Knowledge and Barriers to a Healthy Lifestyle in Medical Students

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Research Article

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Abstract

Background

Across the US, chronic illnesses, including cancer and cardiovascular disease, largely result from poor lifestyle decisions such as diet, tobacco/alcohol use, and physical inactivity. Medical students, in particular, have exceedingly unhealthy lifestyle habits, which can result in severe medical conditions, future poor patient outcomes, and burnout. However, little evidence exists on what perceived barriers medical students hold on lifestyle behaviors or how well they understand the relationship between specific lifestyle behaviors and their impact on health.

Method

This study included data from a self-selected sample of 127 medical students aged 22–41 years. All participants were from a midwestern university. Measures included the perceived health impact of 14 different lifestyle and dietary behaviors, self-reported barriers to lifestyle behaviors, and basic demographic questions.

Results

Results showed an average correlation of −.004 between participants’ perceived impact and the actual impact of the behaviors on health (SD = .25; CI = −.047 − .039). Results also identified perceived barriers across behaviors that impact health. For example, results showed the most commonly reported barriers across eating behaviors are cost at 17%, taste at 14%, time at 8%, and food spoiling too quickly at 7%.

Conclusion

Data suggests medical students have insufficient knowledge of the impact of lifestyle behaviors on health. Results also identified several perceived challenges for each lifestyle behavior. Interventions that target a medical student population should include information regarding how to overcome perceived barriers and the impact of lifestyle behaviors on health. Incorporating such information will bolster future interventions’ effectiveness.

Background

An unhealthy lifestyle is a leading cause of morbidity and mortality (e.g., cancer and heart disease) (GBD, 2019). Studies have shown that lifestyle behaviors contribute to 60% of premature deaths and lead to 10 years longer life expectancy free of major chronic diseases (Li et al., 2014; Mokdad et al., 2016; Tamakoshi et al., 2009). Lifestyle behaviors drive fifteen chronic diseases that account for 80% of the total costs of all chronic illnesses worldwide (Hewitt, 2012). These factors are modifiable, yet less than
2.7% of Americans engage in a healthy lifestyle (Loprinzi et al., 2016), sixty percent of adults live with a chronic condition(s) (Buttorff et al., 2017), and life expectancy for Americans is declining (Woolf & Schoomaker, 2019). One approach to reducing the number of deaths caused by chronic health conditions is to promote a healthier lifestyle, particularly in primary care settings.

There is an increasing need for healthy lifestyle interventions. Surprisingly, while the data on the relationship between lifestyle decisions and chronic illnesses is well documented, the medical community has largely ignored lifestyle medicine (Bodai et al., 2018). Worse, some have reported that those who pioneer healthier lifestyle interventions have been marginalized (Bodai et al., 2018). With the potential advantages of lives saved, increased quality of life, and major economic advantages for the healthcare system, why do more physicians not incorporate lifestyle medicine into their daily care for their patients? One reason may be that physicians are uninformed. Only 27% of medical schools in the U.S. provide a minimum of 25 hours of nutritional teaching (Aams et al., 2010; Mogre et al., 2018; Polak et al., 2015).

Primary care residency programs teach an average of only 2.8 hours on how to counsel patients on obesity, nutrition, and physical activity (Antognoli et al., 2017). If medical students lack knowledge of the impact of lifestyle behaviors on health, this would suggest medical students would be unprepared to have productive conversations with their future patients concerning preventative behaviors. However, evidence is required to reveal how knowledgeable medical students are concerning preventative behaviors. A lack of knowledge could also contribute to a medical student’s unhealthy lifestyle.

