

Perceived stress among male medical students in Egypt and Saudi Arabia: effect of sociodemographic factors

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BACKGROUND AND OBJECTIVES: In Arab countries, epidemiological data about psychological morbidity among medical undergraduate students are scarce. This study sought to determine whether there was a difference in perceived stress levels of male medical students at Mansoura University, Egypt, compared with male medical students at King Faisal University, Saudi Arabia.

METHODS: The sample consisted of 304 male medical students in Egypt and 284 male medical students in Saudi Arabia. The self-reported questionnaire covered four categories, including 15 items, on sources of stress (stressors). The perceived stress scale and hospital anxiety and depression scale were used to measure stress, anxiety and depression.

RESULTS: There was no significant difference between the two groups in number of stressors. However, Egyptian students were more likely to cite relationship, academic and environmental problems than Saudis. The prevalence of high stress was nearly equal in both groups. However, anxiety and depression were significantly higher among Egyptian than Saudi students. A logistic regression analysis of independent predictors of severe stress among both groups combined revealed that a satisfactory family income and university-graduated father were independent protective factors. The independent risk predictors were anxiety and number of stressors.

CONCLUSIONS: Stress, anxiety and depression are frequent among medical students. Counseling and preventive mental health services should be an integral part of the routine clinical facilities caring for medical students.

Stress, health concerns and emotional problems among medical students has been the subject of recent research.¹⁻⁴ Perceived stress is associated with increased levels of depression,^{2,3} drug abuse, relationship difficulties, anxiety and suicide.⁴ Moreover, tired, tense and anxious doctors will not provide as high a quality of care as do those who do not suffer from these conditions.⁵

Some studies suggest that most stress occurs during the transition from preclinical to clinical training.⁶ Others suggest higher levels of stress in first-year medical students due to the tremendous change in lifestyle,^{6,7} or in the penultimate clinical year.⁸ Studies suggesting that medical students are vulnerable to mental health problems has generated increased concern in Western societies.⁹ In Arab countries, epidemiological data about psychological morbidity among

medical undergraduate students are scarce. Some recently performed studies suggest high rates of depression and anxiety.^{10,11} Egypt and Saudi Arabia share common life profiles, including language and religion, but are different in regard to cultural, historical and financial aspects of life. Thus, there is good reason to hypothesize that there would be a significant difference between the two samples in stress level, anxiety and depression and to propose that the Saudi sample might attain a lower mean score on perceived stress, anxiety and depression than their Egyptian counterparts. The aim of this study was to explore the differences between Egyptian and Saudi medical undergraduate students and to highlight the associated risk factors for perceived stress including the sociodemographic variables, physical and psychiatric symptomatology and personality profiles.

METHODS

This was a comparative study of medical students in Mansoura University, Egypt, and the College of Medicine in Al-Hassa, King Faisal University, Saudi Arabia, conducted simultaneously in both groups during October and December 2007. Completed questionnaires were collected one month before the first term examination period so as to minimize the extra stress symptoms. There are no research ethical committees at the moment in either university, but the study was approved by the faculty committee of both institutes. After obtaining this approval for data collection, the researchers introduced themselves to the students in each grade and informed them about the aim of the study and about guarantees of anonymity and confidentiality and the need for verbal consent. The students were allowed to respond on their own time and privately. The participation was entirely on a voluntary basis. Incomplete questionnaires were excluded. A total of 588 (304 Egyptian and 284 Saudi) completed questionnaires were analyzed.

Participants were given a packet with three Arabic instruments validated in previous studies.^{10,12,13} The first instrument enquired about sociodemographics and sources of stress during the past year.¹⁴ The second was Cohen's Perceived Stress Scale (PSS).¹⁵ The third instrument was the Hospital Anxiety and Depression Scale (HAD).¹⁶ Sources of stress included 15 items divided into 4 categories of potential sources of stress: 3 items representing relationship sources of stress, 5 representing personal sources of stress, 5 representing academic sources of stress and 2 representing environmental sources of stress. With respect to the research question "what are the greatest stressors in the last year," the time frame of 12 months was deliberately chosen based on the assumption that a 12-month period is long enough to obtain a reasonable estimate of variation in exposure to recent life events, and short enough to avoid inaccurate recall and perception of the events.¹⁴ Students were asked to enumerate the potential sources of stress they faced during their study. Fifteen items were developed from the responses given by students. These were categorized into the four categories of stress (relationship, personal, academic, and environmental stressors or conditions that they found were most stressful). Student responses were categorized by a psychiatrist and a psychologist working independently. The raters agreed upon 85% of the categorizations. Relationship sources result from interactions with other people, such as trouble with course mates, while personal sources result from internal sources such as personal injury or illness or death of a family member. Academic sources

arise from college-related activities such as the relationship with the instructor. Environmental sources result from problems in the environment outside the academics such as accommodation problems.

