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Determining the Prevalence of Burnout Among Medical Students Using Maslach Burnout Inventory: A Cross-sectional Study

Mohammadhossein Noori Ahmadabadi[1], Amirhossein Parsaei[1], Alborz Sherafati[1,2]*, Hanie Karimi[1], Sara Mortaz Hejri[3] and Behshad Pazooki[4]

1. Department of Cardiology, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran
2. Department of Cardiovascular Medicine, Mayo Clinic, Rochester, MN, USA
3. Department of Medical Education, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran
4. Department of Internal Medicine, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran

*** Corresponding author**

Alborz Sherafati, MD

Department of Cardiology, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran
Fax: +98 21 6693 9537
Email: alborz.sherafati@gmail.com

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Abstract

Background: Burnout is relatively frequent among medical students and has a major impact on mental health. We aimed to determine the prevalence of burnout among medical students of Tehran University of Medical Sciences (TUMS).

Methods: It was a cross-sectional study conducted at TUMS. All medical students at the university entrance (first semester), beginning of the clerkship, beginning of the internship, and end of the internship (graduation time) were enrolled. Maslach`s Burnout Inventory for Students (MBI-SS) was used to assess the prevalence of burnout. Chi-square test and Kendal tau_c test were utilized to compare subscales and curricular phases.

Results: 668 students participated in the study. The prevalence of burnout was 24.1% which was significantly higher at the end of their internship. 65% of the students had high emotional exhaustion, 75.4% had high cynicism, and 37% had low academic efficacy. There was no association between gender and burnout.

Conclusion: The prevalence of burnout among medical students was slightly higher than expected, and interns faced burnout more frequently. Further studies to assess the potential predisposing factors of burnout and appropriate strategies to reduce its burden seem to be mandatory.

Keywords: Medical students, Mental health, Professional burnout

Introduction

Burnout has been studied in medical students as a notable subject. It is described by Maslach *et al* as a psychological syndrome with three dimensions, including emotional exhaustion, depersonalization, and reduced personal accomplishment (1). It has been reported that up to 50% of medical students face burnout symptoms in western countries (2). The prevalence of burnout among medical students is also remarkable in the Eastern Mediterranean Region (EMRO). For instance, 10-15% of medical students in Arabic countries have experienced burnout (3,4). Long duration of medical education can expose medical students to persistent psychosocial stressors, leading to these notable results (5). Other related factors include major illnesses, lack of family and friends' support, low level of support from faculty staff, lack of clerkship organization, exposure to cynical residents, and night shifts resulting in sleep deprivation (6).

Burnout has a major impact on mental health. It is associated with an increased risk of anxiety and depression (2,7). Burnout is also related to an increased chance of suicidal ideation, and recovery from burnout can reduce this risk (2,8). In addition, burnout can lead to a higher prevalence of smoking and other maladaptive behaviors, including drug, alcohol, and substance abuse (7). Burnout is also accompanied by a higher incidence of motor vehicle accidents (2). Along with its negative impact on psychological health and well-being, burnout can affect patients' care and professional career. It can result in a lack of empathy, dishonest behavior, and medical errors (2) and can lead to dropping out of medical school (7). It may also have an influence on future planning for a professional career (2).

Due to the importance of burnout and its impact on medical students, we designed this study to evaluate the prevalence of burnout among medical students studying at Tehran University of Medical Sciences (TUMS). The results of this study can give us an insight into the burnout status among medical students in different preclinical and clinical curricular phases and can assist us in further planning to reduce its burden. We used the Maslach Burnout Inventory Survey for Students (MBI-SS) questionnaire, which is well constructed and validated for the evaluation of burnout among students (9).

Materials and Methods

Participants

This is an observational cross-sectional study performed at TUMS from January 2019 to September 2019. The doctor of medicine (MD) program at TUMS is a 7.5-year program, comprising four different curricular phases as follows: Phase 1 is concerned with basic sciences, which is the first five semesters and includes lecture-based classes, laboratory sessions, and team-based learning. Phase 2 consists of physiopathology courses (two semesters), which are lecture-based classes with subjects of internal medicine, pathology, and pharmacology. These are the preclinical phases. Phase 3 is clerkship (2 years) with internal medicine, surgery, pediatrics, obstetrics and gynecology, and elective rotations. Phase 4 is internship (18 months of clinical rotations with night shifts) where medical students are involved in patient management under the supervision of the residents and the faculty members.

