THE EFFECT OF STRESS ON ACADEMIC ACHIEVEMENT AMONG PRECLINICAL STUDENTS AT HUE UNIVERSITY OF MEDICINE AND PHARMACY, VIETNAM: A PILOT STUDY

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Abstract

Objectives: To determine the prevalence of stress and its relations to the academic achievement among preclinical medical students at Hue University of Medicine and Pharmacy, Vietnam. **Method:** A cross-sectional study was carried out involving 286 medical students in the first and second year at Hue University of Medicine and Pharmacy (HUMP), during the second semester of the academic year 2011-2012. Stress was measured using Stress Subscales of the Depression Anxiety and Stress Scales 21 items (DASS21). Students' academic achievement was recorded using General Point Average (GPA) at the end of the semester. Data was analyzed using STATA version 10.0. Univariate and multivariate analysis were performed using Generalized Estimating Equation (GEE) to estimate the magnitude of effect of severity of stress on GPA, controlling for the effects of demographic variables. **Results:** The prevalence of stress among preclinical medical students was 22.03% (95%CI: 15.39% to 24.67%). Students who reported of being severely effected by stress tend to achieve lower score for GPA in comparison to those perceiving normal stress (mean difference: -0.838; 95% CI: -1.255 to -0.421, p<0.001). **Conclusion:** The prevalence of stress was high among preclinical medical students. The severe stress was found to have negative effect on students' academic achievement. The findings suggest that creation and implementation of supportive programs such as educational and psychological consultations are needed to improve students' well-being and achievement.

Key words: *stress, academic achievement.*

1. INTRODUCTION

Stress is "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" [1]. Medical education has been recognized as a stressful environment that may expose students to a higher risk of stress in comparison to other students' populations or general populations [2,3,4]. Data from literatures have indicated that the prevalence of moderate to extremely stress among medical students varies from 15% to 27%, worldwide, and the most common causes of this condition were related to academic activities [2,3]. Although, Lazarus and Folkman (1984) claimed that a mild level of stress can be necessary for learning, however, moderated to extremely severe stress can affect negatively student's learning ability and academic achievement [1]. In addition, excessive stress was consistently found to be associated with severity of depression and anxiety. These psychological problems are known to cause serious consequences to medical students such as suicide, drug and alcohol abuse, and result in low academic achievement, clinical performance, professionalism, and lifelong learning capability [3,4].

In Vietnam, medical students have been recognized to have a high risk of stress [5]. However, research on this condition and its effects on students' academic achievement have been largely neglected among medical schools [5]. The present study, therefore, aims at primarily determines the prevalence of stress and its effects on academic achievement among preclinical medical students at Hue University of Medicine

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and Pharmacy. Findings can be important for school authority and students in terms of creating policies and actions to improve students' mental well-being and academic achievement.

2. MATERIALS AND METHODS

Study design and sample: This cross-sectional survey uses the data from a pilot study in 300 medical students in the first two years at Hue University of Medicine and Pharmacy, Vietnam, in March 2012. Of 300 students invited, 286 of those joined in the study (response rate of 95.33%). The study was carried out during the second semester of the academic year 2011-2012.

Procedures: We used the Stress Subscale of the Depression, Anxiety, and Stress Scales 21 items (DASS21) to collect data concerning prevalence and severity of stress among medical students. The DASS21-stress is a public domain self-reported tool developed by Livibond and Livibond (1995) for screening stress in adolescent and adult population [6]. It comprises of seven items and each item is scored on a Likert's scales ranging from 0 "does not apply to me" to 3 "applies to me most of the time". The sum of score of items that make up the component produces total score. Therefore, the minimum score was 0 and the maximum was 21. The cutoff points for determining severity of stress are presented in Table 1 [6].

Table 1. Cutoff points for determining severity of stress

Severity	DASS21-stress
Normal (non-stress)	0-7
Mild stress	8-9
Moderate stress	10-12
Severe to extremely severe stress	13-21

Before use, the DASS21-stress was translated into Vietnamese by two Psychiatrists, and two teachers of English at HUMP using forward and backward procedures. It was then tested for reliability using Cronbach's alpha. The result showed Cronbach alpha value of 0.78 indicating that it was reliable. For the academic achievement, we collected students' General Point Average (GPA) from the Database of Department of Undergraduate Training and Student's Affairs at the end of the semester. The students' GPA is the average scores of the summative examinations of the semester using 10 scales. Therefore, the minimum GPA is 0, and the maximum is 10.0.

