Depression, Stigma, and Suicidal Ideation in Medical Students

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Medical students experience depression, burnout, and mental illness at a higher rate than the general population, with mental health deteriorating over the course of medical training. Medical students have a higher risk of suicidal ideation and suicide, higher rates of burnout, and a lower quality of life than age-matched populations. Burnout and depressive symptoms have been associated with suicidal ideation. Medical students are less likely than the general population to receive appropriate treatment despite seemingly better access to care. Students may engage in potentially harmful methods of coping, such as excessive alcohol consumption, and, despite their training, may fail to recognize that depression is a significant illness that requires treatment.

Stigma associated with depression and the use of mental health care services may represent a barrier to seeking treatment. One study identified stigma as an explicit barrier to the use of mental health services by 30% of first- and second-year medical students experiencing depression. In addition, 37% identified lack of confidentiality and 24% cited fear of documentation in their academic record as barriers to treatment. Students may worry that revealing their depression will make them feel less intelligent or compromise their education, and physicians may be reluctant to disclose their diagnosis on licensure and medical staff applications. The fear of professional sanctions may lead to inappropriate and possibly dangerous approaches to seeking care such as self-prescription of antidepressants.

We conducted a study of medical students at the University of Michigan Medical School to assess the prevalence of self-reported depression and suicidal ideation and to assess the perceptions of stigma by depressed medical students that may serve as barriers to receiving appropriate mental health care.

Context There is a concerning prevalence of depression and suicidal ideation among medical students, a group that may experience poor mental health care due to stigmatization.

Objective To characterize the perceptions of depressed and nondepressed medical students regarding stigma associated with depression.

Design, Setting, and Participants Cross-sectional Web-based survey conducted in September-November 2009 among all students enrolled at the University of Michigan Medical School (N = 769).

Main Outcome Measures Prevalence of self-reported moderate to severe depression and suicidal ideation and the association of stigma perceptions with clinical and demographic variables.

Results Survey response rate was 65.7% (505 of 769). Prevalence of moderate to severe depression was 14.3% (95% confidence interval [CI], 11.3%-17.3%). Women were more likely than men to have moderate to severe depression (18.0% vs 9.0%; 95% CI for difference, −14.8% to −3.1%; P = .001). Third- and fourth-year students were more likely than first- and second-year students to report suicidal ideation (7.9% vs 1.4%; 95% CI for difference, 2.7%-10.3%; P = .001). Students with moderate to severe depression, compared with no to minimal depression, more frequently agreed that “if I were depressed, fellow medical students would respect my opinions less” (56.0% vs 23.7%; 95% CI for difference, 17.3%-47.3%; P < .001), and that faculty members would view them as being unable to handle their responsibilities (83.1% vs 55.1%; 95% CI for difference, 16.1%-39.8%; P < .001). Men agreed more commonly than women that depressed students could endanger patients (36.3% vs 20.1%; 95% CI for difference, 6.1%-26.3%; P = .002). First- and second-year students more frequently agreed than third- and fourth-year students that seeking help for depression would make them feel less intelligent (34.1% vs 22.9%; 95% CI for difference, 2.3%-20.1%; P < .01).

Conclusions Depressed medical students more frequently endorsed several depression stigma attitudes than nondepressed students. Stigma perceptions also differed by sex and class year.

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See also pp 1173 and 1231.
cceptions of depression stigma by both depressed and nondepressed stu-
dents.

METHODS
We conducted a cross-sectional sur-
vey from September-November 2009 of
all 769 medical students enrolled at the
University of Michigan Medical School,
a large, research-intensive public medi-
cal school. The medical school curricu-

lum emphasizes basic science teaching
in the first year with early clinical ex-
posure, clinical and basic science cor-
rrelations in the second year, required
clinical rotations in the third year, and
required and elective clinical and ba-
sic science rotations in the fourth year.
The study was approved by the Uni-
versity of Michigan institutional re-
view board. As part of written in-
formed consent, students responding to
the survey were presented with a full
description of the study, the potential
harm (no more than minimal) of the
survey, their rights as potential partici-
pants, their right to decline participa-
tion without prejudice, and the oppor-
tunity to continue or terminate study
participation. Participants received no
financial compensation, but the pri-
ivate survey research firm (see below)
conducted a lottery among all partici-
pants, in which a single pair of airline
tickets was awarded.

