Original Article

STRESS AND DEPRESSION AMONG MEDICAL STUDENTS: A CROSS SECTIONAL STUDY AT A MEDICAL COLLEGE IN SAUDI ARABIA

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ABSTRACT

Objectives: To determine prevalence of stress among undergraduate medical students and to observe an association between stress and academic year, grades, regularity and physical problems.

Methodology: All 600 registered students at College of Medicine, King Saud University in years 1,2,3,4 and 5 were enrolled in the study, and asked to complete a stress inventory called Kessler10.

Results: There were 494 responses with the response rate of 83%. The prevalence of stress of all types was found among 57% and severe stress among 19.6% study subjects. There was highly statistically significant association between year of study and stress levels, ($p<0.0001$). The association between academic grades of study subjects and their stress levels is not statistically significant, as distribution of prevalence of stress is not significantly different across each of the four academic grades ($p=0.46$).The main source of stress found to be their studies (60.3%), followed by home environment (2.8%) and 36.9% of study population did not mention any source of stress.

Conclusion: High levels of psychosocial distress was found in our students during the initial three years of their course. It poses additional challenges for students' support services delivery which may require to address mental health problems along with common health strategies for our students.

KEY WORDS: Educational Achievements, Medical Student, Stress, Depression, Saudi Arabia.

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INTRODUCTION

Medical education is perceived as being stressful. It is characterized by many psychological changes in students. Medical students encounter multiple anxieties in transformation from insecure student to young knowledgeable physician. There is a growing concern about stress in medical training. Studies have observed that medical students experience a high incidence of personal distress during their undergraduate course. High levels of stress may have a negative effect on mastery of the academic curriculum. Stress, health and emotional problems increase during the period of undergraduate medical education. This can lead to mental distress and has a negative impact on cognitive functioning and learning.[1]

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In most medical schools, the environment itself is an all prevailing pressure providing an authoritarian and rigid system; one that encourages competition rather than cooperation between learners.[2] Studies suggest that mental health worsens after student begins medical school and remains poor throughout training. The majority of the studies on stress in medical education focus on the documentation of stress and information on the correlation of stress.[3-6] It is not just undergraduate study period which brings the stress but it may continue later in internship, postgraduate study period and later in physicians' practical life[7-9] and it may reach burnout level.[10] The estimated prevalence of emotional disturbance was found in different studies higher than in general population. In three British universities, the prevalence of stress was 31.2%,[11] in a Malaysian medical school 41.9%[12] and 61.4% is a Thai medical school.[13] Medical school stress is likely to predict later mental health problems, but students seldom seek help for their problems.[14] In a Swedish study, the prevalence of depressive symptoms among students was 12.9% and a total of 2.7% of students had made suicidal attempts.[1] It is important for medical educators to know the prevalence and causes of student distress, which not only affects his health, but also his academic achievement at different time points of their study period.

An extensive electronic internet based search failed to locate any study which shows the prevalence of stress in undergraduate medical students in Saudi Arabia. This study was carried out with the following objectives:

1. To determine the prevalence of self-perceived stress among under graduate medical students.
2. To observe an association between the levels of stress and study variables: (i) academic year (ii) academic grades (iii) regular to course and (iv) physical problems.

METHODOLOGY

Instrument: A wide range of different measures has been used to address stress and depressive symptomatology in medical students. It has been assessed with different tools like Beck's Depression Inventory,[12] General Health Questionnaire (GHQ)[11] and as well as well other common and less common instruments.[1,15]

The instrument Kessler10 Psychological Distress (K10) has been developed by Kessler and colleagues, which widely used in population-based epidemiologic studies to measure current (1-month) distress. It has been shown to be without substantial bias with respect to sex and educational level. It has been designed to measure the level of distress and severity associated with psychological symptoms in population surveys. It is being used widely, including in the World Health Organization World Mental Health Survey, and as a clinical outcome measure.[16-20] The K10 comprises 10 questions of the form, "how often in the past month did you feel ..." and offers specific symptoms such as "tired out for no good reason," "nervous", and "sad or depressed". The five possible responses range from "non of the time" to "all of the time" and are scored from 2 to 5; the items are assumed to obtain a total score. A score of less than 20 was considered not to represent a 'case' possibility of mental illness. A score of 20-24 was considered to present a mild stress, 25-29 was considered to present moderate stress and 30-50 was considered to represent as severe stress. These coding was used according to the instructions of the authors.[21] This K10 questionnaire is observed to have good psychometric properties with Cronbach's alpha of 0.8938 (95% Confidence Interval (C.I.): 0.8793-0.9072).

