

DEPRESSION AMONG FIRST-YEAR UNIVERSITY STUDENTS IN RESTIVE AREAS OF SOUTHERN THAILAND DURING COVID-19 PANDEMIC

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Abstract

This cross-sectional design study aimed to examine prevalence and associated factors of depressive symptoms among first-year university students, who study at the campus located in the restive area of Southern Thailand's insurgency (Pattani campus); during the COVID-19 pandemic, and to compare them with those who studied in a nearby province: (Hat Yai campus). A total of 865 first-year university students who studied at Prince of Songkla University were assessed by PHQ-9 online questionnaires during their first trimester of higher education and the second outbreak of COVID-19 in Thailand. Descriptive analysis, Chi-square and logistic regression analysis were conducted using R software package. The majority of the students who studied at Pattani campus, located in armed conflicted areas of southern Thailand, were female and Muslim, whereas most of those who studied at Hat Yai Campus, located in a nearby province, were Buddhist. About half of the students studying at Pattani and Hat Yai Campuses showed mild-to-severe depressive symptoms, without statistically significant difference between two campuses. However, 20% of those who studied at Pattani campus showed moderate-to-severe depression. Frequency of exercise was significantly associated with depressive symptoms among students who studied at both campuses, whereas physical comorbidities, and financial difficulties were significantly associated with depression among those who studied in armed conflict areas.

Keywords: Depression, Students, Armed conflict, Comparative studies, COVID-19

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Introduction

Depression is a psychiatric condition that presents with depressed mood, feeling bored, feeling guilty or worthless, loss of appetite, insomnia, lack of energy, and lack of concentration.

Depressive symptoms can be chronic or recurring as well as which they can lead to an impaired life. It was found that 322 million people worldwide, or 4.4 percent of the world's population, have been affected by depression, while in Thailand, 4.4 percent of the Thai population were affected by depression (World Health Organization, 2017). Depression was the tenth-highest cause of disability-adjusted life years (DALY) lost in Thai males, while among females, it was the fourth-highest leading cause of disability-adjusted life years lost (DALY) (Bundhamcharoen *et al.*, 2011). By considering gender and age of depressed patients, it was found that most of the patients were of working-age from 25-59 years old (62%), 60 years old or above (26.5%) and 15-24 years old (11.5%) (Kongsuk, 2010).

During the university year, there was a COVID-19 outbreak that affected both people's mental and physical health globally. Depression is one of the most prevalent symptoms among the general population during the COVID-19 pandemic (Rajkumar, 2020). A study during COVID-19 outbreak in Turkish society revealed 23.6% of participants had significant degree of anxiety and depression. Depression scores were significantly higher among women, those who had COVID-19 positive friends or relatives, had chronic diseases or psychiatric illness history and were living in urban areas (Özdin and Bayrak Özdin, 2020). Moreover, the first year of higher education is considered a major life change according to academic performance, the relationship between friends and family, and the economic differences between peers. (Chen *et al.*, 2013; Lun, K.W. *et al.*, 2018). These changes may cause more pressure among students who study in the armed conflict areas of South Thailand. The violent situations have been ongoing since 2004, in 3 provinces of southern Thailand; Patani, Yala, and Narathiwat known as the three Southern Border Provinces (SBP) and some parts of Songkhla Province. Students have psychologically suffered by living in these insecure environments, and violent situations. Thus, young people living in these areas have been at risk of many mental health problems, for example, substance-related disorders and post-traumatic stress disorder (Jatchavala, C., 2017). Therefore, this study aimed to survey the prevalence and

contributing factors for depression of the freshmen, at Prince of Songkla University's Pattani Campus compared with those who studied at the Hat Yai Campus. Previous studies revealed high prevalence of depression found among undergraduate students from a university in the Southern Thai provinces (Pensuksan *et al.*, 2016). Whereas, a survey from grades 7, 9 and 11 and second year students in SBP indicated that 13% of them reported depression and 5% of the students, had attempted suicide during the previous year (Ford *et al.*, 2018). This would therefore seem to represent a higher prevalence, and degree of depression among those young people during the COVID-19 outbreak.