Focus group discussions with stu-
dents informed survey content develop-
ment, item selection, and survey
implementation. Participants were pre-
sented with a standardized oral script
that described the nature of the pro-
posed study and their voluntary par-
ticipation. The focus groups included
a convenience sample of students not
specifically identified as depressed, and
addressed general experiences and opin-
ions about depression, views on
health care seeking, career-related con-
cerns about stigma and depression, and
guidance about achieving optimal sur-
v...
particularly those identified in prior studies, were included with both positive and negative framing as an internal consistency check. These statements were otherwise drawn from the existing literature on stigma in the general population, including several validated instruments and selected for their potential applicability to medical students. Stigma items considered for selection were drawn from generally accepted categories of stigmatization including self-perceived stigma, public stigma, and stigma related to being treated for depression. A total of 35 potential items were initially reviewed and reduced to 27 items based on focus group feedback to target items most pertinent to medical student experiences. Stigma items were adapted to the specific roles and professional responsibilities of medical students. For example, the statement “I believe that my friends would think less of me if they knew I was depressed” was changed to “I believe my fellow medical students would think less of me if they knew I was depressed.”

**Data Analyses**

Frequencies and summary statistics were calculated on all variables of interest. The PHQ-9 scores were collapsed into 3 categories: 0 to 4 (no to minimal depression), 5 to 9 (mild depression), and 10 to 27 (moderate to severe depression). This categorization allowed us to compare responses of students who would most likely meet standardized criteria for major depressive disorder (likelihood ratio ≥7.1) compared with those of the remaining students. The analysis of stigma responses involved dropping the neutral category of responses and recoding the stigma items as dichotomous variables (strongly disagree/disagree vs strongly agree/agree) based on standard analytical schemes for Likert scales. Given the explicit and sometimes provocative or controversial nature of the stigma items, we chose to focus on clear opinions of agreement or disagreement rather than diluting the analysis by, for example, using a simple mean of all responses that would give undue influence on the results to respondents who had no opinion.

Class year was coded as a dichotomous variable in order to compare results for students in preclinical vs clinical education. Using χ² analyses and Fisher exact tests as appropriate, we compared depression severity, perceptions of stigma, and suicidal ideation by several demographic variables and by depression diagnosis and treatment history. The χ² tests investigated associations between stigma item responses and depression severity. Multiple comparisons with Bonferroni post hoc tests were used to limit Type I errors. With the experimental error rate set at 0.05, the individual error rate was reduced to 0.002 (0.05 divided by 27 stigma items). Quantitative analyses were performed using SPSS 17.0 statistical software package (SPSS Inc, Chicago, Illinois).

A formal prospective power analysis could not be made because there were no prior studies or data to indicate the likely pattern of responses and potential differences between groups. Based on general experience in the behavioral sciences, we estimated that a proportion difference of 15% would be of moderate size and worthy of further research and exploration. In order to find a proportion difference of 15% or more to be statistically significant with 80% power, with the smaller proportion ranging between 5% and 10%, we needed between 70 and 167 participants per group, corresponding to a response rate of approximately 14% to 44%. For 2-group comparisons across years in medical school, assuming an equal distribution across years, a 15% effect size would be detected with 80% power with the number of participants ranging between 36 and 114, corresponding to a response rate of approximately 19% to 59%.

**RESULTS**

The response rate for the PHQ-9 items was 65.7% (505 of 769 usable responses). The response rate for first- and second-year students was higher than that for third- and fourth-year students (78.6% and 82.9% vs 50.2% and 56.9%, respectively). The response rate for all stigma items was essentially the same as that for the PHQ-9 with minor exceptions (502-505 re-

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**Table 1. Characteristics of the Study Sample**

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. (%) of Participants (n = 505)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
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</tr>
<tr>
<td>18-20</td>
<td>3 (0.6)</td>
</tr>
<tr>
<td>21-25</td>
<td>341 (67.5)</td>
</tr>
<tr>
<td>26-30</td>
<td>143 (28.3)</td>
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<tr>
<td>31-35</td>
<td>12 (2.4)</td>
</tr>
<tr>
<td>&gt;35</td>
<td>6 (1.2)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>210 (41.6)</td>
</tr>
<tr>
<td>Women</td>
<td>295 (58.4)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>343 (68.2)</td>
</tr>
<tr>
<td>Black</td>
<td>10 (2.0)</td>
</tr>
<tr>
<td>American Indian or Alaskan Native</td>
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</tr>
<tr>
<td>Asian, Asian-American, or Pacific Islander</td>
<td>112 (22.3)</td>
</tr>
<tr>
<td>Other</td>
<td>23 (4.6)</td>
</tr>
<tr>
<td>Preferred not to answer</td>
<td>15 (3.0)</td>
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<td>Ethnicity</td>
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<td>Hispanic or Latino</td>
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<td>Other</td>
<td>478 (94.8)</td>
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<td>Relationship status</td>
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<td>224 (44.4)</td>
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<td>In a committed relationship</td>
<td>212 (42.0)</td>
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<td>Widowed</td>
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<td>17 (3.4)</td>
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<td>6 (1.2)</td>
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<td>Year in medical school</td>
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<td>136 (27.0)</td>
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<td>2</td>
<td>141 (28.0)</td>
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<td>4</td>
<td>112 (22.2)</td>
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<td>Primary care</td>
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<td>Surgical</td>
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<td>Medical or pediatric</td>
<td>95 (18.8)</td>
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<tr>
<td>Hospital-based discipline</td>
<td>71 (14.1)</td>
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<tr>
<td>Undecided</td>
<td>138 (27.3)</td>
</tr>
<tr>
<td>Other</td>
<td>19 (3.8)</td>
</tr>
</tbody>
</table>