Medical students have exceedingly unhealthy lifestyle habits (Alzahrani et al., 2020; Brehm et al., 2016; Nasir et al., 2019; Srivastava et al., 2013; Wilf-Miron et al., 2021). Medical school is a critical time when students face many new challenges. Novel challenges make medical students particularly vulnerable to poor lifestyle decision-making. Research suggests students have poor healthy lifestyle habits (e.g., diet and exercise), which contributes to weight gain and other negative effects (Gropper et al., 2012; Hsu et al., 2014; Kelly-Weeder et al., 2014; Maillet et al., 2021; Nelson et al., 2008; Poddar et al., 2009; Strong et al., 2008), putting them at risk for serious chronic health conditions (GBD, 2019). Indeed, some data suggest that college-age students have the poorest diet compared to other age demographics (Imamura et al., 2015). Further, evidence suggests that medical students who engage in self-care activities, which include a nutritious diet and exercise, have a higher perceived quality of life and lower levels of stress (Ayala et al., 2018; Tempski et al., 2012). Without engaging in healthier lifestyle habits, medical students are more likely to reach burnout and be impaired in their long-term ability to provide care (Picton, 2021). Since healthier lifestyle behaviors impact overall well-being and academic performance, investigating factors associated with their lifestyle is vital for tailoring interventions designed to target medical students (Al-Drees et al., 2016). Interventions targeted at medical students are valuable so habits can be carried on throughout later adulthood and into their medical practice.

Poor lifestyle behaviors among medical students are concerning for future patients. Health coaching from medical professionals can improve the health outcomes of patients (Kivela et al., 2014). Doctors’ habits, views, and strategies for a healthy lifestyle are all predictors of how they communicate lifestyle decisions with their patients (Frank et al., 2010; Howe et al., 2010). If medical students carry their bad
habits throughout their careers, their patients are less likely to engage in preventative behaviors. For example, evidence suggests lack of education in medical school makes physicians ill-equipped to support patients with obesity (Butsch et al., 2020).

Little is known about how informed medical students are about the impact of lifestyle behaviors. Medical students’ understanding of the impact of specific lifestyle behaviors on health is important since this knowledge will impact how prevention behaviors will be communicated with their future patients (Kivelä et al., 2014; Richmond et al., 1996). While medical students should have a more accurate understanding of the impact of lifestyle behaviors, little evidence is available as to whether medical students are informed. Telling someone that they need to engage in a healthy diet is not as useful as saying that eating an insufficient amount of whole grains is the largest dietary factor that impacts morbidity and mortality (GBD, 2019). Identifying what information needs to be presented will help inform future intervention content, thereby strengthening the likelihood of its effectiveness.

Many interventions that target healthier behavior change have been created and tested (Ashton et al., 2019; Deliens et al., 2016; Kelly et al., 2013). However, these interventions have had limited success, particularly long-term. These interventions likely lack long-term effectiveness because they do not address perceived barriers to lifestyle change. Some data exists on what barriers college-age students have that prevent them from engaging in a healthy diet (Alexander et al., 2022; Amore et al., 2019; Ashton et al., 2017; LaCaille et al., 2011; Martinez et al., 2016; Sogari et al., 2018). However, data on barriers to an overall diet likely misses barriers that would be identified if data were collected on barriers to food-specific items. For example, barriers to eating fruit and vegetables may be unique compared to barriers to eating less processed meat. To our knowledge, no evidence exists on what barriers people hold on specific food items and other critical lifestyle behaviors (e.g., handwashing). We predict questions that target specific dietary factors will elicit unique perceived barriers compared to questions that target diet more holistically.

**Research Aims and Questions**

The aim of this study was two-fold. First, it was designed to measure how calibrated medical students are regarding lifestyle behaviors and their impact on their health. To the extent students are calibrated on the impact of lifestyle behaviors, they are more equipped to make decisions aligned with their goals and values. Second, this study was designed to identify perceived challenges associated with engaging in lifestyle behaviors that are key for health. An intervention designed to increase informed decision-making regarding preventative behaviors would have greater success if it were to address the perceived challenges. The present study, therefore, (1) measured the perceived impact of lifestyle behaviors relative to each other that are key to longevity and quality of life (e.g., smoking, eating processed meat, and exercise) and (2) collected qualitative data on the barriers associated with engaging in healthy lifestyle behaviors. We aimed to answer 3 specific questions:
1. Are medical students calibrated on the relation between specific lifestyle behaviors and their impact on health?
2. Does sex, age, race, undergraduate major, or year in medical school impact calibration accuracy on the relation between lifestyle behaviors and health?
3. What perceived challenges do medical students hold that limit their ability to engage in healthier lifestyle behaviors?

