

Medical Student Burnout as Impacted by Trait Emotional Intelligence – Moderated by Three-Year and Four-Year Medical Degree Programs and Gender

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ABSTRACT

Introduction: Medical student burnout has received increasing attention in recent years due to greater acceptance of psychological and emotional vulnerability in the health care profession. Given the significant investment of personal and financial resources in this demanding profession, continued evaluation of factors contributing to burnout in medical training is necessary. A midwestern medical college with a longstanding 4-year medical degree program created 2 regional campuses that utilize a calendar-efficient 3-year medical degree program. The objective in this study is to examine if medical student burnout scores are higher for students on the 3-year campuses and how that is affected by emotional intelligence.

Methods: First- and second-year medical students voluntarily completed the Maslach Burnout Inventory for Students (scale: 1=never, 7=every day) and the Trait Emotional Intelligence Questionnaire (scale: 1=completely disagree, 7=completely agree). Multifactor analysis of variance assessed mean differences in burnout between campus and gender. Multivariate linear regressions were used for predicting burnout from emotional intelligence.

Results: Three-year campus students reported significantly ($P<0.010$) higher mean [SD] scores (8.3 [2.0]) than the 4-year campus students (7.4 [2.4]), and female students reported significantly ($P<0.049$) higher scores (8.2 [2.0]) than male students (7.6 [2.4]). Five emotional intelligence facets were independently associated with increased burnout scores ($R^2=0.26$, $P<0.001$) but significantly varied with campus and gender.

Conclusions: There were higher burnout scores in students studying on the two 3-year campuses compared to students on the traditional 4-year campus and higher scores for female students than male students. Different facets of emotional intelligence mitigated student burnout by campus and gender.

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INTRODUCTION

Medical student burnout has received increasing attention in recent years due to greater acceptance of psychological and emotional vulnerability in the health care profession.¹ Given the significant investment of personal and financial resources in this demanding profession, continued evaluation of factors contributing to burnout in medical training is necessary.² Mental health problems such as anxiety,³ depression,⁴ and suicide⁵ have been reported to be more common in physicians than their peers, and early identification could help prevent these disorders. Analyzing burnout, along with associated psychological antecedents that may be protective, could improve early detection in health professionals at a higher risk. This approach to develop predictor models could assist in anticipating future mental health problems and in informing prevention efforts.⁶

Emotional intelligence is a personal quality reported to mitigate the effects of burnout.⁷ People who are found to possess higher levels of emotional intelligence have a better capacity to manage emotions and to handle interpersonal relationships empathetically.⁸ As an inherent personal trait, emotional intelligence is a measurable construct whose internal structure consists of many interrelated intrapersonal and interpersonal elements. Intrapersonal intelligence, as originally described by Gardner, refers to the ability to perceive one's own feelings, desires, strengths, and weaknesses.⁹ Interpersonal intelligence describes

the ability to identify and respond to the moods, temperaments, and desires of other people. The hierarchical structure of trait emotional intelligence¹⁰ consists of both the intrapersonal factors of well-being and self-control and the interpersonal factors of emotionality and sociability. Broadband factors such as self-control are reliable measures of emotional intelligence but can attenuate underlying information in the narrowband facets, such as emotion regulation, impulse control, and stress management.¹¹ Each of these detailed measures of emotional intelligence may be categorically related to medical student burnout.

The impact of emotional intelligence on burnout requires detailed analysis on the 15 faceted intrapersonal and interpersonal elements.¹² The intrapersonal emotional intelligence factor of well-being includes facets of self-esteem, optimism, and happiness. The interpersonal emotional intelligence factor of emotionality includes facets of emotion perception, empathy, relationships, and emotion expression. Another interpersonal factor—sociability—includes facets of social awareness, emotion management, and assertiveness. Motivation and adaptability are additional independent facets that contribute to the overall measure of emotional intelligence.¹³