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a The 505 participants are those who responded to the Patient Health Questionnaire.

b Percentages may not sum to 100% due to rounding.

c The number of respondents for this question was 503.

d Primary racial category selected by respondents.
e One response was missing.
spondents, 65.3%-65.7%). Women comprise 49.3% of University of Michigan medical students and were overrepresented as participants, with the total survey response rate of women (299 of 379, 78.9%) higher than that of men (213 of 390, 54.6%; P < .001). Women were also overrepresented compared with all US medical students. In 2006-2007, women represented 48.3% of US medical student matriculants but 58.4% of respondents (P = .001). Demographic characteristics of respondents are shown in Table 1.

A total of 72 students (14.3%; 95% confidence interval [CI], 11.3%-17.3%) scored in the moderate to severe depression range on the PHQ-9 (Table 2). First- and second-year medical students were no more likely than third- and fourth-year students to report moderate to severe depression (13.4% [37 of 277] vs 15.4% [35 of 227]; 95% CI for difference, −8.2% to 4.1%; P = .14). A significantly greater percentage of women than men scored in the moderate to severe range (18.0% vs 9.0%; 95% CI for difference, −14.8 to −3.1%; P < .001).

Twenty-two students (4.4%; 95% CI, 2.6%-6.1%) reported suicidal ideation at some point during medical school, with the proportion of moderate to severely depressed participants varying significantly by level of suicidal ideation (χ² = 13.88; 95% CI for difference, 7.1%-48.6%; P = .001; Table 2). First- and second-year students less frequently scored in the moderate to severe range on the PHQ-9 compared with third- and fourth-year students (13.4% [37 of 277] vs 15.4% [35 of 227]; 95% CI for difference, −8.2% to 4.1%; P = .14). A significantly greater percentage of women than men scored in the moderate to severe range (18.0% vs 9.0%; 95% CI for difference, −14.8 to −3.1%; P < .001).

### Table 2. Depression Scores and Suicidal Ideation by Respondent Characteristics

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<thead>
<tr>
<th>Variable</th>
<th>Depression PHQ-9 Score, No. (%)</th>
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<td></td>
<td>None to Minimal (Range, 0-4)</td>
<td>95% CI</td>
<td>P Value</td>
<td>Suicidal</td>
<td>None to Minimal (Range, 0-4)</td>
<td>95% CI</td>
<td>P Value</td>
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<td></td>
<td>(n = 284)</td>
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<td></td>
<td>(n = 22)</td>
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<td>Year</td>
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<tr>
<td>1</td>
<td>136</td>
<td>73 (53.7)</td>
<td>45 (33.1)</td>
<td>18 (13.2)</td>
<td>9 (0.7)</td>
<td>-8.2 to 4.1</td>
<td>.14</td>
<td>.9</td>
<td>2.7 to 10.3</td>
<td>.001</td>
<td></td>
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<tr>
<td>2</td>
<td>141</td>
<td>75 (53.2)</td>
<td>47 (33.3)</td>
<td>19 (13.5)</td>
<td>3 (2.1)</td>
<td>8 (7.0)</td>
<td>10 (8.9)</td>
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<td>3</td>
<td>115</td>
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<td>4</td>
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<td>74 (66.1)</td>
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<td>10 (8.9)</td>
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<td>Sex</td>
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<tr>
<td>Men</td>
<td>210</td>
<td>140 (66.7)</td>
<td>51 (24.3)</td>
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<td>7 (3.3)</td>
<td>-14.8 to -3.1</td>
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<td>.9</td>
<td>15 (5.1)</td>
<td>.39</td>
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<td>98 (33.2)</td>
<td>53 (18.0)</td>
<td>5 (3.3)</td>
<td>-1.7 to 5.2</td>
<td>.39</td>
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<tr>
<td>White</td>
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<td>203 (59.2)</td>
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<td>48 (14.0)</td>
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<td>.39</td>
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<td>3 (30.0)</td>
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<td>-2.5 to 4.9</td>
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<td>16 (42.1)</td>
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<td>9 (23.7)</td>
<td>1 (2.6)</td>
<td>.39</td>
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<tr>
<td>Ethnicity</td>
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<td>7 (26.9)</td>
<td>1 (3.8)</td>
<td>-3.8 to 30.9</td>
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<td>.89</td>
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<td>142 (29.7)</td>
<td>64 (13.4)</td>
<td>21 (4.4)</td>
<td>-8.1 to 7.0</td>
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<td>Seriously consider committing suicide while in medical school?</td>
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<tr>
<td>No</td>
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<td>276 (57.3)</td>
<td>143 (29.7)</td>
<td>63 (13.1)</td>
<td>14 (3.3)</td>
<td>19.4 to 42.0</td>
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<td>.01</td>
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<td>22</td>
<td>7 (31.8)</td>
<td>6 (27.3)</td>
<td>9 (40.9)</td>
<td>8 (10.4)</td>
<td>-14.1 to -0.1</td>
<td>.01</td>
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</table>

Abbreviations: CI, confidence interval; PHQ, Patient Health Questionnaire.