**Methods**

**Participants and Procedure**

The study period was March 2021. Responses from participants at all stages of medical school were included. All medical students at one midwestern university were contacted to participate in the study. Participants were invited through email to complete an online survey. One hundred and twenty-seven participants were collected. Participants needed to be 18 years of age or older. The study featured a self-report online questionnaire that included questions with a Likert scale and open-ended response options. Ethical approval for the study was obtained from Michigan State University in February 2021. Participation was entirely voluntary.

**Materials**

Qualitative and quantitative data were collected to identify students' calibration on lifestyle behavior impact and to identify perceived barriers that limit students from engaging in healthy behaviors. A questionnaire was developed to measure calibration, which consisted of 14 items. Fourteen (no influence 0–10 very high influence) Likert scale survey items were asked to measure the perceived impact of key lifestyle behaviors on morbidity and mortality. See the example items below.

*For the US population, how much do each of the following behaviors influence health (morbidity/mortality) on a 0–10 scale, 0 being no influence and 10 being very high*

<table>
<thead>
<tr>
<th>Alcohol use</th>
<th>No Influence</th>
<th>Very High Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Tobacco use</td>
<td>No Influence</td>
<td>Very High Influence</td>
</tr>
<tr>
<td></td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>Consuming large amounts of processed meat</td>
<td>No Influence</td>
<td>Very High Influence</td>
</tr>
<tr>
<td></td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>

Following these questions, 13 open-ended questions were asked. For example, “List the challenges you have to consuming more vegetables:” or “List the challenges you have to engaging in more physical
activity:” Finally, basic demographic questions were asked, including age, sex, and race. See supplemental materials1 for the full list of survey items.

**Statistical Analyses**

Descriptive statistics were performed with means and frequencies. Demographics are presented as percentages for categorical variables and a mean and standard deviation for the continuous variable. To test whether medical students are calibrated on the impact of lifestyle behaviors on health, spearman Rho correlations were performed between each participant's ranking and the true impact ranking. The true impact rankings are based on the values provided by the Global Burden of Disease data and rescaled to have a minimum and maximum of 0–10 (GBD, 2019). The scales package in R was used to rescale the values (Wickham, 2010). Two independent t-tests were performed to test whether accuracy ratings were impacted by sex or undergraduate major. A pearson product-moment correlation was used to test whether there was a relationship between age and accuracy ratings. Finally, a one-way Anova was used to test whether the number of years in medical school impacted accuracy ratings. All analyses were conducted through Rstudio (2020).

**Results**

Demographics are reported in Table 1.
Table 1
Demographics from study 1.

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>$M = 26.87, SD = 4.38$</td>
</tr>
<tr>
<td></td>
<td>Range = 22–41</td>
</tr>
<tr>
<td>Sex</td>
<td>Male 27.6% ($N = 35$)</td>
</tr>
<tr>
<td></td>
<td>Female 51.2% ($N = 65$)</td>
</tr>
<tr>
<td></td>
<td>No response 21.3% ($N = 27$)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Asian Indian</td>
<td>4.7% ($N = 6$)</td>
</tr>
<tr>
<td>Black</td>
<td>5.5% ($N = 7$)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>55.9% ($N = 71$)</td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>1.6% ($N = 2$)</td>
</tr>
<tr>
<td>Chinese</td>
<td>.8% ($N = 1$)</td>
</tr>
<tr>
<td>Korean</td>
<td>1.6% ($N = 2$)</td>
</tr>
<tr>
<td>Vietnamese</td>
<td>1.6% ($N = 2$)</td>
</tr>
<tr>
<td>Other</td>
<td>6.3% ($N = 8$)</td>
</tr>
<tr>
<td>No response</td>
<td>20.5% ($N = 26$)</td>
</tr>
</tbody>
</table>

Calibration

Results showed an average correlation of $- .004$ between participants’ impact perception and the actual impact of the behaviors ($SD = .25; CI = - .047 - .039$), indicating that medical students did not rate the importance of decisions on health in-line with current epidemiological evidence. Figure 1 shows the violin plot of the correlations.

