Psychometric Properties of Depression Anxiety and Stress in Preclinical Medical Students

Porntip Nimkuntod MD*, Naporn Uengarpon MD**,
Fuangfa Benjaoran MD***, Kwanruan Pinwanna MEd****,
Karakad Ratanakeereepun MEd****, Pattama Tongdee MD*****

** School of Internal Medicine, Institute of Medicine, Suranaree University of Technology, Nakhon Ratchasima, Thailand*
*** School of Pediatrics, Institute of Medicine, Suranaree University of Technology, Nakhon Ratchasima, Thailand*
**** School of Family and Community Medicine, Institute of Medicine, Suranaree University of Technology, Nakhon Ratchasima, Thailand*
***** Institute of Medicine, Suranaree University of Technology, Nakhon Ratchasima, Thailand*
****** School of Obstetrics and Gynecology, Institute of Medicine, Suranaree University of Technology, Nakhon Ratchasima, Thailand*

Background: *Medical education and learning outcomes might adversely affect students' mental health in all axes depression, anxiety, and stress. Faculty has a concern regarding the mental well-being of the medical students.*
Objective: *Explore the prevalence of depressive anxiety and stress symptoms, ways of coping, and their relationships to variables among preclinical medical students.*
Material and Method: *A cross-sectional, observational study was conducted in preclinical medical students, Suranaree University of Technology in March 2015. Two hundred thirty medical students (First, second, and third year students) were included and then completed the Self-administered questionnaire, The Depression Anxiety Stress Scale-21 (DASS-21) is a quantitatively measured for distress along the three axes of depression, anxiety, and stress.*
Results: *At the beginning of the study, 230 students enrolled in the study (43.2% male). The overall response rate among medical students was 92.61% (213/230). The prevalence of mild to moderate degree in depression, anxiety, and stress level was 9.4%, 22.5%, and 5.6%, respectively while the prevalence of severe to extremely severe degree in depression, anxiety, and stress level was 0.9 %, 3.2%, and 0 %, respectively. The second-year medical students exhibited the highest percentage of depression, anxiety, and stress but there was no significant difference among depression, anxiety, and stress between academic year in preclinical medical students. No burnout and suicidal ideation were reported by either males or females.*
Conclusion: *This present indicated that medical students have a low level of depression, anxiety, and stress, however, the data is useful for further planning of prevention in psychometric risks.*

Keywords: *DASS-21, Anxiety, Depression, Stress, Preclinical medical students*

J Med Assoc Thai 2016; 99 (Suppl. 7): S111-S117
Full text. e-Journal: *http://www.jmatonline.com*

Depressive symptoms are highly prevalent among medical students especially when there are poor academic performances. Several studies have revealed that medical students are susceptible to high rates of morbidity and burn-out during their undergraduate years[1-4] and this can be related to impairment in the development of professional, academic, and social skills[5-8]. In addition, this co-morbidity is associated with an increased risk of suicide, evaluated by attempted and completed suicides[9,10]. Medical education and training can directly contribute to the development of depression[11] and behavioral problems such as alcohol and drug abuse[12]. During the first semester, there are significant changes in the student's daily habits[13,14]. Risk factors for developing affective disorders are gender, lack of family support[15,16], personal history of depressive disorders[17], personal beliefs towards the medical professional[18,19], and the number of years of schooling prior to entry into medical school[20]. Stress is a multidimensional phenomenon that is focused on dynamic relationship between the individual and the environment. Definition of stressor is individual's response to the stimuli, which is the interaction with the environment. Assadi et al, in their study, found that psychological problems were more prevalent among medical students, graduates, and women. The

Correspondence to:
Tongdee P, 111 School of Obstetrics and Gynecology, Institute of Medicine, Suranaree University of Technology, Nakhon Ratchasima 30000, Thailand.
Phone: +66-89-8912525
E-mail: pattama_t@sut.ac.th

relationship between depression and anxiety has been longstanding. Clark and Watson[21] proposed a tripartite model of anxiety and depression. This psychometric model suggests that several symptoms share elevated negative effect in both conditions.

The Depression Anxiety and Stress Scales (DASS)[22] is a widely used screening tool to assess symptoms of depression, anxiety, and stress in community settings that standard tool to using in worldwide. There are two forms of the DASS, the full 42 items and the short 21 items version with high internal consistency in both English and non-English versions (Cronbach's alpha scores of >0.7). Both forms assess the same domains. This tool has also been translated and validated in other languages including Chinese[23], Malaysia[24], Italian[25], Spanish[26] and Thai. Better knowledge and understanding of the symptoms involved in the depression, anxiety, and stress in medical students could assist in the development of specific target programs (like mentoring and tutoring), thus helping professors and medical educators to better understand and identify students at risk in each year of education or level of training. It would also help in reducing the impact of any disturbances in attitudes and behavior, which are imperative to make the students aware of their own risk factors[27,28].

