PSYCHOLOGICAL IMPACT AND COPING AMONG MEDICAL STUDENTS IN PHRAMONGKUTKLAO COLLEGE OF MEDICINE DURING THE COVID-19 PANDEMIC

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Abstract

Background: The COVID-19 pandemic has impacted on medical education and other areas of life causing psychological distress.

Objectives: The study aimed to assess psychological impact and coping and to identify factors associated psychological impact among medical students.

Methods: An online cross-sectional study was conducted at Phramongkutklao College of Medicine (PCM) in April 2021. All medical students were invited to complete a standardized online questionnaire for demographics data, impact of COVID-19, coping, fear of illness and virus evaluation (FIVE). The Depression Anxiety Stress Scales (DASS-21) Thai version was used to assess the psychological impact. The factors associated with depression, anxiety and stress were analyzed using logistic regression analysis.

Results: In total, 256 medical students completed the questionnaire. Of these, 54.7% reported having psychological impact, 43.4% depression, 36.7% anxiety and 29.7% stress. Depression was associated with preclinical students (adjusted OR(AOR) =3.03, 95% confidence interval (95% CI) =1.54-5.97), sleep problem (AOR =2.20, 95% CI=1.16-4.16) and extreme deterioration of family income (AOR =7.27, 95% CI=1.81-29.29). Anxiety was associated with preclinical students (AOR =3.20, 95% CI=1.52-6.72), COVID-19 like symptoms (AOR =2.93, 95% CI=1.26-6.83), slight problems adjusting to new learning methods (AOR =6.11, 95% CI=1.54-24.24) and extreme deterioration of family income (AOR =8.29, 95% CI=1.44-47.59). Stress was associated with preclinical students (AOR =3.84, 95% CI=1.75-8.40), COVID-19-like symptoms (AOR =3.54, 95% CI=1.53-8.19), and no confidence in COVID-19 policy of PCM (AOR =2.3, 95% CI=1.06-4.98). A positive correlation between Fear of Illness and Virus Evaluation (FIVE) and psychological impact was observed (r=0.449; p<0.001). Common coping activities were the use of social media, video chats and exercise.

Conclusion: A high prevalence of psychological impact was observed among medical students during the COVID-19 pandemic. To establish psychological support and resilience, training is needed to improve mental wellbeing and prepare medical students to cope with unprecedented situations.

Keywords: Psychological impact, Covid-19, Coping, Medical students, Phramongklao College of medicine (PCM)

J Southeast Asian Med Res 2022: 6:e0106
https://doi.org/10.55374/jseamed.v6i0.106

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Received: 28 September 2021
Revised: 5 February 2022
Accepted: 10 February 2022

Introduction

The coronavirus disease 2019 (COVID-19) pandemic started in December 2019 in China and then spread rapidly worldwide. [1] Since May 2021, 153,738,171 cases of COVID-19 have been confirmed globally, including 3,217,281 deaths, as reported by the World Health Organization (WHO).[2] In Thailand at that time, 74,900 cases of COVID-19 including 318 deaths were confirmed. [3]

The COVID-19 pandemic has caused public panic and deterioration in mental wellbeing. Medical healthcare workers are particularly at risk of psychological distress. [4] Moreover, medical students have higher rates of mental illness, such as anxiety and depression than the general population[5-7] due to social isolation, lack of vaccinations at the beginning, having sudden transition to synchronized online/virtual learning as well as impacts to other areas of life. [8-9]

Many global medical educational studies have been conducted to assess the psychological impact among medical students during the COVID-19 pandemic.[10-13] A study from China reported 24.9% of medical students experienced anxiety symptoms due to the impact of daily living, having relatives or acquaintances infected with COVID-19 and delays in academic activities.[10] In Pakistan, 75.8% of medical students were afraid of becoming infected during rotations while 73.9% did not believe that their institutions could handle the situation.[11] Final year medical students in the UK experienced stress about the OSCE examination and the transition from being students to doctors.[12] In Australia, 68% of Australian medical students reported deterioration in mental wellbeing. The common coping activities were the use of video chats, social media, exercise and hobbies.[13]

