Original Article

Factors Associated with High-to-Severe Stress among University Students in Northern Thailand

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Background: Stress is one of the most significant mental health problems among university students aged 18 to 24. University students are developing into adulthood while facing stress from several factors, including personal lifestyle and interpersonal interactions with their peers.

Objective: To determine the factors associated with high-to-severe stress among university students in northern Thailand.

Materials and Methods: A cross-sectional study design was applied to elicit information among randomly selected students attending three universities located in the Chiang Rai, Chiang Mai, and Pha Yao Provinces in northern Thailand in the 2018 to 2019 academic year. A validated questionnaire and the Suanprung Stress Test 20 (SPST-20) were used to collect information and assess stress levels. Participants filled out all forms voluntarily, which took 20 minutes each. Chi-square and logistic regression were used to determine the factors associated with high and severe stress at α=0.05.

Results: Six hundred fifty-five students were recruited into in the present study. Most students were female (62.6%) and third year students (39.7%). Two-thirds of the students reported less regular exercise (60.2%), and almost half of the students accessed the internet 6 to 9 hours per day (47.3%), and 80.8% of these internet users used the application Facebook. One-fifth of the students had had sexual intercourse (20.9%). Almost half the of students had high stress levels (44.3%), and 16.6% of students had severe stress levels. In the multivariable model, three variables were statistically associated with high-to-severe stress among these students. Students who did not respond to the sexual intercourse experience question had a greater chance, 1.71 (95% CI 1.15 to 2.55) times greater, of high-to-severe stress than those who responded negatively to this question. Those students whose fathers graduated primary school had a greater chance of high-to-severe stress than those whose parents had no education of 3.64 times (95% CI 1.60 to 8.31). Students whose parents had high parental conflicts had greater chance of high-to-severe stress than those students whose parents had no parental conflict of 2.29 times (95% CI 1.18 to 4.47).

Conclusion: Appropriate health interventions should be urgently implemented among university students to reduce stress, particularly among those who do not express their sexual intercourse experience, whose parents have little education, and whose parents have high parental conflicts.

Keywords: Stress, University student, Factors associated, SPST-20

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Stress, which is defined as the degree to which one feels overwhelmed or unable to cope as a result of unmanageable pressures[1], is a major health problem in all age categories, particularly for those who live under difficult conditions[2]. It has a great impact on the individuals' daily life[3] and reduces the quality of life[2,4]. In 2016, stress was determined as a national priority health problem in Thailand[5,6]. While stress is a major, well-known cause of depression[7], other factors could contribute, such as genetics[8], physical health problems[9], family member's relationship[10], and social interrelationships[11], including individuals' adaptability. Today, stress is a global, social and health professional concern.

In 2018, the World Health Organization (WHO) reported that several human physical health problems are stress-related, which could result in severe health

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conditions[12]. The Mental Health Foundation reported that 60.0% of young people aged 18 to 24 have high stress levels related to the pressure to achieve success in life[13].

In Thailand, the Ministry of Public Health (MOPH) cited stress as a major health problem, particularly among university students[6]. In 2018, Thailand's Department of Mental Health reported that 35.3% of those who visited counseling clinics faced stress, which was then ranked the highest mental health priority in Thailand[14]. Urbanization is one contributor to stress among people in Thailand[15]. Commonly, individuals need to improve their family's economic status to survive, therefore, parents work long hours to support their families, especially to fund their children's education[14]. Most Thai parents work on farms, leaving others to care for their children during the day. Once these children go to college, they experience busy class schedules while living away from their family for the first time. Living under several high-pressure conditions, university students are particularly vulnerable to developing stress.

University students are one of the most vulnerable populations to develop stress, not only in Thailand but in every country[4,6,16]. All undergraduate students in Thailand fall in the 18 to 24 age range, which is the life stage of transitioning into adulthood. During this time, students interact with people outside of their family, particularly with peers in the same university or with classmates who have different family backgrounds. Therefore, entering adulthood and having a stressful study schedule makes them a high-risk population for developing stress. Additionally, students are exposed to other factors that may cause them to develop stress, such as family financial hardships, family relationships, problems with peers, and problems with their partners. Factors associated with stress among university students should be identified so that ultimately, a proper public health intervention could be developed to diminish the problem.