The questionnaire was sent to four groups of medical students: Group 1 comprised students in their first semester (first month of university entrance at the beginning of basic sciences phase). Group 2 included students in their 4th year of the program, at the beginning of the clerkship (when the learning environment is changed from classroom to hospital and clinic). Group 3 consisted of students in their 6th year of the program, at the beginning of the internship (when more responsibilities and night shifts are added to their schedule), and group 4 was students upon their graduation and at the end of the internship. 804 medical students were eligible to participate in our study based on the abovementioned groups, and the questionnaire was sent to all.

Data collection

An electronic questionnaire was used to collect the data. Demographic data including age and gender were asked via the questionnaire. We utilized the MBI-SS questionnaire for the assessment of burnout. MBI-SS questionnaire assesses burnout in three dimensions: emotional Exhaustion (EE), Cynicism (CY), and

Academic Efficacy (AE). The first component, "EE" is a key aspect of burnout. It is described as depletion of emotional resources. As people get exhausted, they will not be able to give on themselves at a psychological level. The next component, "cynicism" is known by negative attitudes toward academic activities and school programs. The last component, "reduced AE" is defined by the negative feeling of a person toward his/her productivity and competence. This feeling leads to a lowered sense of efficacy (1,10).

MBI-SS is a Likert-type scale questionnaire, composed of 15 items in the three categories: 5 items for EE, 4 items for CY, and 6 items for AE. Scores are from 0 to 6: 0 is indicated for "never", 1 for "once or less in a year", 2 for "once or less in a month", 3 for "few times a month", 4 for "once a week", 5 for "few times a week", and 6 is indicated for "every day". A validated Persian translation of MBI-SS, validated by Rostami *et al* (11), was utilized. In Rostami's study, Cronbach's alpha coefficient for EE, CY, and AE were 0.88, 0.90, and 0.84, respectively which showed an acceptable internal consistency.

Based on the definition introduced by Maroco *et al* (12), we considered burnout as high score in EE (low = 0–9; moderate = 10–14; high > 14), high score in CY (low = 0–1; moderate = 2–6; high > 6), and low score in AE (low ≤ 22; moderate = 23–27; high ≥ 28). Cut-offs for these three subscales (high EE, high CY, and low AE) correspond to the 66th percentile of EE, 66th percentile of CY, and 33rd percentile of AE.

A link to the online questionnaire and a message explaining the study rationale, goals, and design were sent to all the eligible participants via email and social media. It was mentioned that participation in the study is voluntary, and the questionnaire could be filled out anonymously. A reminder message was sent to all the eligible participants one week after the first message. A minimum number of 200 responses were calculated as the sample size.

Statistical analysis

The prevalence of burnout with three-dimensional criteria in each group of students was demonstrated with frequency tables. The Kolmogorov-Smirnov test was used for checking the normality. The comparison of burnout scores in the four groups and by gender was performed by the chi-square test. The curricular phases and levels of each subscale (low, medium, high) were considered as ordinal variables. Thus, a Kendal tau_c test was performed to measure the strength of association between them. A p-value < 0.05 was considered significant. The IBM SPSS v.22 was utilized to analyze the data.

Ethical considerations

The study protocol was approved by the Ethics Committee of Tehran University of Medical Sciences (code: IR.TUMS.IKHC.REC.1398.085). This project followed the ethical principles and national norms and standards for conducting medical research in Iran. All personal data were protected and kept anonymous.

Results

From 804 eligible medical students, 668 (83%) accepted to enroll in our study and filled out the questionnaire. The mean age (standard deviation) of the participants was 22.7 (3.21) years. 332 (49.8%) of them were male and 336 (50.2%) were female. The number of students in the four mentioned curriculum phases were as follows: 178 (26.6%) students were at the entrance to the university, 159 (23.8%) were at the beginning of the clerkship, 111 (16.6%) were at the beginning of the internship, and 220 (32.9%) were at the end of the internship.