In Thailand, from 1996 to 1997, mental health surveys of medical students were conducted at Srinakharinwirot University where 24.63% reported severe stress resulting in mental health problems. Associated factors related to mental problems included the academic year of students; second year students had the highest number of stress episodes due to financial issues, accommodation problems, extra-curricular activities and relationships with parents, teachers and friends.[14] Studies concerning the mental health of the medical students at Prince of Songkla University used a questionnaire (Thai GHQ-12) indicating that 29.1% were at risk for mental health problems.[15] In 2008, a study focused on the prevalence and sources of stress among medical students. Phramongkutklao College of Medicine reported that 31.94% had stress condition; 20.60% of the respondents had mild stress while 11.34% had significant stress levels affecting their daily lives. [16]

Even though research has been published about assessing the psychological impact of medical students during the COVID-19 pandemic in many countries, studies regarding this topic in Thailand remain limited. This study aimed to assess the psychological impact, investigate activities that medical students used to cope during the COVID-19 pandemic and identify factors associated with psychological impacts among medical students at Phramongkutklao College of Medicine, the only military medical school in Thailand providing a unique curriculum for military medicine expertise.

Methods

Study designs and setting

The protocol of this study was reviewed and approved by the Royal Thai Army Medical Department Institutional Review Board (approval number R008q/64_Ex). The sample size calculation required for this study was 181 participants. An online cross-sectional study was conducted at Phramongkutklao College of Medicine from 1 to 14 April 2021 during the first two weeks of the third wave of the COVID 19 outbreak in Thailand. An electronic survey was conducted including informed consent in Google forms and the survey link was distributed through Line and Facebook applications. During the survey, medical curriculum was modified and shifted to a combination of face-to-face and online/ virtual learning activities.

Participants

Participants were enrolled from 490 second to sixth year medical students, Phramongkutklao

College of Medicine, agreeing to participate to the study and able to respond to online questionnaire. Answers could only be taken and submitted once to avoid replicated responses. Participants with severe medical or psychiatric illness, diagnosed with Covid-19 were excluded.

Measures

General information questionnaire

The general information questionnaire consisted of 30 items that the researcher created to collect demographic data, determine health status and learning platforms, information related to COVID-19, i.e., its impact, level of exposure to the disease and relevant coping activities. The questionnaire was examined by three psychiatrists who were experts in child and adolescent health including an investigator who pilot-tested 30 people to examine the reliability of the questionnaire having a Cronbach's alpha coefficient of 0.86.

Fear of Illness and Virus Evaluation (FIVE)-Adult Report Form

The FIVE form was created by Prof. Jill Ehrenreich-May from Miami University.[17-18] The scale consisting of 35 items also includes child, parent, and adult forms. The adult form was used in this study. Participants rated the scores from 1 to 4 based on the frequency of each item. The scale consisted of 4 parts: fear about contamination and illness (9 items), fear about social distancing (10 items), behaviors related to illness and fear of virus (14 items) and impact of illness and fear of virus (2 items). Permission was obtained and the survey was translated to Thai by three psychiatrists of whom two were experts in child and adolescent health. The investigator tested for reliability by pretesting 30 people using the questionnaire for which a Cronbach's alpha coefficient was obtained at 0.90.

Depression anxiety stress scale (DASS-21)

The DASS-21 is a set of three self-reported scales designed to measure the emotional states of depression, anxiety, and stress. The scale consists of 21 items. Participants rated each item starting from 0 to 3. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, and lack of interest/involvement as well as anhedonia and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety and subjective experience of anxious affect. The stress scale is sensitive to levels of chronic non-specific arousal. The DASS-21 Thai obtained an acceptable internal consistency ($\alpha = 0.75$). [19] In this study, permission was obtained from those who prepared the Thai forms.

