Original Article

Mental health of pre-clinical medical students in Indonesia during the first year of the COVID-19 pandemic: A reflection

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Abstract

Background & Objective: Perceived awareness and concern for mental health issues among students in Indonesia are still lacking, proceeding before and during the coronavirus disease 2019 (COVID-19) pandemic. In order to gain future benefits, this study evaluates pre-clinical medical students' mental health during the first year of the COVID-19 pandemic in Indonesia.

Materials & Methods: This cross-sectional study was conducted on pre-clinical medical students at the Faculty of Medicine, Universitas Islam Indonesia (FM UII), Yogyakarta, Indonesia, in April 2021. A total sampling method was employed. Participants completed online self-reported questionnaires, including socio-demographic data and the Depression, Anxiety, and Stress Scale-21 (DASS-21) questionnaire to evaluate mental health. Descriptive, bivariate, and multivariate analysis was performed.

Results: A total of 273 pre-clinical medical students were included in this study. They suffered from depression (35.2%) and stress (40.3%) more than a third and about half suffered from anxiety (50.2%). Females were more likely to have depression (AOR: 2.22; 95%CI: 1.19 to 4.15), anxiety (2.56; 1.42 to 4.61), and stress (3.44; 1.81 to 6.54) than males. Anxiety was less common in medical students in their second (0.48; 0.23 to 0.98) and third (0.29; 0.13 to 0.67) years than in the first year. Being a third-year student was a protective factor for stress (0.38; 0.17 to 0.87).

Conclusion: A high prevalence of depression, anxiety, and stress among pre-clinical students was observed. This study can become a reflection for educational institutions and policymakers to prepare good strategies to maintain pre-clinical students' quality and mental health during and after COVID-19 pandemic.

Keywords: Anxiety, COVID-19, Depression, Medical student, Mental health, Stress

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Introduction

Since the coronavirus disease 2019 (COVID-19) pandemic has spread worldwide, people's daily lives have changed dramatically. This situation makes policymakers impose social restrictions, especially in Indonesia, which is semi-lockdown to reduce the risk of exposure to infection. As a result, daily life becomes very limited, whereas there is less social life and physical and outdoor activities. According to the Indonesian Ministry of Education instruction, learning at schools and universities is transforming online from March 2020 until an unspecified date (1).

This unprecedented quarantine period has had a devastating impact on students' mental health. For example, Fawaz and Samaha's (2020) study in Lebanon reported that a sudden change to an online learning model led to increased symptoms of depression and anxiety in university students (2). A study by Hamaideh et al. (2022) that evaluated mental health in Jordan reported that students are vulnerable to severe mental illness during the quarantine period if no intervention is indicated (3). Furthermore, Seetan et al. (2021) study among medical students during the pandemic reported that more than half suffered from severe mental

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disorders and were concerned about being unable to get to their clinical and laboratory sessions (4).

Although the COVID-19 pandemic causes students mental health distress, particularly medical students in the pre-clinical period were considered to have higher mental health distress levels, including depression, anxiety, and stress (5,6). This condition is caused by their learning load and more competitive and psychologically high-pressure environment (5). It means that the COVID-19 pandemic has become an agent that worsens the mental health conditions of students. Whereas pre-clinical medical students are prepared to become competent and qualified health personnel and have good mental health.

Even though the pandemic has been going on for a year, appropriate interventions and strategies from policymakers and educational institutions to maintain the quality and mental health of pre-clinical medical students in Indonesia have not been implemented properly. It seems more likely due to the lack of awareness and concern for mental health issues among students in Indonesia, lasting since before the COVID-19 pandemic. It is expected to have a negative impact on subsequent conditions. Studies on pre-clinical students are expected to be able to measure the impact of COVID-19 on mental health and become a reference and reflection for formulating effective strategies and interventions. This study aims to evaluate mental health consisting of depression, anxiety, and stress among pre-clinical medical students and related factors during the first year of the COVID-19 pandemic in Indonesia, which is expected to enhance awareness and concern for policymakers and educational institutions.

