

Perceived stress and associated factors among medical students

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ABSTRACT

Background: Stress and its psychological manifestations are currently a major source of concern. Medical education poses challenging and potentially threatening demands for students throughout the world. **Objectives:** To determine the prevalence and factors associated with perceived stress in medical students in the College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, King Fahad Medical City, Riyadh, Saudi Arabia. **Materials and Methods:** This was a cross-sectional study on all medical students of batches 9, 10, and 11, which constituted all the enrolled students. Data were collected using a questionnaire based on the Kessler-10 psychological distress instrument with a total score ranging from 10 to 50 points in addition to some sociodemographic characteristics. Appropriate statistical test procedures were used to study the magnitude of stress and its risk factors. **Results:** Mean stress score of the eighty participants was 26.03 ± 9.7 . Students with severe stress constituted 33.8%, and 30% were well. Severe stress was significantly associated with female gender and junior level. Nervousness, feeling hopeless, feeling restless, and depressed were the most important factors affecting students' stress scores. Factor analysis revealed three hidden factors for stress in this group, namely, depression, nervousness, and age. **Conclusion:** Stress in medical students is prevalent and significantly associated with the female gender and the junior level. Implementation of coping programs is necessary.

Key words: Factors, medical students, Riyadh, stress

INTRODUCTION

The university environment is very different and more challenging than general schooling since responsibilities in universities are different and more demanding than that of high school level. Parent involvement is reduced, and students may live away from families in dormitories and may have added responsibilities. These factors appear to be stress generating, particularly at the start of the course.^[1,2] There is increased attention to the health and well-being of students at institutions of higher learning as they represent

the future of families, communities, and countries. Of the students in institutes of higher education, medical students appear to have more emotional challenges, physical and psychosocial hazards, and mood disorders as they progress and think of their future and professional goals.^[3-5]

A systematic review of 40 studies concluded that the overall psychological distress and prevalence rates of depression and anxiety in medical students are higher than nonmedical students or age-matched peers from the general population.^[6] In the Arab world, studies on medical

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students have reported similar high levels of perceived psychological stress and depression related to internal and external variables, which accord with results reported in the international literature.^{17,81} The excessive amount of stress in medical training may lead to negative consequences such as diminished attention and concentration, increased incidence of errors, negligence, absenteeism, self-medication, and cheating during examinations.¹⁹¹ Medical education has been reported throughout the world as one of the most stressful academic curricula, which negatively affects the physical and mental health of medical students. Fear of examinations, high parental expectation, peer pressure, lack of leisure time, financial problems, relationship disharmony, and aspirations of higher studies are some of the many factors known to contribute to the development of stress in undergraduate medical students.^{110,111} This study aimed at assessing the perceived level of stress in medical students in the College of Medicine, King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS), King Fahad Medical City. These were graduate students with bachelor's degrees in allied health professions such as pharmacy, laboratory, radiology, physical therapy, and rehabilitation. Their educational background was different from their colleagues in the main university who were from secondary schools.

The objectives of this study was to determine the prevalence and level of perceived stress among medical students, and to identify risk factors associated with perceived stress.

MATERIALS AND METHODS

This cross-sectional study was conducted among all Applied Medical Sciences or science college bachelor program students using an anonymous self-administered questionnaire. Batches 9 and 10 had male students only (15 and 18 students respectively) while batch 11 had both males and females (14 males and 23 females). Batches 9, 10, and 11 were labeled as such by the KSAU-HS according to the year of admission. The study tool was Kessler10 (K10) psychological distress instrument,¹¹² which is widely used in population-based epidemiological studies to measure current (1-month) distress. It had been translated into different languages including Arabic. Its aim was to measure the level of stress and severity associated with psychological symptoms in population surveys. It consisted of ten questions in the form of "how often in the past month did you feel..." and offers specific symptoms, such as "tired for no good reason," "nervous," and "sad or depressed." The five possible responses for each question ranged from "never" to 'all of the time' and were scored from 1 to 5, respectively. A total score was calculated and the level of stress determined accordingly. A total score of <20 denotes

no stress, a score of 20–24 represents mild stress, 25–29 represents moderate stress, and 30–50 represented severe stress. Questions related to basic demographics of the study participants such as age, gender, and grade point average were added to K10 tool. The questionnaire was pilot tested before final administration.