Statistical analysis

Data were analyzed using IBM SPSS Statistics for Windows, Version 23.0 (Armonk, NY: IBM Corp., released 2015). Demographic data were determined using descriptive statistics. Categorical data were presented as numbers and percentages, while continuous data were presented as mean and standard deviation (SD). The prevalence of psychological impact was determined using descriptive statistics and reported as a percentage with a 95% confidence interval (95% CI). The chi-square test was used to compare categorical data. Multivariable regression analysis was performed to identify factors associated with psychological impact (depression, anxiety and stress). Adjusted odds ratio (AOR) from the multivariate analysis was presented with corresponding 95% CI, and statistical significance was set at $p < 0.05$. Pearson's (r) correlation analysis was used to evaluate the linear relation between Fear of Illness and Virus Evaluation (FIVE) and psychological impact (DASS-21).

Results

Demographic data

A total of 256 medical students participated in the study with a 52.24% response rate. Of these, 142 (55.5%) were males and 128 (50%) were preclinical students. More than one half of the participants (55.1%) reported sleep problems. Most participants were at no risk of exposure to virus infection (86.3%), 19.1% had COVID-19-like symptoms, and 67.6% did not believe that the institution could handle the situation (**Table1**).

Table 1. General characteristics of medical students

Characteristic	Frequency N (%)
Sex	
Male	142 (55.5)
Female	114 (44.5)
Age	Mean 22 (±1.57 SD)
Year of Course	
Clinical students (MD 4-6)	128 (50.0)
Preclinical students (MD 2-3)	128 (50.0)
Underlying medical diseases	50 (19.5)
A visit to psychiatric clinic/ psychiatrist/ psychologist	22 (8.6)
Family history of psychiatric illness	22 (8.6)
Sleep problems	104 (40.6)
Average hours of sleep per day	Mean 5.4 ±1.20
Risk of Covid-19 exposure	35 (13.7)
The family lives in a high risk area	76 (30.2)
Have Covid-19-like symptoms	49 (19.1)
Have a relative or close acquaintance with Covid-19	8 (3.1)
No confidence about the Covid-19 policy of the college	171 (67.6)