A series of analyses were performed to determine if demographic variables significantly predicted accuracy ratings. There was no significant effect for sex, $t(65) = -1.38, p = .17$, which was not surprising since women showed little difference in scores ($M = - .01, SD = .23$) compared to men ($M = .06, SD = .25$). Undergraduate majors were grouped into two categories based on whether the major focused on the study of biology ($M = .01, SD = .24$) or a non-biology related subject (e.g., anthropology, history) ($M = .02, SD = .23$). Results showed no significant effect for major $t(41.2) = -0.1, p = .92$. A Pearson product-moment correlation was used to determine if accuracy could be predicted by age. There was no correlation between the two variables $r(97) = .05, p = 0.6$. A one-way ANOVA was performed to compare
the effect of year in medical school year 1 (M = 0, SD = .21), year 2 (M = .02, SD = .28), year 3 (M = .01, SD = .24), and year 4 (M = .03, SD = .25). No statistically significant difference was found between year and medical school and accuracy ratings (F(3, 97) = .08, p = .97).

Barrier Identification

Qualitative data was collected to identify the most common perceived barriers to healthier lifestyle behaviors. Two independent coders analyzed the qualitative data, grouping responses similar in intent but disparate in phrasing. After initial independent analysis, coding was reviewed and discussed between researchers. Minor discrepancies were resolved. A third coder was available but unnecessary since there were no disputes over groupings. Reported barriers that limit medical students from engaging in healthy behaviors are seen in Table 2. The most commonly reported barriers to not eating healthier were cost 17% (N = 166), taste 14% (N = 139), time 8% (N = 73), and food spoiling too quickly 7% (N = 66). The most commonly reported barriers to reducing alcohol consumption were social Pressure 24% (N = 28), Stress 16% (N = 18), Enjoyment 5% (N = 6), and Availability 3% (N = 3).
Table 2
Percentage of perceived barriers across lifestyle behaviors.