The study was approved by the Scientific Research Committee of the College of Medicine, KFMC and ethically approved by the Institution Review Board of KFMC. Consent for participation was obtained from all participants.

All collected data were entered and analyzed using SPSS Version 22 (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). Quantitative variables were expressed as means and its related standard deviations while qualitative variables were presented in the form of frequency and percentages. Logistic regression analysis was done for severely stressed students versus others as a dependent variable with each of age, gender, Bachelor of Allied Health Sciences versus others, and living with parents versus others. Factor analysis techniques with varimax rotation with Kaiser Normalization and scree plot criteria were used to discover hidden factors for stress. Level of significance was set at 0.05 throughout the study.

RESULTS

Of 94 students, 80 (85.1%) completed the questionnaire giving a response rate of 85.1%. Their mean age was 25.9 ± 1.5 years. The mean age for males (26.3 ± 0.3 years) was slightly higher than that of females (25.3 ± 1.4 years). Fifty-five of the sample (68.8%) were males. The majority (46.3%) of the students were from batch 11 and 75% held a BSc from Applied Medical Sciences. About 51.2% of the students had been employed before enrolling in the college; 51.2% lived with their parents [Table 1]. Only 5.9% were not satisfied with their work in the course; 15% rated the quality of education in the college as unsatisfactory while 47.5% rated it as satisfactory. One student described his physical health as poor while 10% students suffered from chronic diseases. Besides, 35% of the students had considered leaving the university at least once [Table 2]. Mean stress scores were 26.03 ± 9.7 with min 10 and max 50. Mean stress score was higher among females (26.9 ± 8.2) than males (25.6 ± 10.4) with no statistical significance. According to Kessler psychological distress scale (K 10), 30% students could be considered well, 18.8% as having a mild disorder, and 17.5% as having moderate disorder. The prevalence of severe stress was 33.8% among the participants, 40.7% of them belonged to the junior batch in the college (Batch 11), and 59.3% did not live with

Table 1: Demographic characteristics of study participants

Variable	Number	Percentage
Sex		
Male	55	68.8
Female	25	31.3
Batch		
9	15	18.8
10	18	35.0
11	37	46.3
Home town		
Riyadh	46	57.5
Other	34	42.5
Bachelor's degree		
Pharmacy	12	15
Applied medical sciences	60	75
Science	8	10
Employment before joining the college		
Yes	41	51.2
No	39	48.8
Living with		
Parents	33	41.3
Other family member	14	17.5
Friends	11	13.8
Alone	17	21.3
Others	5	6.3

Table 2: Students' perceptions of their health status and education environment

Variable	Number	Percentage
Satisfaction with the effort in the study		
Very satisfactory	10	12.5
Satisfactory	37	46.3
Not quite satisfactory	29	36.3
Unsatisfactory	4	5.0
Quality of education in King Fahad Medical City		
Very satisfactory	5	6.3
Satisfactory	33	41.2
Not quite satisfactory	30	37.5
Unsatisfactory	12	15
Physical health now		
Excellent	21	26.6
Very good	29	36.7
Good	23	29.1
Fair	5	6.3
Poor	1	1.3
Chronic diseases		
Yes	8	10
No	72	90
Thought of leaving the college		
Yes	28	35
No	36	45
Not sure	16	20

their parents. Table 3 shows that the feeling of nervousness, hopelessness, restlessness, and depression were the most important factors affecting students' stress scores. Since there were more of those who were likely to have severe disorder in the junior batch, a separate analysis was done for this batch and it showed that the only significant factor affecting stress was gender. One male (7.1%) was likely to have severe stress compared to 10 (43.5%) females ($P = 0.02$). Logistic regression analysis done for students with severe stress versus others and as dependent variables with each of age, gender, Bachelor of Allied Health Sciences versus others, and living with parents versus others showed that gender was the only significant predictor of stress in this study group ($P = 0.04$). Females were 11.8 times more at risk of developing stress than males [Table 4].