Suranaree University of Technology, Thailand has two special tracks of medical students for rural doctors, the Collaborative Project to Increase Production of Rural Doctors (CPIRD) in a provincial area and the One District One Doctor (ODOD) in a non-provincial city. There has been a concern regarding the mental health, depression, anxiety, and stress of the medical students as raised by a number of students and faculty at the Institute of Medicine, Suranaree University of Technology. This led us to design the present study to explore mental health status depression, anxiety, and stress in our preclinical medical students.

Material and Method

Study population

Two hundred thirty medical students from ODOD and CPIRD projects were enrolled in this study. The number of students in first, second, and third year were 80, 80, and 80, respectively. Ethical approval for this project was obtained from Suranaree University of Technology (EC-58-04).

Study protocol

A cross sectional study was conducted. Data were collected using a questionnaire in the Thai language as this is the language of teaching at Thai medical schools. The 10-minute questionnaire also included demographic questions about academic year and gender. Finally, students' academic grades from the first term were obtained from faculties' administration offices. The questionnaire assessed the students' negative psychological health using three scales. DASS-21 is a 21 questions scale comprising of seven questions that are summed for each subscale of depression, anxiety, and stress. It is composed of 21 questions with a four point (0-3) answer scale. Each subclass's score equals the sum of seven corresponding questions.

Sample collection

Data collection took place in the second and third semesters of the academic year of 2014. Data were collected two weeks after the start of the term and not during exams periods in order to avoid any effects of holidays or exams on the responses. Research assistants, who were medical students, helped us in the data collection after receiving training on the questionnaire and the data collection methodology. A multistage sampling technique was used for selecting participants. A random sample was then selected from each academic year at different weekdays and times of day to avoid convenience sampling. Students were approached before and after lectures and the goals of the study were explained to them and any questions they had were answered. Those who consented to participate in this study were then given the study questionnaire and instructed to fill it without discussing it with their classmates.

Definition of term

Psychometric properties

The American Psychological Association characterizes anxiety and stress by feelings of tension, worried thoughts, and physical changes. Anxiety is more related to autonomic arousal, skeletal muscle tension, and situational aspects, whereas stress is more related to irritability, impatience, and difficulty in relaxing.

The depression anxiety and stress scales (DASS)

This instrument comprises three sub-scales. 1) The Depression sub-scale measures hopelessness, low self-esteem, and low positive affect to mental status. 2) The Anxiety scale assesses autonomic arousal,

situational anxiety, musculoskeletal symptoms, and subjective experience of anxious arousal. Finally, 3) The Stress scale assesses tension, agitation, and negative affect to mental status.

Preclinical medical students

Preclinical medical students refer to the first three years of the six-year medical curriculum of medical school. The normal structure and function of human system course introduces medical students to the concepts of history taking and physical examination, preparing for clinical year.

ODOD and CPIRD projects

These are special tracks for medical student's recruitment in Thailand that are based on academic ability using a single examination paper. The two tracks are the Collaborative Project to Increase Production of Rural Doctors (CPIRD) in a provincial area launched in 1995, and the One District One Doctor (ODOD) in a non-provincial city launched in 2005.

Statistical analysis

Descriptive statistics was obtained and reported. Test for significance was conducted using student's t-test and analysis of variance (ANOVA) where applicable. For the performed statistical analysis, a significance level of 0.05 was assumed.

Results

Two hundred thirteen preclinical medical students with mean age 19.51±2.09 years were recruited. First year, second year, and third year medical students were 36.62%, 36.15%, and 27.23%, respectively. About 78.9% of preclinical medical students have been coping problems with family and 78.9% with friends (Table 1).

The mean depression score was 4.82±4.05, the mean anxiety score was 5.59±3.73, and the mean stress score was 7.00±4.17. The present study showed mild to moderate depression, anxiety, and stress level at 9.4%, 22.5%, and 5.6%, respectively. Severe to extremely severe depression, anxiety, and stress level were 0.9 %, 3.2%, and 0 %, respectively (Table 2).

The study showed higher scale of depression, anxiety in male or in student with total grade point average (GPAX) of less than 3. It also showed higher scale of stress in female and high GPAX. However, they were not statistically significant (Table 3).

No difference in academic year was found in all three aspects, depression, anxiety, and stress (Table 4).