Thus, the present study aimed to determine factors associated with high-to-severe stress among university students in northern Thailand.

Materials and Methods

Study design

A cross-sectional study design was applied to collect information from the study's participants.

Study setting

The present study was conducted in three universities located in Chiang Rai, Chiang Mai, and Pha Yao Province (one university from each province, respectively) in northern Thailand. These universities were selected randomly.

Study population

The study population were students who attended the undergraduate programs in the selected universities in the 2018 to 2019 academic year.

Study sample

The study samples were students attending one of the undergraduate programs in the three selected universities in the 2018 to 2019 academic year. They were randomly selected.

The sample size was calculated based on the standard formula for a cross-sectional study[17], where $Z^2_{\alpha/2}$=1.96, P=0.17[5], Q=0.83, then 216 participants were needed in each university. With the condition of conducting in three universities, then at least 651 participants were required for the analysis.

Research instruments

Two sets of questionnaires were used to collect data from the participants. The first set contained 11 questions and was developed from a literature review and in consultation with two psychologists. These questions were used to collect personal information, childhood experiences, and information about participants' parents. The second questionnaire used was the Suanprung Stress Test 20 (SPST-20). SPST-20 has a sensitivity at 95.0% and a specificity at 95.0% with an overall Cronbach's alpha coefficient of 0.89%[18]. Each set of SPST-20 consists of 20 questions. Each question has five scales of stress (from 1 to 5). Therefore, 100 points are possible from 20 questions.

The participants who scored between 0 to 23 points were classified as having a low stress level, those between 24 to 41 points as moderate stress level, those between 42 to 61 points as high stress level, and those between 62 to 100 points as severe stress level.

Moreover, those who had SPST-20 scores between 0 to 41 points were classified as having a stress level that did not require urgent help from a mental health clinic. Those who scored more than 41 points were classified as having a stress problem and required urgent help from a mental health clinic or psychiatrist[18].

Data collection procedure

First, a random method was used to select the three universities and five programs from each

university, which ran during the 2018 to 2019 academic year. Second, one class or a year-cohort (first, second, third, or fourth year) in a selected program was chosen and invited to participate in the study. All selected class members were then invited to provide information by completing two questionnaires. Before completing the questionnaires, all participants were asked to sign permission on an informed consent form. Participants completed all forms on a voluntary basis. Questionnaire completion for both sets of questions lasted 20 minutes.

Data analysis

Data were entered twice into excel spreadsheets and transformed into IBM SPSS Statistics software, version 24.0 (2016, IBM Corp., Armonk, NY, USA), which was then used for analysis. Descriptive and inferential statistics were used for analysis. Participants' general characteristics were described by mean, standard deviation, and percentage. Chi-square was used to detect the different variable proportions from low-to-moderate stress to high-to-severe stress. Logistic regression was used to detect associations between independent variable(s) and dependent variables (high-to-severe stress) with a significance level of alpha at 0.05.

Ethical considerations

The Mae Fah Luang Human Research Ethical Committee (REH-60141) approved all the study proposals and instruments. The researchers provided all participants with essential information regarding the present study before obtaining informed consent from them voluntarily. All participant information was kept in a secure, password-protected location prior to analysis.

Results

Participant characteristics

Six hundred fifty-five students participated in the present study, more than half (62.6%) were female, the average age was 20.1 years (SD 1.2, max 27, and min 17), and most participants were third year students (39.7%). Most were Buddhist (88.2%), and one-third (37.5%) were residents of northern Thailand.

