Title: From Student to Physician: Determining Which Lifestyle Behaviors May Be Risk Factors for Burnout at a South Florida Medical School

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- What proportion of #medicalstudents are burned out?
- What lifestyle factors contribute to #MedicalStudent burnout?
- How much is social support necessary to fight #burnout in medicine?

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ABSTRACT

Background: Compared to other professions, physicians have significantly higher rates of burnout and poor lifestyle behaviors, including inadequate sleep, poor diet, limited exercise, and lack of supportive social relationships. Among physicians in training, burnout and increasingly poor lifestyle behaviors can begin as early as the preclinical years of medical school.

Methods: A cross-sectional survey composed of questions from standardized surveys measuring diet (Yaroch's FVS), exercise (NPAQ-S), sleep (NHANES), stress management (HRQOL), social support (BRFSS), substance use (AUDIT-QF, WHO), and burnout (Mini-Z) was conducted on a South Florida medical school in May 2021. One hundred forty-four students fully completed the survey for a response rate of 16%. Descriptive analysis was performed via SPSS to determine the effects of these lifestyle factors on the likelihood of student burnout.

Results: In this sample of medical students, over half (61%) experienced burnout per the Single Item Burnout Measure. Independently, lack of sleep ($P < .02$) and decreased social support ($P < .001$) were lifestyle factors positively associated with increased risk of burnout. Furthermore, students who experienced burnout reported more poor mental health days and decreased life satisfaction ($P < .001$).

Conclusion: Over half of the medical students experienced burnout. Lack of sleep and lack of social support were significantly associated with increased risk of burnout. In addition, burned-out students showed significantly increased levels of poor mental health and decreased life satisfaction. These findings help us identify specific lifestyle factors that institutions could use to further combat medical student burnout.

MeSH Key Words: "students, medical"; "Burnout, Professional"; "risk reduction behavior"; "Support, Social"

INTRODUCTION

Physicians are burned-out, and it starts in medical school. Nearly half of physicians report experiencing burnout, defined as work-related stress leading to emotional exhaustion, depersonalization, and decreased sense of personal accomplishment.[1] The emergence of COVID-19 only deepened this occupational risk.[1] Burnout is a growing healthcare concern because it has been associated with lower patient satisfaction, decreased medication adherence, and increased rates of medical errors.[1,2] The physical and cognitive impairment of burnout also leads to professional consequences, including medical errors, career regret, and lack of empathy towards patients.[1-4] Furthermore, burnout impacts physician wellness and is linked to personal ramifications such as obesity and increased suicidal ideations.[3]

Burnout can begin as early as the preclinical years of medical school.[5,6] A 2013 literature review estimates 45-71% of medical students experience burnout.[6] Burnout interventions have reported a range of benefits.[5,7,8] For example: (1) those who participate in burnout prevention programs report decreased burnout; and (2) those who completed personal health interventions were more likely to counsel patients on healthy lifestyle behaviors.[7,8]

While prior studies have examined burnout among medical students, less is known about their lifestyle behaviors. Studies that explore the role of lifestyle factors on burnout mostly emphasize individual behaviors such as sleep or exercise.[5,9,10] To better understand lifestyle behaviors and burnout among US medical students, data was collected from a cohort of medical students at an LCME-accredited institution to determine (1) burnout prevalence; and (2) lifestyle behaviors, including social support, of South Florida medical students. The objective of this study is to identify specific lifestyle behaviors among undergraduate medical students that may be associated with burnout.

METHODS

Between May and June 2021, a cross-sectional survey with STROBE was conducted at the University of Miami Miller School of Medicine (UMMSM) to explore medical student burnout and lifestyle factors. All currently enrolled medical students (n=892) were sent an email that included an anonymous link to a Qualtrics survey hosted on a privacy-protected, cloud-based server. The electronic consent form stated participation was voluntary and anonymous. Parameters were set to prevent repeat entries from students. A reminder was sent 21 days later. This research was approved by UMMSM Human Subject Research Office (IRB: 20210170).