*Response percentages calculated for PHQ-9 categories by subgroup. Due to rounding, some subgroup percentage totals may not equal 100. For each response, the denominator for percentages includes students without missing data.

*95% CIs for differences in the proportion of moderately or severely depressed individuals between subgroups characterized by the respective row categories.

*Calculated by 2 × 3 χ² test.

*95% CIs for differences in the proportion of individuals who considered suicide between the subgroups characterized by the respective row categories.

*Calculated by 2 × 2 Fisher exact test with suicidal ideation coded 1 for no, 2 for yes.

*Comparison by year in medical school, coded 1 for first or second year and 2 for third or fourth year.

*When compared first, second, and third year vs fourth year, the results were also statistically significant (95% CI, 0.5-13.3; P = .04).

*When compared first, second, and third year vs fourth year, the results were also statistically significant (95% CI, 0.4-11.5; P = .01).

*Results shown for comparison by race, coded 1 for white and 2 for Other.
DEPRESSION IN MEDICAL STUDENTS

Ever diagnosed as depressed?

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Students</th>
<th>None to Minimal (Range, 0–4)</th>
<th>Mild (Range, 5–9)</th>
<th>Moderate to Severe (Range, 10–27)</th>
<th>95% CI</th>
<th>P Value</th>
<th>95% CI</th>
<th>P Value</th>
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<tbody>
<tr>
<td>Ever diagnosed as depressed?</td>
<td></td>
<td>431</td>
<td>259 (60.1)</td>
<td>118 (27.4)</td>
<td>54 (12.5)</td>
<td>1.5 to 22.1</td>
<td>&lt;.001</td>
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<tr>
<td>No</td>
<td>74</td>
<td>25 (33.8)</td>
<td>31 (41.9)</td>
<td>18 (24.3)</td>
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<tr>
<td>Yes</td>
<td>403</td>
<td>234</td>
<td>130 (64.9)</td>
<td>75 (32.1)</td>
<td>56 (23.9)</td>
<td>16.0 to 55.3</td>
<td>&lt;.001</td>
<td>6 (24.0)</td>
</tr>
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</table>

Currently diagnosed as depressed?

<table>
<thead>
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<th>Variable</th>
<th>No. of Students</th>
<th>None to Minimal (Range, 0–4)</th>
<th>Mild (Range, 5–9)</th>
<th>Moderate to Severe (Range, 10–27)</th>
<th>95% CI</th>
<th>P Value</th>
<th>95% CI</th>
<th>P Value</th>
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<tbody>
<tr>
<td>Ever felt seriously depressed even if not diagnosed?</td>
<td></td>
<td>271</td>
<td>181 (66.8)</td>
<td>74 (27.3)</td>
<td>16 (5.9)</td>
<td>11.9 to 24.2</td>
<td>&lt;.001</td>
<td>2 (0.7)</td>
</tr>
<tr>
<td>No</td>
<td>234</td>
<td>103 (44.0)</td>
<td>75 (32.1)</td>
<td>56 (23.9)</td>
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</table>

Sought prior treatment for depression?

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Students</th>
<th>None to Minimal (Range, 0–4)</th>
<th>Mild (Range, 5–9)</th>
<th>Moderate to Severe (Range, 10–27)</th>
<th>95% CI</th>
<th>P Value</th>
<th>95% CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently receiving treatment?</td>
<td></td>
<td>413</td>
<td>246 (59.6)</td>
<td>115 (27.8)</td>
<td>52 (12.6)</td>
<td>0.1 to 18.2</td>
<td>.004</td>
<td>10 (2.4)</td>
</tr>
<tr>
<td>No</td>
<td>92</td>
<td>38 (41.3)</td>
<td>34 (37.0)</td>
<td>20 (21.7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| No                             | 470            | 272 (57.9)                  | 138 (29.4)       | 60 (12.8)                        |        |         |        |         |
| Yes                            | 35             | 12 (34.3)                   | 11 (31.4)        | 12 (34.3)                        |        |         |        |         |

Abbreviation: CI, confidence interval. PHQ, Patient Health Questionnaire.

Response percentages calculated for PHQ-9 categories by subgroup. Due to rounding, some subgroup percentage totals may not equal 100. For each response, the denominator for percentages includes students without missing data.

