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Extracurricular activities associated with stress and burnout in preclinical medical students

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Stress

Abstract This study aims to assess the prevalence of stress and burnout among preclinical medical students in a private university in Beirut, Lebanon, and evaluate the association between extracurricular involvement and stress and burnout relief in preclinical medical students. A cross-sectional survey was conducted on a random sample of 165 preclinical medical students. Distress level was measured using the 12-item General Health Questionnaire (GHQ-12) while that of burnout was measured through the Maslach Burnout Inventory-Student Survey (MBI-SS). The MBI-SS assesses three interrelated dimensions: emotional exhaustion, cynicism, and academic efficacy. Extracurricular activities were divided into four categories: physical exercise, music, reading, and social activities. All selected participants responded. A substantial proportion of preclinical medical students suffered from stress (62%) and burnout (75%). Bivariate and multivariate regression analyses revealed that being a female or a 1st year medical student correlated with higher stress and burnout. Music-related activities were correlated with lower burnout. Social activities or living with parents were associated with lower academic efficacy. The high stress and burnout levels call for action. Addressing the studying conditions and attending to the psychological wellbeing of preclinical medical students are recommendations made in the study.

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1. Introduction

Medical education is a long emotionally taxing journey. Although most studies focus on medical residents and practicing physicians, stress and burnout arborize as early as the first year of medical school, proceed throughout residency, and surmount throughout the daily practice of physicians [1].

Stress is defined by Lazarus and Folkman [2] as “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”. Unlike stress which may be experienced in all life aspects, burnout is a work-related syndrome that is usually seen in occupations that require caring for others such as social work, teaching, and healthcare professions [3]. According to Maslach [4], burnout has three interrelated dimensions that include emotional exhaustion, depersonalization, and a diminished feeling of personal accomplishment. During the past decades, various studies on student burnout have been carried out [5–7]. These studies assessed “academic burnout” in students.

Stress and burnout progressively develop over the course of medical education. During both pre-clinical and clinical years, medical students are expected to take responsibilities of patients and learn an immense amount of facts and concepts with a limited amount of time and memory, which makes medical school a stressful environment. Studies on medical students have indicated the development of stress and burnout in the preclinical medical education and its progression into clinical years [8].

Medical students use different means for coping with stress and burnout. Strategies that focus on extracurricular activities tend to involve engagements such as problem solving, positive interpretation, reliance on social support, and expression of emotion, enabling students to respond in a manner that leads to adaptation [9]. As such, extracurricular activities may constitute a haven where students aim to utilize, and perhaps refine and develop, their interpersonal skills. Career counselors, student advisors, and recruiters commonly stress the importance of a student being well-rounded and the dangers of being perceived by recruiters as one dimensional or just “book smart” [9]. Furthermore, extracurricular activities can reduce anxiety, stress, and burnout and their effects on mental and physical health [8].

The number of studies tackling stress and burnout among medical students has been on the rise

in the past few years; however, most have focused on the clinical years rather than the preclinical years [10,11]. Furthermore, there are no studies that focus on the association between the involvement in extracurricular activities and relief of stress and burnout levels among preclinical medical students. Thus, this study aims to: (1) assess the prevalence of stress and burnout among preclinical medical students in a private university in Beirut, Lebanon; and (2) evaluate the association between extracurricular involvement and stress and burnout relief in the preclinical medical student.

2. Methods

2.1. Setting and population

The present study was conducted in the Faculty of Medicine at the American University of Beirut (AUB), a private university in Beirut, Lebanon. The Faculty of Medicine was established in 1867 by American missionaries in Lebanon and Syria who asked Dr. Daniel Bliss to withdraw from the evangelistic work of the mission in Lebanon to start a college of higher learning. The college would include a medical school and provide services in the realms of medical education, training, and healthcare to the constituencies of Lebanon and the Middle East region. Its foundational undergraduate medical program is the 4-year Doctor of Medicine (M.D.) program (Med I through Med IV). All applicants must hold a Bachelor’s degree and must have completed the premedical requirements as well as the Medical College Admission Test (MCAT). The structure of the curriculum is lecture-based, discipline-oriented, and imparts basic medical sciences in the first 2 years, followed by clinical disciplines in the last 2 years. The preclinical students of Med I and Med II were available to participate in this study.

