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Burnout and Other Types of Emotional Distress Among Medical Students

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Abstract

Background The medical literature reports that many medical trainees experience burnout. The primary goal of this study was to determine how the prevalence of burnout and other forms of emotional distress among the University of Kansas School of Medicine (KUSM) medical students compared to the previously published data.

Methods We conducted a cross-sectional survey of 379 medical students. Between July and September 2018, we surveyed 872 KUSM medical students on the three campuses (Kansas City, Salina, and Wichita) of KUSM. The survey included items on demographic information, burnout, symptoms of depression, fatigue, quality of life, and self-reported general health. The authors used standard descriptive summary statistics, Kruskal-Wallis test/one-way analysis of variance, chi-square test, correlation, and multivariate logistic regression model to analyze the data.

Results The overall response rate was 43.5% with 48% of the students reporting manifestations of burnout. Burnout, depression, and fatigue were lowest during the first year of training and increased as year in training progressed. In multivariate models, only year in training was associated with increased odds of burnout, symptoms of depression, and fatigue. Nearly 46% of the students screened positive for depression, and 44.6% reported high levels of fatigue in the past week.

Conclusion Even though KUSM students have a lower prevalence of burnout than the national rate (48% vs. 55.9%), this prevalence is high enough to warrant new interventions. Because burnout and other emotional distress increase over the course of medical school no matter what campus the students attend, interventions should be both longitudinal and global across all campuses.

Keywords Medical students · Burnout · Depression · Fatigue · Quality of life · Self-reported general health

Introduction

The medical literature reports that many medical trainees experience burnout in response to chronic job stressors [1, 2]. Manifestations of burnout are characterized in three dimensions: overwhelming exhaustion, depersonalization and detachment from the job, and a sense of ineffectiveness and lack of accomplishment [3]. As explained by Maslach and Leiter, exhaustion is the physical and emotional component of burnout, and is a state of physical and mental fatigue. A person experiencing emotional exhaustion feels overextended and has surpassed their coping limits without any source of replenishment and recovery. Depersonalization is the interpersonal component of burnout and manifests as cynicism, emotional detachment, and disengagement from the job. Finally, the self-evaluation component of burnout presents as a sense of ineffectiveness and lack of accomplishment. It is a decreased sense of pride in one's work. A person with low sense of accomplishment is characterized by feelings of incompetence and lack of achievement and productivity.

Burnout is a serious problem among medical professionals that appears to be getting worse. Not only is burnout more common than in other professions, but current data show a 6% increase in burnout manifestations among US medical students over a 6-year period, from 49.6% in 2008 [4] to 55.9% in 2014 [5]. A 2014 study found that 56% of US medical students experienced at least one manifestation of burnout, 58% screened positive for depression, and 9% reported suicidal ideation in the last

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12 months [5]. Burnout among medical professionals is associated with a number of negative sequelae, including poor quality of patient care [6, 7], self-reported medical errors [8, 9], increased risk of suicidal ideation [4, 5, 10], and substance use disorder [11]. Due to the high rates of burnout and other forms of emotional distress among medical students, the Liaison Committee on Medical Education requires that each medical school "has in place an effective system of personal counseling for its medical students that includes programs to promote their wellbeing and to facilitate their adjustment to the physical and emotional demands of medical education" (pg. 20) [12].

The primary goal of this study was to determine how the prevalence of burnout and other forms of emotional distress (depression and fatigue) among the University of Kansas School of Medicine (KUSM) medical students compares to the previously published data [4, 5]. A second goal was to assess trends across all 4 years of the curriculum and across all three campuses to give insight for targeted interventions. To our knowledge, these trending data have not been previously published for US medical students. Finally, we sought trends related to a new curriculum being implemented at KUSM over 4 years, beginning in July 2017.

The KUSM has three campuses (Kansas City, Salina, and Wichita). The Kansas City campus is a traditional urban, academic medical center with student classes of 175 in each of the first 2 years, and 125 in each of the third and fourth years. The Wichita campus is an urban/suburban, community-based campus with student classes of 28 in each of the first 2 years and 78 in each of the third and fourth years (50 students complete years 1 and 2 in Kansas City then transfer to Wichita for years 3 and 4). The Salina campus is in a town of 48,000 and has eight students per class. Each campus offers different clinical experiences and educational attributes, and often attracts students with different clinical interests. For example, the Wichita and Salina campuses have a high rate of students matching into primary care. Though the curricular goals and objectives as well as assessment methods are the same for all campuses, the student experience varies. Thus, any differences or similarities between campuses could inform intervention decisions.