Materials & Methods

Design and setting(s)

This single institution-based cross-sectional study was conducted at the Faculty of Medicine, Universitas Islam Indonesia (FM UII), Yogyakarta, Indonesia, from 4 to 12 April 2021.

Participants and sampling

According to faculty administration data, participants were recruited from a total of FM UII pre-clinical students (first to third year).

Tools/Instruments

The self-reported questionnaire consists of two parts: 1) Socio-demographic data, including gender, age, year of study, weight, and height; 2) The Indonesian version of the Depression, Anxiety and Stress Scale-21 (DASS-21) questionnaire to evaluate mental health status consisting levels of depression, anxiety, and stress that has previously been tested in several countries including Indonesia (7–9). The overall reliability coefficient (McDonald's omega) of the Indonesian version of the DASS-21 questionnaire was 0.910 and for each sub-scale was 0.794, 0.785, and 0.800 for depression, anxiety, and stress, respectively (10). The sub-scores of depression, anxiety, and stress were summed up and then classified into five categories: normal, mild, moderate, severe, and extremely severe for descriptive data. In bivariate and multivariate logistic regression analysis, mental health status was classified into two categories: normal or depressed (5 to ≥14), anxious (4 to ≥10), or stressed (8 to ≥17). Body mass index (BMI) was calculated using a person's weight in kilograms divided by height in meters squared (BMI=kg/m^2). Then, BMI was classified into three categories according to the Indonesian Ministry of Health: 1) Normal (18.5 to 25.0); 2) Underweight (≤17.0 to 18.4); 3) Overweight (25.1 to ≥27.0) (11).

Data collection methods

Data collection was carried out by distributing a Google Form link containing a self-reported questionnaire that was filled out voluntarily, anonymously, and with consent through social media such as WhatsApp and Line. Participants were required to log in to their email accounts to avoid duplicate data. Male and female pre-clinical medical students who have participated in online learning since it was enacted and had no history of mental illness were eligible to be included in this study.

Data analysis

All data were analyzed using SPSS version 26 (IBM, Chicago, IL, USA). Categorical data were displayed as frequency and percentage. Bivariate analysis using the Chi-Square test was conducted to compare the difference in proportions between groups. Multivariate logistic regression analysis to identify predictors for depression, anxiety, and stress was also carried out by including variables with a P-value <0.25 in the bivariate analysis. A P-value of <0.05 was considered statistically significant.

Results

Socio-demographic characteristics

Table 1 presents the socio-demographic characteristics of pre-clinical medical students. Of 483 FM UII pre-

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clinical medical students, 273 (response rate 56.52%) had filled out the questionnaire and were included in this study (27.1% male and 72.9% female).

Table 1. Descriptive of socio-demographic characteristics (N=273)

Variables	N	%
Gender		
Male	74	27.1
Female	199	72.9
Age, mean ± SD	19.86 ± 1.07	
<20	99	36.3
≥20	174	63.7
Year of study		
1st	70	25.6
2nd	96	35.2
3rd	107	39.2
BMI, mean ± SD	22.54 ± 4.27	
Underweight	36	13.2
Normal	175	64.1
Overweight	62	22.7

SD: standard deviation; BMI: body mass index

Most of them were ≥20 years old (63.7%) with a mean of 19.86 ± 1.07, were in their third year of study (39.2%), and had a normal BMI (64%) with a mean of 22.54 ± 4.27.

Mental health status of pre-clinical medical students

Table 2 presented pre-clinical medical students' mental health status in five categories, including depression, anxiety, and stress levels. Their trends tend to decrease with higher severity. When displayed in two categories (mild to extremely severe) in Figure 1, more than a third of students suffer depression (35.2%) and stress (40.3%). Meanwhile, the prevalence of anxiety was slightly higher than normal (50.2%). Females have a higher prevalence of depression, anxiety, and stress than males.