Table 1. Demographic data of the medical student participants in the preclinical years

Demographic data n = 213	Preclinical year, n (%)
Age (years); mean ± SD	19.51±2.09
Sex (male, %)	92 (43.2)
ODOD project	55 (25.82)
CPIRD project	158 (74.17)
Grade point average	
<3.00	39 (19.21)
≥3.00	174 (75.65)
Depression Score	
Normal	191 (89.7)
Mild	11 (5.2)
Moderate	9 (4.2)
Severe	2 (0.9)
Very severe	0
Anxiety Score	
Normal	158 (74.2)
Mild	28 (13.1)
Moderate	20 (9.4)
Severe	5 (2.3)
Very severe	2 (0.9)
Stress score	
Normal	201 (94.4)
Mild	7 (3.3)
Moderate	5 (2.3)
Severe	0
Very severe	0
Coping problem via	
Family	168 (78.9)
Friend	168 (78.9)
Girlfriend/boy friend	44 (20.7)
Advisor/Teacher	12 (5.6)

Discussion

The present study showed that the mild to moderate depression, anxiety, and stress levels were 9.4%, 22.5%, and 5.6%, respectively. Moderately to severe depression, anxiety, and stress levels were 5.16%, 12.67%, and 2.3% respectively, which are higher than Malaysia, except anxiety, which was 3.6%, 54.5%, and 1.9%, respectively[29]. Factors affecting psychological problems were female gender and high baseline trait burden[30]. The pre-post examinations and busy schedule were the major reasons for their high DASS-21 scale, which reduced after examinations, as it did in previous studies[31].

Severe to extremely severe depression, anxiety, and stress levels were 0.9%, 3.2%, and 0%, respectively. No difference in academic year was found

Table 2. Depression, anxiety and stress scales of preclinical medical students

DASS-21		Preclinical medial students			Total
		First year	Second year	Third year	
Depression	Normal	72	66	53	191
	Mild	1	8	2	11
	Moderate	3	3	3	9
	Severe	2	0	0	2
	Extremely severe	0	0	0	0
Anxiety	Normal	62	54	42	158
	Mild	7	13	8	28
	Moderate	5	9	6	20
	Severe	2	1	2	5
	Extremely severe	2	0	0	2
Stress	Normal	74	72	55	201
	Mild	2	3	2	7
	Moderate	2	2	1	5
	Severe	0	0	0	0
	Extremely severe	0	0	0	0
Total		78	77	58	213

Table 3. Factor effect to DASS-21

Factors	Depression score		Anxiety score		Stress score	
	Mean ± SD	*p*-value	Mean ± SD	*p*-value	Mean ± SD	*p*-value
Sex		0.14		0.63		0.73
Male	5.29±4.27		0.74±4.10		4.63±3.22	
Female	4.45±3.86		55.49±3.43		5.17±3.79	
GPAX		0.16		0.75		0.26
<3.0	5.64±3.46		5.77±3.60		7.69±3.71	
≥3.0	4.63±4.16		5.56±3.76		6.85±4.26	
Medical Project		0.79		0.80		0.38
ODOD	4.69±3.47		5.71±3.16		6.58±3.49	
CPIRD	4.86±4.25		5.56±3.92		6.58±4.38	

* Significant correlation at $p < 0.05$

in all three aspects, depression, anxiety, and stress. The study showed that the depression and anxiety was greater in male and in students with lower GPAX than 3. The study also shows higher scale of stress in female with high GPAX but it was not statistically significant. These results of study are alarming because of the negative consequences of high stress on the students and additionally, because of the potential future negative consequences on patients and the health care system in general.

Implication of this study is to prevent and reduce medical student's psychological problems and reduce family and friend interventions for psychological problems. In addition, medical student mentorship program could be directed to address students' concerns and regular feedback from faculty as well as medical students regarding the academics should be encouraged.

One of the limitation of this study is the fact that the study tool, DASS-21 questionnaire, depends upon self-reported measures. Most of the students did not report their status for smoking and recreational drug use, or about their perceived underlying reasons for their depression, anxiety, or stress.

Table 4. Difference among groups in first, second and third academic years

DASS-21	F	*p*-value
Depression	0.07	0.79
Anxiety	0.07	0.80
Stress	0.76	0.38

* Significant correlation at $p<0.05$

Conclusion

This present study indicated that medical students have a low level of depression, anxiety, and stress. Furthermore, there is no statistically significant difference among academic years. Nonetheless, the data is useful for further planning of prevention in psychometric risks. Our findings are also consistent with the findings the leading cause of anxiety and depression.

What is already known on this topic?

The academic environment increases medical student stress and depression during preclinical years, similar to previous studies.