Prior to 2017, KUSM had a traditional curriculum that included 15 h of lecture per week in years 1 and 2, most of which emanated from Kansas City to Salina and Wichita via interactive television video conferencing. The new ACE (for Active, Competency-based, and Excellence-driven) curriculum overhauled the entire 4 years, especially years 1 and 2, with interventions based on adult learning theory and methods to encourage professional development, teamwork, and life-long learning. We anticipated improvements in student wellbeing as an outcome of the curriculum reform and wanted to measure whether that occurred. To address our study goals, we sought a survey method that would compare closely with published national data [4, 5] yet be simple and quick enough to encourage completion by medical students.

Methods

Study Design and Participants

The study was a cross-sectional survey of 872 medical students on the three campuses of KUSM from July through September 2018. Each student received an email invitation to participate in the study along with a link to a 10-item survey. Participation was voluntary and responses were anonymous. A sample size of 350 was calculated as necessary for adequate power (> 0.85) to detect significant relationships among the variables with 2 degrees of freedom, $P < 0.05$, and 0.21 effect size [13, 14]. The KUSM Institutional Review Board granted exemption for the study.

Study Measures

The survey included items on demographic information (age, sex, year in training, and campus location), burnout, symptoms of depression, fatigue, quality of life, and self-reported general health.

Burnout To make the length of the survey short and reduce the amount of time to complete the survey, manifestations of burnout among the medical students were assessed using two single-item measures of overwhelming exhaustion and depersonalization adapted from the full Maslach Burnout Inventory (MBI-22), which has been previously validated [15]. The overwhelming exhaustion item ("I feel burnout from my work/education") and depersonalization item ("I've become more callous toward people since I became a medical student") have been shown to be useful screening questions for burnout [16, 17]. These two items have shown the highest factor loading [15, 18, 19] and strong correlation [16, 20] with their respective emotional exhaustion and depersonalization domains in the MBI-22 [16]. The two single items have been used in previous studies to measure manifestations of burnout among medical students [4, 5].

The medical students recorded the degree to which each item applied to them on a 7-point Likert scale (0 = *Never*, 6 = *Every day*). The scores of each domain were grouped into low, moderate, and high burnout categories using established cutoffs [2–5, 15]. Higher scores on exhaustion and depersonalization domains are indicative of greater exhaustion and depersonalization, and greater burnout. Consistent with convention [2–5, 15], we considered students who scored high on exhaustion and/or depersonalization domains as having at least one manifestation of professional burnout.

Symptoms of Depression and Fatigue We screened for symptoms of depression using a 2-item Primary Care Evaluation of Mental Disorders Patient Health depression-screening questionnaire (PHQ-2). The questions asked the participants about their feelings of being down, depressed, or hopeless and if they have been bothered by little interest or pleasure in usual

activities during the past month. The 2-question screen has a reported sensitivity of 96% and specificity of 57% [21, 22].

We measured the students' levels of fatigue over the past week using a standardized linear analog scale (0 = *as bad as it can be* to 10 = *as good as it can be*) similar to what is described by West and colleagues [23]. Participants who scored five or less on the scale were considered to have higher levels of fatigue [5].

Quality of Life and General Health The overall quality of life was assessed using a single global item from the World Health Organization Quality of Life (WHOQOL)-BREF [23]. This single item has been validated for use with medical students [24]. The participants rated their overall quality of life on a 5-point Likert scale (1 = *Very poor*, 5 = *Very good*).

For the medical students' general health, we used the question, "How satisfied are you with your health?" This question was adapted from the World Health Organization Quality of Life (WHOQOL)-BREF [25]. Participants rated their general health satisfaction on a 5-point Likert scale (1 = *Very dissatisfied*, 5 = *Very satisfied*).

Statistical Analysis

Standard descriptive statistics were used to create a demographic profile and describe the prevalence of burnout symptoms among the medical students. Kruskal-Wallis test/one-way analysis of variance (for continuous variables), chi-square test (for categorical variables), and correlation were used to evaluate association between the variables. We performed multivariate logistic regression analysis to identify characteristics associated with manifestations of burnout, symptoms of depression, and fatigue. Year in training, age, sex, and location of campus were used in the modeling process. All analyses were 2-sided with alpha of 0.05. The IBM SPSS (Statistical Package for the Social Sciences), version 23 was used for these analyses.

