Assessment of Osteopathic Medical Students' Attitudes Towards Substance Use Disorder (SUD) and Alcohol Use Disorder (AUD)

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Abstract

Millions of people in the United States are diagnosed with substance use disorder (SUD) and alcohol use disorder (AUD) every year. Physicians' attitudes towards SUD and AUD can significantly impact the quality of care they provide to these patients, but these conditions are not covered extensively in most medical school curricula. It is important to understand medical students' baseline attitudes towards SUD and AUD because it will help inform development of training programs and better prepare future medical professionals to deliver compassionate care to patients with these conditions, thus, improving patient outcomes. Current literature focuses on the attitudes of allopathic medical students, with only three studies assessing attitudes within osteopathic medical schools. While these three studies focus on opioid use disorder, this study aimed to better understand osteopathic medical students' attitudes towards SUD and AUD. We hypothesized that exposure to SUD and AUD would increase incrementally throughout years of medical school. Furthermore, we hypothesized that students further along in their medical training and those with exposure to SUD and AUD would have more positive attitudes towards patients with these conditions, prefer harm reduction efforts to criminalization, and endorse allocating resources to treating SUD and AUD. To test this hypothesis, we assessed osteopathic medical students' attitudes towards SUD and AUD given their: 1) level of medical training and 2) self-reported exposure to these populations. A 30-question Qualtrics survey was distributed amongst 1485 first-fourth year osteopathic medical students at Rocky Vista University, and 334 responses were analyzed. Exposure to SUD and AUD increased incrementally with advancement through medical school ($p = 0.001$) and students in their clinical years (third- and fourth-year students) had significantly more positive views toward people diagnosed with SUDs than students in their pre-clinical years (first- and second-year students) ($p = 0.0046$, Cohen's d effect size = 3.65). Moreover, surveyed second-year students were less likely than clinical students to believe resources should be dedicated to supporting and treating individuals with SUD and AUD ($p = 0.0194$, $d = 0.03$) and were less likely to support harm reduction over criminalization ($p = 0.0079$, $d = 3.49$). Respondents with self-reported exposure to SUD and AUD were more likely to support devoting resources to individuals with these conditions ($p = 0.014$, $d = 2.47$) but were not more likely to support harm reduction over criminalization ($p = 0.731$). Our findings highlight the importance of increased training on and exposure to SUD and AUD in the medical

school curricula to better prepare future physicians to effectively treat patients with these conditions.

Introduction

In 2023, 17.1% of the population greater than 12 years old (48.5 million people) reported having a substance use disorder (SUD), and 60% of these individuals (28.9 million) reported having an alcohol use disorder (AUD).[1] Despite the high prevalence of these conditions, SUD and AUD training make up a small portion of the medical school curriculum.[2,3] Medical students receive basic life support (BLS) training, but formal opioid overdose prevention training (OOPT) and management of SUDs is often minimal or absent.[4,5] In the 2021-2022 academic year, the AAMC reported only 75 medical schools (n=155) had required didactic sessions covering the recognition of SUDs and only 73 out of 155 had required didactic sessions on the treatment of SUDs.[6] As a result, many medical students and residents feel ill equipped to effectively and optimally manage patients with SUDs.[7] Moreover, medical schools have no formal interventions in place to address stigma against patients with SUDs[8] despite several studies showing that both experiential learning and exposure to these patients positively impact medical students' attitudes towards them.[9–14] The lack of exposure to SUD withdrawal, overdose, and recovery in medical training perpetuates stigma and directly impacts patient care.[15]
Harm reduction strategies have been shown to improve the health of people who use drugs (PWUD), yet public support of these efforts remains low, including among medical students.[16] Studies have shown that medical students have negative attitudes towards harm reduction even though they have little knowledge of it.[17] Despite the evidence of harm reduction education leading to more positive attitudes and decreased stigma towards PWUD, formal integration of harm reduction training into medical school curricula is lacking.[3,16]

The current literature regarding medical students' attitudes toward people with SUDs is largely from studies conducted at allopathic medical schools with little representation of osteopathic medical students.[9,14,18] This is likely due to the historical lack of prioritization of training in SUDs within osteopathic medicine. It was not until 2019 that the American Osteopathic Association created a "clinical practice pathway for initial osteopathic board certification in addiction medicine" (American Osteopathic Addiction Medicine Examination Committee, 2019). To our knowledge, there are only three studies analyzing osteopathic medical students and their attitudes towards SUDs.[9,14,18] While these studies focus on attitudes towards opioid use disorder, our aim was to add to this literature by assessing osteopathic medical students' attitudes towards people with SUDs and AUDs.