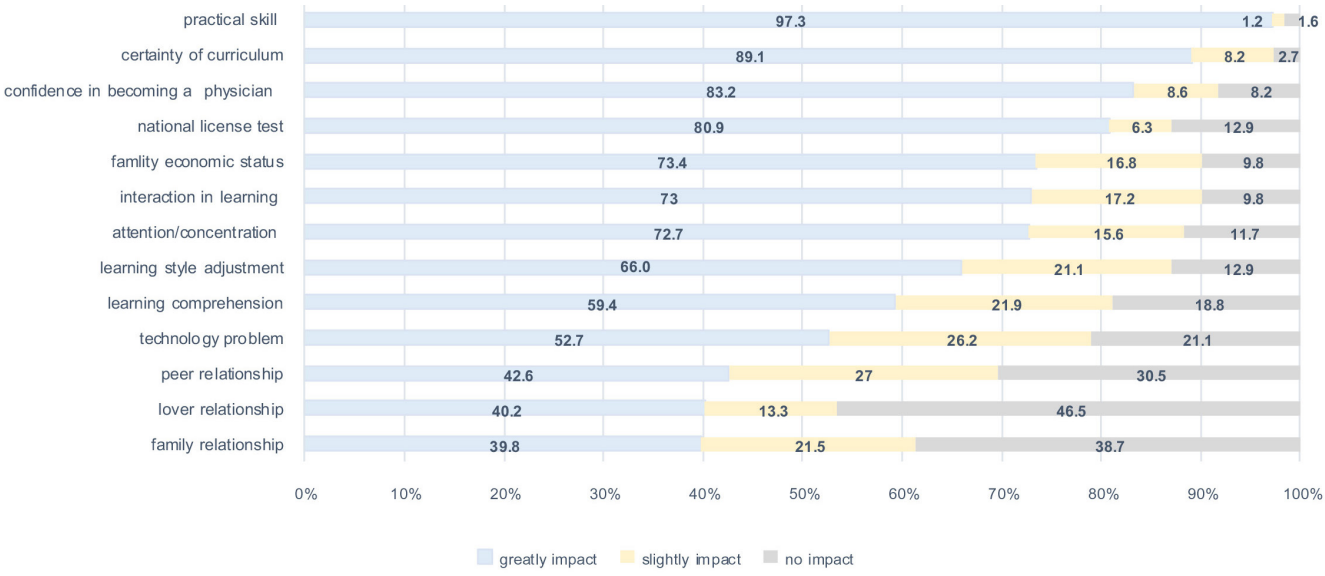

Figure 1. Impact of Covid-19 pandemic

For impact of the COVID-19 pandemic, medical students had been affected by both academic and personal issues; 97.3% reported a significant lack of practical skills, 89.1% were affected by unstable learning methods and promotion to the upper class, 83.2% had greatly decreased confidence in practicing medicine in the future and 73.4% had greatly affected family economic status (**Figure 1**).

Psychological impact on medical students

Using the DASS-21 form, 140 (54.7%) reported psychological impact. The second to sixth year medical students were affected by mental health issues at 70.7, 55.6, 44.2, 44.6 and 37.9%, respectively. The subscale and severity are shown in **Table 2**.

Table 2. Psychological impact among medical students

	MD 2 n (%)	MD 3 n (%)	MD 4 n (%)	MD 5 n (%)	MD 6 n (%)
Psychological impact (at least 1 symptom)	65 (70.7)	20 (55.6)	19 (44.2)	25 (44.6)	11 (37.9)
Depression					
normal	35 (38.0)	25 (69.4)	30 (69.8)	35 (62.5)	20 (69.0)
mild	20 (21.7)	3 (8.3)	3 (7.0)	3 (5.4)	2 (6.9)
moderate	25 (27.2)	4 (11.1)	5 (11.6)	10 (17.9)	7 (24.1)
severe	7 (7.6)	4 (11.1)	2 (4.7)	3 (5.4)	0 (0.0)
extremely severe	5 (5.4)	0 (0.0)	3 (7.0)	5 (8.9)	0 (0.0)
Anxiety					
normal	47 (51.1)	23 (63.9)	30 (69.8)	39 (69.6)	23 (79.3)
mild	15 (16.3)	6 (16.7)	6 (14.0)	8 (14.3)	2 (6.9)
moderate	17 (18.5)	3 (8.3)	2 (4.7)	3 (5.4)	3 (10.3)
severe	7 (7.6)	0 (0.0)	0 (0.0)	4 (7.1)	1 (3.4)
extremely severe	6 (6.5)	4 (11.1)	5 (11.6)	2 (3.6)	0 (0.0)
Stress					
normal	52 (56.5)	27 (75.0)	34 (79.1)	40 (71.4)	27 (93.1)
mild	9 (9.8)	2 (5.6)	0 (0.0)	7 (12.5)	1 (3.4)
moderate	19 (20.7)	3 (8.3)	5 (11.6)	4 (7.1)	1 (3.4)
severe	8 (8.7)	4 (11.1)	4 (9.3)	4 (7.1)	0 (0.0)
extremely severe	4 (4.3)	0 (0.0)	0 (0.0)	1 (1.8)	0 (0.0)

Clinical students (MD 4-6), Preclinical students (MD 2-3)

Fear of Illness and Virus Evaluation (FIVE)