Study Sample: All the five-year male undergraduate students in the College of Medicine were asked to complete the K10 self-administered Arabic version questionnaires during the academic year 2006. Filled questionnaires were collected before one month of the examination period so as minimize the extra stress symptoms. Additional questions relating to academic achievement, source of stress, medical illness in past 4 weeks and how many days a student was not able to work were also collected. All students who participated in the study were informed about the objectives of the study and

information about the instrument was explained by well trained research assistants. The students were allowed to respond in their own time and privacy. The participation was entirely on voluntary basis. All students were guaranteed the confidentiality. The study was approved by research ethical committee.

Statistical Analysis: Data were entered in Microsoft Excel and analyzed using SPSS version 12.0 statistical software. Prevalence of an outcome variable along with 95% confidence interval was calculated. Pearson's chi-square test and odds ratio were used to observe and quantify an association between the categorical outcome and different study variables. Student's t-test for independent samples was used to compare the mean values of study variables in relation to stress. A p-value of < 0.05 was considered statistically significant. The outcome variable stress was categorized into dichotomous as stress (no/yes) by considering the three levels (mild, moderate and severe) of stress as presence of stress.

RESULTS

There were 494 responses from a total student population of approximately 600 with the response rate of 83%. The mean (± standard deviation) age of study sample was 21.4(± 1.9) years. The prevalence of stress of all types was found to be about 57% (95% Confidence Interval (C.I.): 52.6-61.4) and the severe stress prevalence was 19.6% (95% C.I.: 16.1-23.1) (Table-I). The distribution of study variables are given in Table-II.

The prevalence of stress was higher (74.2%) in first year of study followed by second year (69.8%), third year (48.6%), fourth year (30.4%) and 49% was observed in fifth year of the study. There is highly statistical significant association between the year of study subjects and the stress levels. As the year of study was increasing, the prevalence of stress was decreasing, which is statistically significant ($X^2 = 45.9$, $p < 0.0001$). The odds ratios 6.4(for 1st year), 5.2 (2nd year), 2.4 (3rd year) and 2.1 (5th year), when 4th year is considered as reference category also indicates highly statistically significant association. The odds of student having stress is higher in 1st and 2nd year, where as the odds are decreasing in 3rd and 5th year. (Table-III)

Table-I: Distribution of stress levels among medical students.

Not stressed	:	43.1%
Mild	:	21.5%
Moderate	:	15.8%
Severe	:	19.6%

Table-II: Distribution of variables of study sample

Variables	*Number (%)*
Academic level (n = 494)	
First year	120 (24.3)
Second year	106 (21.5)
Third year	148 (29.9)
Fourth year	69 (14)
Fifth year	51 (10.3)
Academic grades (n = 439)	
Excellent	224 (51)
Very good	111 (25.3)
Good	76 (17.3)
Poor	28 (6.4)
Regular to academic course(n = 480)	
Yes	432 (90)
No	48 (10)
Physical problems (n=450)	
No	267 (59.3)
Mild to moderate	158 (35.1)
Severe	25 (5.5)

The association between academic grades of study subjects and their stress levels is not statistically significant, as the distribution of prevalence of stress is not significantly different across each of the four academic grades ($X^2 = 2.57$, $p = 0.46$). There is no statistical significant association between the regularity (Yes/No) to the academic course and the stress levels of study subjects. The distribution of stress levels is not significantly different, being a student either regular or irregular to the academic course ($X^2 = 0.78$, $p = 0.37$). The corresponding odds ratios also show non significant association. But the prevalence of physical problems is statistically significantly associated with the stress levels ($X^2 = 19.78$, $p < 0.001$). The odds ratios 2.5 and 2.0 shows the odds of getting

into stress is higher with mild to moderate and severe physical problems when compared with no physical problems (Table-IV). The mean number of days unable to work(9.5 days) was higher in subjects who had stress, when compared with the subjects with no stress (2.3 days) which is statistically significant (t = 9.75, p< 0.0001). The mean number of days cut down (10.7 days) was higher in subjects, who had stress, when compared with subjects with no stress (5.2 days) which is statistically significant (t = 5.3, p<0.0001).

The main source of stress stated by the study subjects was their studies (60.3%), followed by home environment (2.8%) and 36.9% of study population did not mention any source of stress.

DISCUSSION

A descriptive self administered questionnaire based study got a response rate of 83%, which provides an adequate sample size to fulfill the objectives of this study. The results of this study indicates higher prevalence of stress in our undergraduate medical students. The level of stress or depression varied between stages of education. This increased level of stress indicates a decrease of psychological health in our students which may impair students' behaviour, diminish learning, and, ultimately, affect patient care. Overall prevalence of stress in this study is 57% which is similar to the Thai study; 61.4%[13] but higher than Malaysian; 41.9%[12] and British study;31.2%.[11] The increase in stress level in fifth year is expected as it is the clinical teaching where students are loaded with clinical schedules at the hospital.

