# Correlation between Stressors and Academic Performance in Second Year Medical Students

Winitra Nuallaong MD*

** Faculty of Medicine, Thammasat University, Pathumthani, Thailand*

***Objective:*** *The present study aimed to find which type of stressors correlating to academic performance in second year medical students. One-hundred and eighty three second year medical students of Thammasat University participated in a three-week cross-sectional study. The self-report questionnaire consisted of Thai stress test, stress factors and examination grades referring academic performance were applied in the present study.*

***Results:*** *Females felt stress more than males in severe, high, and medium level of stress. There was no low level of stress and no correlation between stress level and the entrance programs. Academic performance found relating to 1) fear of doing a mistake, 2) feeling of competition or comparison, 3) unilateral headache, 4) worrying, and 5) poor concentration. Students with poor concentration had significantly decreasing grade in the second year ($p < 0.01$). Interestingly, worrying, feeling of competition or comparison, and fear of doing a mistake correlated to increasing grade in some terms ($p < 0.05$). Specifically to poor concentration, there were medium linear association with fatigue, poor memory, feeling confused, feeling sad, feeling angry or irritable, changing appetite, and headache from stress ($p < 0.01$).*

***Conclusion:*** *Poor concentration was the only stressor significantly correlated with poorer academic performance. Poor concentration also correlated with physical, cognitive, and financial problems. The recommendation is to keep watching those issues in order to early detect problem about academic performance.*

***Keywords:*** *Stress, Medical student, Academic performance, Grade*

***J Med Assoc Thai 2011; 94 (Suppl. 7): S81-S85***
***Full text. e-Journal:*** *http://www.jmat.mat.or.th*

Stress in medical training is well recognized as a common phenomenon and a risk factor of unfortunate physical, mental and well-being consequences[1]. Dyrbye et al found that 45 percent of 545 Minnesota medical students had significantly increasing symptoms of burnout in the training year[2]. In Thailand, Nuallaong in 2010 found 73.67% of medical students in clinical years felt more stress than normal daily level[3]. Rakkhajeekul reported in 2008 that 13% of medical students had poorer mental health than general population[4]. Apiwatanasiri reported in 2007 that 55.8% of clinical years medical students had morbid stress[5]. Turakitwanakan in 1997 revealed 24.63% of medical students had emotional disturbance during the training period. The highest prevalence was in the second year[6].

There are some kinds of stressor in medical training. Moffat et al reported major sources stressors related to medical training such as individual study behavior, progression and aptitude, assessment and learning materials rather than to personal problems[7]. Ross et al found that stress from debt associated to lower examination grade in medical students[8]. However, Sanders and Lushington argued that chronic stress cannot predict academic performance and had little support for an association between increased stress levels and reduced academic performance[9]. In Thailand, Saipanish reported academic stress, especially from an examination and relationship problem, were the major cause[10]. Chantarujikapong reported in 1991 that almost all of stressors in medical students came from academic stress[11]. There was no statistically significant difference in stress among genders[3,11], age[11], methods of university entrance[11] and academic years[3]. Turakitwanakan in 1997 reported financial problem, dormitory problem, having hobby, relationship problems with parent, teacher, classmate and lack of closed friends[6].

The present study aims to demonstrate prevalence of stress among second year medical students and correlation between stressors, stress levels and academic performance (as an examination grade).

***Correspondence to:***
*Nuallaong W, Faculty of Medicine, Thammasat University, Pathumthani 12120, Thailand.*
*Phone: 0-2926-9204*
*E-mail: winitra145@yahoo.com*

**Objective**

To identify the problem of stress in second year medical students and stressors correlating to academic performance.

**Material and Method**

A cross-sectional study was designed for all 183 second year medical students in Thammasat University, Thailand. They were recruited in the first 3 weeks of the second semester with ethical informed before entering the study. Data was collected by a self-report questionnaire including demographic data and Thai stress test while academic performance was collected from the university's website as an examination grade. Statistical methods included frequency, percentage and Spearman correlation coefficient.

**Results**

All 183 second year medical students in Thammasat University were eligible and willing to participate. There were three groups of students dividing by methods of university entrance examination including ODOD (the One District One Doctor program), CPIRD (the Collaborative Project to Increase production of Rural Doctor program) and the Consortium of Thai Medical School 9.84%, 45.36% and 44.81% respectively. Ratio between male to female was 4:5 (Table 1).

Table 2 presented level of stress in medical students. Five students (2.79%) had severe stress, 51 students (28.49%) had high stress and 123 students (68.72%) had medium stress. Females had more stress than males in severe level (2.79% and 0% respectively), high level (16.76% and 11.73% respectively) and medium level (36.87% and 31.84% respectively). No participant had low level of stress. There were more students with medium, high and severe stress level in CPIRD and consortium group than ODOD group, but there was no significant correlation between stress levels and entrance programs (the Spearman correlation coefficient was -0.038, p-value is 0.611) (Table 1).