Recently, a midwestern medical college with a longstanding 4-year medical degree program created 2 regional campuses that utilize a calendar-efficient 3-year medical degree program.¹⁴ For those not familiar, differences in contact hours between these types of curricula are measured in weeks or months because of the elimination of summers off and the shortening of vacations and intercessions in typical 3-year programs.¹⁴ Potential advantages of 3-year programs are reduction in student debt load, rapid entry into clinical practice, close mentoring in clinical training, and—in our case—smaller cohort sizes. First-year medical students on the 3-year campus start their curricula in the summer, 6 weeks earlier than their 4-year counterparts on the central campus. Although the students on all 3 campuses participate in identical basic science courses during the first year, there are increased time demands for the 3-year campus students due to early preclinical courses. Following their first year, 3-year campus students begin their first clinical clerkships, while 4-year campus students have a 12-week break over the summer. In the second year of the curriculum on the 3-year campuses, students are engaged in longitudinal clinical rotations, in addition to their remaining foundational science courses. Students on the 3-year campuses then enter the match during their third year of medical school, although students are given the option of adding a fourth year.

The literature has reported mixed results for the impact of gender on burnout in medical students, with some studies reporting statistically significant higher scores for 1 gender,¹⁵ while in other studies no significant difference was detected.¹⁶

Similarly, the relationship of gender on emotional intelligence for medical students has produced mixed results that need further examination to resolve the variation likely due to situational

differences. Some researchers¹⁷⁻¹⁹ have reported higher emotional intelligence for female medical students, while others²⁰ have reported higher faceted emotional intelligence scores for male medical students. Other reports yielded no significant differences due to gender.^{21,22}

Our objective in this study is to examine if burnout scores are higher for students on the 3-year campuses given the calendar efficiency of that program. Most medical students reported some reoccurring level of burnout by their first year of medical school, which has previously been observed by others.^{2,23} Given the significant relationship of emotional intelligence with mental health,²⁰ burnout,²⁴ and performance outcomes²⁵ in academic environments, it is logical to examine how specific facets affect burnout for medical students. The categorical measure of gender was included in this study as it has been reported to interact with emotional intelligence^{17,22} and burnout for medical students.

METHODS

Subjects

Medical students enrolled in the first- and second-year medical school classes of a private Liaison Committee on Medical Education-accredited medical institution were invited to participate in a survey in February of the 2017-2018 academic year. The institution included a traditional 4-year campus (admitting 204 students in each class) and 2 regional campuses that feature an accelerated 3-year curriculum and are focused on training physicians to address workforce shortages in the state (admitting a total of 25 students in each class). Regional campuses were established within the study institution beginning in 2015 and 2016. Invitations were sent via email to all enrolled students at all 3 medical school campuses, and students were provided with lunch when they attended a session to complete the survey.

Measures

As part of a larger survey examining various aspects of the curriculum, students were asked to complete the 15-item Maslach Burnout Inventory for Students (scale: 1 = never, 7 = every day) and the 30-item Trait Emotional Intelligence Questionnaire Short Form (scale: 1 = completely disagree, 7 = completely agree). Burnout scores were determined from adding 5 items of emotional exhaustion. An analyst not part of this research study linked the surveys by AAMC ID number and associated them with institutional-reported gender scores. All students participating in this research study reported as female or male gender. The AAMC ID was removed from the survey dataset by the analyst before forwarding to the research group for statistical analysis.

Analysis

Multifactor analysis of variance was used to assess mean differences in burnout between campus and gender. Cohen's *d* reported effect sizes. Pearson correlations and multivariate linear regressions were used for predicting burnout from emotional

intelligence. Inter-item reliability was determined by Cronbach alpha. IBM SPSS 26.0 generated the statistical analysis. Statistical significance was set at $P < 0.050$.

Human Subjects Approval

This research was reviewed and approved by the institution's Institutional Review Board. Informed consent documentation was sent by email to the medical student 1 week prior to completing the surveys. The signed forms were printed on paper and signed by the student, which were sent back to the principal investigator by email or handed to him in person.

RESULTS

Of 498 eligible medical students, 205 (41%) completed the survey. This included 130 (52%) first-year students and 75 (30%) of second-year students. Responses were received from 123 (30%) 4-year campus students and 82 (91%) 3-year campus students. The responses included 106 male (39%) and 99 female (43%) students.