Scores of the MBI-SS subscales

The mean scores of all students in MBI-SS subscales were as follows: 25.23 ± 6.91 for EE, 12.04 ± 7.13 for CY, and 18.34 ± 8.7 for AE. 434 (65%) of students had high EE, 504 (75.4%) had high CY, and 247 (37%) had low AE. By defining burnout as a three-dimensional issue (high EE, high CY, low AE), 161 (24.1%) of the medical students enrolled in our study had burnout (Table 1).

Burnout and contributing factors

The prevalence of burnout was different among various curricular phases ($p < 0.05$). The prevalence of three-dimensional burnout was higher at the end of the internship in comparison to the other groups (Table 2). There was no difference in the prevalence of burnout between men and women.

Table 1. Prevalence of burnout among medical students of Tehran University of Medical Sciences

Scores in burnout subscales	Participants (n = 668)	
	N	%
Emotional exhaustion		
Low (0-9)	121	18.1%
Moderate (10-14)	113	16.9%
High (14)	434	65.0%
Cynicism		
Low (0-1)	38	5.7%
Moderate (2-6)	126	18.9%
High (6<)	504	75.4%
Academic efficacy		
Low (22)	247	37.0%
Moderate (23-27)	159	23.8%
High (28)	262	39.2%
Burnout*		
No	507	75.9%
Yes	161	24.1%
*Burnout = high scores in Emotional exhaustion and Cynicism with low score in Academic efficacy		

Table 2. Prevalence of burnout based on curricular phases and gender in medical students of Tehran University of Medical Sciences (n = 668)

Contributing factors	Burnout				
	No		Yes		
	N	%	N	%	p-value
Curriculum Phase					
Beginning of basic sciences	142	79.8%	36	20.2%	0.008
Beginning of clerkship	132	83.0%	27	17.0%	
Beginning of internship	81	73.0%	30	27.0%	
End of internship	152	69.1%	68	30.9%	
Gender					
Female	251	74.7%	85	25.3%	0.467
Male	256	77.1%	76	22.9%	

Table 3. Correlation between Burnout Subscales and the Curriculum Phases in Students of Tehran University of Medical Sciences (n = 668)

	Beginning of basic sciences		Beginning of clerkship		Beginning of internship		End of internship		Correlation Coefficient
	N	%	N	%	N	%	N	%	
Emotional exhaustion									
Low (0-1)	38	21.3%	0	0.0%	0	0.0%	0	0.0%	0.325
Moderate (2-6)	59	33.1%	36	22.6%	20	18.0%	11	5.0%	
High (6)	81	45.5%	123	77.4%	91	82.0%	209	95.0%	

Cont Table 3

Cynicism									
Low (0-9)	96	53.9%	12	7.5%	8	7.2%	5	2.3%	
Moderate (10-14)	37	20.8%	33	20.8%	19	17.1%	24	10.9%	0.0420
High (14)	45	25.3%	114	71.7%	84	75.7%	191	86.8%	
Academic efficacy									
High (28)	32	18.0%	84	52.8%	56	50.5%	90	40.9%	
Moderate (23-27)	38	21.3%	39	24.5%	22	19.8%	60	27.3%	0.171
Low (22)	108	60.7%	36	22.6%	33	29.7%	70	31.8%	

Burnout subscales and curriculum phases

The number and percentage of participants with low, moderate, and high scores in each subscale of burnout are shown in table 3. There was a positive and moderately strong relationship between the curriculum phases and EE (Kendal's coefficient = 0.420, p-value < 0.05). There was a moderate relation between the curriculum phases and cynicism (Kendal's coefficient = 0.325, p-value < 0.05). The relation between the level of AE and the curriculum phases is considered weak (Kendal's coefficient = 1.71, p-value < 0.05).

Discussion

In this study, the prevalence of burnout was assessed among medical students at four different levels of the MD program using the MBI-SS questionnaire. It was revealed that 24.1% of medical students are experiencing burnout, and there are higher percentages of medical students experiencing high emotional exhaustion, high cynicism, or low academic efficacy. We also found out that the prevalence of burnout was significantly increased at the end of the internship. To the best of our knowledge, this is the first study to assess the prevalence of burnout among medical students in different curricular phases in TUMS.