95% CIs for the difference in the proportion of moderately or severely depressed individuals between subgroups characterized by the respective row categories.

Calculated by 2×3 χ² test.

95% CIs for differences in the proportion of individuals who considered suicide between the subgroups characterized by the respective row categories.

Calculated by 2×2 Fisher exact test with suicidal ideation coded 1 for no and 2 for yes.

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Table 4. Comparison of Agree and Disagree Stigma Responses by Depression Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Responses Analyzed(^b)</th>
<th>Depression PHQ-9 Depression Scores, No. (%)</th>
<th>95% CI, %c</th>
<th>P Value(^d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telling a counselor I am depressed would be risky</td>
<td>427</td>
<td>Disagree</td>
<td>205 (33.3)</td>
<td>93 (76.9) 28 (46.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agree</td>
<td>41 (16.7)</td>
<td>28 (23.1) 32 (53.3)</td>
</tr>
<tr>
<td>Other students would stop including me in social activities if they</td>
<td>391</td>
<td>Disagree</td>
<td>203 (89.4)</td>
<td>96 (78.9) 38 (69.1)</td>
</tr>
<tr>
<td>discovered I was depressed</td>
<td></td>
<td>Agree</td>
<td>24 (10.6)</td>
<td>23 (21.1) 17 (30.9)</td>
</tr>
<tr>
<td>If I were depressed and asked for help, I would be admitting that my</td>
<td>398</td>
<td>Disagree</td>
<td>147 (66.5)</td>
<td>56 (47.9) 23 (38.3)</td>
</tr>
<tr>
<td>coping skills are inadequate</td>
<td></td>
<td>Agree</td>
<td>74 (33.5)</td>
<td>61 (52.1) 37 (61.7)</td>
</tr>
<tr>
<td>If I were depressed, I would seek treatment(^f)</td>
<td>352</td>
<td>Disagree</td>
<td>27 (12.8)</td>
<td>24 (24.5) 23 (53.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agree</td>
<td>184 (87.2)</td>
<td>74 (75.5) 20 (46.5)</td>
</tr>
<tr>
<td>If I were depressed, I would be blamed for being unable to cope(^f)</td>
<td>339</td>
<td>Disagree</td>
<td>149 (77.6)</td>
<td>56 (68.3) 22 (43.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agree</td>
<td>43 (22.4)</td>
<td>40 (41.7) 29 (56.9)</td>
</tr>
<tr>
<td>Seeking help for depression would make me feel less intelligent as a</td>
<td>406</td>
<td>Disagree</td>
<td>175 (78.8)</td>
<td>81 (65.9) 33 (54.1)</td>
</tr>
<tr>
<td>medical student(^g)</td>
<td></td>
<td>Agree</td>
<td>47 (21.2)</td>
<td>42 (34.1) 28 (45.9)</td>
</tr>
<tr>
<td>Other students and faculty members would view me as unable to handle my</td>
<td>359</td>
<td>Disagree</td>
<td>88 (44.9)</td>
<td>37 (35.6) 10 (16.9)</td>
</tr>
<tr>
<td>responsibilities if I were depressed(^f)</td>
<td></td>
<td>Agree</td>
<td>108 (55.1)</td>
<td>67 (64.4) 49 (83.1)</td>
</tr>
<tr>
<td>If I were depressed, fellow medical students would respect my opinions</td>
<td>340</td>
<td>Disagree</td>
<td>145 (76.3)</td>
<td>59 (59.0) 22 (44.0)</td>
</tr>
<tr>
<td>less(^g)</td>
<td></td>
<td>Agree</td>
<td>45 (23.7)</td>
<td>41 (41.0) 28 (56.0)</td>
</tr>
<tr>
<td>If I were depressed and applying to a residency, my application would</td>
<td>384</td>
<td>Disagree</td>
<td>87 (41.8)</td>
<td>28 (24.8) 15 (23.8)</td>
</tr>
<tr>
<td>be less competitive than that of a student who does not have depression(^h)</td>
<td></td>
<td>Agree</td>
<td>121 (58.2)</td>
<td>85 (75.2) 48 (76.2)</td>
</tr>
<tr>
<td>Most medical students would not want to work with a medical student who</td>
<td>365</td>
<td>Disagree</td>
<td>138 (68.7)</td>
<td>59 (66.7) 31 (51.7)</td>
</tr>
<tr>
<td>is depressed(^d)</td>
<td></td>
<td>Agree</td>
<td>63 (31.3)</td>
<td>45 (43.3) 29 (48.3)</td>
</tr>
<tr>
<td>Medical students with depression could snap out of it if they wanted to</td>
<td>458</td>
<td>Disagree</td>
<td>253 (98.8)</td>
<td>130 (96.3) 62 (92.5)</td>
</tr>
<tr>
<td>do so</td>
<td></td>
<td>Agree</td>
<td>3 (1.2)</td>
<td>5 (3.7) 7 (5.5)</td>
</tr>
<tr>
<td>If I were depressed, I would worry that my medical student friends who</td>
<td>399</td>
<td>Disagree</td>
<td>133 (61.3)</td>
<td>64 (51.6) 25 (43.1)</td>
</tr>
<tr>
<td>knew would tell other students or faculty(^h)</td>
<td></td>
<td>Agree</td>
<td>84 (38.7)</td>
<td>60 (48.4) 33 (56.9)</td>
</tr>
<tr>
<td>Medical students and faculty members believe that a student who has</td>
<td>396</td>
<td>Disagree</td>
<td>24 (10.4)</td>
<td>20 (19.2) 13 (21.3)</td>
</tr>
<tr>
<td>depression is just as intelligent as other students(^d)</td>
<td></td>
<td>Agree</td>
<td>207 (99.6)</td>
<td>84 (80.8) 48 (75.7)</td>
</tr>
<tr>
<td>Medical students with depression are dangerous to their patients(^g)</td>
<td>308</td>
<td>Disagree</td>
<td>130 (74.3)</td>
<td>58 (65.2) 38 (86.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agree</td>
<td>45 (25.7)</td>
<td>31 (34.8) 6 (13.6)</td>
</tr>
</tbody>
</table>