Measures

Demographic questions on the survey captured the student's race and medical school year. Ten questions measured burnout and lifestyle factors on diet, exercise, sleep, substance use, stress management, and social support. Diet was assessed with Yaroch's 2-item survey for fruit and vegetable servings, which has adequate reliability but has not been validated.[11] Exercise was measured by the validated Nordic Physical Activity Questionnaire-Short (NPAQ-S).[12] Sleep was measured by adapting NHANES question SLD012. Substance use and substance-related stress management included the validated Alcohol Use Disorder Identification Test (AUDIT-QF) for alcohol and modified questions from WHO for tobacco.[13] Poor mental health days and life satisfaction were measured by adapting questions from Health-Related Quality of Life (HRQOL). Social support was measured through the Behavioral Risk Factor Surveillance System (BRFSS) question: "How often do you get the social and emotional support you need?"[20] Possible responses were: "Always", "Usually", and "Sometimes." Presence of social support was denoted for participants who answered "Always."

Burnout

The key outcome variable measured in this study was emotional burnout. Burnout was measured by the Single Item Burnout Measure from the Mini-Z, which measures emotional exhaustion and has been validated against the Maslach Burnout Index (MBI).[14,15] Answers were dichotomized into burnout and no burnout. Students answering: "The symptoms of burnout that I'm experiencing won't go away. I think about frustration at work a lot", "I am definitely burning out and have one or more symptoms of burnout, such as physical and emotional exhaustion", "I feel completely burned-out and often wonder if I can go on. I am at the point where I may need some changes or may need to seek some sort of help," were considered to have burnout.[14,15]

Data Analysis

Only fully completed surveys were included for analysis. Data was exported from Qualtrics to Microsoft Excel. Descriptive statistics were conducted to characterize demographic and lifestyle factors. Bivariate analyses including Chi-square were conducted to examine associations among demographic and lifestyle variables. Items with a P-value less than 0.05 were considered significant.

RESULTS

One hundred forty-four students out of 892 completed the survey for a response rate of 16%. First-year medical students (49%) accounted for most respondents, followed by third-year medical students (35%). Almost half of the respondents (47%) identified as non-white, representing Hispanic/Latinx (17%), Asian or Pacific Islander (15%), Black/African-American (7%), and Other (8%). This reflects the racial demographic of this institution.

Burnout and Life Satisfaction

Eighty-eight medical students (61%) met the burnout criteria per the Single-Item Burnout Questionnaire. Only 5% of students reported no symptoms of burnout.

Most students were satisfied (64%) or very satisfied (26%) with their life; only 10% reported dissatisfaction. Over half (56%) of participants had 7 or more days of poor mental health in a month. Both life satisfaction ($P < .001$) and days of poor mental health ($P < .001$) were significantly associated with student burnout (Figure 1).

Lifestyle Behaviors

Most students (63%) averaged 7-9 hours of sleep per night while 36% got 6 hours of sleep or less per night. Most students reported eating at least 1 serving of fruits (86%) and vegetables (94%) daily. Most students (54%) exercised less than 150 minutes per week, with 29% having less than 30 minutes of vigorous exercise per week. Nearly all students reported abstaining from tobacco use (92%). Of students who drank alcohol (88%), 60% drank no more than 4 times a month. Typically, 1-2 drinks were consumed per sitting (57%); however, 10% of students averaged 5 or more drinks per sitting. Twenty-nine percent of students mentioned using substances as a stress-coping mechanism. Thirty percent of students reported “always” receiving emotional support. The largest category of students (43%) reported “usually” receiving emotional support, whereas 27% stated only “sometimes” receiving emotional support.

To determine the effects of specific lifestyle factors on burnout, a bivariate Chi-squared analysis was performed (Figure 1). Lack of social support, increased days of poor mental health, and decreased life satisfaction was significantly associated with student burnout ($P < .001$). In addition, we found a significant association between decreased hours of sleep per night and burnout ($P < .02$). There was a decreased trend between minutes of vigorous exercise and burnout ($P = .085$). No association was found between burnout and diet, exercise, or alcohol/tobacco use. Separately, no association between race and burnout was found in this sample.

DISCUSSION.

This study is one of the first to examine all six pillars of lifestyle medicine per the American College of Lifestyle Medicine (ACLM) in medical student burnout, which future studies can build upon.[16] In our study, 61% reported burnout, consistent with previous studies that estimate half of American medical students experience burnout.[6] Burnout has serious consequences, as shown in our study where burnout was significantly associated with poor mental health and decreased life satisfaction. Sleep and social support were lifestyle factors that showed a significant association with burnout. No significant association between diet, exercise, or risky substance use and burnout was found, however, a decreased trend between vigorous exercise and burnout was seen which reflects other studies.[8,9] Tobacco and binge alcohol use were rare in our sample. These findings do not diminish the importance of diet, exercise, or risky substance use. Rather, this study introduces new factors that lifestyle-based interventions can target to address burnout among medical students.[5]