2.2. Study design

A cross-sectional survey of Med I and Med II students was conducted in January 2015 using a 34-item self-administered questionnaire. The institutional review board of AUB approved the study. Each participant was provided with a consent form explaining the purpose of the study before filling in the questionnaire. A total of 205 preclinical medical undergraduates from Med I (105 students) and Med II (100 students) were approached. The students were asked to complete a set of questionnaires consisting of three parts, namely: demographic

information and participation in extracurricular activities, the 12-item General Health Questionnaire (GHQ-12), and the Maslach Burnout Inventory-Student Survey (MBI-SS).

2.3. Measure

2.3.1. Extracurricular activities

Extracurricular activities (or extra academic activities) are those that fall outside the realm of the normal curriculum of school or university education and performed by students. These activities are generally voluntary (as opposed to mandatory), nonpaying, social, and philanthropic (as opposed to scholastic).

A set of questions targeting the nature of extracurricular activity/activities performed was administered. Extracurricular activities were divided into four categories: (1) physical exercise, which included gym and sport-related activities; (2) music-related activities like playing an instrument, being in a choir or a band, or listening to music; (3) reading; and (4) social activities that covered political or religious involvement, university club involvement, community service, and volunteering.

2.3.2. Stress

One of the most widely used tools to measure stress levels is the GHQ-12 [12]. Various studies have demonstrated high internal consistency of this tool, with reliability coefficients ranging from 0.78 to 0.95 [12,13]. The GHQ-12 (English version) consists of 12 items, each one assessing the manifestations of stress over the past few weeks preceding the study using a 4-point Likert-type scale. Participants respond to each question by choosing from four typical responses: “not at all”, “no more than usual”, “rather more than usual”, and “much more than usual”. A binary scoring method is used to evaluate responses where replies are coded 0-0-1-1. This method assigns a score of zero to the two least symptomatic answers and a score of one to the two most symptomatic answers; thus, responses can only be scored as zero or one. As demonstrated in previous studies, a threshold of 2/3 on the GHQ-12 provided the best conservative estimate of psychiatric morbidity [12,13]. High scores indicate worse health.

2.3.3. Burnout

A brief self-report questionnaire, the MBI-SS, was developed to assess burnout among students [14]. The MBI-SS has been shown to have adequate reliability and factorial validity in Dutch, Spanish,

Portuguese, and Chinese students [14,15]. However, it has not been used in Lebanon before.

The MBI-SS includes three dimensions that constitute burnout: emotional exhaustion, which refers to severe fatigue caused by study demands, representing the basic individual stress component of the syndrome; cynicism, which refers to the student's mental distance from his/her studies or excessively detached responses to other students at an academic setting, representing the interpersonal component of burnout; and reduced academic efficacy, which refers to feelings of decline in one's competence and productivity and to a lowered sense of accomplishment, representing the self-evaluation component of burnout [16].

Emotional exhaustion was measured with five items (e.g., “I feel emotionally drained by my studies”). Cynicism was measured with four items (e.g., “I have become more cynical about the potential usefulness of my studies”). And academic efficacy was measured with six items (e.g., “In my opinion, I am a good student”). All items were scored on a seven-point frequency rating scale ranging from 0 (Never) to 6 (Always). High scores on emotional exhaustion, cynicism, and low scores on academic efficacy are indicative of burnout (academic efficacy items are reverse scored) [14].

2.4. Data collection

A random sample of 165 preclinical medical students (80 from Med I and 85 from Med II) participated in the survey. Participants were chosen by randomizer software after providing it with all the preclinical medical students' names and data. Selected students were given a copy of the written instructions and the objectives of the study. Students were also provided with a list of authorized institutions that provide psychological health services and hospitals/medical centers that have psychiatry departments in Beirut to increase the benefits of the study. Informed consent was taken from all the participants; however, written consent was waived to assure confidentiality of the information provided. Participants had an option of refusal to participate in the survey. The anonymous questionnaire was distributed on the 1st day after a Christmas vacation of 2 weeks and during breaks between lectures, and the researchers collected the completed questionnaires. The Med I class had finished two modules – “Cellular and Molecular Basis of Medicine” and “Clinical Anatomy” – prior to the Christmas vacation. The Med II class had finished five modules before the Christmas vacation consisting of “The Liver and

Gastrointestinal System”, “The Cardiovascular System”, “The Respiratory System”, “The Kidneys and Urinary System” and “The Skin”.