(continued)

\(^a\) Depression PHQ-9 depression scores range from 0 to 27, with higher scores indicating greater depression.

\(^b\) The number of responses analyzed for each question is provided in the first column.

\(^c\) 95% confidence interval for the proportion of responses.

\(^d\) Significance level for the comparison of agree and disagree responses.

\(^e\) Statistical significance at the 0.05 level.

\(^f\) Questions answered in the context of shoplifting.

\(^g\) Questions answered in the context of substance use.

\(^h\) Questions answered in the context of sexual assault.

\(^i\) Questions answered in the context of domestic violence.

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### Table 4. Comparison of Agree and Disagree Stigma Responses by Depression Scorea (continued)

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Responses Analyzedb</th>
<th>Depression PHQ-9 Depression Scores, No. (%)</th>
<th>95% CI, %c</th>
<th>P Valued</th>
</tr>
</thead>
<tbody>
<tr>
<td>My teachers would not ignore me or take me any less seriously if I were depressed</td>
<td>377</td>
<td>Disagree 76 (34.5) 50 (47.2) 24 (47.1)</td>
<td>−27.6 to 25.6 .05</td>
<td></td>
</tr>
<tr>
<td>Agree 144 (65.5) 56 (52.8) 27 (52.9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A medical student who sees a counselor is admitting that he/she is unable to handle the stress of medical schoolh</td>
<td>396</td>
<td>Disagree 191 (83.8) 85 (76.6) 40 (70.2)</td>
<td>0.8 to 26.4 .05</td>
<td></td>
</tr>
<tr>
<td>Agree 37 (16.2) 26 (23.4) 17 (29.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most people believe that depressed medical students would provide inferior treatment to their patients</td>
<td>365</td>
<td>Disagree 57 (25.8) 21 (21.2) 18 (40.0)</td>
<td>−29.6 to 1.2 .06</td>
<td></td>
</tr>
<tr>
<td>Agree 164 (74.2) 78 (78.8) 27 (60.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression is a sign of personal weaknessf</td>
<td>422</td>
<td>Disagree 227 (92.7) 110 (89.4) 45 (83.3)</td>
<td>−1.1 to 19.8 .09</td>
<td></td>
</tr>
<tr>
<td>Agree 18 (7.3) 13 (10.6) 9 (16.7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I were depressed, I would tell my medical school friends</td>
<td>399</td>
<td>Disagree 127 (58.3) 76 (63.9) 43 (69.4)</td>
<td>−24.3 to 2.1 .24</td>
<td></td>
</tr>
<tr>
<td>Agree 91 (41.7) 43 (36.1) 19 (30.6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I were depressed, I would be unable to complete medical school tasks and responsibilities as well as other studentsg</td>
<td>414</td>
<td>Disagree 37 (16.0) 23 (18.1) 13 (23.2)</td>
<td>−19.2 to 4.8 .44</td>
<td></td>
</tr>
<tr>
<td>Agree 194 (84.0) 104 (81.9) 43 (76.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I were depressed it would be risky to reveal my depression on my residency applicationf</td>
<td>453</td>
<td>Disagree 12 (4.8) 6 (4.3) 1 (1.5)</td>
<td>−0.7 to 7.3 .50i</td>
<td></td>
</tr>
<tr>
<td>Agree 237 (95.2) 133 (95.7) 64 (98.5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical students with depression are NOT to blame for their problemsf</td>
<td>326</td>
<td>Disagree 38 (20.3) 22 (23.9) 12 (25.5)</td>
<td>−18.9 to 8.5 .66</td>
<td></td>
</tr>
<tr>
<td>Agree 149 (79.7) 70 (76.1) 35 (74.5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I were depressed, I would worry that I would miss out on educational opportunities</td>
<td>426</td>
<td>Disagree 55 (23.6) 27 (20.3) 12 (20.0)</td>
<td>−7.9 to 15.1 .70</td>
<td></td>
</tr>
<tr>
<td>Agree 178 (76.4) 106 (79.7) 48 (80.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A depressed medical student is worth the investment of medical school teaching time and effortf</td>
<td>460</td>
<td>Disagree 7 (2.7) 4 (3.0) 2 (3.1)</td>
<td>−5.0 to 4.2 .70i</td>
<td></td>
</tr>
<tr>
<td>Agree 253 (97.3) 131 (97.0) 63 (96.9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I were depressed, I would not feel embarrassed or ashamedf</td>
<td>378</td>
<td>Disagree 163 (81.1) 100 (84.7) 49 (83.1)</td>
<td>−12.9 to 9.0 .71</td>
<td></td>
</tr>
<tr>
<td>Agree 38 (18.9) 18 (15.5) 10 (16.9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression is a real medical illnessh</td>
<td>489</td>
<td>Disagree 5 (1.8) 3 (2.1) 1 (1.4)</td>
<td>−2.8 to 3.6 &lt;.99i</td>
<td></td>
</tr>
<tr>
<td>Agree 270 (88.2) 141 (97.9) 69 (98.6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical students with depression are not worth the time and resources for medical school teachingh</td>
<td>492</td>
<td>Disagree 280 (99.6) 140 (98.6) 69 (100.0)</td>
<td>−1.0 to −0.3 &lt;.99i</td>
<td></td>
</tr>
<tr>
<td>Agree 1 (0.4) 2 (1.4) 0 (0.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; PHQ, Patient Health Questionnaire.