Mean [SD] burnout ($\alpha = 0.7$) scores for all respondents was 7.8 [2.2]. Medical student mean score differences of burnout determined by multifactor analysis are reported in Table 1. Statistically significant differences in burnout scores were reported for campus ($P < 0.010$) and gender ($P < 0.049$) but not for class ($P < 0.192$). Three-year campus students reported higher scores (8.3 [2.0]) than the 4-year campus students (7.4 [2.4]), and female students reported higher scores (8.2 [2.0]) than male students (7.6 [2.4]). In addition, a statistically significant interaction ($P < 0.001$) was reported between campus and gender, with increasing burnout scores for the 4 subgroups. Ranked from lowest to highest, the 4 groups were: (a) male student on the 4-year campus (6.7 [2.4]), (b) female students on the 3-year campuses (8.0 [1.9]), (c) female students on the 4-year campus (8.4 [2.1]), and (d) male students on the 3-year campus (8.5 [2.1]).

Fifteen facets of emotional intelligence differed based on whether students were on a 3-year or 4-year campus or by gender (Table 2). Students on the 4-year campus showed consistently higher results than 3-year students in self-esteem, motivation, and empathy, while women scored higher on empathy, optimism, and assertiveness measures. In contrast, male students scored higher in emotional management. These 7 facets of emotional intelligence did not report a statistically significant interaction term between campus and gender, and no subgroup analysis is reported.

When we analyzed correlations between burnout and emotional intelligence facets (Table 3), we found that 9 of 15 Pearson correlations (60%) between burnout and the fifteen individual emotional intelligence facets were negative and statistically significant ($P < 0.050$). These included two facets of interpersonal elements of emotional intelligence (emotion perceptions [$r = -0.2$] and relationships [$r = -0.2$]) along with 7 intrapersonal elements of emotional intelligence (emotion regulation [$r = -0.3$],

Table 1. Mean Score Differences of Burnout split by Campus, Gender, and Class

Variable	Group	N	Mean (SD)	Difference	P value	Cohen's d
Campus	3-year	82	24.8 (6.0)	2.6	0.010 ^a	0.41
	4-year	123	22.2 (7.2)			
Gender	Female	99	24.5 (6.1)	1.8	0.049 ^a	0.27
	Male	106	22.7 (7.2)			
Class	2nd year	75	23.9 (7.1)	1.1	0.192	0.18
	1st year	130	22.8 (5.9)			
Overall		205	23.6 (6.7)			

^aDenotes statistical significance.

Table 2. Mean Score Differences of Emotional Intelligence Split by Campus and Gender

Emotional Intelligence Facet	Group	N	Mean (SD)	Difference	P value	Cohen's d
Self-esteem ^a	3-year	82	5.4 (1.2)	0.5	0.003 ^c	0.45
	4-year	123	5.9 (1.0)			
Motivation ^a	3-year	82	5.0 (1.3)	0.5	0.003 ^c	0.42
	4-year	123	5.5 (1.1)			
Empathy ^b	3-year	82	5.1 (1.5)	0.4	0.017 ^c	0.30
	4-year	123	5.5 (1.1)			
Empathy ^b	Female	99	5.5 (1.3)	0.4	0.023 ^c	0.31
	Male	106	5.1 (1.3)			
Optimism ^a	Female	99	5.8 (1.0)	0.4	0.009 ^c	0.34
	Male	106	5.4 (1.3)			
Assertiveness ^b	Female	99	4.9 (1.2)	0.3	0.041 ^c	0.23
	Male	106	4.6 (1.4)			
Emotion management ^b	Female	99	4.6 (1.3)	-0.2	0.038 ^c	0.17
	Male	106	4.8 (1.1)			

^aIntrapersonal emotional intelligence.

^bInterpersonal emotional intelligence.

^cDenotes statistical significance.