2.5. Data analysis

The data was analyzed using the IBM SPSS version 22.0 for Windows (SPSS Inc., Chicago, IL, USA). The scores for the GHQ-12 and the MBI-SS total and subscales were calculated. The number and percentage of stressed cases were calculated and reported by demographic variables. The Chi-square test and Pearson correlation were used to test the association between stress and burnout on one hand and demographics and extracurricular activities on the other hand. Logistic regression analyses were carried out to assess determinants of stress and burnout controlling for potential cofounders. As stress was considered dichotomous, GHQ-12 scores ≥ 3 indicated distress. We considered stress and burnout as the dependent variables, and demographic variables and extracurricular activities as the independent variables. Adjusted odds ratios (OR) and 95% confidence intervals (95% CI) were calculated. A p value < 0.05 was considered as statistically significant.

3. Results

The distribution of the preclinical medical students according to demographics and related variables is displayed in Table 1. The sample included a larger proportion of males (53.3%) with an overwhelming majority between 18 and 24 years of age (97.6%). The percentage of students that reported participating in extracurricular activities was 76% (125 students). According to the GHQ-12 and the total MBI-SS scores, 102 (61.8%) students were suffering from stress and 124 (75.2%) from burnout.

The bivariate analysis, presented in Table 2, showed that being a female was significantly associated with high emotional exhaustion, high total burnout, and high stress. Being in Med I was significantly associated with high cynicism, high total burnout, and high stress. Being in Med II was significantly associated with low academic efficacy. Being in a relationship was significantly correlated with high emotional exhaustion and living with relatives (e.g., parents) was significantly associated with low academic efficacy. Reading was significantly associated with high emotional exhaustion. Music-related activities were significantly correlated with low burnout but low academic efficacy.

Physical exercise was significantly associated with low stress. Social activities were significantly correlated to low academic efficacy but low cynicism.

Table 3 shows the results of the different regression models for the association between the different dimensions of burnout, total burnout, and total stress on the one hand, and the demographic and extracurricular variables on the other hand, that were statistically significant at the bivariate level ($p < 0.05$). Multivariate analysis showed that being a female was a significant determinant of high emotional exhaustion (OR = 4.02; 95% CI 1.34–12.08), high burnout (OR = 3.49, 95% CI 1.47–8.27), and high stress (OR = 2.24, 95% CI 1.07–4.66). Being in Med I was significantly associated with high cynicism (OR = 2.83, 95% CI 1.44–5.55), high burnout (OR = 2.76, 95% CI 1.21–6.33), and high stress (OR = 5.07, 95% CI 2.38–10.8). Living with parents/relatives (OR = 0.43; 95% CI 0.21–0.89) and participating in social activities (OR = 2.08, 95% CI 1.03–4.21) were both significantly correlated with low academic efficacy. Engaging in music-related activities was associated with low burnout (OR = 3.5, 95% CI 1.35–9.07).

4. Discussion

This study represents one of the first attempts to assess the magnitudes of stress and burnout among preclinical medical students in Lebanon and the first to analyze its association with extracurricular engagement.

The results of this study reveal worrisome rates of stress (62%) and burnout (75%) among preclinical medical students. The literature reports varying rates of stress among similar samples. Konjengbam et al. [17] and Sarikaya et al. [18] found the prevalence of stress among undergraduate medical students to be 28.4% and 25.6%, respectively, which is much lower than the stress rate presented in our study. By contrast, Sidik et al. [19] reported the prevalence of stress to be 57% among preclinical medical students, which is comparable to our 62%. The rate of burnout in our sample is much higher than others in the literature. A similar study in Spain measured burnout risk in preclinical medical students and showed that only 14.8% suffered from the syndrome [10]. Numerous studies note rates of burnout between 25% and 60% in a wide spectrum of health-related specialties [20,21]. A number of US based studies on burnout in medical students reported a prevalence ranging between 45% and 71% [11,22–28]. A number of factors contribute to these results. The American medical

Table 1 Sample profile ($N = 165$) defined by sex, age, year of medical school, involvement in extracurricular activities, relationship status, living arrangement, total stress and burnout scores.