Factor analysis techniques with varimax rotation with Kaiser normalization and scree plot criteria revealed three hidden factors for this group, namely, depression, nervousness, and age [Figure 1].

DISCUSSION

The response rate of this study was more than 80%, which is comparable or even better than response rates reported in similar studies.^[13,14] The results of this study revealed that the mean stress score was 26.03 ± 9.7 (range from 10 to 50). This overall stress prevalence of just over 52% is lower than the 67% prevalence reported in a previous KSA study.^[15] Overall stress among medical students using K10 instrument ranged from 38% to 62% in many countries, which is higher than that of the general population.^[16,17] The highly individualized and competitive environment in medical schools generates stress which tends to continue even after graduation.^[18] The learning and recreational environment of medical education have to be more friendly to medical students to reduce their current levels of stress. In this study, females showed higher stress levels than males but the difference did not reach statistical significance. It is to be noted that females were only in batch 11, the junior batch. Females in this batch were significantly more stressed than males. The association of gender with stress levels in medical students has been addressed in many studies. Some studies have claimed that the gender differences in mean scores of stress were rare and not significant.^[19,20] Others found that males were more stressed than females, which as suggested by the authors might be because male students needed to have high scores and complete their courses within the shortest possible time to start their careers.^[21] The majority of studies, including the present study, found that females were much more stressed than males.^[15,16,22] The inconsistency of gender association with stress in

Table 3: Perception of stress factors by students during the past 4 weeks

Stress statements	All the time (5) N (%)	Most of the time (4) N (%)	Some of the time (3) N (%)	A little of the time (2) N (%)	None of the time (1) N (%)
In the past 4 weeks, about how often did you feel tired for no good reason?	4 (5)	14 (17.5)	32 (40)	24 (30)	6 (7.5)
In the past 4 weeks, about how often did you feel nervous?	6 (7.5)	16 (20)	23 (28.7)	25 (31.3)	10 (12.5)
In the past 4 weeks, about how often did you feel so nervous that nothing could calm you?	29 (36.2)	24 (30)	8 (10)	11 (13.8)	8 (10)
In the past 4 weeks, about how often did you feel hopeless?	23 (28.7)	25 (31.2)	20 (25)	7 (8.8)	5 (6.3)
In the past 4 weeks, about how often did you feel restless or fidgety?	14 (17.5)	21 (26.3)	21 (26.3)	19 (23.8)	5 (6.3)
In the past 4 weeks, about how often did you feel so restless you could not sit still?	25 (31.2)	24 (30)	14 (17.5)	11 (13.8)	6 (7.5)
In the past 4 weeks, about how often did you feel depressed?	17 (21.3)	19 (23.8)	22 (27.5)	15 (18.8)	7 (8.8)
In the past 4 weeks, about how often did you feel that everything was an effort?	14 (17.5)	18 (22.5)	20 (25)	18 (22.5)	10 (12.5)
In the past 4 weeks, about how often did you feel so sad that nothing could cheer you up?	27 (33.7)	22 (27.5)	16 (20)	11 (13.8)	4 (5)
In the past 4 weeks, about how often did you feel worthless?	41 (51.2)	13 (16.3)	11 (13.7)	9 (11.3)	6 (7.5)

Table 4: Logistic regression model to predict stress score from some important variables

Independent variables	β	SE of β	p-value	OR	95% CI for OR
BSc (allied medical sciences vs. others)	0.23	0.815	0.78	1.3	0.42-3.8
Living with parents	0.7	0.81	0.42	1.9	0.6-2.7
Gender	2.47	1.15	0.03	11.8	3.8-15.4
Constants	-6.5		0.33	0.001	