One half of the participants used alcohol (51.1%), while a significantly smaller amount smoked (9.2%). Two-thirds of the participants (60.2%) reported that they did not exercise regularly. Almost half of the participants (47.3%) used the internet for six to nine hours per day. The most used program was Facebook (80.8%), for approximately five hours per day. One-fifth of the participants (20.9%) had had sexual intercourse. Ultimately, more than half of the participants were classified as having a high-to-severe stress level (60.9%) (Table 1).

Participants' parents' characteristics

Most of the students' fathers were alive (93.4%) and aged 41 to 50 (44.3%). A few of the participants' fathers had no education (5.0%) and were unemployed (7.5%). The majority of the participants' fathers had a monthly income equal to or less than 10,000 Baht (65.0%). More than half of the participants' fathers used alcohol (56.0%), and one-third smoked (38.2%).

Most of the participants' mothers were alive (98.5%) and aged 41 to 50 years (61.2%). A small proportion had no education (4.0%). One-third of the participants' mothers worked as government officers (29.2%) with an approximate monthly income of less than 10,000 Baht per month (71.6%). One-third of the participants' mothers used alcohol (23.1%) and few smoked (1.7%) (Table 2).

Five participant characteristics were found that significantly differentiated those who had low-to-moderate stress and those who had high-to-severe stress tested by a chi-square test, student who had sexual intercourse (p=0.010), father's education (p=0.005), father's life status (p=0.028), mother's education (p=0.001), and parental conflict (p=0.028) (Table 3).

In the multivariable model, three variables were found statistically correlated with high and severe stress among the university students. Students who did not respond to the sexual intercourse experience question had a 1.71 (OR_{adj} 1.71; 95% CI 1.15 to 2.55) greater chance of high-to-severe stress than those who did not have sexual intercourse. The students who had fathers graduated primary school had a 3.64 (OR_{adj} 3.64; 95% CI 1.60 to 8.31) greater chance of high-to-severe stress than those had parents who had no education. Students whose parental conflict was high had a 2.29 (OR_{adj} 2.29; 95% CI 1.18 to 4.47) greater chance of high-to-severe stress than those had no parental conflict (Table 3).

Discussion

Of the students attending universities in northern Thailand and facing stress, there was a 60.9% prevalence in the high-to-severe stress level. These university students did not have a healthy lifestyle, with a high proportion of alcohol use (51.14%) and no regular exercise. Students spent almost six hours per day accessing the internet, using Facebook more

Table 1. General characteristic of participants

Characteristic	n (%)
Total	655 (100)
University	
University No.1 (Chiang Rai Province)	281 (42.9)
University No. 2 (Chiang Mai Province)	217 (33.1)
University No. 3 (Pha Yao Province)	157 (24.0)
Sex	
Male	245 (37.4)
Female	410 (62.6)
Year of study	
1st year	89 (13.6)
2nd year	188 (28.7)
3rd year	260 (39.7)
4th year	61 (9.3)
Missing	57 (8.7)
Age (year); mean±SD	20.1±1.2
Religion	
Buddhist	578 (88.2)
Christian	23 (3.5)
Islam	54 (8.3)
Region of residency in Thailand	
Northern	246 (37.5)
Central	153 (23.3)
Southern	119 (18.2)
North Eastern	80 (12.3)
Eastern	38 (5.8)
Western	19 (2.9)
Number of sibling (person)	
≤2	523 (79.8)
3 to 5	123 (18.8)
≥6	9 (1.4)
Order of sibling	
First	384 (58.6)
Second	210 (32.1)
Third or more	61 (9.3)
Alcohol drinking	
No	320 (48.9)
Yes	335 (51.1)
Smoking	
No	595 (90.8)
Yes	60 (9.2)
Exercise	
No	205 (31.3)
Sometimes	394 (60.2)
Regular	56 (8.5)
Internet use (hour/day)	
≤5	189 (28.9)
6 to 9	310 (47.3)
≥10	156 (23.8)
Facebook use (hour/day)	
≤5	529 (80.8)
6 to 9	98 (14.9)
≥10	28 (4.3)
Having sexual intercourse	
No	347 (53.0)
Yes	137 (20.9)
No response	171 (26.1)
SPST (points)	
Low stress (0 to 23 points)	19 (2.9)
Moderate stress (24 to 41 points)	237 (36.2)
High stress (42 to 61 points)	290 (44.3)
Severe stress (62 to 100 points)	109 (16.6)
Stress	
Low-to-moderate stress (SPST ≤41 points)	256 (39.1)
High-to-severe stress (SPST ≥42 points)	399 (60.9)