a Responses of "strongly agree" and "agree" were recoded as "agree," and responses of "strongly disagree" and "disagree" were recoded as "disagree." Responses of "neither disagree nor agree" were excluded from the analysis. Response percentages calculated for stigma items within PHQ-9 categories; due to rounding, some subgroup percentage totals may not equal 100.

b Represents the number analyzed, excluding responses of "neither disagree nor agree." c 95% CIs for difference in the rate of agreement between moderately or severely depressed and no or minimally depressed individuals. d Significant using the Bonferroni adjustment for multiple comparisons (P < .002). e 9504 responded. f 9503 responded. g 9502 responded. h Calculated by Fisher exact test.
moderate to severe depression scores also agreed more strongly that, if depressed, others would find them unable to handle medical school responsibilities (83.1% vs 55.1%; 95% CI for difference, 16.1%-39.8%). Medical students with moderate to severe depression scores more frequently reported feeling that, if depressed, fellow medical students would respect their opinions less than did those with no to minimal depression (56.0% vs 23.7%; 95% CI for difference, 17.3%-47.3%). (P < .001 for all preceding comparisons.)

Male and female medical students responded differently to 4 stigma items (Figure 1). A significantly larger percentage of male students agreed that most medical students would not want to work with a depressed medical student (49.0% vs 29.4%; 95% CI for difference, 9.51%-29.7%; P < .001) and that depressed medical students are viewed as dangerous to their patients (36.3% vs 20.1%; 95% CI for difference, 6.1%-26.3%; P = .002). Perceptions also varied according to class year for 7 stigma items, with first- and second-year students more frequently agreeing than third- and fourth-year students that depressed medical students would provide inferior patient care (79.3% vs 66.9%; 95% CI for difference, 3.3%-21.5%; P = .007), and that seeking help for depression would make students feel that they were less intelligent than other students (34.1% vs 22.9%; 95% CI for difference, 2.3%-20.1%; P = .01; Figure 2).

**COMMENT**

This study provides detailed characterization of the stigma perceived by medical students reporting depression and the differences between depressed and nondepressed students in their beliefs about the stigma of depression. Compared with students with low self-identified depression, students with high scores more frequently agreed that the opinions of depressed medical students would be less respected, that the coping skills of depressed medical students would be viewed as less adequate, that they would be viewed as less able to handle their responsibilities by faculty members, and that telling a counselor about depression would be risky. Students with high scores would also be less likely to seek treatment if depressed than would students with low scores.

These data could reflect the cognitive distortion known to occur in patients with depression, such that de-
pressed students could have an inaccurate and excessively negative view of how they are viewed by other students. The data could also indicate an accurate perception by depressed students that they are, in fact, viewed as less capable. The findings may reflect a medical school environment in which depressed students are stigmatized because of their disease rather than on the basis of performance. In such an environment, revealing depression to friends, faculty members, and residency program directors could have real and adverse consequences.