Table 2. Level of depression, anxiety, and stress among pre-clinical medical students

Levels	Depression		Anxiety		Stress	
	N	%	N	%	N	%
Normal	177	64.8	136	49.8	163	59.7
Mild	44	16.1	39	14.3	45	16.5
Moderate	32	11.7	41	15.0	37	13.6
Severe	7	2.6	21	7.7	21	7.7
Extremely severe	13	4.8	36	13.2	7	2.6

*Depression scoring: normal (0-4), mild (5-6), moderate (7-10), severe (11-13), extremely severe (≥14)
*Anxiety scoring: normal (0-3), mild (4-5), moderate (6-7), severe (8-9), extremely severe (≥10)
*Stress scoring: normal (0-7), mild (8-9), moderate (10-12), severe (13-16), extremely severe (≥17)

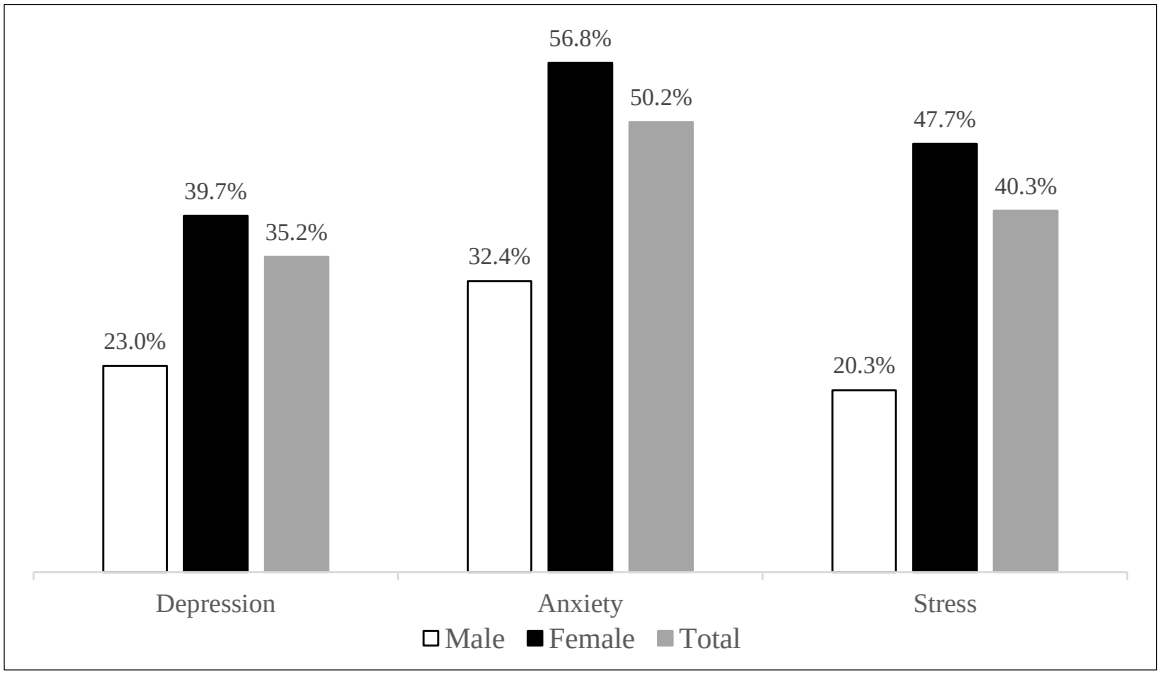

Figure 1. Prevalence of depression, anxiety, and stress among pre-clinical medical students

Association between socio-demographic variables with depression, anxiety, and stress

As presented in Table 3, females were more prevalent to have depression significantly (P<0.05) than males. Whereas age, year of study, and BMI did not differ significantly in proportion. Being a female was 2.22 times more likely to suffer depression (95%CI: 1.19 to 4.15).

Bivariate analysis for anxiety-associated factors showed that females, aged ≥20, in the third year of study, and have underweight BMI were statistically significant (P<0.05). Then, we adjusted those significant variables for multivariate analysis. The results showed that being female and underweight had higher odds of developing anxiety with an adjusted odds ratio (AOR): 2.56 (95% confidence interval, 95%CI: 1.42 to 4.61) and AOR: 2.81 (95%CI: 1.26 to 6.28) respectively. However, medical students in their second (AOR: 0.48; 95%CI: 0.23 to 0.98) and third years of study (AOR: 0.29; 95%CI: 0.13 to 0.67) were less likely to suffer anxiety compared to first-year students.