Thus, the results on the prevalence and depression-related factors of the first-year students at Prince of Songkla University revealed by this study will be useful in setting up policies for screening and prevention of depressive symptoms among students at both campuses from the beginning of their under-graduate curricula, and preparing an associated care-plan.

Materials and Methods

Study population

This study is part of a larger project which was the first author's minor thesis of Higher Graduate Diploma Program in Clinical Sciences, Department of Family and Preventive Medicine, Faculty of Medicine, Prince of Songkla University, Thailand. The study was conducted at Hat Yai and Pattani Campuses, Prince of Songkla University located in the south of Thailand. There were four main schools at Hat Yai Campus comprising Health science, Applied science, Pure science, and Social science. However, there were three main schools at Pattani Campus: Health science, Pure science and Social science.

Sample size, Sampling and data collection Size of population: $n = [Z^2_{1-\alpha/2} p(1-p)]/d^2$ Where Z is the confidence interval; if we choose 95% as the area under the normal curve, Z will be 1.96. This critical value is denoted as alpha (α) and is set at 0.05, d is the expected margin of error ($\alpha=0.05$) and p is the expected prevalence of the variable being studied ($P=0.655$) (Wayne W., D., 1995).

The study entitled prevalence and related risk factors of anxiety and depression among Chinese college freshmen revealed the prevalence of depression was 65.55% reported (Lu *et al.*, 2015). Therefore, the total n should be 347 first-year students in total.

All of the first-year students which studied at both campuses were the target participants in this study. A cross-sectional study was employed. As the target number of participants to be recruited was at least 347 students, all students from both campuses were invited to participate in an online survey. The data was collected from October till December 2020, three-months after they began their college life.

The inclusion criteria for this study were as follows: first year student of Hat Yai and Pattani Campus of Prince of Songkla University, age more than 18 years, and those who are able to read and communicate in Thai language. Students who failed to fulfill all inclusion criteria were excluded from the study.

Procedure

The study protocol was approved by the Ethics Committees of the Faculty of Medicine, Prince of Songkla University (REC:63-457-9-4). The researchers contacted the students with the approval of their faculty's student affairs. The researchers disclosed all the studies' purposes, benefits, and adverse effects to the target population, before inviting them to participate. All participants recruited then completed the online questionnaire. Therefore, the Thai version of PHQ-9 was adopted to screen for depressive symptoms in this study (Cronbach's $\alpha=0.79$). The Thai version of PHQ-9 has been shown to be a valid and reliable tool for assessing depressive symptoms in Thailand's general population (sensitivity=0.53 and specificity=0.98) (Lotrakul *et al.*, 2008).

Data analysis

R software package was used to analyze descriptive statistics including: age, gender, schools of the faculty, religion, family psychological disease history, physical comorbidities, average personal income (Baht/month), financial difficulties, receiving scholarship, hometown, alcohol consumption, smoking history and frequency of exercise to create the multiple logistic regression model for the effects of multiple covariates on the odds of having mild to severe depressive symptoms in this study. The p-value less than 0.05 was considered statistically significant.

Results and Discussion

Sociodemographic characteristics

In total 865, first year students from Hat Yai Campus and Pattani Campus, Prince of Songkla University participated. The missing data (Incomplete response $n=47$) were not included for

analysis. From data collected between October and December 2020, 23.7% were from Pattani Campus, most were female (87.3%), Muslim (85.3%) and more than half of them were students of social schools (59.4%). While 76.3% of the participants were from Hat Yai Campus, they were mostly female (72.6%), Buddhist (79.1%) and studied in social schools (56.4%). Comparing participants from both campuses, the significantly differential factors were gender, schools of faculty, religion, average personal income, receiving scholarship, hometown, alcohol consumption and frequency of exercise with statistically significant differences (p -value <0.05). At Pattani Campus, only 13.2% of participants were Buddhist, while 79.1% of Hat Yai Campus's participants were Buddhist. The average personal income of those who studied at Pattani Campus was less than 5,000 (Baht/month) for 77.6%, in contrast to 53.9% at Hat Yai Campus. Less than one-fifth of participants, 18.6% at Pattani and 12% at Hat Yai Campus, received a scholarship. Participants' hometowns also varied with rural areas accounting for 73.7% and 50.8% at Pattani and Hat Yai Campus, respectively. Most of the participants from both Pattani 91.2% and Hat Yai Campus 65.2% did not drink alcohol, while, 45.1% and 35.8% of participants at Pattani and Hat Yai Campus did not exercise (Table 1).