The objective of this study was to assess the attitudes of first- through fourth-year osteopathic medical students at Rocky Vista University towards people with SUDs and AUDs. In addition, the survey included questions to assess self-reported level of exposure to this population, level of medical training, and desire to work with SUD and/or AUD patient populations in the future. We hypothesized that exposure to people with SUD and AUD would increase incrementally throughout the years in medical school. Additionally, we hypothesized that students further along in their medical training and students with exposure to people with SUDs and AUDs would have more positive attitudes towards them, favor harm reduction strategies over criminalization, and support the allocation of resources to treat patients with these conditions.

Methods

A 30-question IRB-approved Qualtrics survey was distributed to 1485 first- through fourth-year medical students at the Rocky Vista University College of Osteopathic Medicine Colorado, Utah, and Montana campuses, and 350 students completed it from September 2023 through December 2023 (response rate = 23.56%). Responses from students at the Montana campus (n=16) were excluded from analysis resulting in a final sample size of 334. The survey was sent by email to all first- through fourth-year medical students at the Colorado, Utah, and Montana campuses. Additionally, a flyer describing the study and including a QR code link to the survey was posted in several locations on the Colorado campus. However, no flyers were posted on the Utah or Montana campuses. Participation was voluntary, and students could choose to enter their email at the end of the survey for a chance to win a one-hundred-dollar Visa gift card. Responses were not matched to the email entry to ensure anonymity.

The survey questions included 11 demographic questions and 19 statements (Table 1) aimed to assess students' attitudes towards people with substance use disorder and alcohol use disorder using a 5-point Likert scale. Cronbach's alpha values were calculated for the following groups of statements: items 12–19 ($\alpha = 0.6295$), items 20–23 ($\alpha = 0.2306$), items 24–25 ($\alpha = 0.6166$), and items 26–30 ($\alpha = 0.7018$). For all analyses, the third- and fourth-year students were grouped together due to their comparable stage in education. First-year students receive minimal exposure to and training on SUD and AUD, while second-year students receive some training in their Principles of Clinical Medicine course, including the impact of SUDs on the social determinants of health. Third-year students were expected to have engaged in patient interactions with people with SUD or AUD in their clinical rotations. Fourth-year students were expected to have additional general clinical training; however, since the sample sizes were low for the third- and fourth-year classes, they were combined for statistical analysis. This allowed for comparison between pre-clinical and clinical students, while still ensuring adequate sample sizes for reliable statistical analysis.

The "Medical Condition Regard Scale" (MCRS) has been used by several studies to qualify medical students' views towards patients with a given medical condition.[19] Its support and subsequent use in various peer-reviewed journals highlights its reliability and validity.[19] The scale has three main components: "the degree to which medical students find patients with a given medical condition to be enjoyable, treatable, and worthy of medical resources."[19] While we did not use this exact scale, our statements tested two of these three components. Statements 12-23 (Table 1) assessed if respondents found these patients to be treatable, and statements 26-30 assessed their beliefs about worthiness of resources.

We chose not to utilize the MCRS for several reasons. Although the MCRS is used to assess regard for any medical condition, we wanted to individually evaluate attitudes towards SUD and AUD. Additionally, our survey allowed us to assess students' views on specific parameters such as harm reduction and naloxone accessibility. Moreover, we were able to include statements that directly addressed commonly held biases about SUD and AUD (Table 1, items 12-30).

All statistical analyses were performed with SAS Version 9.4 (SAS Institute, Cary, NC). Scores for attitudes regarding the various substance use disorders were calculated by averaging each participant's responses to the Likert scale questions within each topic. Agree and strongly agree

were coded as in support of the statement; disagree and strongly disagree were coded as not in support of the statement. The mean score of questions answered was analyzed for each participant. Each participant will have a mean score between 1 and 5 (Table 2). A higher mean score indicates a more negative attitude, while a lower mean score indicates a more positive attitude.