Table 3. Association between socio-demographic variables with depression, anxiety, and stress

Variables	Depression, N (%)		OR (95%CI)	P-value	AOR (95%CI)	P-value
	Depressed	Normal				
Gender						
Female	79 (39.7)	120 (60.3)	2.21 (1.20 to 4.07)	**0.010**	2.22 (1.19 to 4.15)	**0.013**
Male	17 (23.0)	57 (77.0)	Reference		Reference	
Age						
≥20	62 (35.6)	112 (64.4)	1.06 (0.63 to 1.78)	0.830		
<20	34 (34.3)	65 (65.7)	Reference			
Year of study						
3rd	34 (31.8)	73 (68.2)	0.59 (0.31 to 1.09)	0.091	0.61 (0.32 to 1.16)	0.132
2nd	31 (32.3)	65 (67.7)	0.60 (0.32 to 1.13)	0.115	0.57 (0.30 to 1.10)	0.096
1st	31 (44.3)	39 (55.7)	Reference		Reference	
BMI						
Overweight	26 (41.9)	36 (58.1)	1.62 (0.89 to 2.94)	0.113	1.71 (0.93 to 3.16)	0.086
Underweight	16 (44.4)	20 (55.6)	1.79 (0.86 to 3.73)	0.115	1.81 (0.86 to 3.83)	0.120
Normal	54 (30.9)	121 (69.1)	Reference		Reference	

Variables	Anxiety, N (%)		OR (95%CI)	P-value	AOR (95%CI)	P-value
	Anxious	Normal				
Gender						
Female	113 (56.8)	86 (43.2)	2.74 (1.56 to 4.80)	**0.000**	2.56 (1.42 to 4.61)	**0.002**
Male	24 (32.4)	50 (67.6)	Reference		Reference	
Age						
≥20	78 (44.8)	96 (55.2)	0.55 (0.33 to 0.91)	**0.019**	1.02 (0.52 to 2.0)	0.947
<20	59 (59.6)	40 (40.4)	Reference		Reference	
Year of study						
3rd	40 (37.4)	67 (62.6)	0.29 (0.16 to 0.55)	**0.000**	0.29 (0.13 to 0.67)	**0.003**
2nd	50 (52.1)	46 (47.9)	0.53 (0.28 to 1.01)	0.052	0.48 (0.23 to 0.98)	**0.043**
1st	47 (67.1)	23 (32.9)	Reference		Reference	
BMI						
Overweight	32 (51.6)	30 (48.4)	1.27 (0.71 to 2.26)	0.424	1.40 (0.76 to 2.59)	0.278
Underweight	25 (69.4)	11 (30.6)	2.70 (1.25 to 5.82)	**0.010**	2.81 (1.26 to 6.28)	**0.012**
Normal	80 (45.7)	95 (54.3)	Reference		Reference	

Variables	Stress, N (%)		OR (95%CI)	P-value	AOR (95%CI)	P-value
	Stressed	Normal				
Gender						
Female	95 (47.7)	104 (52.3)	3.59 (1.91 to 6.76)	**0.000**	3.44 (1.81 to 6.54)	**0.000**
Male	15 (20.3)	59 (79.7)	Reference		Reference	
Age						
≥20	61 (35.1)	113 (64.9)	0.55 (0.33 to 0.91)	**0.019**	0.95 (0.49 to 1.85)	0.879
<20	49 (49.5)	50 (50.5)	Reference		Reference	
Year of study						
3rd	32 (29.9)	75 (70.1)	0.34 (0.18 to 0.64)	**0.001**	0.38 (0.17 to 0.87)	**0.021**
2nd	39 (40.6)	57 (59.4)	0.54 (0.29 to 1.01)	0.054	0.53 (0.26 to 1.07)	0.077
1st	39 (55.7)	31 (44.3)	Reference		Reference	
BMI						
Overweight	22 (35.5)	40 (64.5)	0.79 (0.43 to 1.44)	0.434		
Underweight	16 (44.4)	20 (55.6)	1.14 (0.56 to 2.36)	0.714		
Normal	72 (41.1)	103 (58.9)	Reference			

Bold P-value indicates statistically significant (P<0.05); OR: odds ratio; AOR: adjusted odds ratio; 95%CI: 95% confidence interval; BMI: body mass index.