Prevalence of depressive symptom

Regarding the PHQ-9 score, 53.2% participants who studied at Pattani Campus were found to have depressive symptoms (mild 32.8%, moderate 10.9%, severe 9.5%). Whilst, 46.2% participants were found to have depressive symptoms at Hat Yai Campus (mild 28.9%, moderate 11.1%, severe 6.2%) (Figure 1). However, no significant differences in the depressive prevalence was found between the participants at either Pattani or Hat Yai Campus ($p=0.212$).

Factors associated with depressive symptoms

According to Table 4, the significant associated factors of depression were physical comorbidities ($p=0.031$) and financial difficulties ($p=0.001$), which revealed that Pattani Campus's participants who had physical comorbidities and financial difficulties were 2.7 times (95% CI: 1.04,7.35) and 2.76 times (95% CI: 1.46,5.22) more likely to be depressed than the students who were healthy and had no financial problems. However, for the participants from Hat Yai Campus, schools of the faculty ($p=0.02$), history of alcohol consumption ($p=0.007$) and smoking history ($p<0.001$) were shown to be significant (Table 5) Participants studying at applied science

school, pure science school, and social school were 1.54(95% CI: 0.92, 2.57) , 2.08(95% CI: 1.4,31), and 1.86(95% CI: 1.24,2.8) times more likely to be depressed than the students studying at health science school. Participants with history of alcohol consumption and smoking history were discovered to have depressive symptoms 1.56 times (95% CI: 1.13,2.16) and 3.12 times (95% CI: 1.57,6.21) higher than those without these histories.

Only frequency of exercise was reported as an associated factor of depression at both

Pattani ($p=0.08$) and Hat Yai Campus ($p<0.001$). At Pattani Campus, students who did not exercise were 2.42 times (95% CI: 1.35,4.36) more likely to be depressed than students who exercised <3 times/week with a similar result at Hat Yai Campus, where students who did not exercise were 2.53 times (95% CI: 1.8,3.54) more likely to show depressive symptoms than students who did exercise <3 times/week.

Table .1 Sociodemographic characteristics

Sociodemographic characteristics	Pattani Campus(n=205)	Hat Yai Campus (n=660)	Chi square P-value
Age			0.008
mean(SD)	18.9 (0.9)	18.7 (0.8)	
Gender			< 0.001
Female	178 (87.3)	478 (72.6)	
Male	24 (11.8)	142 (21.6)	
LGBT	2 (1)	38 (5.8)	
Schools of the faculty			< 0.001
Applied science	0 (0)	113 (17.2)	
Health science	10 (5)	136 (20.7)	
Pure science	72 (35.6)	38 (5.8)	
Social	120 (59.4)	371 (56.4)	
Religion			< 0.001
Buddhist	27 (13.2)	522 (79.1)	
Christian	2 (1)	8 (1.2)	
Irreligious	1 (0.5)	18 (2.7)	
Muslim	174 (85.3)	112 (17)	
Family psychological disease history			1
No	198 (97.5)	641 (97.3)	
Yes	5 (2.5)	18 (2.7)	
Physical comorbidities			0.574
No	182 (88.8)	574 (87)	
Yes	23 (11.2)	86 (13)	
Average personal income (Baht/month)			< 0.001
<5,000	159 (77.6)	356 (53.9)	
5,000 - 10,000	44 (21.5)	278 (42.1)	
>10,000	2 (1)	26 (3.9)	
Financial difficulties			0.247
Not enough	63 (31)	175 (26.6)	
Enough	140 (69)	484 (73.4)	
Receiving scholarship			0.021
No	166 (81.4)	580 (88)	
Yes	38 (18.6)	79 (12)	
Hometown			< 0.001
Rural	151 (73.7)	335 (50.8)	
Urban	54 (26.3)	325 (49.2)	
Alcohol consumption			< 0.001
No	187 (91.2)	430 (65.2)	
Yes	18 (8.8)	230 (34.8)	
Smoking history			0.154
No	198 (96.6)	617 (93.6)	
Yes	7 (3.4)	42 (6.4)	
Frequency of exercise			0.015
<3 T/WK	102 (50)	360 (54.5)	
>3 T/WK	10 (4.9)	64 (9.7)	
No	92 (45.1)	236 (35.8)	