Prior to data collection, the Informed Consent Form was sent to participant to invite them to join in the study. Those who agreed to participate in the study signed the Informed Consent and returned it to the research team before data collection. The DASS21-stress was administered to participants in classroom and took appropriately 30 minutes to complete. Data regarding severity of stress was collected in March 2012 (at the beginning of semester).

Statistical analysis: Data was analyzed using STATA version 10.0. Mean and standard deviation were used to summarize the continuous data, frequency and percentage for the categorical data. We then applied Generalized Estimating Equation (GEE) to determine magnitude of potential effects of stress on students' academic achievement. The following quantities were used to build the GEE model. Type of model: Population Average Generalized Estimating Equation (PA-GEE); Link function: Identity (Gaussian distribution); Correlation structure: Independent; and the panel variable were the student's classes [7]. The results are reported with mean difference, 95%CI, and a statistical significant level was set at 0.05.

3. RESULTS

Of 300 students invited to participate, 286 of them joined in the study (response rate of 95.33%). Among these, 141 (49.3%) were female, their ages ranged from 18 to 22 years, with a mean of 19.57 years (SD=0.66). One hundred and forty one students (49.3%) were in the first year, and 145 students (50.7%) were in the second year. Other demographic characteristics of the study sample were presented in table 2.

Regarding morbidity of stress, our data indicated that the mean of stress was 7.12 (SD=2.91). There was no difference of stress between male and female students, and those in different ethnic groups. The prevalence of moderate to extremely severe stress was 19.4% (95%CI: 14.82% to 23.98%) (Table 3).

For the effects of stress on students' academic achievement, results of GEE analysis indicated that normal to moderate stress was positively associated with students' GPA (mean difference: 0.276; 95%CI: 0.021 to 0.530, p=0.034) (Table 4). In opposition, severe to extremely severe level of stress was found to effect negatively on students' GPA in comparison to those perceiving mild stress (mean difference: -1.133; 95%CI: -1.58 to -0.684; p<0.001) (Table 4). Furthermore, results of multivariate analysis using GEE revealed that the severe to extremely severe stress was found to be significantly associated with reduction of students' GPA while controlling for potential demographic covariates (mean difference: -0.838; 95%CI: -1.255 to -0.421; p<0.001) (Table 5).

Table 2. Characteristics of the study sample (n=286)

Characteristics	n	%
Ages (Mean, SD)	286	19.57 ± 0.66
Gender		
Male	145	50.7
Female	141	49.3
Years of study		
Year 1	141	49.3
Year 2	145	50.7
Ethnic groups		
Minority	4	1.4
Majority	282	98.6
Residences		
Urban	66	23.1
Rural	195	68.2
Remote	25	8.7
Internet accessibility		
No	84	29.4
Yes	202	70.6
Financial difficulty		
No	263	91.96
Yes	23	8.04
Part-time job		
No	257	89.9
Yes	29	10.1

Note: SD=standard deviation.

Table 3. Descriptive statistics of DASS21-stress (n=402)

Severity	DASS21-Stress		
	n	%	Cumulative %
Mean, SD	286	7.29	2.98
Normal	146	51.05	51.05
Mild	77	26.92	77.97
Moderate	50	17.48	95.45
Severe	13	4.55	100

Note: SD=standard deviation, DASS21=Depression, Anxiety, and Stress Scales 21 items

Table 4. Univariate analysis using GEE for assessing the effects of stress on GPA (n=286)

Variables	General Point Average (GPA)			
	Mean dif.	95%CI		p-value
Stress (total)	0.003	-0.037	0.031	0.859
Mild	0.098	-0.121	0.317	0.381
Moderate	**0.230**	**0.021**	**0.530**	**0.034**
Severe	**-1.133**	**-1.580**	**-0.684**	**<0.001**
Age	**-0.159**	**-0.305**	**-0.014**	**0.032**
Gender				
Female	Reference			
Male	**-0.426**	**-0.614**	**-0.237**	**<0.001**
Ethnic groups				
Majority	Reference			
Minority	-0.771	-1.595	0.053	0.067
Residences				
Urban area	Reference			
Rural area	-0.675	-0.276	0.141	0.526
Remote area	-0.115	-0.459	0.229	0.514
Internet accessibility	Reference			
No	**-0.379**	**-0.588**	**-0.171**	**<0.001**
Yes				
Financial difficulty	Reference			
No	-0.136	-0.493	0.222	0.457
Yes				
Part-time job				
No	Reference			
Yes	-0.298	-0.619	0.023	0.069
NMCAT	**0.109**	**0.056**	**0.163**	**<0.001**

