relationship between the Duration of Non-Academic Online Activities and Symptoms of Depression in Medical Students of Pelita Harapan University

Duration of Non-Academic Online Activities	Depression				Total		OR (95% CI)	<i>p-value</i>
	No Depression		Depression					
	n	%	n	%	N	%		
> 6 hours	6	25	18	75	24	100	0,497	0,237
≤ 6 hours	55	40,1	82	59,9	137	100	(0,186-1,331)	
Total	61	37,9	100	62,1	161	100		

The results of statistical analysis using Chi square test obtained p value of 0.237 ($p > 0.05$) which indicates that there is no significant relationship between non-

academic duration and symptoms of depression in students of the Faculty of Medicine, Pelita Harapan University.

The Relationship between Place of Residence and Symptoms of Depression in Medical Students of Pelita Harapan University

Table 5. The Relationship between the Place of Residence and Symptoms of Depression in Medical Students of Pelita Harapan University

Place of Residence	Depression				Total		OR (95% CI)	<i>p-value</i>
	No Depression		Depression					
	n	%	n	%	N	%		
Greater Jakarta	28	41,2	40	58,8	68	100	1,273	0,452
Outside Greater Jakarta	33	35,5	60	64,5	93	100	(0,669-2,421)	
Total	61	37,9	100	62,1	161	100		

The results of statistical tests using the Chi square test obtained a p value of 0.452 ($p > 0.05$) which indicates that there is no

significant relationship between the place of residence and symptoms of depression.

Discussion

In this study, there is no significant relationship between the duration of online learning and depressive symptoms in medical students of Pelita Harapan University. This study is not in line with the cross-sectional study conducted by Madhav, et al in 2016 on 4,201 students in the United States which stated that the duration of online learning was significantly associated with symptoms of depression in students in the United States, where the duration of online learning was more than 6 hours affects the onset of depressive symptoms in students in the United States at that time. This can happen because in this study the number of samples was larger than the number of samples set by the researchers in this study so that this study obtained more significant results than the number of samples set by the researchers in this study. In addition, differences in the characteristics of the sample within a country as in the study can also affect the results of this study, where country differences can affect differences in the education system and culture that can make research results different, as well as the random sampling method used in the study can lead to more significant differences in results.⁸

However, another cross-sectional study conducted by Zhou, et al. in 2020 in China in 3,254 female adolescents showed a non-significant relationship between duration of online learning and depressive symptoms in female adolescents in China.⁹ This study has a sample size that is not much different from the number of samples in a study conducted by Madhav, et al.⁸ but had insignificant results due to differences in the characteristics of the respondents where the respondents in the study of Zhou, et al.⁹ all of them are female respondents, the sampling method is purposive sampling where the number of respondents who do not fill out the questionnaire completely. And in this study, there are also differences in the benchmark average duration determined by the research of Madhav, et al.⁸ Where the study of Zhou, et al. used a benchmark of 4 hours duration while

Madhav, et al. used the benchmark duration of 6 hours, as well as differences in the use of questionnaires where Zhou, et al. used the CES-D questionnaire⁹ while Madhav, et al. used the PHQ-9 questionnaire.⁸

In this study, it was found that the relationship between non-academic duration and symptoms of depression in students of the Faculty of Medicine, Universitas Pelita Harapan showed a p-value of 0.237 (OR 0.497, 95%CI (0.186-1.331) which indicates that the non-academic asynchronous learning duration of the respondent has no statistical significant effect on the onset of depressive symptoms, but according to Odd Ratio, this result has clinically significant, as asynchronous learning duration has smaller impact on depressive symptom in medical students. This is contradicted with research conducted by Chi, et al. in 2020 which showed that the duration of online non-academic activities had no significant effect on causing depressive symptoms in students in China at that time.¹⁴

The relationship between the place of residence and the symptoms of depression in medical students of Pelita Harapan

University got a p value of 0.452 which means that the variable of residence does not significantly affect the onset of symptoms of depression in students of the Faculty of Medicine, University of Pelita Harapan so that the respondent's place of residence during online learning was not a confounding factor in this study. This is contrary to research conducted by Liu, et al. in 2020 on 552 medical students in China which showed that one of the factors that significantly influenced the onset of symptoms of depression in students who carried out online learning was the student's residence during online learning.¹⁵ This can happen because in Liu et al.'s research, the location where the research was carried out is different where in the study the research location was carried out in Hubei province and outside Hubei province, where at that location, there were differences in the number of cases of COVID-19 infection so that it could affect the significance of these variables.¹⁵

Conclusion

In conclusion, majority of respondents in this study do the online learning with duration for > 6 hours/day and have mild depressive symptoms. The result of this study shows that there is no significant relationship between the duration of online learning during the COVID-19 pandemic and symptoms of depression in medical students of Pelita Harapan University.

Limitation

The limitation of this study including the method of sampling by non- randomized sampling method which can increase risk of experiencing bias in this study. The use of the self-reporting questionnaire where the researcher only asks subjectively about the duration of online learning conducted by the respondent so that data collection using this questionnaire can be subjective so this is also can lead to recall bias and under or over-reporting in the study. And the use of the PHQ-9 questionnaire which is not the gold standard method for assessing depressive symptoms. The gold standard questionnaire that can be used is Hamilton Depression Rating Scale.

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