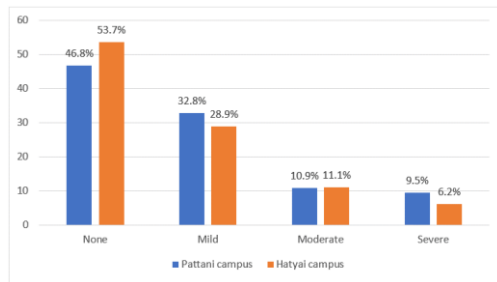


Figure 1. Severity of depression among participants: Pattani and Hat Yai Campus

Discussion

This study was the first survey of depression among higher education students in Thailand, during the academic year of COVID-19 pandemic. A prior study of Depression during the COVID-19 pandemic, of 678 participants from Pakistan, Canada and the UK, revealed that 58.6% of the participants suffered from depression, which was higher than the prevalence found in this study (53.7% in the restive area and 46.8% in a nearby province). (Shah *et al.*, 2021). The explanation for the difference of prevalence may relate to the current situations of the outbreaks in each country. In this study, the research was conducted during the second outbreak in Thailand; hence, mental health policies had been prepared as of the first outbreak.

A study of depression in Southern Medical University, Guangzhou, China found that the prevalence of depression symptom in college students during COVID-19 epidemic was 12.2%, which was lower than that results in this research (Wang *et al.*, 2020). The main reason for the differences may be explained by some participants in this study studying in restive areas, which may relate to increased psychological conflicts. Moreover, the study period could be a significant factor, resulting in the higher prevalence of depression, since the study was conducted during the second outbreak of COVID-19 pandemic in Thailand. There were recently confirmed cases at both Pattani and Songkhla province. (Hat Yai is a district in Songkhla province). Many preventive policies and changed patterns of studying, regarding the university and the government's strategies, may induce stresses and maladaptive behaviors among the university students, especially, the first-year students who face many life-changes.

Therefore, the depressive symptoms during this period could significantly increase among them.

The survey showed frequency of exercise was an associated factor of depression among those who studied at both campuses. These results were consistent with a previous survey from The University of Hong Kong that revealed regular exercise is significantly related to depression and could be decreased by regular exercise (Lun, K.W., 2018). Exercise has been shown to reduce symptoms associated with depressive disorders. Moreover, it represented potential effects to lessen the dependability on psychopharmacology (Carek *et al.*, 2011). Lack of exercise may be a consequence of the COVID-19 pandemic, since people must decreased their exercise activities, due to "lock-down" and other governmental policies to cease the outbreak. Hence, to endorse exercise activity during outbreak is a challenge to balance mental health promotion and outbreak prevention.

A study in Southwestern China reported that average household income is significantly associated with depressive symptoms during the COVID-19 pandemic. Also financial difficulties was found to be an associated factor of depression in students studying in armed conflict area, whilst for those who studied at a nearby province it was not. (Lei *et al.*, 2020). Due to the violent situations in armed conflict area of southern Thailand, economic depression was reported many years before the pandemic (Ford *et al.*, 2018). Hence, the students studying at Pattani campus may have less assets than those who studying in a nearby province. A previous study, conducted before the pandemic, found almost half of university students who studied at Pattani campus had debt. Thus, financial support and health care policy should be specifically reconsidered by both government and university (Jatchavala, C., 2020).