SD=standard deviation; SPST=Suanprung Stress Test

often than other applications. Moreover, almost half had experienced sexual intercourse. Three factors were associated with high-to-severe stress among the university students in northern Thailand, having experienced sexual intercourse, father's education, and parental conflict.

In the present study, the researchers found that students who did not respond to the question related to sexual intercourse had a greater chance of having high-to-severe stress than those who did not have sexual intercourse. Several studies explained this detail. Under Thai cultural norms and context, there is limited acceptance for expressing sexual activity in public among Thai people, particularly for women prior to marriage[19-21]. Most Thais, particularly aged over 40, still accept that sexual behavior should

Table 2. Parents' characteristics

Father's characteristics	n (%)	Mother's characteristics	n (%)
Age (year)		Age (year)	
≤40	30 (4.6)	≤40	53 (8.1)
41 to 50	290 (44.3)	41 to 50	401 (61.2)
51 to 60	258 (39.4)	51 to 60	184 (28.1)
61 to 70	51 (7.8)	≥61	17 (2.6)
≥71	26 (3.9)	Mean±SD	47.9±5.8
Mean±SD	50.6±7.4	Education	
Education		No education	39 (4.0)
No education	33 (5.0)	Primary school	139 (21.2)
Primary school	137 (20.9)	High school	221 (33.7)
High school	214 (32.7)	University	256 (39.1)
University	271 (41.4)	Live status	
Life status		Alive	645 (98.5)
Alive	612 (93.4)	Dead	10 (1.5)
Dead	43 (6.6)	Occupation	
Occupation		Unemployed	85 (12.9)
Unemployed	49 (7.5)	Agriculture	94 (14.4)
Agriculture	116 (17.7)	Government officer	191 (29.2)
Government officer	192 (29.3)	Other	285 (43.5)
Other	298 (45.5)	Income (Baht/month)	
Monthly income (Baht/month)		≤10,000	469 (71.6)
≤10,000	426 (65.0)	10,001 to 50,000	160 (24.4)
10,001 to 50,000	181 (27.6)	≥50,001	26 (4.0)
≥50,001	48 (7.4)	Alcohol use	
Alcohol use		No	504 (76.9)
No	288 (44.0)	Yes	151 (23.1)
Yes	367 (56.0)	Smoking	
Smoking		No	644 (98.3)
No	405 (61.8)	Yes	11 (1.7)
Yes	250 (38.2)		

SD=standard deviation

be kept personal and that women should save their virginity for their husband[21,22]. Therefore, answering "no response" to the question asking about sexual intercourse among Thai university students could be common in a Thai context. However, this response may reflect that they have already had sexual intercourse. Women are more likely to answer inaccurately due to social norms and context. However, a recent study showed a shift in sexual behaviors and attitudes among people living in urban areas of Thailand where a large proportion did not care about their partner's past sexual experience[23]. Yanapipatpong's Master's thesis[24] demonstrated that having sexual intercourse among university students in Bangkok, Thailand was associated with stress, which concurred with the present study.