SE: Standard error; OR: Odds ratio; CI: Confidence interval

medical students may be related to differences in social and educational environment as well as subjectivity in measuring self-reported stress. Male and female students may have separate campuses with different educational and recreational facilities.^[15,16,23] Women are more likely to perceive challenging and threatening events as stressful than men as suggested by some authors.^[24] The stress level was higher in the new batch of students compared to those at the senior levels. This is in agreement with studies which found that stress appears much more profound in the first academic year and that the level of stress decreased as the years progressed.^[13-15] There have been similar results in which stress was found to be higher in first-year medical students (28%) than in second-year medical students (16%). This difference was explained by the fact that the second-year medical students gradually adapted to the new living environment and the medical course thus reducing their stress and burnout.^[25] Important causes of stress in new medical students included unsuitable teaching methods, an unsatisfactory study environment in college,

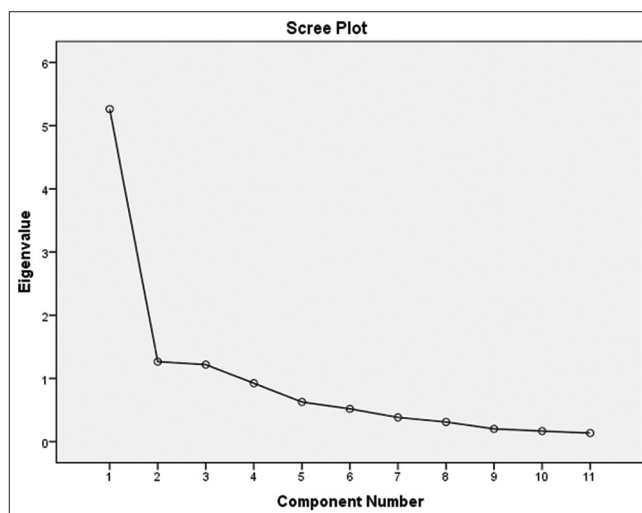


Figure 1: Scree plot for the extracted factors affecting stress among King Fahad Medical City students

fear of failure in examinations, and social problems. All of these results in perceived anxiety and depression, negative lifestyle practices, and the state of physical and mental health worsened from the start of their college studies.^[26] This is contradictory to the findings of studies reporting that the level of stress increased progressively during their education and training.^[7,20] Variations and inconsistencies may be due to differences in curricula, educational, and social environments. In this study, no significant differences in stress levels were detected according to the state of physical health as shown in other studies.^[27] This is at variance with studies that reported that stress was significantly associated with students' self-reported

physical problems.^[28-30] The subjectivity in reporting episodes of illness and the perception of the nature of the illness and behavior may partly explain the inconsistency. This study revealed no significant effect on the stress level of medical students who lived with their families, with friends, or on their own. This contradicts another study which found that medical students living with their families tended to have less stress and burnout levels than those living alone.^[31] Because of the cultural norm of close family ties, family members are generally supportive. However, they can also be a source of stress, especially in the case of students who have family problems, or who are married and/or with children, who may be struggling to balance family life and medical school training.^[30] The evaluation of the teaching and learning environment and the intention to discontinue studies were not significantly associated with stress levels. One would expect students who rated the educational environment poorly or were thinking of leaving the college to show higher stress levels. Medical students are trained to take care of the health of individual patients and populations. Unfortunately, their training is so physically and mentally demanding that it may have undesirable effects on their own physical, social, psychological, and mental health. As this study revealed worrying stress levels in medical students, much work is needed to reduce the prevalence of stress and promote good physical, psychological, and mental health. Some medical colleges implemented successful intervention strategies and programs to prevent or reduce stress among medical students.^[26,32-34] Those interventions and programs reduced stress, depression, and anxiety, increased spirituality and empathy, and made better use of positive coping skills among medical students. These interventions resulted in reducing the negative effects of stress on the health and academic performance of medical students. Much work is required to make the medical education environment more acceptable and engender less stress.

CONCLUSION AND RECOMMENDATIONS

The stress level in medical students particularly females and junior students is high. It is recommended that universities start conducting stress coping strategies courses and workshops for medical students. Provision of free professional services to help cope with stress and psychological support services are also highly recommended.

Limitation of the study

This was a cross-sectional study, so cause-effect relationships could not be established. Some students might have over- or under-reported their stress and stressful factors.

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Conflicts of interest

There are no conflicts of interest.

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