For the 14-item Cohen's perceived stress scale PSS, the Cronbach coefficient of internal consistency was reported to be 0.85, and test-retest reliability during a short retest interval (several days) was 0.85.¹⁵ The Arabic version was tested among a sample of US Arab immigrants.¹² The PSS does not tie appraisal to a particular situation; it is sensitive to the non-occurrence of events as well as to ongoing life circumstances. The stress score was stratified into no, mild, moderate (merged as low level) stress or severe (high level) stress according to first, second and third quartiles. On the HAD a score of 12 or more for either the anxiety or the depression components denotes possible anxiety or depression.¹⁶ This cut-off point had a sensitivity of 0.89 and a specificity of 0.75.¹⁷ The Arabic version of the HAD scale was validated by El-Rufaie and Absood.¹³ The overall Cronbach alpha measures of internal consistency were 0.7836 and 0.8760 for anxiety and depression, respectively.

In the College of Medicine in Al-Hassa, the total number of registered male students in 2007 was 361, and all were selected for this study. The questionnaire was distributed to 348 regular course attendants. We received 284 completed questionnaires (response rate, 81.6%). An equal number of Egyptian students were targeted. The total number of registered students in Mansoura College of Medicine was 6843, and 3893 (56.9%) were males. A systematic random sample of 389 were selected (every 10th male student from each academic year) and the questionnaire was distributed to them. The response rate for completed questionnaires was 78.1% (304 students).

We analyzed data using SPSS (Statistical Package for Social Sciences) version 11. For quantitative data, the unpaired t test was used for group comparisons. For categorical data, the chi-square test was used for comparison between groups. Significant factors predicting a high stress level on bivariate analysis were entered into multivariate logistic regression analysis to find out the independent predictors of stress. The odds ratio and 95% confidence interval was calculated. A $P < .05$ was considered statistically significant.

RESULTS

Compared to Egyptian male students, the Saudi students were older, more likely to belong to urban families and subsequently live with their families during study, with satisfactory family income, large family size, less highly educated parents, more mothers who were

Table 1. Sociodemographics characteristics of Egyptian and Saudi male medical students.

Total	Egyptian n (%)	Saudi n (%)	Statistical test results (Egyptian vs. Saudi)
	304 (100)	284 (100)	
Age (mean±SD)	20.6±2.3	21.0±1.9	t=2.6, P=.009
Academic year			
First	52 (17.1)	52 (18.3)	$\chi^2=0.9$, P=.97
Second	58 (19.1)	56 (19.7)	
Third	69 (22.7)	58 (20.4)	
Fourth	49 (16.1)	50 (17.6)	
Fifth	41 (13.5)	35 (12.3)	
Sixth	35 (11.5)	33 (11.6)	
Family residence			
Urban	173 (56.9)	227 (79.9)	$\chi^2=0.358$, P=.000
Rural	131 (43.1)	57 (20.1)	
Residence during study			
With family	245 (80.6)	270 (95.1)	$\chi^2=28.3$, P=.0001
Away from the family	59 (19.4)	14 (4.9)	
Family income			
Unsatisfactory	61 (20.1)	22 (7.7)	$\chi^2=18.4$, P<.001
Satisfactory	243 (79.9)	262 (92.3)	
Family size			
Up to 5	191 (62.8)	19 (6.7)	$\chi^2=0.2015$, P=.0001
6 and more	131 (37.2)	265 (93.3)	
Father's education			
< Secondary	44 (14.5)	134 (47.2)	$\chi^2=76.2$, P=.000
Secondary	54 (17.8)	40 (14.1)	
> Secondary	206 (67.8)	110 (38.7)	
Father's occupation			
Farmer/manual workers	61 (20.1)	47 (16.5)	$\chi^2=68.8$, P=.0001
Professional/semi-professional	218 (71.7)	134 (47.2)	
Trades/business/others	25 (8.2)	103 (36.3)	
Mother's education			
< Secondary	77 (25.3)	168 (59.2)	$\chi^2=72.2$, P=.0001
Secondary	54 (17.8)	39 (13.7)	
> Secondary	173 (56.9)	77 (27.1)	
Mother's occupation			
Housewife	149 (49.0)	225 (79.2)	$\chi^2=57.9$, P=.0001
Work outside home	155 (51.0)	59 (20.8)	

Table 2. Stressful factors and circumstances reported by male medical students.