In the present study, the researchers also found that parents' socioeconomic status, which refer to the occupation, education, and income, was one of the factors that predicted high-to-severe stress in their children while attending university. This finding agrees with Emmen et al's study[25], which reported that parents' socioeconomic status was associated with the stress in their child among minority families in the Netherlands. The population-based German National Health Interview and Examination Survey

Table 3. Comparison of participants' characteristics between low-to-moderate stress and high-to-severe stress, univariable and multivariable analyses on factors associated with stress among the university students

Factors	Low-to-moderate n (%)	High-to-severe n (%)	Chi-square (p-value)	OR	95% CI	p-value	OR_{adj}	95% CI	p-value
Sex			0.04 (0.837)						
Male	97 (39.6)	148 (60.4)		1.00					
Female	159 (38.8)	251 (61.2)		1.03	0.74 to 1.43	0.837			
Year of study			6.35 (0.174)						
1st year	43(48.3)	46 (51.7)		1.00					
2nd year	75 (39.9)	113 (60.1)		1.40	0.84 to 2.34	0.186			
3rd year	98 (37.7)	162 (62.3)		1.54	0.95 to 2.51	0.079			
4th year	24 (39.3)	37 (60.7)		1.44	0.74 to 2.79	0.278			
Other	16 (28.1)	41 (71.9)		2.39	1.17 to 4.88	0.016*			
Number of family member (persons)			3.80 (0.149)						
≤2	207 (39.6)	316 (60.4)		1.00					
3 to 5	43 (35.0)	80 (65.0)		1.21	0.80 to 1.83	0.344			
≥6	6 (66.7)	3 (33.3)		0.32	0.08 to 1.32	0.117			
Order sibling			0.64 (0.726)						
First	151 (39.3)	233 (60.7)		1.00					
Second	84 (40.0)	126 (60.0)		0.97	0.69 to 1.37	0.872			
Third or more	21 (34.4)	40 (65.6)		1.23	0.70 to 2.18	0.466			
Religion			2.00 (0.367)						
Buddhist	225 (38.9)	353 (61.1)		1.00					
Christian	12 (52.2)	11 (47.8)		0.58	0.25 to 1.34	0.207			
Muslim	19 (35.2)	35 (64.8)		1.17	0.65 to 2.10	0.589			
Region of residency in Thailand			4.74 (0.448)						
Northern	101 (41.1)	145 (58.9)		1.00					
Central	65 (42.5)	88 (57.5)		0.94	0.62 to 1.42	0.779			
Southern	42 (35.3)	77 (64.7)		1.27	0.81 to 2.01	0.291			
Southeastern	24 (30.0)	56 (70.0)		1.62	0.94 to 2.79	0.079			
Eastern	15 (40.5)	22 (59.5)		1.02	0.50 to 2.06	0.953			
Western	8 (42.1)	11 (57.9)		0.95	0.37 to 2.46	0.929			
Alcohol use			0.66 (0.417)						
No	120 (37.5)	200 (62.5)		1.00					
Yes	136 (40.6)	199 (59.4)		0.88	0.64 to 1.20	0.417			
Smoking			0.46 (0.496)						
No	235 (39.5)	360 (60.5)		1.00					
Yes	21 (35.0)	39 (65.0)		1.12	0.70 to 2.11	0.497			
Regularly exercise			0.86 (0.648)						
No	76 (37.1)	129 (62.9)		1.00					
Yes	180 (40.0)	269 (60.0)		0.88	0.63 to 1.24	0.477			
Internet use (hour/day)			1.20 (0.547)						
≤5	80 (42.3)	109 (57.7)		1.00					
6 to 10	118 (38.1)	192 (61.9)		1.19	0.82 to 1.72	0.345			
≥11	58 (37.2)	98 (62.8)		1.24	0.80 to 1.91	0.332			

OR=odds ratio; OR_{adj}=adjusted odds ratio; CI=confidence interval

* Significance level at α=0.05

Table 3. (Continued)