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Evaluation for stress-associated factors with bivariate analysis found that stress was significantly (P<0.05) associated with being female, aged ≥20, and in the third year of study. After adjusting for gender, age, and year of study, only females (95%CI: 1.81 to 6.54) were 3.44 times more likely to have stress. Meanwhile, in the third year of the study (AOR: 0.38; 95%CI: 0.17 to 0.86) were less likely to have stress.

Discussion

Pre-clinical students, especially during the COVID-19 pandemic, are vulnerable to mental health distress. We have investigated the prevalence of symptoms of depression (35.2%), anxiety (50.2%), and stress (40.3%) in pre-clinical students during the first year of the COVID-19 pandemic using the DASS-21 questionnaire. Notably, this questionnaire cannot be used as a mental disorder diagnostic tool but can evaluate the prevalence of mental health in the population. Our results in depression, anxiety, and stress prevalence among pre-clinical medical students were higher than the general world population reported in a previous study conducted during the COVID-19 pandemic and a previous study conducted before the pandemic among university students (12,13). In addition, young people were reported to have worse mental distress than older people (14). Our findings indicate that a pre-clinical medical student at a young age is more likely to experience mental health distress and deteriorate during the pandemic. A cohort study in Switzerland by Elmer et al. (2020) proved that students' mental health during the COVID-19 crisis, including depression, anxiety, stress, and loneliness, tended to deteriorate compared to before the crisis. These findings are associated with concerns about COVID-19, physical and social isolation, and a lack of interaction and emotional support (15).

In fact, many factors influence student mental health, resulting in various findings on the prevalence of depression, anxiety, and stress globally. For example, a study by Islam et al. (2020) on university students in Bangladesh reported that 82.4% and 87.7% of students had mild to severe depressive and anxiety symptoms, respectively (16). Furthermore, several factors, such as feeling left behind from others in academics and living with a family, are at risk of being more likely to suffer depression. Meanwhile, additional classes, concerns about academic activities, and living with a family will be more at risk of suffering anxiety. Another study by Ramón-Arbués et al. (2020) in Spain reported different results in the prevalence of depression (18.4%), anxiety (23.6%), and stress (34.5%) among university students as measured using the DASS-21 questionnaire. Furthermore, those aged <21 years, having problematic internet use, smoking, insomnia, and low self-esteem, were more likely to suffer depression, anxiety, and stress (12). The different findings of these mental health studies may be explained by differences in inclusion criteria, internal factors (gender, perception, age, mental health history, and others), and external factors (residential environment, geographic location, socio-cultural, profession, and others).

Based on our study results, females have a higher prevalence and are more likely to experience depression, anxiety, and stress symptoms than males. Previous studies on university students in Egypt by Soltan et al. (2021) and Lebanon by Fawaz and Samaha (2020) during the COVID-19 pandemic reported similar results to our study (2,17). Possible reasons for impaired mental health in females appear to be influenced by several proposed potential factors, including high estrogen levels associated with depressive events, females tending to have a more expressive and feminine coping style, and gender differences in symptom phenotypes (18).

At our institution, FM UII, being a first-year student tends to be tiring and has many stressors because they are still in the adaptation phase to the new environment at the university, have tight academic schedules, and have to undergo a fairly long orientation period (>6 months). Although these activities are carried out online during the pandemic, this also takes a long time to spend more laptop screen time. In addition, they become less socially interactive directly with their colleagues. It is plausible that our findings suggest that being second and third-year students is a protective factor for anxiety, and only the third year is a protective factor for stress. The most likely reason is that second and third-year students have experienced offline lectures before the pandemic and are more likely to adapt to the physical and social environment than first-year students who have never experienced offline lectures.