Table 3 presented descriptive data of male and female stress score. Male had mean score at 39.098 (95% CI 36.437-41.758) while female had 43.307 (95% CI 41.307-45.307). Standard deviation of male was 1.337 while female was 10.129. The mean and lower bound of 95% CI was plotted as illustrated in Fig. 1.

Table 4 showed correlation between academic performance and 5 kinds of stressor including 1) fear of doing a mistake, 2) feeling of competition or comparison, 3) unilateral headache, 4) worrying and 5) poor

**Table 1.** Demographic data and Spearman correlation coefficient between gender and methods of university entrance examination

| | Program | | | Total n (%) | Correlation coefficient (p-value) |
|---|---|---|---|---|---|
| | ODOD n (%) | CPIRD n (%) | Consortium n (%) | | |
| Male | 9 (4.92) | 37 (20.22) | 36 (19.67) | 82 (44.8) | 0.038 (0.611) |
| Female | 9 (4.92) | 46 (25.14) | 46 (25.14) | 101 (55.2) | |
| Total | 18 (9.84) | 83 (45.36) | 82 (44.81) | 183 (100.00) | |

**Table 2.** Number and percentage of each demographical group separated into four levels of stress

| Stress levels | Male | | Female | | Total | | ODOD | | CPIRD | | Consortium | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | (%) | n | (%) | n | (%) | n | (%) | n | (%) | n | (%) |
| Severe | 0 | (0.00) | 5 | (2.79) | 5 | 2.79 | 1 | (0.56) | 1 | (0.56) | 3 | (1.68) |
| High | 21 | (11.73) | 30 | (16.76) | 51 | 28.49 | 7 | (3.91) | 26 | (14.53) | 18 | (10.06) |
| Medium | 57 | (31.84) | 66 | (36.87) | 123 | 68.72 | 10 | (5.59) | 56 | (31.28) | 57 | (31.84) |
| Low | 0 | (0.00) | 0 | (0.00) | 0 | 0.00 | 0 | (0.00) | 0 | (0.00) | 0 | (0.00) |
| Total | 78 | (43.57) | 101 | (56.42) | 179 | 100.00 | 18 | (10.06) | 83 | (46.37) | 78 | (43.58) |

**Table 3.** Descriptive data of stress levels among male and female

| Stress levels | n | Mean | Standard Deviation | Standard Error | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Male | 82 | 39.098 | 12.108 | 1.337 | 36.437 | 41.758 |
| Female | 101 | 43.307 | 10.129 | 1.008 | 41.307 | 45.307 |
| Total | 183 | 41.421 | 11.226 | 0.830 | 39.783 | 43.058 |

**Table 4.** The Spearman correlation coefficient between academic performance and stressors

| Grades | Stressors | fear of doing a mistake | feeling of competition or comparison | unilateral headache | worrying | poor concentration |
|---|---|---|---|---|---|---|
| The 1st term of the 1st year (1/1) | | | | | | |
| correlation coefficient (rho) | 0.145 | 0.213(**) | -0.165(*) | 0.159(*) | -0.150(*) | |
| p-value | 0.054 | 0.004 | 0.027 | 0.034 | 0.046 | |
| The 2nd term of the 1st year (2/1) | | | | | | |
| correlation coefficient (rho) | 0.151(*) | 0.149(*) | -0.147 | 0.223(**) | -0.110 | |
| p-value | 0.044 | 0.047 | 0.050 | 0.003 | 0.144 | |
| The 1st term of the 2nd year (1/2) | | | | | | |
| correlation coefficient (rho) | 0.079 | 0.099 | -0.051 | 0.059 | -0.234(**) | |
| p-value | 0.291 | 0.186 | 0.500 | 0.434 | 0.002 | |
| Difference between 1/1 to 2/1 | | | | | | |
| correlation coefficient (rho) | -0.044 | 0.064 | -0.023 | 0.058 | -.087 | |
| p-value | 0.559 | 0.391 | 0.763 | 0.438 | 0.249 | |
| Difference between 2/1 to 1/2 | | | | | | |
| correlation coefficient (rho) | -0.035 | 0.007 | -0.054 | 0.068 | 0.163(*) | |
| p-value | 0.645 | 0.926 | 0.470 | 0.366 | 0.029 | |