Regarding the evaluation of all participants, a positive correlation was observed between FIVE scale scores and the psychological impact (DASS-21 scale) ($r=0.449$; $p<0.001$). Using the FIVE adult report form, the results showed that the fear about virus and illness subscale were as followed: 12.9% of students were always afraid of family members might get sick or die, and 11.3% were constantly afraid that they might do something to cause someone getting illness or infection. About the fear of social distancing subscale, 22.3% were unable to enjoy good things and 13.7% had a difficult time to do things they liked. About their behaviors related to illness and virus fear subscale, 57.4% wore masks over their faces or used other protective gear all the time and 38.3% used social media to continue connecting to their friends. About the impact of illness and virus fear subscale, 2.3% were afraid that an illness or virus infection would cause them to experience stress emotion and 1.2% were afraid that an illness or virus infection would involve the way of enjoying their lives **(Figures 2-5).**

Coping activities that were used to help with mental wellbeing

Common coping activities comprised the use of social media, video chats and exercise. Comparing coping strategies between preclinical and clinical students, a significant difference in using social media applications, consulting with friends/senior and joining activities/club of the college was observed (**Table 3**).

Table 3. Coping activities used among medical students

Coping activity	Total (%)	Preclinical students (%)	Clinical students (%)	*p-value*
Social media applications	241 (94.1)	125(97.6)	116(90.6)	0.017*
Video call/Chat	211 (82.4)	109(85.1)	102(79.6)	0.250
Exercises	207 (80.9)	107(83.1)	100(78.1)	0.266
Search for more information to be prepared and protect oneself	145 (56.6)	72(56.2)	73(57.0)	0.900
Consult with friends/seniors	144 (56.3)	84(65.6)	64(50.0)	0.002*
Join activities/clubs of the college	92 (35.9)	54(42.1)	38(29.6)	0.037*
Do meditation or study religious teachings	69 (27)	38(29.6)	31(24.2)	0.324
Consult with advisors	60 (23.4)	35(27.3)	25(19.5)	0.140
Use drugs, alcohol, and/or cigarettes	23 (9)	13(10.1)	10(7.8)	0.512
Consult a psychologist/ psychiatrist	20 (7.8)	9(7.0)	11(8.5)	0.641
Consult via online mental health/telephone	19 (7.4)	9(7.0)	10(7.8)	0.812
Others	40 (15.6)	25(19.5)	15(11.7)	0.085

*Significance at $p< 0.05$

Factors associated with the psychological impact

The results of ordinal multivariate analysis of factors associated with the psychological impact of medical cadets and medical students during the COVID-19 pandemic are presented in **Table 4**. Depression was associated with preclinical students, sleep problems and extreme deterioration in family economic status. Anxiety was associated with preclinical students, COVID-19-like symptoms, slight problems in adapting to a new learning method and extreme deterioration in family economic status. Stress was associated with preclinical students, COVID-19-like symptoms and no confidence in prevention or control of COVID-19 due to the college's policy.

Discussion

This study revealed that one half of students had psychological effects: depression, anxiety or stress. The findings on the effects on mental health were similar to those reported in other countries.[13, 20, 21] During unprecedented situations, improving medical students' mental health has become a higher priority to reduce psychological effects. Both males and females experienced similar effects on their mental health status;[8] thus, sex was not a determinant factor in developing psychological impact among medical students in Phramongkutklao College of Medicine. The results of this study did not agree with the findings reported from Australia and Turkey where being female had a significant psychological influence.[13, 22] Our study revealed that medical students studying in the preclinical year experienced increased depression, anxiety and stress during the Covid-19 pandemic. This was consistent with other studies reporting that preclinical medical students experienced greater psychological impact because of their lack of expertise in patient care and comprehension of the disease pandemic.[9, 23, 24] Because preclinical students were less resilient, they struggled more