Students who slept 6 or fewer hours reported higher levels of burnout than those who slept 7-9 hours, the amount recommended by the ACLM and CDC.[17] This corroborates prior research showing burned-out medical students are more likely to experience sleep deprivation, often due to stress and academic demands.[9,18] Chronic sleep deprivation can lead to depression, anxiety, and even substance abuse, all of which can decrease the quality of life and wellbeing of students who have barely begun their medical careers.[8,9,18] Sleep deprivation may impact students' ability to learn and diminish empathy towards patients and classmates, which can damage their ability to build rapport and relationships.[9,18]

While the connection between sleep and burnout is well-established, limited studies address the relationship between social support and burnout. This could be attributed to difficulty defining support but may also reflect the medical community's disregard for social support as a critical aspect of health. Only half of Americans claim to have "support all or most of the time."[19] Medical school's academic demands worsen the availability of social support, leading to professional consequences.[20,21] US medical students without social support are less likely to feel confident in their medical skills.[7,10] Like US students, half of Trinidadian medical students (52%) experienced burnout, but those who lacked emotional support exhibited higher burnout and depressive symptoms.[20] Another study found poor social support in medical students was positively associated with psychological distress and poor academic self-perception.[22]

In parallel, our study found that students reporting consistent access to emotional support were significantly less likely to have burnout. These findings suggest the need for more peer-to-peer support in medical schools by prioritizing a program's social aspects, such as school-sponsored extracurriculars.[21,22] Additionally, medical students should be encouraged to nurture social relationships that existed before medical school. This includes scheduled breaks and absence policies enabling students necessary time off without repercussion, particularly in times of personal tragedy when risk of burnout increases.[23]

The availability of support—or lack thereof—may influence important lifestyle factors such as sleep and impact medical students' interpersonal relationships.[21] The role of social support in burnout underscores the importance of diverse campuses. The ability to find support in shared communities may be critical to

preventing burnout and promoting academic success, as studies show lack of support contributes to a negative learning environment.[7,22]

The concept of social support as a vital sign is gaining popularity as studies show social support is a reliable predictor of longevity comparable to traditional risk factors.[24] Previous research on student burnout and lifestyle factors noted lack of a social support measurement as a study limitation.[25] Our study addresses this, reiterates social support's role in mitigating medical school burnout, and highlights it as a potential target for intervention.

Overall, our findings may support the use of lifestyle interventions to reduce the risk of burnout in medical students.[1,17-19] Incorporating individual and structural interventions in medical schools to reduce burnout in medical students has been shown to be effective in reducing burnout.[26] Perhaps a prescription for social support could be added to supplement wellness.[24] However, the effectiveness of social support prescriptions in burnout prevention needs to be further evaluated.

Strengths and limitations

We note our study is limited in response rate and lacks demographic details regarding gender and age. In addition, the COVID-19 pandemic introduced a landmark change in the medical school experience that may have been captured in this study. Classes were conducted virtually and students had limited opportunities to socialize with peers and faculty, which may have contributed to a lack of social support. Generalization may not apply due to low response rates leading to potential selection bias, as the study was conducted at a single private medical school in Florida, and burned-out students may be more likely to respond to a burnout survey. In addition, self-reported data confers a response bias which may falsely represent the true practice of lifestyle behaviors or level of burnout in students. While validated, using the Single Item Burnout Measure limits result details; medical student burnout could be more thoroughly described with a full MBI survey. Lastly, as a cross-sectional study, this study captures does not account for how fluctuating academic stressors impact levels of burnout or lifestyle behaviors. However, this study captured a racially diverse medical student population, which contrasts with other American medical education research which historically has captured the white-predominant population of US medical schools.

Conclusion

Early preliminary data suggests that lifestyle factors such as sleep and social support may significantly influence burnout rates in medical students. Further studies are needed to expand on the role social support play in medical student burnout.

SUMMARY

Title: From Student to Physician: Determining Which Lifestyle Behaviors May Be Risk Factors for Burnout at a South Florida Medical School

Main Problem to Solve: Burnout is a growing issue among American healthcare providers. Burnout is defined as physical, emotional, or mental exhaustion and is often seen as a type of work-related stress. In medicine, burnout can lead to decreased empathy for patients, increased medical errors, and career regret. However, burnout is not just limited to physicians. Medical students training to become medical doctors experience burnout even before entering the workforce. A survey of medical students estimated around half of medical students experienced burnout. With the national healthcare shortage in a critical stage, it is important to identify and mitigate potential burnout risk factors in these budding physicians.