Our study reported that the prevalence of abnormal BMI was 35.9%, comprising underweight 13.2% and overweight 22.7%. A possible reason during the quarantine period of the COVID-19 pandemic is that students tend to spend longer time living a sedentary lifestyle and eating more food, which leads to obesity (19, 20). They spend more time on laptops,

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smartphones, televisions, and others, resulting in an intense isolation effect that contributes to poor mental health (2). On the other hand, a study by Palmer et al. (2021) on university students in Germany reported a gain (27.5%) and loss (21.9%) of weight during the COVID-19 quarantine (21). Those who experienced weight gain were influenced by increased consumption of pasta, meat, sausages, sweets, cakes, and snacks, while weight loss was influenced by fruits and bakery product consumption.

In the current study, having an underweight BMI was also a predictor of being more likely to experience anxiety. Our findings are in line with Dejesus et al. (2016) that there is an increased prevalence of anxiety in people who have underweight and overweight BMI (22). However, a previous cohort study by Sahle et al. (2019) had different results, in which a history of anxiety was not associated with subsequent changes in BMI and vice versa. Possible reasons for these inconsistent findings are the different characteristics of participants and confounding variables that may be involved (23).

During the COVID-19 pandemic in 2020-2021, which was increasingly felt to be affecting mental health, several medical student organizations collaborated with the United Nations Children's Fund (UNICEF) and universities held mental health webinars (24–26). However, after the COVID-19 pandemic conditions were declared under control in mid-2022 (27), such mental health webinars were as hard to find as before the pandemic period. Mental health awareness is still a big challenge, as reported in a previous study that the stigma in Indonesian society to sufferers of mental health problems is still lacking (28). In addition, seminars or workshops to provide and maintain good mental health among medical students who will enter the clinical stage likely have never been held.

To the best of our knowledge, the current study is the first to evaluate the mental health and associated factors among medical students during the first year of the COVID-19 pandemic in Indonesia. However, this study only evaluates pre-clinical students at one university and other factors potentially associated with mental health were not comprehensively evaluated due to fewer socio-demographic characteristics. This cross-sectional study was also only conducted at one time, so post-COVID-19 mental health needs to be evaluated in future studies. However, our result can be an illustration and reference for the post-COVID-19 period as well as for an unwanted condition that might affect pre-clinical students' mental health in the future.

Conclusion

This study reveals a high prevalence of depression, anxiety, and stress among pre-clinical students in Indonesia, with gender, year of study, and BMI as contributing factors. The study demonstrates that more than a third of the students suffered from depression and stress, while about half suffered from anxiety. In addition, females were more likely to experience depression, anxiety, and stress, whereas anxiety was less common in second and third-year students. Interestingly, being a third-year student was found to be a protective factor against stress. As a reflection, our study's findings highlight the crucial need for intervention from educational institutions and policymakers to prepare effective strategies that prioritize pre-clinical students' mental health and quality not only during the COVID-19 pandemic but also in any future situations that may impact students' mental health. By doing so, educational institutions can ensure the development of a healthy and resilient cohort of medical professionals for the future.

Ethical considerations

All study protocols that met the ethical standards outlined in the International and National Guidelines were ethically approved by the Medical and Health Research Ethics Committee, Faculty of Medicine of Universitas Gadjah Mada, Yogyakarta, Indonesia (Number: KE/FK/0234/EC/2021). All participants were given and agreed to the informed consent online.

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Disclosure

The authors declare no conflict of interest and have not received any funds.

Author contributions

Naufal Arif Ismail contributed to the conception and design of the study, conducted the study, provided study materials, collected, organized, analyzed, and interpreted data, and wrote the initial and final draft of the manuscript. Nur Aisyah Jamil contributed to the supervised, critically reviewed, and approved

manuscript publishing, and she agrees to be accountable for the accuracy of the work.

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