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Perceived Barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains</td>
<td>None 31% (N = 37), Cost 21% (N = 25), Taste 17% (N = 20), Unavailability 9% (N = 12), Time 6% (N = 8), Health 5% (N = 6), Other 4% (N = 5), Unaware 2% (N = 3), Social Pressure 2% (N = 2), Spoils 2% (N = 2), 1% Convenience (N = 1)</td>
</tr>
<tr>
<td>Fruit</td>
<td>Spoils 29% (N = 37), Cost 26% (N = 34), None 21% (N = 27), Taste 6% (N = 8), Unavailability 6% (N = 8), Time 5% (N = 7), Other 5% (N = 7), Health 1% (N = 1)</td>
</tr>
<tr>
<td>Legumes</td>
<td>None 45% (N = 45), Taste 13% (N = 13), Unaware 12% (N = 12), Time 9% (N = 9), Other 7% (N = 7), Cost 6% (N = 6), Forgets 4% (N = 4), Health 3% (N = 3), Unavailability 1% (N = 1)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>Spoils 20% (N = 27), Time 20% (N = 26), None 16% (N = 21), Cost 14% (N = 18), Taste 13% (N = 17), Unaware 7% (N = 9), Other 7% (N = 9), Unavailability 5% (N = 6)</td>
</tr>
<tr>
<td>Handwashing</td>
<td>None 61% (N = 61), Forgets 8% (N = 8), Inconvenience 7% (N = 7), Dry Skin 6% (N = 6), Limited Soap 6% (N = 6), Time 6% (N = 6), Health 3% (N = 3), Lazy 3% (N = 3)</td>
</tr>
<tr>
<td>Nuts and Seeds</td>
<td>Cost 39% (N = 47), None 21% (N = 25), Taste 12% (N = 15), Forgets 9% (N = 11), Other 6% (N = 7), Unhealthy 5% (N = 6), Complicated 4% (N = 5), Unavailability 2% (N = 2), Health 1% (N = 1), Time 1% (N = 1), Unaware 1% (N = 1)</td>
</tr>
<tr>
<td>Alcohol</td>
<td>None 51% (N = 59), Social Pressure 24% (N = 28), Stress 16% (N = 18), Enjoyment 5% (N = 6), Availability 3% (N = 3), Other 1% (N = 1)</td>
</tr>
<tr>
<td>Red Meat</td>
<td>None 43% (N = 50), Taste 22% (N = 25), Availability 12% (N = 14), Cost 8% (N = 9), Social Pressure 5% (N = 6), Upbringing 4% (N = 5), Enjoyment 2% (N = 2), Health 2% (N = 2), Other 2% (N = 2)</td>
</tr>
<tr>
<td>Drugs</td>
<td>None 85% (N = 67), Stress 5% (N = 4), Social Pressure 5% (N = 4), Bored 3% (N = 2), Availability 1% (N = 1), Enjoyment 1% (N = 1)</td>
</tr>
<tr>
<td>Unsafe Sex</td>
<td>None 82% (N = 79), Social Pressure 6% (N = 6), Other 5% (N = 5), Availability 4% (N = 4), Cost 2% (N = 2)</td>
</tr>
<tr>
<td>Tobacco</td>
<td>None 98% (N = 96), Social Pressure 2% (N = 2)</td>
</tr>
<tr>
<td>Processed Meat</td>
<td>None 26% (N = 35), Convenient 23% (N = 31), Cost 17% (N = 23), Time 16% (N = 22), Availability 8% (N = 11), Taste 6% (N = 8), Health 2% (N = 3), Enjoyment 1% (N = 2), Forgets 1% (N = 1), Social Pressure 1% (N = 1)</td>
</tr>
<tr>
<td>Sweetened Beverages</td>
<td>None 42% (N = 47), Taste 29% (N = 32), Convenience 11% (N = 12), Availability 9% (N = 10), Enjoyment 5% (N = 5), Cost 4% (N = 4), Other 1% (N = 1)</td>
</tr>
<tr>
<td>Exercise</td>
<td>Time 47% (N = 77), Motivation 12% (N = 20), Tired 11% (N = 18), Weather 10% (N = 17), Cost 6% (N = 10), Space 4% (N = 7), Stress 3% (N = 5), None 3% (N = 5), Other 2% (N = 3), Health 1% (N = 1), Social Pressure 1% (N = 1)</td>
</tr>
<tr>
<td>Diet</td>
<td>None 30% (N = 287), Cost 17% (N = 166), Taste 14% (N = 139), Time 8% (N = 73), Spoils 7% (N = 66), Convenient 4% (N = 44), Other 4% (N = 37), Availability 4% (N = 35), Unavailable 3% (N = 29), Unaware 3% (N = 25), Forgets 2% (N = 16), Health 2% (N = 16), Enjoyment 1% (N = 9), Social Pressure 1% (N = 9), Unhealthy 1% (N = 6), Complex 1% (N = 5), Upbringing 1% (N = 5)</td>
</tr>
</tbody>
</table>
Discussion

The purpose of this study was (1) to assess how calibrated medical students are on the relationship between lifestyle behaviors and health and (2) to identify perceived barriers to key lifestyle behaviors. The data collected here suggest that medical students do not understand the relative impact of lifestyle behaviors on health. Participants did not rate the importance of behavior on health in-line with current epidemiological evidence. In addition, qualitative data identified perceived barriers for 14 different behaviors. Results showed the most commonly reported barriers across eating behaviors are cost at 17%, taste at 14%, time at 8%, and food spoiling too quickly at 7%.

The evidence collected in this study suggests that medical students lack sufficient knowledge for future conversations with their patients about preventative behaviors. Since this evidence suggests medical students are uncalibrated as to the impact of lifestyle behaviors on health, they may be less motivated to have preventative behavior conversations with their patients or provide information that causes valuable resources from the patient (e.g., time and energy) to be placed on less impactful behaviors. For example, physicians may emphasize the need for patients to exercise rather than diet, even though diet is a larger determinant of health (GBD, 2019).

Previous interventions designed to change or inform lifestyle behaviors have had limited long-term success. One reason may be that they do not increase the necessary knowledge of the relative impact of lifestyle behaviors on health. The present data suggest medical students hold insufficient knowledge regarding the impact of different lifestyle behaviors on health. This means that college students are not equipped to make decisions about their limited resources (e.g., time, energy, and money) in-line with their health goals. For example, medical students could spend more money on vegetables and fruit and neglect whole grains even though whole grain consumption has a larger impact on health (GBD, 2019).