Aim of Study: Therefore, a study was conducted to better understand lifestyle behavior and rates of burnout among US medical students. The goal was to identify the rates of burnout and types of lifestyle behaviors in medical students and see if there were any specific lifestyle behaviors that might be linked to burnout.

Methodology: In 2021, a survey was distributed to all students in a South Florida medical school. This survey compiled questions for validated surveys measuring lifestyle behaviors such as diet, exercise, sleep, stress management, social support, and risky substance use. Another validated question was included to measure burnout. One hundred forty-four students responded to this voluntary survey, and the data was analyzed to determine the effects of these lifestyle behaviors on the likelihood of student burnout.

Results: In our study, 61% of the medical students met the criteria for burnout. Only 5% of students reported absolutely no symptoms of burnout. Regarding lifestyle factors, 86% of students ate at least 1 serving of fruit daily, while 94% ate at least 1 serving of vegetable daily. Fifty-four percent of students exercised less than 150 minutes per week, with 29% of students having less than 30 minutes of vigorous exercise per week. Most students averaged 7-9 hours of sleep nightly, but 36% got 6 hours or less. Only 8% reported tobacco use, while 88% reported alcohol use. Of those who drank, 60% drank no more than 4 times a month. Typically 1-2 drinks were consumed per sitting; however, 10% of students averaged 5 or more drinks per sitting. Twenty-nine percent of students mentioned using substances as a stress-coping mechanism. Only thirty percent of students reported they consistently received emotional support. Forty-three percent of students reported "usually" receiving emotional support, whereas 27% stated only "sometimes" receiving emotional support.

Medical students who were burned out were significantly more likely to have poor mental health and decreased life satisfaction. In terms of lifestyle factors, medical students who had less than the recommended 7 to 9 hours of sleep had increased rates of burnout. In addition, medical students who reported having less social support also had increased rates of burnout. There was no link between the number of fruits and vegetables eaten, the frequency of exercise, or tobacco and alcohol use and burnout in this study.

Conclusion:

In our study, 61% reported burnout, consistent with previous studies that estimate half of American medical students experience burnout. Burnout has serious consequences, as shown in our study where burnout was significantly associated with poor mental health and decreased life satisfaction. Sleep and social support were the lifestyle factors that showed a significant association with burnout in our study. Lack of sleep is a well-established factor in burnout. Chronic sleep deprivation is known to cause decreased quality of life by

increasing stress, anxiety, and depression. These feelings may affect a student's ability to perform academically or build relationships with patients or peers. Social support as another factor in burnout is significant because social support is increasingly being viewed as a critical aspect of health. Studies show social support is a reliable predictor of longevity, as much as other traditional risk factors like smoking. The role of social support in burnout underscores the importance of diverse campuses. The ability to find support in shared communities may be critical to preventing burnout and promoting academic success, as studies show lack of support contributes to a negative learning environment, decreased confidence, and higher rates of depression.

Previously, lifestyle-based interventions have been effective in reducing burnout in medical students. Our findings suggest using lifestyle interventions to specifically target lack of sleep and lack of social support in medical school may help reduce the risk of student burnout. However, further studies are needed to expand on the role social support play in medical student burnout.

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FIGURES AND TABLES.

Table 1. Demographics and Lifestyle Behaviors of Participating South Florida Medical Students, 2021

Behavioral Factors	**Frequency (n)**	**Percent (%) (n = 144)**
What year of medical school are you in?		
M1	71	49.3
M2	19	13.2
M3	50	34.7
M4	4	2.8
Which best describes your race?		
Asian or Pacific Islander	22	15.3
Black or African American	10	6.9
Hispanic or Latino	24	16.7
Other	11	7.6
White	77	53.5
How many servings of fruit do you usually eat or drink each day? Think of a serving as being about 1 medium piece, or ½ cup of fruit, or ¾ of cup of fruit juice.		
0	20	13.9
1	54	37.5
2	54	37.5
3+	16	11.1
How many servings of vegetables do you usually eat or drink each day? Think of a serving as being about 1 cup of raw leafy vegetables, ½ cup of other cooked or raw vegetables, or ¾ cup of vegetable juice.		
0	8	5.6
1	48	33.3
2	53	36.8
3+	35	24.3
On a typical week, how much time do you spend in total on moderate and vigorous physical activities where your heartbeat increases and you breathe faster (e.g., brisk walking, cycling as a means of transport or exercise, heavy gardening, running or recreational sports). *Only include activities that lasted at least 10 minutes at a time.*		
Less than ½ an hour (less than 30 minutes)	26	18.1
½ an hour - 1 ½ hours (30-90 minutes)	22	15.3
1 ½ - 2 ½ hours (90-150 minutes)	30	20.8