Notes: 95%CI=95 percent confident interval, NMCAT=National Medical College Admission Test Scores, Mean dif. = Mean difference (average different score of GPA given one score change in independent variables)

Table 5. Multivariate analysis using GEE for assessing the effects of stress on GPA (n=286)

Variables	Mean dif.	95%CI		p-value
Stress				
Normal	Reference			
Moderate	0.203	-0.023	0.428	0.078
Severe	**-0.838**	**-1.255**	**-0.421**	**<0.001**
Gender				
Female	Reference			
Male	**-0.371**	**-0.547**	**-0.195**	**<0.001**
Ethnic groups				
Majority	Reference			
Minority	-0.222	-0.971	0.527	0.562
Internet accessibility				
Yes	Reference			
No	**-0.321**	**-0.515**	**-0.127**	**0.001**
NMCAT	**0.126**	**0.075**	**0.177**	**<0.001**

Notes: GEE=Generalized Estimating Equation, 95%CI=95 percent confident interval, NMCAT=National Medical College Admission Test Scores, Mean dif. = Mean difference, GPA=General Points Average.

4. DISCUSSION

Data from the present study has shown that the prevalence of stress were high among preclinical medical students at Hue University of Medicine and Pharmacy. This condition was found to be comparable to those reported in other countries such as USA and Malaysia where the prevalence of stress hovered around 20% [2,3]. These findings indicated that medical students are the population at risk of stress. Thus, studying in medical schools has been found to have very high requirements and challenges from students, in terms of competition for admission, competitive learning environment, extremely academic workload, high parental expectation, and limited time and leisure [2,3]. In addition, the mission of the medical school is to train the knowledgeable, competent and professional physician for caring and promoting public health. However, these demands inadvertently put a huge pressure and challenges on students which may cause a high level of psychological distress [3].

Regarding the effects of stress on students' academic achievement, literatures suggest that the moderate to severe level of stress, in turn, can impair students learning motivation, and learning strategies [1,2]. As a consequence, this condition may reduce student's academic achievement, clinical performance, professionalism, and lifelong learning capability [2,3]. Data from our study supports this assumption. That is, those who perceived being severely affected by stress tended to achieve lower score for GPA (Table 4). In opposition, those who perceived mild to moderate stress tended to optimize their GPA in comparison to the severe stress ones. These findings revealed very important implications to authority and students at medical universities. Since, the studying in medical school is supposed to be highly challenging and pressure, a mild level of stress is unavoidable, evenly necessary for learning [1]. However, severe level of stress is assumed to cause serious consequences such as reducing academic achievement, clinical performance, and increasing severity of depression, suicide, and alcohol and drug abuse [8]. This implies that creation and implementation of programs for supporting students could play an important role in preventing distress arousal among medical students [3,8,9]. In addition, strengthening the coping skills to academic stressors for students could play the crucial role for improving students' mental well-being and academic achievement [3,4,8,10].

Although, a high prevalence of stress and its negative effect on students' academic achievement have been found, however, these findings may not be generalized to other student population in clinical rotation years or in other Vietnamese medical universities due to the restriction of participants in this study. In addition, stress as the subjective appraisal and highly contextual dependent, can be changeable overtime. For this reason, the cross-sectional survey is considered a rather weak design to investigate the causal relationships. We suggest that future longitudinal study applying multi-schools design and involving students from different years is necessary to draw the firm evidences for policy making.

5. CONCLUSIONS

We carried out a cross-sectional pilot study to determine the prevalence and severity of stress as well as its relationships to the academic achievement (GPA) among 286 preclinical students at Hue University of Medicine and Pharmacy. The results indicated that the prevalence of stress was rather high and comparable to those in other countries. We also found that the severe stress was significantly associated with lower score for students' academic achievement. These findings revealed the important implications for school authorities and medical students. That is supportive programs for helping students could play an important role in reducing morbidity of distress and improving academic achievement.

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