According to the high prevalence of depressive symptoms in students studying at both campuses, all first-year students studying at Prince of Songkla University should be monitored for depressive symptoms from the beginning of their curricula. Especially, the first-year university students with reported physical comorbidities, financial difficulties at Pattani Campus, and history of alcohol consumption, and smoking history at Hat Yai Campus. These behaviors are important as they could be either risk or protective factors of depression.

The university students as well as other young people who show depressive symptoms should be referred to a general practitioner and/or psychiatrist for proper management, because the PHQ-9 and other available screening tests are only screening tools; and are not for diagnosis. Cognitive behavioral therapy (CBT) group intervention has shown good effectiveness in recurrence prevention of depressive symptoms and could be used in both clinical and community

settings. However, the mental health care personnel should develop skills concerning this kind of group therapy and be able to adapt it for the security situation of students who live and study in the restive area (Jatchavala, C., 2018a, 2018b). Furthermore, a university campus special support system for mental health should be considered by universities during the pandemic, such as, specific mental healthcare delivery and protocol (Vadivel, R., 2021).

Table 2. Association between demographic data and PHQ-9 Pattani Campus

Sociodemographic characteristics	None	Mild	Moderate	Severe
Total	94(46.8)	66(32.8)	22(10.9)	19(9.5)
Age				
median(IQR)	19 (18,19)	19 (19,19)	19 (18.2,19)	19 (19,19)
Gender				
Female	81 (46.6)	56 (32.2)	20 (11.5)	17 (9.8)
Male	13 (54.2)	8 (33.3)	2 (8.3)	1 (4.2)
LGBT	0 (0)	1 (50)	0 (0)	1 (50)
Schools of the faculty				
Health science	4 (40)	3 (30)	1 (10)	2 (20)
Pure science	39 (56.5)	17 (24.6)	10 (14.5)	3 (4.3)
Social	49 (41.2)	45 (37.8)	11 (9.2)	14 (11.8)
Religion				
Buddhist	15 (55.6)	4 (14.8)	4 (14.8)	4 (14.8)
Christian	0 (0)	0 (0)	1 (50)	1 (50)
Irreligious	1 (100)	0 (0)	0 (0)	0 (0)
Muslim	78 (45.9)	61 (35.9)	17 (10)	14 (8.2)
Family psychological disease history				
No	90 (46.4)	64 (33)	22 (11.3)	18 (9.3)
Yes	2 (40)	2 (40)	0 (0)	1 (20)
Physical comorbidities				
No	88 (49.4)	58 (32.6)	19 (10.7)	13 (7.3)
Yes	6 (26.1)	8 (34.8)	3 (13)	6 (26.1)
Average personal income (Baht/month)				
<5,000	70 (44.9)	54 (34.6)	20 (12.8)	12 (7.7)
5,000 - 10,000	23 (53.5)	11 (25.6)	2 (4.7)	7 (16.3)
>10,000	1 (50)	1 (50)	0 (0)	0 (0)
Financial difficulties				
Not enough	19 (30.2)	25 (39.7)	12 (19)	7 (11.1)
Enough	74 (54.4)	40 (29.4)	10 (7.4)	12 (8.8)
Receiving scholarship				
No	80 (49.4)	53 (32.7)	15 (9.3)	14 (8.6)
Yes	13 (34.2)	13 (34.2)	7 (18.4)	5 (13.2)
Family origin				
Rural	75 (50.7)	46 (31.1)	15 (10.1)	12 (8.1)
Urban	19 (35.8)	20 (37.7)	7 (13.2)	7 (13.2)
Alcohol consumption				
No	85 (46.4)	62 (33.9)	20 (10.9)	16 (8.7)
Yes	9 (50)	4 (22.2)	2 (11.1)	3 (16.7)
Smoking history				
No	91 (46.9)	64 (33)	22 (11.3)	17 (8.8)
Yes	3 (42.9)	2 (28.6)	0 (0)	2 (28.6)
Frequency of exercise				
<3 T/WK	56 (56)	24 (24)	9 (9)	11 (11)
>3 T/WK	6 (60)	1 (10)	1 (10)	2 (20)
No	31 (34.4)	41 (45.6)	12 (13.3)	6 (6.7)