2 ½ - 5 hours (150-300 minutes)	36	25.0
More than 5 hours (more than 300 minutes)	30	20.8
How much of the time that you spend on physical activities in a typical week, which you indicated above, do you spend in total on vigorous physical activities? This includes activities that get your heart racing, make you sweat, and leave you so short of breath that speaking becomes difficult (e.g., swimming, running, cycling at high speeds, cardio training, weight-lifting or team sports such as football). *Only include activities that lasted at least 10 minutes at a time.*		
Less than ½ an hour (less than 30 minutes)	42	29.2
½ an hour - 1 ½ hours (30-90 minutes)	32	22.2
1 ½ - 2 ½ hours (90-150 minutes)	31	21.5
2 ½ - 5 hours (150-300 minutes)	23	16.0
More than 5 hours (more than 300 minutes)	16	11.1
How often do you have a drink containing alcohol?		
Never	17	11.8
Monthly or less	34	23.6
2-4 times a month	52	36.1
2-3 times a week	36	25.0
4 or more times a week	5	3.5
How many drinks containing alcohol do you have on a typical day when you are drinking?		
0	12	8.3
1 or 2	82	56.9
3 or 4	35	24.3
5 or 6	11	7.6
7 or 8	4	2.8
Do you smoke or use tobacco products (including e-cigarettes)?		
No	133	92.4
On occasion	8	5.6
Yes	3	2.1
In the last 30 days, did you use alcohol, tobacco products, or other substances as a stress-coping strategy?		
No	99	68.8
Unsure	4	2.8
Yes	41	28.5

How many hours do you usually sleep on weekdays or workdays?		
5 hours or less	5	3.5
6 hours or less	47	32.6
7-9 hours	90	62.5
9 hours or more	2	1.4
How often do you get the social and emotional support you need?		
Always	43	29.9
Usually	62	43.1
Sometimes	39	27.1
In general, how satisfied are you with your life?		
Dissatisfied	14	9.7
Satisfied	92	63.9
Very satisfied	38	26.4
Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?		
0-6 days	64	44.4
7-13 days	43	29.9
14-20 days	17	11.8
21-30 days	20	13.9
Overall, based on your definition of burnout, how would you rate your level of burnout?		
I enjoy my work. I have no symptoms of burnout	7	4.9
Occasionally I am under stress, and I don't always have as much energy as I once did, but I don't feel burned-out	49	34.0
I am definitely burning out and have one or more symptoms of burnout, such as physical and emotional exhaustion	60	41.7
The symptoms of burnout that I'm experiencing won't go away. I think about frustration at work a lot	13	9.0
I feel completely burned-out and often wonder if I can go on. I am at the point where I may need some changes or may need to seek some sort of help	15	10.4
Presence of Burnout		
No	56	38.9
Yes	88	61.1

Table 2. Chi-Square Results of Medical Student Burnout and Lifestyle Factors for 144 South Florida Medical Students, 2021

Burnout Chi-Square Test	**Value**	**Df**	**Asymptotic Significance (2-sided)**
Race Pearson $\chi 2$	4.196	4	0.38
Fruit Consumption Pearson $\chi 2$	2.236	3	0.525
Vegetable Consumption Pearson $\chi 2$	1.043	3	0.791
Moderate Phys. Activity Pearson $\chi 2$	3.669	4	0.453
Vigorous Phys. Activity Pearson $\chi 2$	8.187	4	0.085
Alcohol Freq Pearson $\chi 2$	2.671	4	0.614
Alcohol Consumed Pearson $\chi 2$	3.886	4	0.422
Smoker Status Pearson $\chi 2$	0.676	1	0.411
Coping via Alcohol/Substances Pearson $\chi 2$	2.325	2	0.313
Avg. Hours of Sleep Pearson $\chi 2$	8.486	2	.014*
Support Systems Pearson $\chi 2$	13.183	2	<.001*
General Life Satisfaction Pearson $\chi 2$	21.983	2	<.001*
Mental Health Pearson $\chi 2$	28.633	3	<.001*

* Indicates significance at a P < 0.05 level