To reduce response bias, some questions were reverse-coded and properly adjusted on the scoring scale (Table 2). See Table 1 for reverse-coded items. Analysis of variance (ANOVA) procedures (or independent t-tests for factors with two levels) were utilized to determine the differences in the variables measured. Means and standard errors are reported, and statistical significance set at $p<0.05$. In the cases of ANOVA, significant results were further analyzed with post-hoc multiple comparisons.

Results

In analyzing the study results, responses from Montana (n=16) were excluded from the final analysis, reducing the sample size to 334. This decision was based on the small number of responses from Montana, differences in curriculum, and the fact that only first-year students were enrolled at the time of the survey. Table 3 presents the results of item 4 from the demographic survey, showing that 264 participants identified their race as white. Additionally, in response to item 5, 90.12% of respondents indicated that they do not identify as Hispanic.

We hypothesized that exposure to SUD and AUD would increase incrementally throughout the years of medical school. To determine self-reported exposure to SUD and AUD, we analyzed the responses to items 6, 7, and 8 from the demographic survey. The data showed that self-reported exposure to these conditions increased significantly and incrementally with advancement through medical school ($p = 0.001$) (Table 4). We hypothesized that more extensive medical training and exposure to SUD and AUD would be associated with more positive views towards SUD and AUD, increase students' likelihood of supporting harm reduction over criminalization, and be associated with increased likeliness to support the allocation of resources to treat patients with these conditions. Although our results did not demonstrate this clear, positive linear progression with increased medical training or exposure to SUD and AUD, we observed some interesting differences. To determine the association between year in school and attitude towards SUD, we analyzed the responses to items 12-19 (Table 1). Data showed students in their clinical years have significantly more positive views toward SUD than students in their pre-clinical years (first- and second-year students) ($p = 0.0046$). Second-year students had the least positive attitudes, albeit not significantly different from first-year students (Figure 1), suggesting that clinical exposure may be associated with more positive attitudes.

To analyze support of harm reduction over criminalization, statements 24 and 25 (Table 1) were used and showed second-year students were significantly less likely to support harm reduction over criminalization than first-year students and clinical students (third- and fourth-year students) ($p = 0.0079$) (Figure 2). The second-year students we surveyed were also significantly less likely than clinical students, but not first-year students, to believe resources should be dedicated to supporting and treating individuals with SUD and AUD based on our analysis of statements 26-30 ($p = 0.0194$) (Figure 3). Notably, our analyses of statements 20-23 showed no

significant difference in views towards AUD between students in different years of medical school (Figure 4), but all classes had a mean greater than 3, indicating negative attitudes.

To further support hypothesis 3, students that responded "yes" to question 6, 7, or 8 in Table 1 were classified as having exposure to SUD or AUD. Interestingly, while those with self-reported exposure to SUD and AUD were more likely to support devoting resources to individuals with these conditions ($p = 0.014$) (Figure 5), they were not more likely to support harm reduction over criminalization ($p = 0.731$) (Figure 6). However, in both cases, those with and without exposure have positive attitudes towards resource allocation and harm reduction with means below 3.

Discussion

Based on the literature, we expected increased exposure to SUDs and AUDs over the course of medical education would correlate with a more positive attitude towards those conditions.[2,11,20] Our findings supported this hypothesis with significantly increased exposure with each consecutive year in medical school and found that students in their clinical years (third- and fourth-year students) had significantly more positive attitudes towards people with SUDs than first- and second-years. While our findings suggest that clinical exposure may positively impact students' attitudes, there have been mixed findings regarding the impact of clinical experiences on medical students' attitudes towards patients with SUDs.[21,22] Experiential learning through hearing patient recovery narratives, participating in addiction consult liaison psychiatry rotations, and structured anti-stigma trainings in pre-clinical years has been associated with improved attitudes of medical students towards SUDs.[21,22] More generally, direct patient contact has been shown by some studies to improve attitudes, but others have suggested that a directed focus on addiction is needed to positively impact attitudes.[23,24]