Since there are several various definitions of burnout, it is difficult to make a good comparison between different studies. In other studies among medical students in Iran which used the MBI-SS questionnaire, the prevalence of burnout was about 16-23% (13,14). Other studies in different countries using the MBI-SS questionnaire showed a prevalence of about 10-14% (15,16). Our result shows a slightly higher prevalence compared to the mentioned studies. Some researchers utilized less strict criteria and considered burnout as a two-dimensional issue (8,17). This leads to a higher prevalence of burnout, reaching 50% among medical students. This may explain the difference in the reported prevalence of burnout among various studies. The third group of researchers defines burnout by high scores in either EE or CY (18,19). This less strict definition results in an even more different range of burnout prevalence. We used the three-dimensional criteria for the definition of burnout to have a more precise measurement.

The prevalence of burnout was remarkable in our study. Furthermore, the scores in the burnout subscales were also notable. In the total study population, the percentage of the participants with high EE, high CY, and low AE were 65, 75, and 39%, respectively. It is mentioned that burnout is more associated with learning and work environment than personal characteristics (2). The grading system plays a role in the preclinical phases (2). The high amount of study materials for exams preparation and a competitive atmosphere may lead to emotional exhaustion and low academic efficacy. Yang *et al* have noted the difficult and extensive programs and syllabus medical students face during the first years of medical school and mentioned that it takes some time for them to get accustomed to it (20). In the clinical phases, poor adjustment to the new clinical setting, unsupportive learning environment, financial concerns, and poor supervision may contribute (2). Medical students may also feel that their education is not a priority to faculty staff and they are not playing an efficient role in patient management.

The prevalence of burnout was increased in the internship and the percentage of high EE and high CY in this phase were 95% and 86%, which are remarkable. These numbers are much higher

compared to similar studies in undergraduate medical students (16,21). During the internship, the amount of workload and the level of stress increase. This can occur due to the responsibilities regarding patient care, limited autonomy, and long hours of hospital stay (2). It is demonstrated in a review that students who stay overnight shifts are more likely to face burnout, possibly due to the long hours they spend at the hospital and the acute cases they encounter in their shifts (6). Sleep deprivation may also play a role and can have critical consequences like impaired performance, unintentional medical errors, and mood disorders (22). Depression, anxiety, and the inability to cope with stress are also mentioned as possible contributors (23,24). Regarding the fact that the internship is the final year of studying medicine leading to graduation, concerns about the future career may be another predisposing factor. It is worth to be mentioned that medical interns are about to make a decision to participate in residency programs, and burnout may affect their choice in favor of specialties with less workload and high income rather than specialties align with their interests or skills. Also, some students may decide to quit medicine and find a job in other fields.

One considerable point in the results is a significant decrease in the AE score at the beginning of the clerkship. This time is the first exposure of medical students to the hospital and clinical programs including daily bedside visits, outpatient clinics, and learning skills along with studying for final exams. In a study conducted in Brazil, the prevalence of burnout failed to be remarkably different among curricular phases, but after a strict review of the results, a higher level of burnout was noted in the introductory clinical cycle, which is a time of transition to the clinic, first contacts with real patients, and handling new responsibilities (15). This change of environment from classrooms to clinical settings may also contribute to our result.

The focus of this study was on the prevalence of burnout among medical students at TUMS without evaluating the possible predisposing factors. However, no association was found between gender and burnout in the present study. The results of other studies are controversial in this regard. Some studies found no association similar to our result (18,25). Others showed a higher prevalence of depersonalization in males (15). The third group demonstrated that male gender is a protective factor for burnout (26), and there is a higher rate of burnout in female participants (27).

Our study has some limitations. Demographic and psychosocial variables were not evaluated for possible contributing factors. Further studies including multiple variables can help to bring more light on the underlying causes. Also, since different students were assessed in four groups, personal characteristics including the ability of resilience can confound the results. A long follow-up of the same group of students from the university entrance in the first year through the graduation and assessing burnout in multiple time points in this group can provide more accurate data.

Conclusion

In conclusion, burnout is observed in approximately one-fourth of the medical students, and the prevalence of burnout is higher among medical students in the internship. Further studies to assess the potential predisposing factors of burnout, and more importantly, appropriate strategies to reduce its burden seem to be mandatory.

Acknowledgements

This study protocol was approved by the Ethics Committee of Tehran University of Medical Sciences (code: IR.TUMS.IKHC.REC.1398.085)

Conflict of Interest

None

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