Results

On average, the students spent approximately 2 min to complete the survey. The response rates were 43.5% (379/872) for all the KUSM medical students, 40.5% (259/639) for the Kansas City students, 48.8% (98/201) for the Wichita students, and 28.1% (9/32) for the Salina students. As shown in Table 1, 197 (52%) of the respondents were females; 322 (89.4%) were younger than 30 years; and plurality were in second and third years of training. Analysis of the study sample compared demographically to the overall KUSM medical students' population showed a statistical difference between the groups on only gender and age. There was a 3.79% margin

Table 1 Demographic characteristics of responding medical students compared to all KUSM medical students

Characteristics	Responders (N = 379)	All KUSM medical students (N = 872)	P value
Gender, no. (%)			0.024
Male	166 (43.8)	460 (52.8)	
Female	197 (52.0)	412 (47.2)	
Other	2 (0.5)	–	
Missing	14 (3.7)	–	
Age, years			< 0.001
Median	25.0	23.0	
Age group, no. (%)	(n = 360)		
20–24	140 (36.9)	648 (71.3)	
25–29	182 (48.0)	169 (19.4)	
30–34	28 (7.4)	37 (4.2)	
35–39	5 (1.3)	13 (1.5)	
40–44	5 (1.3)	5 (0.6)	
Year in training, no. (%)			0.997
First-year medical student	91 (24.0)	213 (24.4)	
Second-year medical student	96 (25.3)	223 (25.6)	
Third-year medical student	96 (25.3)	230 (26.4)	
Fourth-year medical student	86 (22.7)	206 (23.6)	
Missing	10 (2.6)	–	
Campus of location			0.241
Kansas City	259 (68.3)	639 (73.3)	
Wichita	98 (25.9)	201 (23.1)	
Salina	9 (2.4)	32 (3.7)	
Missing	13 (3.4)	–	

of error at a 95% confidence level between the study sample and the overall KUSM medical students' population, demonstrating that our sample represented the overall KUSM medical student population [26, 27].

Table 2 summarizes the prevalence of burnout, depression, and fatigue along with overall quality of life and satisfaction with general health. In aggregate, 48% (182 of 379) of the medical student respondents reported manifestations of

Table 2 Burnout, depression, fatigue, quality of life, and general health among KUSM medical students

Characteristics	All participants (N = 379)	First-year students (n = 91)	Second-year students (n = 96)	Third-year students (n = 96)	Fourth-year students (n = 86)	P value
Burnout index, no. (%)[a]						
Emotional exhaustion: high score	160 (42.7)	16 (17.6)	44 (45.8)	51 (53.1)	47 (54.7)	< .001
Depersonalization: high score	99 (26.5)	7 (7.7)	23 (24.0)	32 (33.7)	36 (41.9)	< .001
Burnout[b]	182 (48.0)	20 (22.0)	46 (47.9)	58 (61.1)	56 (65.1)	< .001
Depression, no. (%)						
Screened positive for depression	174 (45.9)	28 (30.8)	43 (44.8)	48 (50.0)	48 (55.8)	< .01
Missing	1 (0.3)	–	–	–	1 (1.2)	
Fatigue						
Mean (standard deviation [SD])[c]	5.9 (2.1)	7.3 (1.4)	5.8 (1.9)	5.5 (2.2)	5.0 (2.1)	< .001
Level of fatigue in the past week, No. (%)						
Low	205 (54.1)	74 (81.3)	51 (53.1)	46 (47.9)	32 (37.2)	
High	169 (44.6)	17 (18.7)	45 (46.9)	50 (52.1)	53 (61.6)	
Missing	5 (1.3)	–	–	–	1 (1.2)	
Quality of life						
Mean (SD)	4.0 (0.8)	4.5 (0.5)	4.0 (0.7)	3.8 (0.9)	3.9 (0.9)	< .001
Overall quality of life, No. (%)						
Very poor	3 (0.8)	–	–	2 (2.1)	1 (1.2)	
Poor	23 (6.1)	–	4 (4.2)	9 (9.4)	10 (11.6)	
Neither poor nor good	37 (9.8)	1 (1.1)	12 (12.5)	12 (12.5)	9 (10.5)	
Good	208 (54.9)	42 (46.2)	59 (61.5)	55 (57.3)	46 (53.5)	
Very good	107 (28.2)	48 (52.7)	21 (21.9)	18 (18.8)	19 (22.1)	
Missing	1 (0.3)	–	–	–	1 (1.2)	
General health						
Mean (SD)	3.7 (1.0)	4.1 (0.6)	3.6 (1.0)	3.5 (1.1)	3.4 (1.1)	< .001
General health satisfaction, No. (%)						
Very dissatisfied	6 (1.6)	–	–	3 (3.1)	3 (3.5)	
Dissatisfied	68 (17.9)	2 (2.2)	23 (24.0)	22 (22.9)	18 (20.9)	
Neither dissatisfied nor satisfied	46 (12.1)	8 (8.8)	12 (12.5)	11 (11.5)	13 (15.1)	
Satisfied	192 (50.7)	58 (63.7)	45 (46.9)	44 (45.8)	41 (47.7)	
Very satisfied	66 (17.4)	23 (25.3)	16 (16.7)	16 (16.7)	10 (11.6)	
Missing	1 (0.3)	–	–	–	1 (1.2)	