While students at Rocky Vista receive some pre-clinical education on SUD and AUD in their principles of clinical medicine course and psychiatry lectures, there are no specific anti-stigma trainings in place that we are aware of. At the time of data collection, there was a non-clinical elective offered on integrative pain management and substance use disorders. The class sizes were small, between 18 and 27 students, and consisted mainly of first- and second-year students, although it was open to third- and fourth-year students as well. There is also a one-week gap course for fourth-year students on pain management available. Participation at the time of data collection consisted of 149 students from the class of 2024. This course is centered around pain management but does include some minor discussion on SUD throughout the week. While this course may touch on aspects of substance use disorder (SUD), to our knowledge, there are no other dedicated electives or didactic trainings specifically focused on SUD or AUD in students' clinical years.

In line with our hypothesis that attitudes toward SUD would improve throughout medical training, we also hypothesized that students would increasingly favor harm reduction over criminalization and show greater support for allocating resources to treat SUD as they progressed through medical school. Our findings showed that while second-year students had significantly more negative attitudes towards harm reduction and resource allocation, third- and fourth-year students had more positive attitudes. This further supports the idea that clinical exposure may be associated with more positive attitudes. The less positive attitude we found in the second-year class was unexpected, but given that our study was only conducted at two satellite campuses of

the same medical school, we are unable to generalize these findings to all second-year medical students. We hypothesize that this finding could be due to the burnout effect, as second-year medical students taking our survey were halfway through their last year of didactics and were turning their attention to studying for their board exams.[25]

When comparing medical students with self-reported exposure to those without, we hypothesized that those with previous exposure would prefer harm reduction over criminalization of SUD and would have significantly more positive attitudes towards resource allocation. We found that both groups had a generally positive attitude towards resource allocation and harm reduction. While there was no significant difference in views on harm reduction based on self-reported exposure, there was a significant difference in attitudes towards resource allocation. We hypothesize this may reflect the current lack of knowledge surrounding harm reduction and criminalization and that students' attitudes towards harm reduction could become more positive with harm-reduction specific training. This finding is consistent with the systematic review by Gugala et al., which found significant gaps in physician knowledge surrounding harm reduction.[26] Gugala et al. noted a stigmatizing belief system targeting individuals with OUD and called for more education around harm reduction. While the concept of harm reduction is gaining more traction in mainstream media, as well as in medical school curricula, universities could include more training in their curricula. Several studies have shown that educational lectures and modules regarding harm reduction improve both medical students' knowledge of and attitudes towards harm reduction.[16,17,27,28]

Limitations

The findings in this study are subject to several limitations: the lack of longitudinal data and an uneven distribution of participants throughout all four years of medical training. Our study consisted of substantially more first- and second-year respondents compared to third- and fourth-year students (Table 1) and an underrepresentation of the third- and fourth-year classes. This study could be conducted longitudinally in subsequent years to identify if training in medical school is significantly impacting students' attitudes towards SUD or AUD. Additionally, we did not strictly define "exposure" in our survey. We considered anyone that answered "yes" to questions 6-8 in Table 1 to have exposure to SUD or AUD. However, a positive answer to any of these could represent a wide variety of experiences. While studies have demonstrated that SUD specific training modules and direct interaction with individuals in recovery have positively impacted students' attitudes towards these conditions,[11,15,29–32] other research suggests that certain experiences, such as working as emergency medical personnel, may be associated with negative attitudes towards people with SUDs.[33] Thus, experiences providing exposure to SUD can have both positive and negative effects on attitudes, limiting what conclusions we can draw from our data. Lastly, future studies could consider using the MCRS as the survey instrument or assess differences in attitudes between SUD and AUD.

Conclusion

Students' self-reported exposure to SUD and AUD increased incrementally (p=0.001) with advancement through medical school. While the second-year class was found to have more negative attitudes toward people with SUD and AUD compared to the first-year class, there was an increase in positive attitudes towards people with SUD and AUD among the third- and fourth-year classes compared to the second-year class, suggesting that clinical experience obtained in the latter two years of medical school could be associated with more positive attitudes. Attitudes towards harm reduction and resource allocation were generally positive. These positive views towards harm reduction were not significantly different based on self-reported exposure to SUD and AUD. We theorize that harm-reduction specific training could further improve students' attitudes towards harm reduction. Future studies can expand on these findings by utilizing a control group and assessing attitudes longitudinally.