Table-III: Association of stress and year of study

Year of study *	*Stress No. (%)*		*Odds ratio (OR)*	*95% CI's of OR*
	No	*Yes*		
First year	31 (25.8)	89 (74.2)	6.4	3.2-13.1
Second year	32 (30.2)	74 (69.8)	5.2	2.5-10.6
Third year	76 (51.4)	72 (48.6)	2.4	1.2-4.5
Fourth year#	47 (69.6)	21 (30.4)	1.0	-
Fifth year	26 (51)	25 (49)	2.1	0.9-4.9

* $X^2 = 46.99$, $p < 0.00001$, # reference group

An interesting finding of this study is that the level of stress decreases as the year of study is increasing. This is contradicting to the finding of a study where the level of stress increased progressively during the course, to as much high as 40% by the end of the clinical training period.[22] Other studies also suggest that mental health worsens after students are admitted to medical school and remains poor throughout the training[23] especially in the transition from basic science teaching to clinical training.[24] Only one study goes in line with our finding that, students found medical course stressful during the first year but not in subsequent years.[25] Our finding could be explained by many factors. Our students may be able to develop coping mechanism with the help of our students support system. Other factor could be that our education is free and a small amount of monthly stipend given to each student during their under graduate course. In many different foreign schools students are plagued by financial worries, which is an important cause of their stress[3,26] which is not the case in our

Table-IV: Association between stress and study variables (academic grades, regular to academic course and physical problems)

Study Variables	*Stress No. (%)*		*Odds ratio (OR)*	*95% CI's of OR*
	No	*Yes*		
Academic grade (n = 439)*				
Excellent	91 (40.6)	133 (59.4)	1.23	0.5-3.1
Very Good	54 (48.6)	57 (51.4)	1.7	0.7-4.4
Good	32 (42.1)	44 (57.9)	1.3	0.5-3.5
Poor	10 (35.7)	18 (64.3)	1.0	--
*Regular to academic course (n=480)**				
Yes	187 (43.3)	245 (56.7)	1.39	0.7-2.7
No	17 (35.4)	31 (64.6)	1.0	--
*Physical problems (n = 450)****				
No	130 (48.7)	137 (51.3)	1.0	--
Mild to moderate	43 (27.2)	115 (72.8)	2.5	1.6-3.9
Severe	8 (32)	17 (68)	2.0	0.8-5.3

X2 - Value	P- value
* 2.57	0.46
** 0.78	0.37
*** 19.78	<0.0001

college, as it is funded by the Government agency(Ministry of Higher Education).

This study did not show any association of stress with academic grades and being regular to courses. But stress is found to be significantly associated with physical problems. It is difficult to understand and could not be answered from this study, whether stress is causing physical problems or vice versa.

The negative effects of long and tiring medical education on the psychological status of students have been shown in several studies. A study from UK showed that one third of psychiatrically ill students did not graduate from the college.[27] The changes appear to be significant during the first year. Therefore with early identification and with effective psychological services, possible future illness may be prevented. Besides educational demands, social and friendship-related factors are reasons for psychological disturbance in our students. Our data suggest that first and second year students who have the higher level of stress should be supported well by student support system as they may be able to cope up with the stress properly in later years and at higher level of education. It is also important to target prevention strategies at the students who have mild or moderate level of psychological stress in order to prevent the development of more serious conditions.

Wellness and mental health programmes are needed to help students to make smooth transitions between different learning environments with changing learning demands and a growing burden. Medical schools in the United States and Canada have initiated health promotion programmes and have reported positives results in reducing the negative effects of stress upon medical students' health and academic performance.[28-30]

Our students must be taught to look for any cardinal signs and symptoms of stress such as recent weight change, sleeping and concentration difficulties, depression, or increasing cigarette smoking and so forth. If such signs and symptoms are present, they should seek medical advice. On the other hand, a minimal amount of stress is necessary to add spice to one's life. An element of stress is involved with growth and is essential for sound personal functioning.

Limitations of the study: We acknowledge that this is a cross-sectional study with sample drawn from only male students as our college regulation has different system for male and female students. It could be considered as one of the limitation of this study. But other studies showed that gender differences in specific stress symptoms and overall prevalence or mean scores of stress were not much and did not turn out to be a significant factor in stress reporting.[11,20,22] Furthermore, the findings of this study are based on self reported information provided by students and some potential for reporting bias may have occurred because of respondents' interpretation of the questions or desire to report their emotions in a certain way or simply because of inaccuracies of responses. Low response was evident in 4th and 5th year students as they were occupied with clinical works. A prospective study could be carried out with a cohort of all five year students to look at the different levels of stress.

CONCLUSIONS

This study presents empirical evidence regarding the psychological health of students in our college. These findings suggest that high levels of psychosocial distress exists in our students during the initial three years of their course, and pose additional challenges for students' support services delivery. This suggests that when students are taken into colleges, special care has to be taken to find out obvious psychiatric problems or just psychological distress in them. The major finding is that psychological distress in students is more common than population based estimates; therefore, it may require to address mental health problems along with common health strategies for our students.

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