	Egyptian n (%)	Saudi n (%)	Statistical test results (Egyptian vs. Saudi)
Stressors ^a			
Relationships	145 (47.7)	104 (36.6)	$\chi^2=7.4, P=.007$
Relationship problems with parents	67 (22.0)	42 (14.8)	$\chi^2=5.1, P=.02$
Problems with the opposite sex	62 (20.4)	41 (14.4)	$\chi^2=3.6, P=.06$
Trouble with coursemates	65 (21.4)	49 (17.3)	$\chi^2=1.6, P=.2$
Personal problems	201 (66.1)	184 (64.8)	$\chi^2=0.12, P=.74$
Personal illness or injury	66 (21.7)	53 (18.7)	$\chi^2=0.8, P=.36$
Death of a family member	14 (4.6)	12 (4.2)	$\chi^2=0.1, P=.8$
Change of a family member's health	60 (19.7)	42 (14.8)	$\chi^2=2.5, P=.11$
Financial problems	62 (20.4)	25 (8.8)	$\chi^2=15.7, P<.001$
Anxiety or depression	75 (24.7)	124 (43.7)	$\chi^2=23.7, P<.001$
Academic problems	277 (91.1)	112 (39.4)	$\chi^2=62.7, P=.000$
Congested classrooms	217 (71.4)	14 (4.9)	$\chi^2=271.8, P<.001$
Excessive workload	44 (14.5)	68 (23.9)	$\chi^2=8.5, P=.003$
Inconsiderate and insensitive instructors	99 (32.6)	111 (39.1)	$\chi^2=2.7, P=.1$
Fear of future	81 (26.6)	33 (11.6)	$\chi^2=21.2, P<.001$
Environmental problems	74 (24.3)	43 (15.1)	$\chi^2=7.8, P=.005$
Accommodation problems ^b	58 (19.1)	34 (12.0)	$\chi^2=5.6, P=.018$
Close contact with serious diseases and illness	35 (11.5)	9 (3.2)	$\chi^2=14.8, P<.001$
Limited time for recreational and social activities	76 (25.0)	10 (3.5)	$\chi^2=54.2, P<.001$
Number of stressors (mean \pm SD, minimum-maximum)	3.1 \pm 2.2, 0-11	2.9 \pm 2.2, 0-11	t=0.8, P=.4

^aCategories are not mutually exclusive. ^be.g., overcrowded accommodation, noisy living environment, transportation problems.

housewives and less professional/semi-professional fathers (Table 1). The majority of students reported one or more stressors (94.7% in Egyptian vs. 92.3% in Saudis). There was no significant difference between the two groups in number of stressors (Table 2). However, Egyptian students were more likely to cite relationship, academic and environmental problems than Saudi students. The most common items in Egyptian students were congested classrooms (71.4%), inconsiderate and insensitive instructors (32.6%), fear of the future (26.6%), limited time for recreational activities (25%), and anxiety and depression (24.7%). The prevalence of high stress level was nearly equal in both groups. However, anxiety and depression were significantly higher among Egyptian than Saudi students (Table 3).

A logistic regression analysis of independent predictors of a severe degree of stress among both groups

combined revealed that satisfactory family income and a highly educated father were independent protective factors (odds ratio=0.5 and 0.6, respectively). On the other hand, the independent risk predictors were anxiety (odds ratio=2.3) and number of stressors (odds ratio=1.3) (Table 4).

DISCUSSION

The young student population has always been vulnerable to stressful life conditions, especially in pursuit of higher professional education in a highly competitive environment.¹⁸ Compared to Egyptian students, the Saudis had a higher socioeconomic status and belonged to middle and upper classes, as measured by the family income, education and occupation of the parents. The students did not mirror the socioeconomic makeup of the society from which they came; instead, they came

Table 3. Stress, anxiety, depression and distress among male medical students.

	Egyptian n (%)	Saudi n (%)	Statistical test results
High stress level	94 (30.9)	82 (28.9)	$\chi^2=0.3, P=.6$
Anxiety	118 (38.8)	44 (15.5)	$\chi^2=40.0, P<.001$
Depression	81 (26.6)	46 (16.2)	$\chi^2=9.5, P=.002$

Table 4. Logistic regression analysis of significant independent predictors of severe stress among Egyptian and Saudi male medical students.

Predictor	β	P	Odds ratio (95% CI)
Satisfactory family income	-0.66	.01	0.52 (0.3-0.9)
Anxiety	0.82	<.001	2.3 (1.5-3.4)
University-graduated father	-0.5	.043	0.6 (0.4-0.99)
Number of stressors (continuous)	0.2	<.001	1.3 (1.2-1.4)
Constant		-1.1	
Model χ^2		68.9, P<.001	
% correctly predicted		72.3	

from an elite background of higher socioeconomic status than the general population. It is undeniable that enrollment in higher education in Arab countries is biased toward richer social groups. The chances of children of the poor reaching higher education are constricted by the high cost of the pre-university schooling phase to begin with and the need to obtain high grades in general examinations to qualify for higher education, especially in prestigious tracks such as medicine.¹⁹

Although there is no difference in the number of stressors in both samples, they differ in the nature of these stressors. Relationship problems, academic problems, personal problems, and environmental problems in both groups were similar to what has been described in previous studies on medical students.²⁰⁻²³ Egyptian students were more likely to cite relationship, academic and environmental problems than Saudi counterparts, but there was no significant difference in personal problems. These findings were in keeping with recent studies by Amr et al¹⁰ in Egypt and Abdulghani¹¹ in Saudi Arabia. Issues related to health and dying were common universal stressors reported in students in health care profession.²² The top four stressors in Egyptian students identified in this study were congested classrooms, troubles with the instructors, fear of the future and limited time for recreational activities, all of which lie in the academic domain.