Factors	Low-to-moderate n (%)	High-to-severe n (%)	Chi-square (p-value)	OR	95% CI	p-value	OR_{adj}	95% CI	p-value
Facebook use (hour/day)			5.39 (0.067)						
≤5	216 (40.8)	313 (59.2)		1.00					
6 to 10	28 (28.6)	70 (71.4)		1.72	1.07 to 2.76	0.023*			
≥11	12 (42.9)	16 (57.1)		0.92	0.42 to 1.98	0.832			
Having sexual intercourse			9.25 (0.010*)						
No	153 (44.1)	194 (55.9)		1.00			1.00		
Yes	51 (37.2)	86 (62.8)		1.33	0.88 to 1.99	0.169	1.37	0.90 to 2.08	0.140
No response	52 (30.4)	119 (69.6)		1.80	1.22 to 2.66	0.003*	1.71	1.15 to 2.55	0.009*
Father's age (year)			5.15 (0.273)			0.273			
≤40	12 (40.0)	18 (60.0)							
41 to 50	108 (37.2)	182 (62.8)							
51 to 60	103 (39.9)	155 (60.1)							
61 to 70	26 (51.0)	25 (49.0)							
≥71	7 (26.9)	19 (73.1)							
Father education			12.94 (0.005*)						
No education	16 (51.6)	15 (48.4)		1.00			1.00		
Primary school	36 (26.7)	99 (73.3)		2.93	1.31 to 6.53	0.008*	3.64	1.60 to 8.31	0.002*
High school	86 (40.4)	127 (59.6)		1.57	0.74 to 3.35	0.239	1.94	0.89 to 4.22	0.096
University	117 (43.3)	153 (56.7)		1.39	0.66 to 2.93	0.381	1.73	0.80 to 3.74	0.161
Father's living status			4.84 (0.028*)						
Alive	246 (40.2)	366 (59.8)		1.00					
Dead	10 (23.3)	33 (76.7)		2.21	1.07 to 4.58	0.031*			
Father's occupation			5.11 (0.276)						
Unemployed	21 (39.6)	32 (60.4)		1.00					
Agriculture	38 (32.8)	78 (67.2)		1.34	0.68 to 2.64	0.386			
Governance	83 (43.2)	109 (56.8)		0.86	0.46 to 1.60	0.638			
Other	110 (39.7)	167 (60.3)		0.99	0.54 to 1.81	0.990			
Father's income (Baht/month)			0.77 (0.678)						
≤10,000	170 (39.9)	256 (60.1)		1.00					
10,001 to 50,000	66 (36.5)	115 (63.5)		1.15	0.80 to 1.65	0.426			
≥50,001	20 (41.7)	28 (58.3)		0.93	0.50 to 1.70	0.813			
Father's alcohol use			1.85 (0.173)						
No	121 (42.0)	167 (58.0)		1.00					
Yes	135 (36.8)	232 (63.2)		1.25	0.91 to 1.71	0.174			
Father's smoking behavior			1.22 (0.269)						
No	165 (40.7)	240 (59.3)		1.00					
Yes	91 (36.4)	159 (63.6)		1.20	0.87 to 1.66	0.269			
Mother's education			17.72 (0.001*)						
No education	17 (44.7)	21 (55.3)		1.00					
Primary school	35 (25.2)	104 (74.8)		2.40	1.14 to 5.06	0.021*			
High school	86 (38.9)	135 (61.1)		1.27	0.63 to 2.54	0.499			
University	118 (46.1)	138 (53.9)		0.95	0.48 to 1.89	0.890			

OR=odds ratio; OR_{adj}=adjusted odds ratio; CI=confidence interval

* Significance level at α=0.05

Table 3. (Continued)