Variables	Frequency	Percentage (%)
Sex		
Female	77	47
Male	88	53
Age		
18–24 y.o	161	98
≥25 y.o	4	2
Year of medical school		
Med 1	80	48
Med 2	85	52
Extracurricular activities		
Yes	125	76
No	40	24
Relationship status		
Single	131	79
In a relationship	34	21
Living arrangement		
Parents/relatives	111	67
Alone/other	54	33
GHQ-12 score		
Stress	102	62
No stress	63	38
MBI-SS score		
Burnout	124	75
No burnout	41	25

education system that confines all didactic courses in the basic sciences to the preclinical years is an important factor. In addition, most AUB medical students aim to apply for residency positions in the US. Given that most AUB graduates fall under the International Medical Graduates (IMG) category, extra work to achieve higher grades and getting involved in research and certain extracurricular activities to be able to impress residency program directors and compete with American medical graduates and other IMGs add up to cause higher stress and burnout.

Sex was a major indicator, with an increased risk of stress and burnout for females. The reason for this excess risk in females is not clear and the literature reports conflicting results, but some authors suggested that women are more likely to perceive challenging or threatening events as stressful compared to men [24].

Our results agree with Guthrie et al. [27] who showed that students of Med I had higher stress

and burnout rates than those of Med II. In another study in Nepal [29], similar results were also obtained where stress was found to be higher among 1st year medical students (28%) as compared to 2nd year medical students (16%). Sreeramreddy et al. [29] explain this difference by the better gradual adaptation of 2nd year medical students to the new living environment and the medical course that contribute to lesser stress and burnout.

Students who lived with their parents had a lower academic efficacy compared to those living alone. One can speculate that this fact is related to the increased time wasting away from studies that can result when you spend time in a family environment. This finding contradicts another discussed by Humphris et al. [30] who report those living with their families to be suffering from lower burnout than those living alone.

Our results showed that music-related activities were significantly correlated with better burnout outcomes. This conforms to a study by Canga et al. [31] who used live music to alleviate compassion fatigue and stress in a wide spectrum of health professionals. Music has been used since ancient times to enhance wellbeing, reduce pain and suffering, and distract patients from unpleasant symptoms [32]. Although there are wide variations in individual preferences, music appears to exert direct physiologic effects through the autonomic nervous system [33]. We believe that music-related activities may be a cost-effective and enjoyable strategy to improve empathy and compassion. They can create a positive milieu for preclinical medical students and have significant positive effects on mood in terms of anxiety, depression, and perceived stress [34].

Physical activity was shown to be associated with better stress outcomes on the bivariate level. De Moor et al. [35] showed that regular exercise is associated with lower levels of neuroticism, anxiety, and depression. Moreover, Broman-Fulks et al. [36] showed that both high and low intensity exercises tended to reduce anxiety sensitivity.

Our results show that social activities correlate with low academic efficacy; similar results have been reported by Van Dyk [37] and Akintola [38]. In one study, Ramos et al. [39] revealed that volunteering, which promotes solidarity, social responsibility, and a sense of community while disburdening the social welfare, was associated with burnout and stress. We believe that social activities, like volunteering, are energy and time-consuming, which might, in turn, negatively influence academic performance of preclinical medical

Table 2 Proportion of preclinical medical students with high stress (GHQ) and burnout scores in each of the domains by selected demographic and extracurricular related variables. EE, emotional exhaustion; Cyn, cynicism; AE, academic efficacy. * $p < 0.05$.

	High EE		High Cyn		Low AE		High burnout		High stress (GHQ \geq 3)	
	%	<i>p</i> -Value	%	<i>p</i> -Value	%	<i>p</i> -Value	%	<i>p</i> -Value	%	<i>p</i> -Value
Sex										
Male	76.1	0.002*	46.6	0.091	56.8	0.105	65.5	0.003*	53.4	0.017*
Female	93.5		59.7		44.2		85.7		71.4	
Age										
18–24 y.o.	84.5	0.608	52.8	0.912	50.9	0.971	75.0	1	61.5	0.583
\geq 25 y.o	75.0		50.0		50.0		75.0		75.0	
Year of medical school										
Med 1	85.0	0.796	66.2	0.001*	42.5	0.036*	83.5	0.015*	78.8	<0.001*
Med 2	83.5		40.0		58.8		67.1		45.9	
Relationship Status										
Single	80.2	0.005*	53.4	0.721	51.9	0.614	72.3	0.119	58.8	0.115
In a relationship	100.0		50.0		47.1		85.3		73.5	
Living Arrangement										
With relatives (Parents)	84.7	0.823	53.2	0.875	57.5	0.013*	76.4	0.565	63.1	0.637
Other (alone)	83.3		51.9		37.0		72.2		59.3	
Extracurricular activities										
Reading										
Yes	91.9	0.035*	46.8	0.235	51.6	0.888	80.6	0.193	64.5	0.58
No	79.6		56.3		50.5		71.6		60.2	
Music										
Yes	88.6	0.428	48.6	0.579	65.7	0.048*	61.8	0.045*	54.3	0.301
No	83.1		53.8		46.9		78.5		63.8	
Physical exercise										
Yes	84.8	0.794	48.5	0.181	56.6	0.075	72.4	0.358	55.6	0.043*
No	83.3		59.1		42.4		78.8		71.2	
Social activities										
Yes	84.7	0.895	42.4	0.047*	64.4	0.01*	67.8	0.11	54.2	0.135
No	84.0		58.5		43.4		79.0		66.0	