[a] We assessed burnout using the single-item measures for emotional exhaustion and depersonalization adapted from the full Maslach Burnout Inventory

[b] High score on emotional exhaustion and/or depersonalization subscale of the Maslach Burnout Inventory

[c] Scores ranged from 0 to 10, low mean fatigue score suggests higher/worsened fatigue

burnout. Manifestations of burnout increased with seniority (see Fig. 1).

As shown in Table 3, the medical students who reported manifestations of burnout were 2.53 (72.1 vs 28.5, $P < .001$) times more likely to screen positive for depression, and 2.09 (68.0 vs 32.5, $P < .001$) times more likely to report excessive fatigue. In a multivariate logistic regression model, only year in training was independently associated with higher odds of experiencing burnout (Table 4).

Overall, 174 (45.9%) of the medical students screened positive for depression during the prior month (Table 2). Symptoms of depression were least prevalent among the first-year medical students and most prevalent among the fourth-year medical students. In the multivariate model, only year in training was independently associated with higher odds of experiencing symptoms of depression (Table 4).

One hundred sixty-nine (44.6%) of all the medical student respondents complained of excessive fatigue during the prior week. The level of fatigue worsened as training year progressed (Table 2). In the multivariate model, year in training was independently associated with higher odds of experiencing fatigue over the prior week (Table 4).

Three hundred and fifteen (83.1%) of the participating students rated their overall quality of life as good/very good, and 258 (68.1%) were satisfied/very satisfied with their self-reported general health (Table 2). The overall quality of life negatively correlated with manifestations of burnout ($r[372] = -.45$, $P < .001$), negatively correlated with symptoms of depression ($r[377] = -.49$, $P < .001$), negatively correlated with fatigue ($r[373] = -.46$, $P < .001$), and positively correlated with general health ($r[372] = .43$, $P < .001$).

Discussion

Our multivariate analysis demonstrated that high exhaustion, high depersonalization, manifestations of burnout, depressive symptoms, and high fatigue increased with year in training at KUSM and that the findings were consistent across all three campuses. We did not find significant associations of any of these features with student age, gender, or location of campus. Compared nationally, 48% of the KUSM students reported burnout versus 55.9% of the US medical students. However, the 61.1–65.1% rates among the KUSM medical students in their clinical years are higher than the nationally reported findings of 49.9–55.9% overall [4, 5].

Students experiencing burnout were more likely to have symptoms of depression and fatigue. The definitions for these variables overlap. Our findings support studies that have found an association between medical student burnout and risk of depression [5, 28, 29], and high degree of fatigue [5]. Personal and medical education-related factors have been associated with medical student emotional distress [30]. Different aspects of medical training may have an impact on burnout due to different types of stress. Clinical years in medical school may be associated with longer hours, potentially stressful patient care experiences such as death and dying, and social isolation [31–33].