In Egypt, the current education policy allows an increasing number of admitted medical students depend-

ing on the total marks alone conducted by the coordination office,²⁴ and this may account for the crammed classrooms. The problem of poor relationships with teachers appears to be quite widespread in the health professions. Student nurses and medical students regularly mention this stressor²⁵ and it has been reported that the culture of maltreatment of medical students is deeply ingrained in medical education, associated with the false belief by teachers that it helps students learn.²⁶ The academic problems encountered by Egyptian students could be explained by the large number of students that an Egyptian lecturer has to deal with in crammed classrooms, the increased work load, the bad working environment and traditional teaching methods.

The importance of the perceived financial situation is evident in our study. Although students of both groups belonged to middle and upper social classes and medical education is free in both colleges, financial difficulties were reported by about a fifth of Egyptian students compared to less than 9% of Saudis. The latter group receives a monthly stipend and may be eligible for financial support. In contrast, Egyptian families shoulder a variety of expenses such as fees, cost of books and equipment and sometimes private tuition.¹⁸

The overall high stress rate of 30.9% and 28.9% in Egyptian and Saudi samples, respectively, with no significant difference, is comparable to other studies using different distress measures in both developed and developing countries.^{27,28} However, a much higher rate (49.9%) was observed in Singapore.²¹

The results of this study indicate a significantly higher prevalence of anxiety and depression in undergraduate Egyptian than Saudi students. These findings may be explained by expanding in medical knowledge that puts pressure on the limited resources of colleges that have a traditional educational program. Therefore, these students experience more anxiety about a possible lack of proper training and skills.²⁹ Second, financial hardships after graduation are likely due to a low salary, which is reflected on their social and family life.

The logistic regression analysis of independent predictors of high levels of stress among both groups revealed that satisfactory family income and a highly educated father were independent protective factors. On the other hand, the independent risk factors were anxiety and the number of stressors.

A meta-analysis of 40 studies on psychological distress among U.S. and Canadian medical students explored the relationship between level of perceived stress and student anxiety.³⁰ Perceptions of stress were found not only to correlate with depression and anxiety,^{31,32} but also to predict the future risk of depression.³³ Okasha et

al³⁴ concluded that most cases of anxiety among Egyptian college students were reactions to either maturational or environmental stresses rather than endogenous factors. Although stress may cause physical and psychiatric (depression and anxiety) symptoms it is possible that elevated stress may cause these symptoms or a third factor (socioeconomic status, for example) influences both stress and health.¹⁵ Because the data in the present study were cross-sectional, the direction of any association between stress and different physical and mental predictors cannot be determined. Moreover, in research by Misra and McKean³⁵ that investigated the interrelationship among independent predictors of stress in undergraduate university students, it was hypothesized that academic stress would show a positive correlation with anxiety.³⁶ Cohen and Williamson³⁷ added that stress as measured by the PSS would be moderately correlated with the number of stressors.

The limitations of this study are that the findings are based on self-reported information provided by students and thus 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. In addition, the study took place at only two colleges, which will affect the generalizability to other institutions. The study was limited to male medical students and did not not

address females. In Saudi Arabia, male and female students are educated separately in accordance with Islamic rules. Furthermore, other studies showed that gender differences in specific stress symptoms and overall prevalence or mean scores of stress were small and were not a significant factor in stress reporting.^{1,38} The study did not take into account faculty characteristics or teaching styles, which could have an effect on student's perceived stress levels.

As a result of our findings, we recommend that counseling and preventive mental health services should be an integral part of the routine clinical facilities caring for medical students to help them to cope with the increasing demands of medical education. Prospective studies of the effects of stress on practicing doctors are needed to further explore the possible delayed effects of medical school stress.

These results raise a number of issues that need to be addressed in future studies such as course design, early detection, students' support and services, students' awareness about stress and transition, and training workshops for students and staff development. More studies need to be conducted at a multi-center level using more informative sociodemographic, psychosocial, and institutional variables in order to dissect the national from the institutional variances. Such replications are needed to confirm the present findings and to enlighten corrective interventions.

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