Table 3 Results of the logistic regression analysis models for the association between high stress (GHQ) and high burnout in the different domains and selected demographics.

	High EE			High cynicism			Low AE			High burnout			High stress (GHQ \geq 3)		
	OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI	
Sex (female)	4.02*	1.34	12.08	1.96	0.99	3.87	1.84	0.93	3.65	3.49*	1.47	8.27	2.24*	1.07	4.66
Year of medical school (Med 1)	1.38	0.52	3.67	2.83*	1.44	5.55	1.89	0.95	3.76	2.76*	1.21	6.33	5.07*	2.38	10.80
Living arrangement (with relatives)	0.96	0.34	2.76	1.16	0.57	2.37	0.43*	0.21	0.89	1.46	0.62	3.44	1.28	0.59	2.80
Relationship status (single)	0.45	0.16	1.25	1.31	0.57	3.01	1.06	0.46	2.45	0.45	0.14	1.41	0.50	0.19	1.29
Reading (No)	0.38	0.12	1.20	1.31	0.64	2.67	0.67	0.32	1.39	0.46	0.19	1.11	0.56	0.25	1.21
Music (No)	0.98	0.27	3.49	1.15	0.51	2.59	2.05	0.88	4.77	3.50*	1.35	9.07	1.78	0.74	4.28
Physical exercise (No)	0.71	0.24	2.12	0.93	0.44	1.93	1.40	0.67	2.92	0.83	0.34	2.01	1.29	0.58	2.85
Social activities (No)	0.89	0.32	2.49	1.92	0.95	3.86	2.08*	1.03	4.21	1.78	0.78	4.06	1.39	0.66	2.93

EE, emotional exhaustion; Cyn, cynicism; AE, academic efficacy. * $p < 0.05$.

students. Although Ghorpade et al. [40] reported that personal accomplishments are positively related to extroversion, conscientiousness, agreeableness, and emotional stability, we believe that the immense load of material and limited time to study do not promote or foster these desired personality traits.

Our study is the first to measure stress and burnout levels of preclinical medical students in Lebanon. It is also the first to associate the levels of stress and burnout with extracurricular activities. We used random sampling and validated questionnaires which eliminates systemic bias and helps in drawing conclusions from the study. Furthermore, the study yielded significant information and can be used as groundwork for further studies in Lebanon and around the world.

However, our study has some limitations. First, this study is not representative of the national outcomes of stress and burnout in preclinical medical students, as it measures the outcomes in one university. Second, this study is cross-sectional and therefore cannot determine causal relationships. Third, we did not assess economic and religious factors. Religious belief and economic background have been purposefully omitted from the selection criteria because they are sensitive topics in the country and thus the institutional review board of the university did not grant us permission to collect such data.

5. Conclusion

A substantial proportion of preclinical medical students suffer from stress and burnout. Medical educators need to be conscious of the causes, manifestations, and consequences of student distress. Interventions focusing on extracurricular activities, like music, generate wellness during medical training and are highly recommended. Student led support programs designed to promote mentorship of Med I students by Med II students to help them accommodate to the new medical school setting are also recommended. Future research can follow up with the students of this study and include more students from different medical programs. Studies can further investigate the genres of music that are associated with less stress and burnout and explore more types of extracurricular activities. Successful prevention of stress and burnout and wellness education programs during medical school will yield new standards of self-care and wellness in doctors during advanced training and further into practice.

Conflicts of interest

The authors declare no conflicts of interest.

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