The high rates of burnout and emotional distress displayed by students as their training progresses could be due to the cumulative effect of medical training. Interestingly, the level of exhaustion among the KUSM medical students plateaued during the clinical years while depersonalization continued to progress. The plateau in exhaustion could be explained by the typical relaxation of work hours in year four as compared to year three.
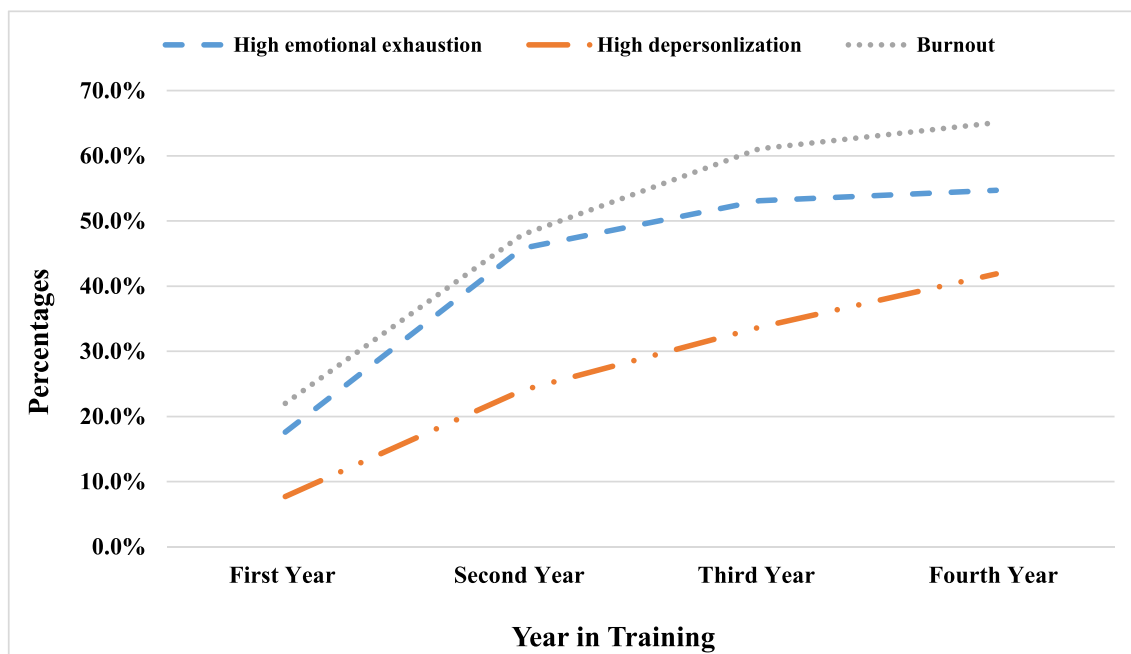

Fig. 1 Manifestations of burnout, emotional exhaustion scores, and depersonalization scores by year in training

Table 3 Relationship of depression and fatigue with burnout among the medical students

Measures	Burnout			χ^2	P value	Phi
	Present	Not present	Total			
Depression, no. (%)				70.34	< .001	0.44
Screened positive for depression	124 (72.1)	48 (27.9)	172 (100.0)			
Screened negative for depression	57 (28.5)	143 (71.5)	200 (100.0)			
Total	181 (48.7)	191 (51.3)	372 (100.0)			
Level of fatigue, no. (%)				46.62	< .001	0.35
High degree	115 (62.0)	54 (32.0)	169 (100.0)			
Low degree	66 (32.5)	137 (67.5)	203 (100.0)			
Total	181 (48.7)	191 (51.3)	372 (100.0)			

Table 4 Results of multivariable analysis of factors independently associated with burnout, depression, and fatigue among the medical students

Dependent variables	Independent variables	Odds ratio (95% confidence interval)*	P value
Burnout manifestations	Year in training		< .001
	Fourth year	6.1 (2.98 to 12.46)	< .001
	Third year	5.1 (2.63 to 10.11)	< .001
	Second year	3.2 (1.67 to 6.14)	< .001
	First year	1.0 (Reference)	–
	Age (for each additional year older)	1.02 (0.95 to 1.10)	0.51
	Male (versus female)	0.76 (0.48 to 1.18)	0.22
	Campus location		0.79
	Kansas City	1.14 (0.25 to 5.09)	0.87
	Wichita	0.96 (.204 to 4.48	0.95
	Salina	1.0 (Reference)	–
Screened positive for depression	Year in training		0.006
	Fourth year	3.36 (1.71 to 6.61)	< .001
	Third year	2.22 (1.18 to 4.17)	0.013
	Second year	1.85 (1.00 to 3.42)	< .05
	First year	1.0 (Reference)	–
	Age (for each additional year older	0.98 (.91 to 1.05)	0.51
	Male (versus female)	0.80 (.52 to 1.23)	0.31
	Campus location		0.84
	Kansas City	0.73 (.17 to 3.02)	0.66
	Wichita	0.68 (.17 to 2.69)	0.58
	Salina	1.0 (Reference)	–
Low degree of fatigue	Year in training		< .001
	Fourth year	0.13 (.06 to .28)	< .001
	Third year	0.23 (.11 to .45)	< .001
	Second year	0.26 (.13 to .50)	< .001
	First year	1.0 (Reference)	–
	Age (for each additional year older	1.01 (.94 to 1.08)	0.87
	Male (versus female)	1.57 (1.00 to 2.47)	0.51
	Campus location		0.76
	Kansas City	1.10 (.23 to 5.0)	0.94
	Wichita	1.26 (.28 to 5.69)	0.76
	Salina	1.0 (Reference)	–

*Higher odd ratio is more desirable. Odd ratio represents increased risk of burnout, depression, or fatigue in the categorical group relative to the reference group

Progression of depersonalization could be due to the cumulative effect of medical education or medical culturalization.