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Figures, Tables, and Appendices

Table 1. Demographic Survey Questions (1-11) and survey statements organized by assessment topic (12-30). Statements that were reverse coded are labeled.

Demographic Survey Questions
1. What is your age? ❑ 18-20 ❑ 21-23 ❑ 24-26 ❑ 27-29 ❑ 30-32 ❑ 33-35 ❑ 36-39 ❑ 40 +
2. What year of medical school are you currently in? ❑ OMS-I ❑ OMS-II ❑ OMS-III ❑ OMS-IV
3. Which campus location do you attend? ❑ Colorado ❑ Utah ❑ Montana
4. Please select the race with which you most identify. ❑ Native American/Alaska Native

- ❑ Asian
- ❑ Black or African American
- ❑ Native Hawaiian/Pacific Islander
- ❑ White
- ❑ Multi-Racial
- ❑ Prefer not to respond
- ❑ Other: _____

5. What is your ethnicity?

- ❑ Hispanic or Latino/Latinx/Latiné
- ❑ Not Hispanic or Latino/Latinx/Latiné

6. Do you have any family or friends that have struggled with substance use disorder, alcohol use disorder, or opioid use disorder?

- ❑ Yes
- ❑ No
- ❑ Not Sure

If yes, please select all that apply.

- ❑ Alcohol Use Disorder
- ❑ Substance Use Disorder
- ❑ Opioid Use Disorder
- ❑ Other
- ❑ Not Sure

7. Do you have any experience working with patients with addiction, substance use disorder, alcohol use disorder, or opioid use disorder in a clinical setting?

This includes anything with direct patient interactions

- ❑ Yes

- ❑ No

8. Do you have any experience with addiction medicine?

This includes addiction medicine research or course work

- ❑ Yes
- ❑ No

9. Do you want to work with patients with substance use disorder, opioid use disorder, or alcohol use disorder in your career as a physician?

- ❑ Yes
- ❑ No
- ❑ Maybe
- ❑ Not Sure

10. What is/are your current specialty/ies of interest? Please select no more than three.

- ❑ Anesthesia
- ❑ Dermatology
- ❑ Emergency Medicine
- ❑ Family Medicine
- ❑ General Surgery
- ❑ Internal Medicine
- ❑ Neurology
- ❑ OBGYN
- ❑ Pathology
- ❑ Pediatrics
- ❑ Psychiatry
- ❑ Radiology
- ❑ Surgical Subspecialty

❑ Other
11. When you think of a person with substance use disorder, what substances do you think of? Please select no more than three. ❑ Alcohol ❑ Benzodiazepine ❑ Cocaine ❑ Crack ❑ Ecstasy ❑ Fentanyl ❑ Heroin ❑ Ketamine ❑ LSD (Acid) ❑ Methamphetamine ❑ THC
Survey Statement
SUD Attitude
12. People with substance use disorder lack willpower.
13. People with substance use disorder deserve empathy. **(reverse)**
14. People with substance use disorder deserve the same quality of care as people with other chronic health conditions**. (reverse)**
15. People with substance use disorder are more likely to be homeless.
16. I can tell by looking at someone if they have substance use disorder.
17. There should be a limit to the number of times that a person with substance use disorder can go to rehab.

18. Naloxone should be made more accessible. **(reverse)**
19. People with less education are more likely to become addicted to drugs.
AUD Attitude
20. Addiction to alcohol is less severe than addiction to other drugs. **(reverse)**
21. It is easier for a person with alcohol use disorder to function in society than a person with substance use disorder. **(reverse)**
22. Working class people are at a higher risk than more affluent people to become addicted to alcohol.
23. Alcohol has less health consequences than illicit substances. **(reverse)**
Support of Harm Reduction Vs Criminalization
24. Harm reduction enables people with substance use disorder to continue using drugs.
25. Criminalization is an effective approach to discouraging drug use.
Allocation of Resources Attitude
26. There should be a limit to the number of times that a person with substance use disorder can go to rehab.
27. It is not a good use of resources for emergency medical services to respond to a patient who repeatedly overdoses.
28. Insurance plans should cover patients with substance use disorders to the same degree that they cover other conditions **(reverse)**
29. Addiction rehabilitation centers should be accessible to patients regardless of insurance status **(reverse)**
30. Naloxone should be made more accessible. **(reverse)**

Table 2. Numerical conversions of Likert scale responses.