Table 3. Pearson Correlations of Burnout and Facets of Emotional Intelligence

Intrapersonal or Interpersonal	Element of Emotional Intelligence		Correlation		
	Factor	Facet	r	P value	
Interpersonal	Emotionality	Emotion perception	-0.20	0.003 ^a	
		Emotion expression	-0.05	0.459	
		Empathy	-0.04	0.528	
		Relationships	-0.20	0.003 ^a	
	Sociability	Assertiveness	-0.13	0.059	
		Social awareness	-0.03	0.672	
		Emotion management	-0.03	0.704	
Intrapersonal	Self-control	Stress management	-0.33	0.001 ^a	
		Emotion regulation	-0.32	0.001 ^a	
		Impulse control	-0.29	0.001 ^a	
	Well-being	Happiness	-0.24	0.001 ^a	
		Optimism	-0.19	0.007 ^a	
		Self-esteem	-0.07	0.286	
		—	Adaptability	-0.30	0.001 ^a
		—	Motivation	-0.24	0.001 ^a

^aDenotes statistical significance.

impulse control [$r = -0.3$], stress management [$r = -0.3$], happiness [$r = -0.2$], optimism [$r = -0.2$], adaptability [$r = -0.3$], and motivation [$r = -0.2$].

When we performed a linear regression of burnout adjusting for each of the 15 emotional intelligence facets (Table 4), we found five emotional intelligence facets were independently associated with increased burnout scores ($R^2 = 0.26$, $P < 0.001$). Two of these were the interpersonal elements of emotion management (beta = 0.20) and emotion perception (beta = -0.16) and the remaining three were the intrapersonal elements of impulse control (beta = -0.25), adaptability (beta = -0.22), and stress management (beta = -0.18).

Finally, additional regression models were generated after splitting the respondents by campus and gender. The 2 regression models based on gender had 2 statistically significant predictors. The 2 regression models for campus had 3 significant predictors each. Female medical students and 3-year medical students showed associations between burnout scores and the intrapersonal elements of emotional intelligence as significant predictors. Significant predictors of burnout scores in male students and 4-year campus medical students were the interpersonal and intrapersonal elements of emotional intelligence.

DISCUSSION

Burnout

Among medical students in their first 2 years of study at a private, midwestern medical school, we found higher burnout scores in students studying on the two 3-year campuses compared to students on the traditional 4-year campus. Potential differences could be attributed to the recent development of these campuses, as well as structural differences between the 3-year and 4-year programs, suggesting that some specific aspects of the learning environments may account for the differences. The response rate differences (91% of 3-year campus students vs 30% of 4-year campus students) could have affected the reported differences and are consistent with trends others have reported: that students attending schools in nonurban areas are more likely than students in urban areas to participate in surveys. While there are curricular similarities between the 2 types of programs, students at the 3-year campuses begin their term in July with a condensed clinical skills course, while students on the 4-year campus start 6 weeks later and have the clinical skills course distributed over a semester. The two 3-year campuses are also much smaller (20 and 25 students in each class), which may offer reduced opportunity to build social support structures compared to the 4-year campus that enrolls 204 students each year, although the literature shows mixed results on this. The larger campus size also provides more opportunity for social interactions between first-year through fourth-year students, which may help reduce the inter-related measures of social isolation and anxiety for students in the early years of their education. Another factor to consider is an

Table 4. Linear Regression of Burnout on Emotional Intelligence Facets Split by Campus and Gender

Group	Emotional Intelligence Facet	Individual Predictor		Overall Regression	
		Beta	P value	R ²	P value
Female	Happiness ^a	-0.38	0.001 ^c	0.32	0.001 ^c
	Emotion regulation ^a	-0.30	0.003 ^c		
Male	Impulse control ^a	-0.33	0.001 ^c	0.19	0.001 ^c
	Emotion perception ^b	-0.25	0.009 ^c		
3-year	Happiness ^a	-0.55	0.001 ^c	0.34	0.001 ^c
	Self-esteem ^a	-0.46	0.001 ^c		
	Adaptability ^a	-0.33	0.001 ^c		
4-year	Stress management ^a	-0.41	0.001 ^c	0.28	0.001 ^c
	Motivation ^a	-0.27	0.009 ^c		
	Emotion management ^b	0.31	0.002 ^c		

^aIntrapersonal emotional intelligence.