What this study adds?

The present study investigated psychological status in medical students in three domains of psychological status, depression, anxiety, and stress.

Acknowledgements

We would like to thank all the research assistants who helped us in the data collection and the medical students who filled the study questionnaire. This study is supported by the grant from Faculty Development Academy, Suranaree University of Technology.

Potential conflicts of interest

None.

References

1. Clark DC, Zeldow PB. Vicissitudes of depressed mood during four years of medical school. JAMA 1988; 260: 2521-8.
2. Mosley TH Jr, Perrin SG, Neral SM, Dubbert PM, Grothues CA, Pinto BM. Stress, coping, and well-being among third-year medical students. Acad Med 1994; 69: 765-7.
3. Dyrbye LN, Thomas MR, Eacker A, Harper W, Massie FS Jr, Power DV, et al. Race, ethnicity, and medical student well-being in the United States. Arch Intern Med 2007; 167: 2103-9.
4. Dahlin ME, Runeson B. Burnout and psychiatric morbidity among medical students entering clinical training: a three year prospective questionnaire and interview-based study. BMC Med Educ 2007; 7: 6.
5. Henderson P, Johnson MH. An innovative approach to developing the reflective skills of medical students. BMC Med Educ 2002; 2: 4.
6. Murdoch-Eaton DG, Levene MI. Formal appraisal of undergraduate medical students: is it worth the effort? Med Teach 2004; 26: 28-32.
7. Facundes VL, Ludermir AB. Common mental disorders among health care students. Rev Bras Psiquiatr 2005; 27: 194-200.
8. Kristal SL, Randall-Kristal KA, Thompson BM, Marx JA. 1998-1999 SAEM emergency medicine faculty salary and benefits survey. Acad Emerg Med 1999; 6: 1261-71.
9. Tyssen R, Vaglum P, Gronvold NT, Ekeberg O. Suicidal ideation among medical students and young physicians: a nationwide and prospective study of prevalence and predictors. J Affect Disord 2001; 64: 69-79.
10. Wallin U, Runeson B. Attitudes towards suicide and suicidal patients among medical students. Eur Psychiatry 2003; 18: 329-33.
11. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. Acad Med 2006; 81: 354-73.
12. Houwink AP, Kurup AN, Kollars JP, Kral Kollars CA, Carmichael SW, Pawlina W. Help of third-year medical students decreases first-year medical students' negative psychological reactions on the first day of gross anatomy dissection. Clin Anat 2004; 17: 328-33.
13. Rosal MC, Ockene IS, Ockene JK, Barrett SV, Ma Y, Hebert JR. A longitudinal study of students' depression at one medical school. Acad Med 1997; 72: 542-6.
14. Shapiro SL, Shapiro DE, Schwartz GE. Stress management in medical education: a review of the literature. Acad Med 2000; 75: 748-59.
15. Chandra A, Minkovitz CS. Stigma starts early: gender differences in teen willingness to use mental health services. J Adolesc Health 2006; 38: 754-8.
16. Skarsater I. Parents with first time major

depression: perceptions of social support for themselves and their children. Scand J Caring Sci 2006; 20: 308-14.
18. Brown S, Gunderman RB. Viewpoint: enhancing the professional fulfillment of physicians. Acad Med 2006; 81: 577-82.
19. Hansen MN. Social background in recruitment of medical students. Tidsskr Nor Laegeforen 2005; 125: 2213-5.
20. Vasegh S, Mohammadi MR. Religiosity, anxiety, and depression among a sample of Iranian medical students. Int J Psychiatry Med 2007; 37: 213-27.
21. Millan LR, Azevedo RS, Rossi E, De Marco OL, Millan MP, de Arruda PC. What is behind a student's choice for becoming a doctor? Clinics (Sao Paulo) 2005; 60: 143-50.
22. Clark LA, Watson D. Tripartite model of anxiety and depression: psychometric evidence and taxonomic implications. J Abnorm Psychol 1991; 100: 316-36.
23. Lovibond SH, Lovibond PF. Manual for the depression anxiety stress scales. 2nd ed. Sydney: Psychology Foundation of Australia; 1995.
24. Chan RC, Xu T, Huang J, Wang Y, Zhao Q, Shum DH, et al. Extending the utility of the Depression Anxiety Stress scale by examining its psychometric properties in Chinese settings. Psychiatry Res 2012; 200: 879-83.
25. Musa R, Fadzil MA, Zaini Z. Translation, validation and psychometric properties of Bahasa Malaysia version of the Depression Anxiety and Stress Scales (DASS). Asian J Psychiatr 2007; 82: 82-9.
26. Severino GA, Haynes WD. Development of an Italian version of the Depression Anxiety Stress Scales. Psychol Health Med 2010; 15: 607-21.
27. Bados A, Solanas A, Andres R. Psychometric properties of the Spanish version of depression, anxiety and stress scales (DASS). Psicothema 2005; 17: 679-83.
28. Mino Y, Yasuda N, Tsuda T, Shimodera S. Effects of a one-hour educational program on medical students' attitudes to mental illness. Psychiatry Clin Neurosci 2001; 55: 501-7.
29. Merritt RK, Price JR, Mollison J, Geddes JR. A cluster randomized controlled trial to assess the effectiveness of an intervention to educate students about depression. Psychol Med 2007; 37: 363-72.
30. Yusoff MS, Abdul Rahim AF, Baba AA, Ismail SB, Mat Pa MN, Esa AR. Prevalence and associated factors of stress, anxiety and depression among prospective medical students. Asian J Psychiatr 2013; 6: 128-33.
31. Aboalshamat K, Hou XY, Strodl E. Psychological well-being status among medical and dental students in Makkah, Saudi Arabia: a cross-sectional study. Med Teach 2015; 37 (Suppl 1): S75-81.
32. Kulsoom B, Afsar NA. Stress, anxiety, and depression among medical students in a multiethnic setting. Neuropsychiatr Dis Treat 2015; 11: 1713-22.