Response	**Score (Higher score indicates negative attitude)**	**Score (Reverse coded questions)**
Strongly Disagree	1	5
Somewhat Disagree	2	4
Neutral//Not Sure	3	3
Somewhat Agree	4	2
Strongly Agree	5	1

Table 3. Table of self-reported race. This was classified based on respondents' answers to question 4 in Table 1.

Race	**Frequency**	**Percent**
Asian	35	10.50
Multi-Racial	22	6.60
Native American/Alaska Native	2	0.60
White	264	79.0
Prefer Not to Respond	11	3.29
Total	334	100

Table 4. Table of self-reported exposure by year in school (p= 0.001). Exposure was defined as responding "yes" to questions 6, 7, or 8 in Table 1.

	OMS-I	**OMS-II**	**OMS-III**	**OMS-IV**	**Total**
No	25 (24.04%)	17 (13.49%)	4 (6.15%)	1 (2.56%)	47
Yes	79 (75.96%)	109 (86.51%)	61 (93.85%)	38 (97.44%)	287
Total	104	126	65	39	334

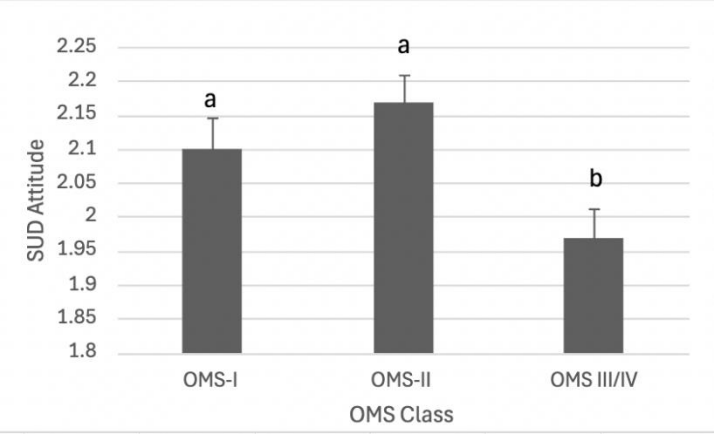

Figure 1. SUD attitude by Osteopathic Medical Student (OMS) class. Columns represent mean attitude scores ± SEM. A lower score indicates a more positive attitude. Two attitude means with the same lowercase letter are not significantly different at the 0.05 level. Students in their clinical years (third- and fourth-year students, OMS III/IV) have significantly more positive views toward SUD than students in their pre-clinical years (first- and second-year students, OMS I/ II) ($p = 0.0046$, $d = 3.65$).

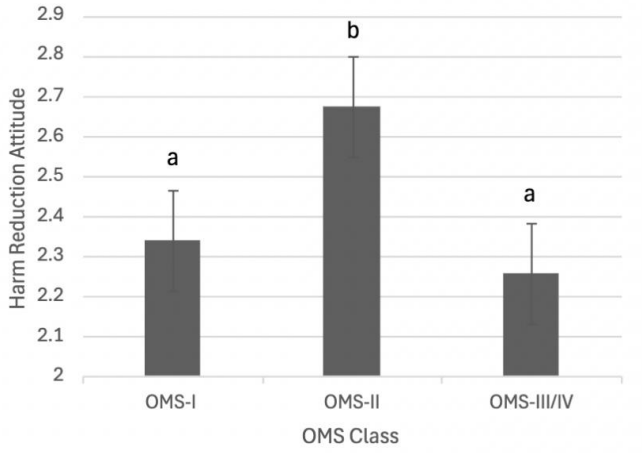

Figure 2. Support of harm reduction vs. criminalization by OMS class. Columns represent mean attitude scores ± SEM. A lower score indicates a more positive attitude. Two attitude means with the same lowercase letter are not significantly different at the 0.05 level. Second-year students were significantly less likely to favor harm reduction over criminalization than first-year students and clinical students (third- and fourth-year students) ($p = 0.0079$, $d = 3.49$).