Factors	Low-to-moderate n (%)	High-to-severe n (%)	Chi-square (p-value)	OR	95% CI	p-value	OR_{adj}	95% CI	p-value
Mother's age (year)			1.43 (0.698)			0.001*			
≤40	18 (34.6)	34 (65.4)							
41 to 50	161 (40.1)	240 (59.9)							
51 to 60	68 (37.0)	116 (63.0)							
≥61	8 (47.1)	9 (52.9)							
Mother's living status			0.01 (0.947)						
Alive	251 (39.0)	393 (61.0)		1.00					
Dead	4 (40.0)	6 (60.0)		0.95	0.26 to 3.42	0.947			
Mother's occupation			5.16 (0.160)						
Unemployed	29 (34.1)	56 (65.9)		1.00					
Agriculture	30 (31.9)	64 (68.1)		1.14	0.60 to 2.16	0.67			
Government officer	83 (43.5)	108 (56.5)		0.66	0.38 to 1.14	0.14			
Other	115 (40.4)	170 (59.6)		0.76	0.45 to 1.27	0.29			
Mother's income (Baht/month)			4.88 (0.087)						
≤10,000	193 (41.2)	276 (58.8)		1.00					
10,001 to 50,000	51 (31.9)	109 (68.1)		1.49	1.02 to 2.18	0.03*			
≥50,001	12 (46.2)	14 (53.8)		0.81	0.36 to 1.80	0.61			
Mother's alcohol use			1.31 (0.253)						
No	203 (40.3)	301 (59.7)		1.00					
Yes	53 (35.1)	98 (64.9)		1.48	0.85 to 1.82	0.253			
Mother's smoking behavior			1.12 (0.289)						
No	250 (38.8)	394 (61.2)		1.00					
Yes	6 (54.4)	5 (45.5)		0.53	0.16 to 1.75	0.297			
Parental conflict			7.11 (0.028*)						
No	199 (41.4)	282 (58.6)		1.00			1.00		
Moderate	43 (37.4)	72 (62.6)		1.18	0.77 to 1.79	0.435	1.28	0.83 to 1.98	0.265
High	13 (23.2)	43 (76.8)		2.33	1.22 to 4.45	0.010*	2.29	1.18 to 4.47	0.015*
People who support life			1.75 (0.625)						
Both father and mother	174 (38.0)	284 (62.0)		1.00					
Only father	14 (43.8)	18 (56.2)		0.79	0.38 to 1.63	0.528			
Only mother	46 (43.8)	59 (56.2)		0.79	0.51 to 1.21	0.282			
Other	21 (35.6)	38 (64.4)		1.11	0.63 to 1.96	0.706			

OR=odds ratio; OR_{adj}=adjusted odds ratio; CI=confidence interval

* Significance level at α=0.05

also revealed that parents' socioeconomic status, especially the father's education, impacted their children and adolescents' stress[26].

The present study also found that separated parents was associated with high-to-severe stress in their university children. This finding is supported by several studies in different countries. For instance, Lin et al[27] reported that marital status of parents directly impacted stress and depression in their children, particularly negatively. Anderson[28] and Kelly[29] showed that separated parents incited both physical and mental problems in their children, particularly with their children having less skills to cope with stress.

Some limitations were found in the present study. First, the study was conducted two to three weeks before the students took their midterm examinations, therefore, there was a high chance of having high-to-severe stress. This result is supported by Saipanish's study[30], which showed that Thai medical students had a high stress level before taking exams. Second, peer or classmate relationships were also not included in

the present study, which may have impacted stress. Finally, some variables were not included in the study, particularly personal life attitude and skills in coping with stress, which may impact their current stress levels.

Conclusion

University students in Thailand living in the northern region have high-to-severe stress levels from various factors, such as personal sexual behaviors, parents' socioeconomic status, and parental conflict. Close cooperation between university staff and parents to develop an effective method for coping with high levels of stress among university students is urgently required. Moreover, sexual education among university students detailing proper procedures in the Thai context also needs to be developed. Providing mental or counseling clinics for university students for improving stress coping skills should be implemented.

What is already known on this topic?

Stress is a major mental health problem among university students in Thailand. Many factors increase individual stress, including personal attitude and perception of certain issues. Interpersonal relationships and a heavy class schedule can also impact a person's stress. Moreover, coping with stress is an important skill that can help diminish a person's stress level.

What this study adds?

This study found that having personal sexual experience, parental conflict, and a father's particular education level are all influencing factors for the high-to-severe stress level among university students in northern Thailand.

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Conflicts of interest

The authors declare no conflict of interest.

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