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

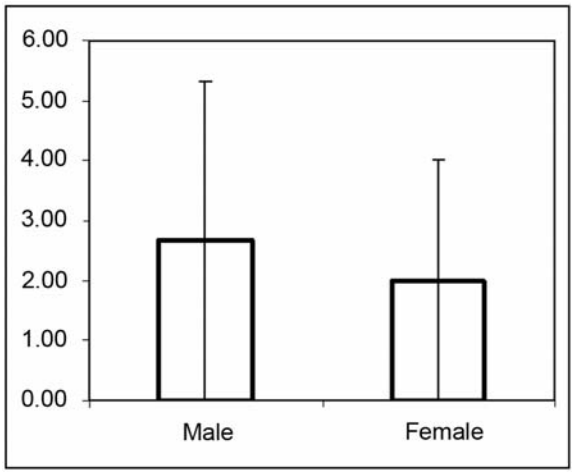


**Fig. 1** Difference between mean and lower bound of 95% confidence interval between male and female

concentration. Grade in the first term of second year of student with poor concentration, was significantly lower than the previous term (the Spearman correlation coefficient was -0.163, p-value is 0.029). Poor concentration also correlated with relatively lower grade in the first term of the first year (p = 0.046) and second year (p = 0.002). Another stressors correlated with relatively lower grade was unilateral headache (p = 0.027). Worrying and feeling of competition or comparison correlated with relatively higher grade in the first and second term of the first year (p = 0.034 and 0.003 respectively for worrying and p = 0.004 and 0.047 for feeling of competition).

Regarding poor concentration which was the only stressor correlating to lower grade than the previous term, Table 5 showed correlation between poor concentration and stressors.

**Table 5.** The Spearman correlation coefficient between poor concentration and stressors

| Stressors | Correlation coefficient (p-value) | Strength of linear relationship |
|---|---|---|
| Fatigue | 0.472 (0.000) (**) | Medium size |
| Poor memory | 0.400 (0.000) (**) | Medium size |
| Feeling confused | 0.400 (0.000) (**) | Medium size |
| Feeling sad | 0.339 (0.000) (**) | Medium size |
| Feeling angry or irritable | 0.329 (0.000) (**) | Medium size |
| Changing appetite | 0.324 (0.000) (**) | Medium size |
| Headache from stress | 0.311 (0.000) (**) | Medium size |
| Feeling frustrated | 0.298 (0.000) (**) | Small size |
| Feeling of competition or comparison | 0.269 (0.000) (**) | Small size |
| Cannot reach goal | 0.264 (0.000) (**) | Small size |
| Worrying | 0.243 (0.001) (**) | Small size |
| Muscle ache | 0.229 (0.002) (**) | Small size |
| Financial problems | 0.201 (0.007) (**) | Small size |
| Unilateral headache | 0.199 (0.008) (**) | Small size |
| Frequently catching cold | 0.181 (0.015) (*) | Small size |
| Worrying of environmental issues | 0.159 (0.034) (*) | Small size |

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

## Discussion

Poor concentration was the only stressor significantly correlated with lower examination grade in the next term ($p < 0.01$) (Table 4). In case of poor concentration, there were correlation with physical symptoms such as fatigue, changing appetite, headache from stress, muscle ache, and unilateral headache ($p < 0.01$) as well as frequently catching cold ($p < 0.05$). Poor concentration also correlated with cognitive symptoms such as poor memory, feeling confused or sad or angry or irritable or frustrated, feeling of competition or comparison, cannot reach goal, worrying ($p < 0.01$) as well as worrying of environmental issues ($p < 0.05$). Financial problem was the only social issue correlated with poor concentration ($p < 0.01$). Students would keep watching these problems in order to early detect concentration problem that relating to academic performance.

According to level of stress difference among gender, female students had more stress than male, however, Nuallaong[3] and Saipanish[11] founded there was no difference among genders. The descriptive result showed means of stress in female was 43.307 while male was 39.098 (Table 3). Illustration in Fig. 1 presented difference between means and lower bound of 95% CI. The arms of both graphs were wider in relation to estimate itself indicate instability. An unstable estimate is one that would vary from one sample to another. Thus repeated surveys would give approximately the different results. In the present study, the result that female students had more stress than male probably gives a different result if the survey is repeated. Therefore, applying different intervention to male or female in order to reduce stress would be considered.

However, the present study limited in variety of participants. Since there were only second year medical students from one centre, applying to other population would be considered. Further experimental study about stress management intervention and long term effect to stress level would benefit the faculty in order to promote either mental health or academic performance.

## Potential conflicts of interest

None.