^bInterpersonal emotional intelligence.

^cDenotes statistical significance.

observation in a related study with this same student population²⁶ noting differences between the student populations on the 3-year campuses compared to the 4-year campus. In that study, it was observed among matriculated students that those at the regional 3-year campuses are nearly 4 times more likely to come from a rural county and have slightly higher Medical College Admission Test scores. While this study did not directly address differences among the matriculated student populations, they could play a yet-to-be-determined role in the observed difference in burnout.

Second-year students did report higher levels of burnout than first-year students. This finding is not surprising given that on the 3-year campuses, students continue their clinical work throughout the summer, and on the 4-year campus, students have 12 weeks they can devote to vacation, research, or other individual pursuits. However, it should be emphasized that the wide range of scores among students in the second year decreased the precision of our measurements and may have prevented the mean score difference from being statistically significant.

The year in which these surveys were completed in relationship to the establishment of the 3-year programs also could contribute to the reported student burnout. In 2017, at the time of this study, neither regional campus had graduated its first cohort of students, and the clinical instruction was in the early stages of its development. As such, students at the 3-year campuses experienced a learning environment that was emerging rather than established and had no peers that had graduated from their institutions to guide them in the process. Three-year students in their first year of the curriculum began their clinical rotations in June of that year. Notification pertaining to this coursework occurs in early spring (February-March), and the prospect of clinical coursework prior to completing pathophysiology coursework could be a contributor to increased burnout. There is recent evidence²⁷ of increasing burnout as students enter their clinical

coursework. At the time, second-year students on the 4-year campus were preparing for the United States Medical Licensing Examination (USMLE) Step 1 and their first clinical experiences, while 3-year campus students also had Step 1 but experienced their initial clinical experience the year prior. These aspects of the learning environment—some related to calendar efficiency and others related to the establishment of the campus programs—could account for the observations on burnout at the 3-year and 4-year campuses.

We also found that female students reported higher levels of burnout than the male students, with a significant interaction observed between gender and campus. Of the 4 subgroups generated between gender and campus, male students on the 3-year campus reported the highest level of burnout, while their male counterparts on the 4-year campus reported the lowest. Intermediate scores between the 3 subgroups of male students were the 3 subgroups of female students. Presently, results are mixed on the impact of gender on burnout, so it is not surprising that an interaction term emerged between gender and campus on mean scores or that the regression models were moderated by either predictor. Situational differences may be contributing to outcome variation and need to be resolved. The use of female or male binary gender identifications also may cloud this interpretation, as students who identify as nonbinary or transgender were not distinguished in the survey design. Unfortunately, the facets of emotional intelligence that had significant differences in campus and/or gender did not produce an interaction to account for the burnout observations.

Emotional Intelligence

Many facets of emotional intelligence also showed significant differences on mean scores due to campus and gender. Self-esteem, motivation, and empathy were 3 facets of emotional intelligence that reported higher mean scores for 4-year campus students than 3-year students. The higher motivation scores of 4-year students seem counterintuitive since one might assume it requires greater motivation to progress through medical school in a shorter timeframe. Given the increasing academic demands that emerge as medical school continues, medical students may not maintain the same levels of intrinsic and extrinsic motivation. The motivation items on the emotional intelligence instrument do not differentiate between intrinsic and extrinsic motivation. Additional study is needed to fully resolve the interaction of motivation, campus, and burnout.

Empathy, optimism, and assertiveness were 3 facets of emotional intelligence that were reported higher for female students than male students. Male students reported higher levels of emotion management. These findings collectively align with the mixed reports from the literature.^{17,18} In this study, gender had more numerous effects on emotional intelligence than campus did, although the facet of optimism was the sole intrapersonal

element to report significant differences in mean scores. Higher empathy scores for female medical students indicate a greater understanding of other people's perspectives, higher optimism generates a more positive outlook of the future, and elevated assertiveness suggests being more forthright.¹² Emotion management is the ability to manage other people's emotional states—which was slightly higher for male students—but its significant impact on burnout was not moderated by gender.