An accurate understanding of disease impact is essential for making preventative behavior decisions (Brawarsky et al., 2018). Increasing knowledge on the impact of lifestyle behaviors would likely influence motivation to change behavior and help medical students and their future patients make decisions with limited and valuable resources more aligned with their goals and values.

Strong evidence suggests that increasing self-efficacy significantly impacts healthy behavior change (Jackson et al., 2007; Sheeran et al., in-press). However, a recent meta-analysis shows current interventions do not significantly increase self-efficacy (Sheeran et al., in-press). Neglecting to address perceived barriers limits the effectiveness of an intervention on its potential for behavior change. The present paper identified perceived barriers for 14 different behaviors. By providing information on how to overcome the perceived barriers identified in this study, self-efficacy would likely be improved.

Understanding or comprehension is the cornerstone of informed decision-making. Representative understanding or comprehension is also fundamental for making decisions about engaging in prevention practices (Cokely et al., 2018). Further, behavior change theories (e.g., Health Belief Model, Social Cognitive Theory, Theory of Planned Behavior, Integrated Behavior Model, Diffusion of Innovation) include individual comprehension (i.e., understanding of risk, outcomes, severity, consequences, etc.) as a
necessary antecedent to behavior (Bandura, 1998; Cane et al., 2012; Damschroder et al., 2009; Michie et al., 2013; Michie & Johnston, 2012). Comprehension not only directly influences the capability of engaging in the appropriate behavior but also influences autonomous motivation to engage in the behavior (Ryan & Deci, 2000). Results in the present study can be used to inform the content of future lifestyle interventions, thereby increasing their informed decision-making. Increasing how informed medical students are on the relationship between lifestyle behaviors and health and how to overcome perceived challenges associated with behavior change makes it more likely that medical students and their future patients will make better health decisions.

**Limitations**

There are several limitations to the present study. First, the study only recruited participants from a midwestern university. Medical students at other locations may have unique challenges to a healthier lifestyle that are not captured by the current sample. This data represents information regarding only one medical school. While evidence suggests that medical schools do not engage in a sufficient amount of lifestyle education, other universities may be informing their students to a larger degree. Therefore, this limits the generalizability of the results, particularly outside of the US. Data was collected through a respondent-driven sampling method and, therefore, may miss medical students who were unwilling or unable to respond to the survey. These students could have unique challenges that are not captured in the present study. Further, it is unclear whether participants understood one of the items in the calibration questions (i.e., drugs). Some participants may have misinterpreted this item and thought of prescription drugs. Therefore, this item could, in part, skew the results. However, despite these limitations, this study provides a foundation for future research on further samples and demographic groups.

**Conclusion**

This study suggests that medical students lack sufficient knowledge of the relationship between specific lifestyle behaviors and health. This study also identified many barriers specific to each major lifestyle behavior impacting health. Results from this study can be used to inform future intervention content and medical student curriculum content. Incorporating such information will increase the likelihood of changing medical student behavior and make them more prepared to address patient needs.

**Declarations**

**Availability of data and materials**

All data generated or analyzed during this study are included in this published article and its supplementary information files.

**Acknowledgments**

Ms. Ann-Inger Mortvedt for her thoughtful review of the paper.
Funding

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Ethics declaration

All methods were conducted following relevant guidelines and regulations.

Ethics approval and consent to participate

Ethical approval for the study was obtained from Michigan State University Internal Review Board Protocol # STUDY00004821 in February 2021. Informed consent was received from the participants to use the information anonymously for the purpose of this study.

Consent for publication

During the distribution of the survey to potential respondents, they were informed that by completing the survey, they would be providing consent for their anonymized data to be used, analyzed, and potentially published. Consent was received from the participants for the publication of this manuscript.

Competing interests

The authors declare no competing interests.

Authors' contributions

BN conducted the analysis and reporting and was involved in all paper components. EP conceived the idea, directed the research, and was involved in all paper components. ST collected and analyzed data. All authors read and approved the final manuscript.

References


Figures
Figure 1

Violin plot of the medical student sample correlations. Boxplot is included in the plot. The dot is the mean, and the bars report the 95% Confidence Intervals.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Appendix.docx
- MSUHealthyLifestyleSurveyrawdata.xlsx