## References


1. Thoits PA. Stress and health: major findings and policy implications. J Health Soc Behav 2010; 51 (Suppl): S41-53.
2. Dyrbye LN, Thomas MR, Huntington JL, Lawson KL, Novotny PJ, Sloan JA, et al. Personal life events and medical student burnout: a multicenter study. Acad Med 2006; 81: 374-84.
3. Nuallaong W. Stress in medical students of

Thammasat University. Thammasat Med J 2010; 10: 95-102.
4. Chantarujikapong S, Loysangrun R, Kupituksa P. Stress among second year and third year Siriraj medical students. Siriraj Med J 1991; 43: 646-53.
5. Apiwatanasiri C, Somaketrarin K, Suraprayoon K, Leurmprasert K, Wankaew N, Homchampa P, et al. Stress and coping in medical students at clinical level, Khon Kaen University. Srinagarind Med J 2007; 22: 416-24.
6. Thurakitvanakarn V. Mental health of Srinakharinwirot University medical students. J Psychiatr Assoc Thai 1997; 42: 88-100.
7. Moffat KJ, McConnachie A, Ross S, Morrison JM. First year medical student stress and coping in a problem-based learning medical curriculum. Med Educ 2004; 38: 482-91.
8. Ross S, Cleland J, Macleod MJ. Stress, debt and undergraduate medical student performance. Med Educ 2006; 40: 584-9.
9. Sanders AE, Lushington K. Effect of perceived stress on student performance in dental school. J Dent Educ 2002; 66: 75-81.
10. Saipanish R. Stress among medical students in a Thai medical school. Med Teach 2003; 25: 502-6.
11. Rakkhajeekul S, krisanaprakornkit T. Mental health survey in medical students in Khon Kaen University. J Psychiatr Assoc Thai 2008; 53: 31-40.

## *ความสัมพันธ์ระหว่างปัจจัยก่อความเครียดและสมรรถนะทางการศึกษาของนักศึกษาแพทย์ชั้นปีที่ 2*

***วินิทรา นวลละออง***

***วัตถุประสงค์****: การศึกษานี้มีวัตถุประสงค์เพื่อค้นหาปัจจัยก่อความเครียดที่สัมพันธ์กับสมรรถนะทางการศึกษาในนักศึกษาแพทย์ปีที่สอง นักศึกษาแพทย์ 183 คน จากระบบสอบเข้ามหาวิทยาลัย 3 แบบเข้าร่วมในการศึกษาแบบภาคตัดขวางในระยะเวลา 3 สัปดาห์ แบบสอบถามชนิดประเมินด้วยตนเองประกอบด้วยแบบทดสอบความเครียดฉบับภาษาไทย, ปัจจัยก่อความเครียด, และระดับคะแนนสอบซึ่งใช้อ้างอิงสมรรถนะทางการศึกษา*

***ผลการศึกษา****: เพศหญิงรู้สึกถึงความเครียดมากกว่าเพศชายทั้งในระดับรุนแรง, สูง, และปานกลาง ไม่พบความเครียดระดับต่ำและไม่พบความสัมพันธ์ระหว่างระดับความเครียดกับระบบการสอบเข้า สมรรถนะทางการศึกษาพบว่าสัมพันธ์กับความเครียดเกี่ยวกับ 1) กลัวทำผิดพลาด, 2) รู้สึกแข่งขันหรือเปรียบเทียบ, 3) ปวดศีรษะ ข้างเดียว, 4) วิตกกังวล, และ 5) สมาธิไม่ดี นักศึกษาที่สมาธิไม่ดีพบว่าเกรดต่ำลงในชั้นปีที่สองอย่างมีนัยสำคัญทางสถิติ ($p < 0.01$) สิ่งที่น่าสนใจคือความวิตกกังวล, ความรู้สึกแข่งขันหรือเปรียบเทียบ, และความกลัวทำผิดพลาดสัมพันธ์กับการเพิ่มขึ้นของเกรดในบางเทอม ($p < 0.05$) เมื่อพิจารณาเฉพาะสมาธิไม่ดี พบว่ามีความสัมพันธ์แบบเส้นตรงในขนาดปานกลางกับความอ่อนเพลีย, ความจำแย่ลง, รู้สึกสับสน, รู้สึกเศร้า, รู้สึกโกรธหรือฉุนเฉียว, ความอยากอาหารเปลี่ยนแปลง, และปวดศีรษะจากความเครียด ($p < 0.01$)*

***สรุป****: สมาธิไม่ดีเป็นปัจจัยก่อความเครียดชนิดเดียวที่สัมพันธ์กับการตกต่ำลงของสมรรถนะทางการศึกษาอย่างมีนัยสำคัญทางสถิติ สมาธิไม่ดียังสัมพันธ์กับอาการทางร่างกาย, ทางระบบความคิด, และปัญหาการเงินอีกด้วย คำแนะนำคือควรเฝ้าสังเกตปัญหาดังกล่าวเพื่อให้ตรวจพบปัญหาที่เกี่ยวข้องกับสมรรถนะการศึกษาอย่างตั้งแต่แรกเริ่ม*