The 3-year campus predictive model of burnout included 3 intrapersonal facets of emotional intelligence and zero interpersonal facets, suggesting that burnout on those campuses is wholly driven by the internal capacity to control and express one's emotions. In order of decreasing impact, happiness, self-esteem, and adaptability were significant predictors of burnout. As the most important predictor of burnout for the 3-year campus, finding ways to have moments of happiness in a schedule with less personal downtime is important to offset burnout. As the second most important predictor of burnout, self-esteem is also an important driver of achievement and recently has been reported with a significant association between performance-based self-esteem and exhaustion,²⁸ which is surprising as it is counterintuitive. Increasing self-esteem might be anticipated to increase rather than decrease burnout if it drives performance. Adaptability—the student's ability to remain flexible and adapt to change—may be of greater concern on the 3-year campuses as students adjust to the faster pace of the learning environment and its other unique aspects compared to the 4-year campus.

The 4-year campus burnout model included 2 elements of intrapersonal and 1 interpersonal facet of emotional intelligence, suggesting that an integrative framework will manage relationships through emotion and stress management. In order of decreasing impact, stress management, emotion management, and motivation were significant predictors of burnout. The 4-year campus students can keep burnout lower with higher levels of stress management and motivation, which seems self-evident given the challenges to complete medical school. External pressures, such as stress, are necessary to drive achievement but can reach a critical impasse if not managed properly. Since all other emotional intelligence facets were negatively related to burnout, it was surprising that the interpersonal element of emotion management was a significant and only direct predictor of burnout. In other words, spending time managing other people's emotional states increases burnout and would be counterproductive. Although this is speculative, there is at least 1 report of a direct relationship of female emotion management and burnout in an academic setting.²⁹

Other research suggests that burnout may be associated with specialty trajectories.³⁰ Students selecting higher income specialties and those that provided more lifestyle control had lower frequency of burnout than students interested in lower income specialties and those with less controllable lifestyles, such as primary

care. The two 3-year campuses have a mission focus emphasizing future primary care and psychiatry providers, a mission not shared at the 4-year campus that could also contribute to some of the differences observed for burnout between campuses—even during the early stages of the medical school curriculum.

Study Limitations

A weakness of this study is that we did not include students who were doing their intensive clinical rotations in the third year of medical school. Since most students on the 3-year campus complete their training at the end of this year, the third year is more intense for these students, which may contribute to increased burnout.

An additional factor to consider in this study is timing of the survey with the “opening” of the regional campuses. At the time of the survey, neither regional campus had graduated its first class, and the relative newness of the campuses also may have influenced this data. Gathering this data at the formative time in the early establishment of the 3-year campuses was important for us to understand the student experience at these campuses and may prove beneficial to others attempting to do the same. It will be beneficial to repeat this study when the 3-year campuses are more established and have matched multiple cohorts into the residency of their choice and then compare if any changes in burnout levels occurred between a more established 3-year program and one it is formative phase.

Also concerning is the difference in student response rates to the survey between the regional campuses and the main campus (91% vs 30%, respectively). We have no direct means to explain this difference, but the high response rates at the regional campus suggest that the study has great confidence in the data generated from the regional campuses. A response rate of 30% on the main campus suggests that data set suffers from a nonresponse bias of 70%. One contributing factor that has been observed to improve survey response rates is personalization.³¹ The smaller cohort size on the regional campuses (25 students on each campus vs > 200 on the main campus) may have dramatically increased the personalization of the survey environment (lunch upon completion of the survey) on the regional campuses compared to the main campus. The surveys were completed in February, a few weeks away from spring break. This would be a good time to complete surveys in terms of student availability, but enthusiasm and energy may be diminished when compared to other times of the academic year, which could lower participation rates.

CONCLUSIONS

There were higher burnout scores in students studying on the two 3-year campuses compared to students on the traditional 4-year campus and higher scores for female students than male students. Different facets of emotional intelligence mitigated student burnout by campus and gender.

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