The prevalence of self-identified depression in University of Michigan medical students is consistent with that found in several prior studies, approximately 10% to 25% depending on severity and the specific instruments used.4,5,10-12 Most students with high depression scores or who had thoughts about suicide did not report a current or past diagnosis or treatment of depression. However, the self-perception of previous depressive episodes, even if not formally diagnosed, was significantly associated with both high depression scores and the prevalence of suicidal thinking. These results suggest the importance of developing a medical school culture in which medical students have the opportunity to discuss their mental health concerns, irrespective of actual diagnosis or treatment, in a safe and confidential way. Where this discussion might best occur is unclear because potential stigma is seen as coming from several sources, including other students, faculty members, and counselors. Many medical schools have small-group settings led by faculty mentors, but approaching these issues in such a venue may have risks and unintended consequences that would need to be explored before implementation.

The prevalence of depressive symptoms is significantly higher in female than in male medical students, consistent with previous studies of medical students and physicians.3-5,10,11 The risk of suicidal ideation was also higher in female students, although not reaching statistical significance. These findings are consistent with the known increased risk of suicidal ideation as well as suicide completion in female physicians.13 When combined with the finding that men were more likely than women to agree that depressed medical students may be dangerous in their patient care and are undesirable members of the medical care team, these results suggest potential directions for further study regarding sex differences in how medical students experience their educational environment.

There are also differences between first- and second-year (preclinical) and third- and fourth-year (clinical) medical students in their views of depression, with preclinical students more likely to endorse that depressed medical students would provide inferior care to their patients, are unable to cope with medical school stress, and are less intelligent than their peers. These results could reflect the anticipatory anxiety experienced by preclinical students as they look ahead to the clinical years or could suggest that medical students may become more accepting and supportive of depressed students as they become more clinically knowledgeable and experienced. Educational, preventive, and clinical interventions may need to be framed differently for preclinical than for clinical students.

These results suggest that new approaches may be needed to reduce the stigma of depression and to enhance its prevention, detection, and treatment. The characteristics of medical education emphasizing professional competence and outstanding performance might be explored as reinforcing, rather than potentially sabotaging, factors in the creation of a culture that promotes professional mental health. The effective care of mental illness, the maintenance of mental health and effective emotional function, and the care of professional colleagues with mental illness could be taught as part of the ethical and professional responsibilities of the outstanding physician and become a critical component of the teaching, role modeling, and professional guidance that medical students receive as part of their curriculum in professionalism.

Strengths of this study include the extension of previous work on general sources of depression stigma, with more detailed descriptions of specific stigma perceptions and the comparison of responses to stigma items by depressed and nondepressed medical students. As with any self-report cross-sectional survey of a complex and sensitive issue like depression, there are also limitations to this study. First, the results represent the views of a single medical school student population, although we are aware of no reason why University of Michigan students would be different from those at other medical schools with regard to their perceptions of depression.

Second, bias could have been introduced due to missing respondents. The relatively good response rate, based on the entire medical student sample, is somewhat reassuring. The response rate for preclinical students (80.8%) was higher than that for clinical students (53.6%), which may reflect their greater opportunity and time flexibility for responding, but also reduces the generalizability of results for clinical students. It is possible that depressed students chose not to respond because of the sensitivity of the topic. However, it is also possible that depressed students would be more willing to respond because of concerns about their medical school experience. Neither of these factors should affect the attitudes of those students who did respond.

Third, student concerns about the confidentiality of a study conducted by members of their faculty could have influenced the students’ responses. However, focus group participants perceived this concern to be well-addressed by the use of a private survey research firm as a firewall to render the responses anonymous to the investigators.

In conclusion, depressed medical students more frequently endorsed...
several depression stigma attitudes than did nondepressed students. Stigma perceptions also differed by sex and class year.

Author Contributions: Drs Schwenk and Wimsatt had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Schwenk, Wimsatt, Davis.

Acquisition of data: Schwenk, Wimsatt, Davis.

Analysis and interpretation of data: Schwenk, Wimsatt.

Drafting of the manuscript: Schwenk, Wimsatt.

Critical revision of the manuscript for important intellectual content: Schwenk, Wimsatt, Davis.

Statistical analysis: Wimsatt.

Obtained funding: Schwenk.

Administrative, technical, or material support: Schwenk, Wimsatt, Davis.

Study supervision: Schwenk.

Financial Disclosures: None reported.

Funding/Support: The Department of Family Medicine, University of Michigan.

Role of the Sponsor: The sponsor had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

Previous Presentations: A limited set of preliminary data and analysis was presented at a Colloquium of the Depression Center at the University of Michigan on February 5, 2010.


Additional Contributions: Guidance in study design and concept was provided by Daniel Eisenberg, PhD; assistance in data analysis by Ananda Sen, PhD; critical review of the manuscript by Katherine T. Gold, MD; and logistical and philosophical support by James O. Woolliscroft, MD. All are affiliated with the University of Michigan, and none received compensation for their assistance.

REFERENCES