Table 3. Association between demographic data and PHQ-9 Hat Yai Campus

Sociodemographic characteristics	None	Mild	Moderate	Severe
Total	353(53.7)	190(28.9)	73(11.1)	41(6.2)
Age				
median(IQR)	19 (18,19)	19 (18,19)	19 (18,19)	19 (19,20)
Gender				
Female	256 (53.8)	135 (28.4)	57 (12)	28 (5.9)
Male	78 (55.3)	45 (31.9)	8 (5.7)	10 (7.1)
LGBT	18 (47.4)	9 (23.7)	8 (21.1)	3 (7.9)
Schools of the faculty				
Applied science	62 (54.9)	32 (28.3)	9 (8)	10 (8.8)
Health science	88 (65.2)	30 (22.2)	12 (8.9)	5 (3.7)
Pure science	18 (47.4)	12 (31.6)	5 (13.2)	3 (7.9)
Social	185 (50.1)	114 (30.9)	47 (12.7)	23 (6.2)
Religion				
Buddhist	288 (55.5)	143 (27.6)	62 (11.9)	26 (5)
Christian	3 (37.5)	2 (25)	1 (12.5)	2 (25)
Irreligious	5 (27.8)	5 (27.8)	3 (16.7)	5 (27.8)
Muslim	57 (50.9)	40 (35.7)	7 (6.2)	8 (7.1)
Family psychological disease history				
No	347 (54.4)	183 (28.7)	70 (11)	38 (6)
Yes	6 (33.3)	6 (33.3)	3 (16.7)	3 (16.7)
Physical comorbidities				
No	304 (53.2)	172 (30.1)	64 (11.2)	31 (5.4)
Yes	49 (57)	18 (20.9)	9 (10.5)	10 (11.6)
Average personal income (Baht/month)				
<5,000	191 (53.8)	103 (29)	40 (11.3)	21 (5.9)
5,000 - 10,000	147 (53.3)	80 (29)	32 (11.6)	17 (6.2)
>10,000	15 (57.7)	7 (26.9)	1 (3.8)	3 (11.5)
Financial difficulties				
Not enough	83 (47.4)	50 (28.6)	25 (14.3)	17 (9.7)
Enough	269 (55.9)	140 (29.1)	48 (10)	24 (5)
Receiving scholarship				
No	310 (53.7)	169 (29.3)	63 (10.9)	35 (6.1)
Yes	43 (54.4)	20 (25.3)	10 (12.7)	6 (7.6)
Family origin				
Rural	173 (51.8)	100 (29.9)	38 (11.4)	23 (6.9)
Urban	180 (55.7)	90 (27.9)	35 (10.8)	18 (5.6)
Alcohol consumption				
No	247 (57.6)	117 (27.3)	36 (8.4)	29 (6.8)
Yes	106 (46.5)	73 (32)	37 (16.2)	12 (5.3)
Smoking history				
No	341 (55.5)	172 (28)	62 (10.1)	39 (6.4)
Yes	12 (28.6)	17 (40.5)	11 (26.2)	2 (4.8)
Frequency of exercise				
<3 T/WK	219 (61.3)	86 (24.1)	32 (9)	20 (5.6)
>3 T/WK	43 (67.2)	15 (23.4)	5 (7.8)	1 (1.6)
No	91 (38.6)	89 (37.7)	36 (15.3)	20 (8.5)

Table 4. Multiple logistic regression model for the effects of multiple covariates on the odds of having mild to severe depressive symptoms, based on the Thai version of PHQ-9 at Pattani Campus