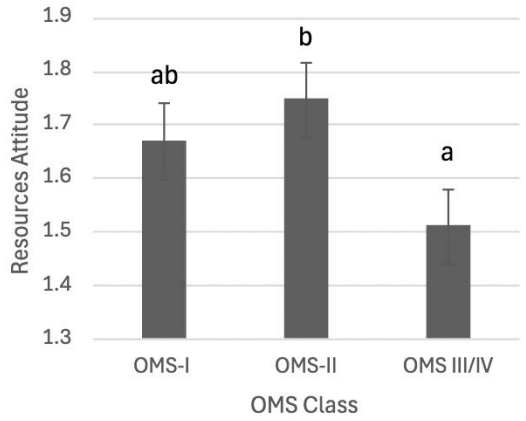

Figure 3. Allocation of resources attitude by OMS class. A higher score indicates a more negative attitude. Columns represent mean attitude scores ± SEM. A lower score indicates a more positive attitude. Two attitude means with the same lowercase letter are not significantly different at the 0.05 level. The second-year students were less likely than clinical students (third- and fourth-year students) to believe resources should be dedicated to supporting and treating individuals with SUD and AUD ($p = 0.0194$, $d = 0.03$)).

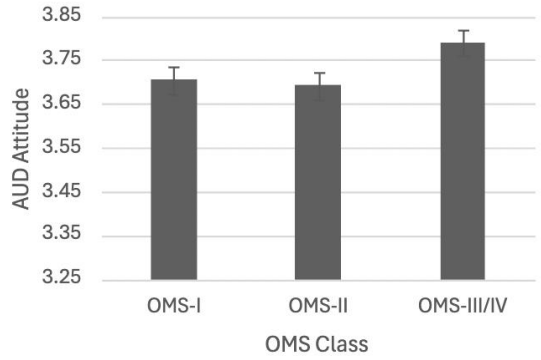

Figure 4. AUD attitude by OMS class. Columns represent mean attitude scores ± SEM. A higher score indicates a more negative attitude. No significant difference in views towards AUD were observed between students in different years of medical school ($p = 0.2733$).

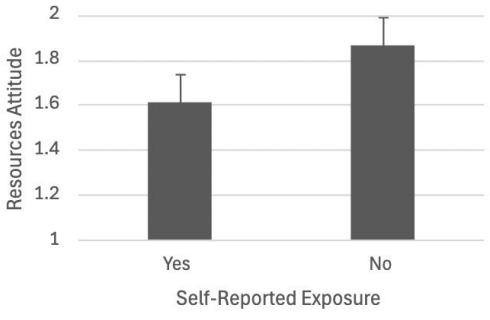

Figure 5. Allocation of resources attitude by self-reported exposure to SUD or AUD. Exposure was defined as responding "yes" to questions 6, 7, or 8 in Table 1. A higher score indicates a

more negative attitude. Columns represent mean attitude scores ± SEM. 287 students answered "yes" while 47 responded "no." Students with self-reported exposure to SUD or AUD were significantly more likely to support devoting resources to individuals with these conditions ($p = 0.014$, $d = 2.47$).

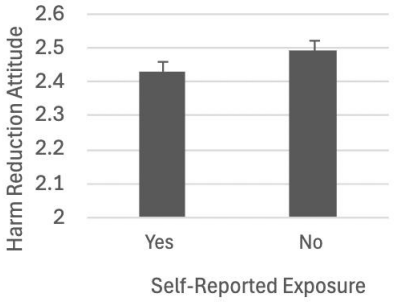

Figure 6. Support of harm reduction vs. criminalization by self-reported exposure to SUD or AUD. Exposure was defined as responding "yes" to questions 6, 7, or 8 in Table 1. A higher score indicates a more negative attitude. Columns represent mean attitude scores ± SEM. No significant difference in support of harm reduction vs. criminalization was observed by self-reported exposure to SUD or AUD ($p = 0.731$).