คุณลักษณะของสภาวะจิตใจ ภาวะซึมเศร้า วิตกกังวล และความเครียดในนักศึกษาแพทย์ ชั้นปรีคลินิก

พรทิพย์ นิ่มขุนทด, นพร อึ้งอาภรณ์, เฟื่องฟ้า เบญจโอพาร, ขวัญเรือน ปิ่นวันนา, การะเกด รัตนคีรีพันธุ์, ปัทมา ทองดี

ภูมิหลัง: *ในการศึกษาทางการแพทย์มีผลกระทบต่อสภาวะทางจิตใจของนักศึกษาแพทย์ทั้ง 3 แบบ ซึมเศร้า วิตกกังวล และความเครียด ดังนั้นจึงต้องมีการเฝ้าระวังสภาวะจิตใจของนักศึกษาแพทย์*

วัตถุประสงค์: *เพื่อประเมินความชุกของภาวะซึมเศร้า วิตกกังวล และความเครียด วิธีการแก้ไข และปัจจัยที่มีผลต่อสภาวะทางจิตใจของนักศึกษาแพทย์ชั้นปรีคลินิก*

วัสดุและวิธีการ: *การศึกษาสังเกตแบบตัดขวางในนักศึกษาแพทย์ชั้นปรีคลินิก มหาวิทยาลัยเทคโนโลยีสุรนารี เดือนมีนาคม พ.ศ. 2558 พบว่านักศึกษาแพทย์ชั้นปีที่ 1, 2 และ 3 จำนวน 230 คน ได้รับการประเมินแบบสอบถามด้วยตนเอง แดช-21 ที่เป็นการวัดใน 3 ด้าน ภาวะซึมเศร้า ความวิตกกังวล และความเครียดในทุกคนที่เข้าร่วมการศึกษา*

ผลการศึกษา: *ตอนเริ่มต้นการศึกษามี 230 คน ที่เข้าร่วมการศึกษาเป็นผู้ชาย 43.2% และตอบแบบสอบถามกลับ 92.61% โดยพบว่าความชุกของภาวะซึมเศร้า วิตกกังวล และความเครียดในระดับน้อยถึงปานกลางเท่ากับ 9.4%, 22.5% และ 5.6% ตามลำดับ ภาวะซึมเศร้า วิตกกังวล และความเครียดในระดับรุนแรงถึงรุนแรงมาก 0.9%, 3.2% และ 0% ตามลำดับ นักศึกษาแพทย์ชั้นปีที่ 2 มีเปอร์เซ็นต์ของการเกิดภาวะซึมเศร้า วิตกกังวล และความเครียดมากกว่าแต่ไม่แตกต่างกันอย่างมีนัยสำคัญทางสถิติในชั้นปรีคลินิก ไม่มีรายงานความคิดการเลิกเรียนหรือการฆ่าตัวตายทั้งเพศชายและเพศหญิง*

สรุป: *ความชุกของภาวะซึมเศร้า วิตกกังวล และความเครียดต่ำในการศึกษานี้ แต่อย่างไรก็ตามข้อมูลที่ได้จากการศึกษาจะนำไปสู่การวางแผนด้านการป้องกันในกลุ่มที่มีความเสี่ยง*