Factor	OR(95%CI)	P(Wald's test)	P(LR-test)
Gender			0.218
female			
male	0.74 (0.31,1.74)	0.485	
LGBT	5014869.26 (0,Inf)	0.988	
Schools of the faculty			0.116
Health science			
Applied science	-	-	
Pure science	0.51 (0.13,1.98)	0.333	
Social	0.95 (0.26,3.55)	0.942	
Religion			0.177
Buddhist			
Christian	7197266.07 (0,Inf)	0.988	
Irreligious	0 (0,Inf)	0.992	
Muslim	1.47 (0.65,3.34)	0.352	
Family psychological disease history	Yes vs No	0.778	0.776
Physical comorbidities	Yes vs No	0.041	0.031
Average personal income (Baht/month)	<5,000		0.603
5,000 - 10,000	0.71 (0.36,1.39)	0.317	
>10,000	0.81 (0.05,13.25)	0.885	
Financial difficulties	Not enough vs enough	0.002	0.001
Receiving scholarship	Yes vs No	0.095	0.089
Family origin	Urban vs Rural	0.065	0.062
Alcohol consumption	Yes vs No	0.773	0.773
Smoking history	Yes vs No	0.833	0.833
Frequency of exercise	<3 T/WK		0.008
>3 T/WK	0.85 (0.23,3.19)	0.808	
No	2.42 (1.35,4.36)	0.003	

Table 5. Multiple logistic regression model for the effects of multiple covariates on the odds of having mild to severe depressive symptoms, based on the Thai version of PHQ-9 at Hat Yai Campus

Factor		OR(95%CI)	P(Wald's test)	P(LR-test)
Gender	female			0.218
	male	0.74 (0.31,1.74)	0.485	
	LGBT	5014869.26 (0,Inf)	0.988	
Schools of the faculty	Health science			0.116
	Applied science	-	-	
	Pure science	0.51 (0.13,1.98)	0.333	
Religion	Social	0.95 (0.26,3.55)	0.942	
	Buddhist			0.177
	Christian	7197266.07 (0,Inf)	0.988	
	Irreligious	0 (0,Inf)	0.992	
Family psychological disease history	Muslim	1.47 (0.65,3.34)	0.352	
	Yes vs No	1.3 (0.21,7.94)	0.778	0.776
Physical comorbidities		Yes vs No	2.77 (1.04,7.35)	0.041
Average personal income (Baht/month)		<5,000		0.603
Financial difficulties	5,000 - 10,000	0.71 (0.36,1.39)	0.317	
	>10,000	0.81 (0.05,13.25)	0.885	
	Not enough vs enough	2.76 (1.46,5.22)	0.002	0.001
Receiving scholarship		Yes vs No	1.88 (0.9,3.92)	0.095
Family origin		Urban vs Rural	1.84 (0.96,3.51)	0.065
Alcohol consumption		Yes vs No	0.87 (0.33,2.28)	0.773
Smoking history		Yes vs No	1.18 (0.26,5.4)	0.833
Frequency of exercise	<3 T/WK			0.008
	>3 T/WK	0.85 (0.23,3.19)	0.808	
	No	2.42 (1.35,4.36)	0.003	

Limitation of the study

There were several limitations in this study. Firstly, regarding cross-sectional design, the study cannot verify causality between the identified factors and symptoms of depression. Thus, the identified factors were considered as associated factors, which could be either the results or the causes of depression. The relationships between these factors and symptoms of depression should be explored in further studies, in which cohort design should be used. Secondly, this study did not recruit large numbers of participants, or consider all students in the university. It is suggested that in future studies a larger number of participants should be recruited from more universities /colleges, regarding the ratio and number of university students in southern Thailand.

Conclusions

During the period of COVID-19 pandemic, about half the first-year university students who studied in a university, located in southern Thailand presented some degree of depressive symptoms. The prevalence of depression among those who were university students in armed conflict areas of southern Thailand, were more

than those who studied in a nearby province, but it was not statistically significantly different. However, one-fifth of participants who studied in the restive areas, showed moderate-to-severe depressive symptoms. Regarding associated factors, the first-year students with physical comorbidities and financial difficulties, who studied at Pattani represented higher depression than those without. Hat Yai Campus's participants who reported history of alcohol consumption and smoking, showed more depressive symptoms; whereas, frequency of exercise was an associated factor of depression in both campuses.

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