As the majority of students experienced burnout by the end of training, an opportunity exists to promote wellness and prevent burnout. Interventions can be considered from both the individual student perspective and from the curriculum perspective. Effective strategies directed toward individual students include skills training to recognize distress, self-recognition of when to seek help, and development of strategies that promote personal wellbeing. Fostering supportive relationships with faculty mentors has also been suggested as a strategy to reduce emotional distress and promote wellbeing among students [34, 35]. Peer support "buddy-programs," pairing a senior student with a junior student as a mentor, have been associated with decreased stress among medical students [29, 36]. Peer discussions (e.g., Balint groups) are another opportunity to provide support and prevent burnout [37, 38]. Importantly, medical schools can intensify their commitment to providing support to students with emotional distress either through institutional support systems or outside resources. Also, medical schools can encourage medical students to adopt strategies to reduce the risk of emotional distress. For example, medical trainee participation in activities that promote wellness (such as regular physical activities, healthier eating, adequate sleep, mindfulness activities, emotional decompression, and work-life balance) has been suggested as a strategy to combat emotional distress [30, 39]. Establishing and maintaining meaningful personal and social relationships with family and friends have been associated with a reduction in burnout and other distress among medical students [40, 41].

In the ACE curriculum, KUSM has implemented several of these strategies at all three campuses. The ACE curriculum was in its second year at the time of the study, so the ACE strategies had not been applied to students who were in their clinical years. Follow-up surveys should help us determine which strategies are most successful over time.

In addition, medical schools should consider reforming their curriculum to encourage collaborative learning, which has been suggested to create a positive learning environment that promotes wellbeing [42]. The ACE curriculum at KUSM was designed to expressly address this theme through the use of methods such as case-based collaborative learning [43].

Despite the high rates of distress among the KUSM medical students, the majority (83.1%) of the students rated their overall quality of life as good/very good. 68.1% were satisfied/very satisfied with their general health. The apparent discrepancy between these percentages could be due to the way the students interpreted the survey item. They might have interpreted the quality of life as physical health rather than a multidimensional construct that includes domains of physical health, psychological wellbeing, social relationships, and economic satisfaction [43–47].

A strength of this study was the creation of a single-survey tool to measure burnout and other emotional distress among medical students. The study has brought together constructs from several validated inventories/instruments to create a survey tool that may be useful to others interested in comparing their students to national norms and following trends over time and through curriculum revisions.

Our study has limitations. First, although similar to other studies with medical students [4, 5, 11], the 43.5% overall response rate limits the generalizability of the findings. Emotionally distressed medical students may be less motivated to respond to the survey, or more likely to participate because the topic may be relevant to them. Second, respondents were older and more likely to be female than non-respondents, a confounder of uncertain significance. Third, as the results are limited to the KUSM medical students, the findings may not be generalizable to other medical schools. Though this is the case, the consistency of the findings across three different campus types suggests important generalities in student experience. Finally, the study was done at the beginning of the academic year which could impact the way the findings are reported. First-year students may report low levels of burnout as they have just started medical training, while students in the fourth year have just completed their third year. Thus, higher burnout rates reported by the fourth-year students may be related to the students' experiences in the third year rather than the fourth year.

Conclusion

In conclusion, even though KUSM students have a lower prevalence of burnout than the national rate (48% vs. 55.9%), this prevalence is high enough to warrant new interventions. Because burnout and other emotional distress increase over the course of medical school no matter what campus the students attend, interventions should be both longitudinal and global across all campuses. Future studies may address causes for the progression of burnout over the course of medical school and the impact of interventions to prevent it earlier. Addressing medical student wellbeing has the potential to not only benefit students, but patients, the public, health care delivery, the medical profession, and medical career.

Compliance with Ethical Standards

Conflict of Interest　The authors declare that they have no conflict of interest.

Ethical Approval　The University of Kansas School of Medicine Institutional Review Board granted exemption for the study.

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