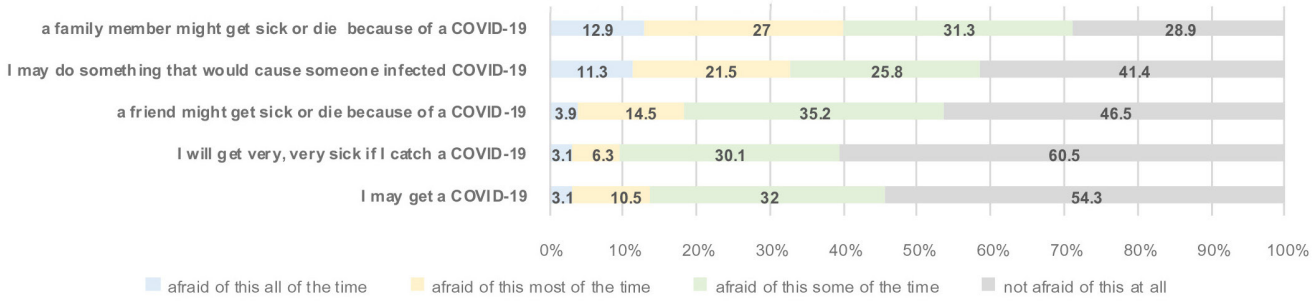

Figure 2. Fears about Contamination and Illness

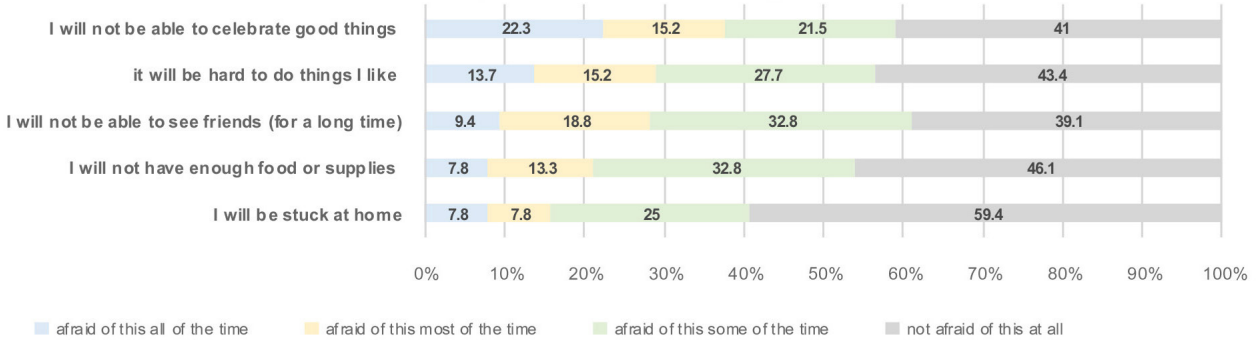

Figure 3. Fears about Social Distancing

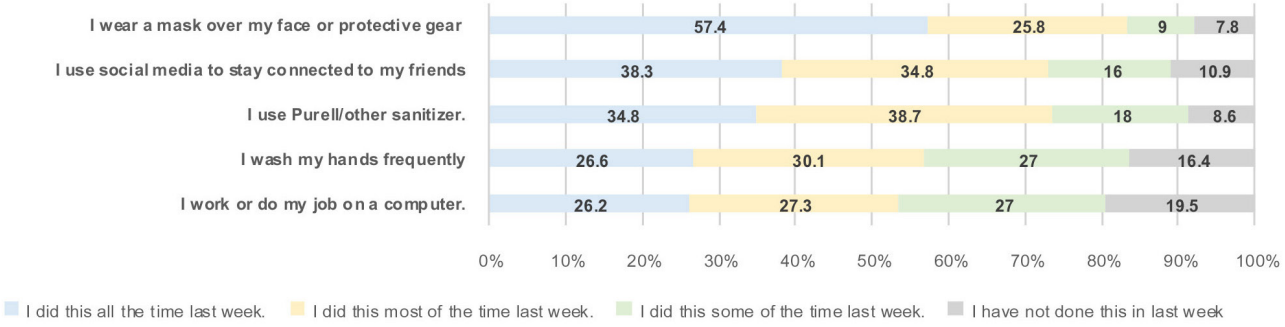

Figure 4. Behaviors Related to Illness and Virus Fears

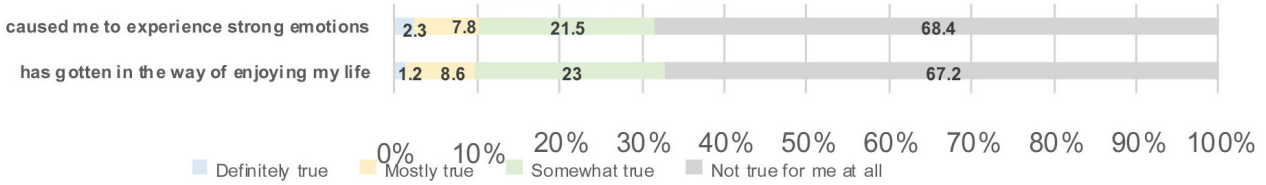

Figure 5. Impact of Illness and Virus Fears

Table 4. Factors associated with the psychological impact

	Depression			Anxiety			Stress		
	AOR	**95% CI**	***p*-value**	**AOR**	**95% CI**	***p*-value**	**AOR**	**95% CI**	***p*-value**
Class									
clinic	1			1			1		
preclinical	3.03	1.54-5.97	0.001*	3.20	1.52-6.72	0.002*	3.84	1.75-8.40	0.001*
Sleep problem									
No	1			1			1		
Yes	2.20	1.16-4.16	0.015*	1.40	0.70-2.80	0.345	1.32	0.65-2.68	0.445
Covid-19 like symptoms									
No	1			1			1		
Yes	1.52	0.68-3.43	0.309	2.93	1.26-6.83	0.012*	3.54	1.53-8.19	0.003*
Confidence in Covid-19 policy of PCM									
Yes	1			1			1		
No	1.41	0.74-2.70	0.298	1.93	0.95-3.93	0.070	2.3	1.06-4.98	0.035*
Problems with adaptation to a new learning method									
No problem	1			1			1		
Slight problem	1.6	0.46-5.54	0.461	6.11	1.54-24.24	0.010*	1.29	0.32-5.23	0.719
Significant problem	1.53	0.66-3.54	0.323	1.08	0.43-2.74	0.872	0.54	0.20-1.43	0.215
Family financial status									
No problem	1			1			1		
Slight problem	3.11	0.67-14.34	0.146	2.31	0.33-16.2	0.401	3.05	0.48-19.61	0.240
Great problem	7.27	1.81-29.29	0.005*	8.29	1.44-47.59	0.018*	4.47	0.84-23.76	0.079

AOR= adjusted odds ratio, *Significance at *p*-value < 0.05

with self-adaptation to new learning patterns than clinical students. [25-26] According to a 26-year retrospective study in Thailand, preclinical students used counseling services at a higher rate than those of clinical students, and second year medical students were the most likely to use mental health services.[27] Besides the stress of studying medicine in PCM, the stress of the military training was added, especially in preclinical classes that had more intense military training than those of clinical classes.[28] In our study, preclinical students were more likely than clinical students to use social media applications, consult with friends/seniors and participate in college activities/clubs. The suitable techniques to promote their mental wellbeing were online therapy or online extracurricular activities.

During the Covid-19 outbreak, medical students with Covid-19-like symptoms were more likely to experience mental health issues. [10,11] The fear of Covid-19 was positively correlated with anxiety among US college students.[29] In Vietnam, medical students who reported having greater fear of the COVID-19 scales had lower health literacy and mental health deterioration.[24] Similarly, our study indicated that students with Covid-19-

like symptoms experienced significantly higher levels of anxiety and stress. Furthermore, using Pearson's correlation analysis, a correlation between the fear of illness/virus evaluation and the psychological impact was observed.

To avoid putting themselves at risk of developing COVID-19, it became critical to remain healthy throughout this time. Moreover, medical students' sleep hygiene should not be disregarded, as sleep problems constitute physical and mental health hazards.[20-21] Jianping et al. reported that 33.2% of medical students reported poor sleep quality during the Covid-19 pandemic.[30] A meta-analysis showed a higher prevalence of sleep problems among healthcare professionals during the COVID-19 pandemic.[31] According to the SLEEP-50 questionnaire, a related study showed two thirds of medical students were at risk of at least one sleep disorder. Furthermore, all sleep disorders were associated with low academic performance.[32] In Mexico, depression symptoms among medical students were associated with academic stress and sleep problems.[33] Our findings also revealed that 40.6% of students experienced sleep issues, with sleep issues being associated with depression among medical students. Depression is linked to a functional decrease in serotoninergic neurotransmission as well as specific sleep disturbances, particularly insomnia.[34] However, specific details defining the sleep disorder were not clarified in this study. From this study, medical students obtained an average of 5.4 hours of sleep nightly. According to a study conducted at Srinakharinwirot University, sleeping for less than six hours resulted in poor academic performance as well as increased stress.[35]

The learning platform for medical students was shifted to online according to the social distancing policy. This study found that students who had difficulties adapting to a new learning technique experienced anxiety. The majority of students reported lacking practical skills and had low confidence in their abilities to practice medicine in the future. As a result, developing a curriculum to improve the medical educational process during the COVID-19 pandemic remains a top goal. Our findings revealed that two thirds of medical students lacked trust in the institution's policies which was significantly associated with stress. During the pandemic, educational institutions and hospitals must have robust and immediate safeguards in place to decrease the danger of infection while also mitigating stress and anxiety.[23] In Pakistan, 73.9% of medical students had little faith in their institutions' policies since more time had to be spent on epidemic prevention.[9] Thus, the curriculum had to be expanded to include emergency responses, i.e., disasters, outbreaks and other emergencies.[36] Aside from the effects on learning and the likelihood of infection with Covid-19, the effects on the family in terms of economic stability and harmful relationship within the family had a direct association with the effects on mental health.[10] Our findings revealed that medical students encountering a significant impact on their family's socioeconomic situation were more likely to experience depression and anxiety. During the epidemic, most medical students relied on social networking applications, video chats and exercise to unwind. When they experienced troubles, only 23% had to meet their advisors, and only 7.8% had to see psychiatrists or psychologists. Medical students have used a variety of techniques to cope with their COVID-19-induced mental health difficulties in reported studies. Spending time outside, having physical activities and exercise, using video calls plus social media applications as well as being mindfulness and meditation retreat were some of the tactics used to increase mental wellbeing.[37] Following the COVID-19 outbreak, physical activities and exercise have been proven to be particularly useful tools in aiding mental health of English medical students.[38]

Problem-adaptive coping and resilience training should be included in mental health treatment for medical students, especially at the preclinical level to improve the abilities needed for improved health care, sleep quality and mental health. Teaching and learning plans should include defined evaluation criteria. Furthermore, topic teachers should be available for online consultations to facilitate learning support. To enhance the impact of comprehensive mental health care, an online adviser, psychiatrist and psychologist should be available.

Because this study employed a cross-sectional survey of the Phramongkutklao College of Medicine, the results should be interpreted with caution when applied to other medical institutions. Self-reported data collection has a limitation in terms of data dependability and is susceptible to recall bias. As a result, a study using molecular biomarkers tests, such as salivary cortisol levels[39] and salivary amylase, is required.[40] Following up the mental health condition to evaluate any changes is also necessary. The lack of clarity regarding sleep problems, the severity of the underlying mental or medical diagnosis and health literacy may all be key factors in the psychological impact involving this study.

Conclusion

Medical students represent a vulnerable group that is prone to high levels of stress as a result of their studies, particularly during the COVID-19 epidemic, which could disrupt their education, family and other areas of life. During the COVID-19 epidemic, a high prevalence of psychological effects was observed among medical students. It remains critical to address the consequences of COVID-19 on medical students' mental health to provide psychological support and resilience training to promote mental wellbeing.

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