

# Mental Health of College Students and Their Non-College-Attending Peers

## Results From the National Epidemiologic Study on Alcohol and Related Conditions

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**Context:** Although young adulthood is often characterized by rapid intellectual and social development, college-aged individuals are also commonly exposed to circumstances that place them at risk for psychiatric disorders.

**Objectives:** To assess the 12-month prevalence of psychiatric disorders, sociodemographic correlates, and rates of treatment among individuals attending college and their non-college-attending peers in the United States.

**Design, Setting, and Participants:** Face-to-face interviews were conducted in the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions (N=43 093). Analyses were done for the subsample of college-aged individuals, defined as those aged 19 to 25 years who were both attending (n=2188) and not attending (n=2904) college in the previous year.

**Main Outcome Measures:** Sociodemographic correlates and prevalence of 12-month DSM-IV psychiatric disorders, substance use, and treatment seeking among college-attending individuals and their non-college-attending peers.

**Results:** Almost half of college-aged individuals had a psychiatric disorder in the past year. The overall rate of psychiatric disorders was not different between college-

attending individuals and their non-college-attending peers. The unadjusted risk of alcohol use disorders was significantly greater for college students than for their non-college-attending peers (odds ratio=1.25; 95% confidence interval, 1.04-1.50), although not after adjusting for background sociodemographic characteristics (adjusted odds ratio=1.19; 95% confidence interval, 0.98-1.44). College students were significantly less likely (unadjusted and adjusted) to have a diagnosis of drug use disorder or nicotine dependence or to have used tobacco than their non-college-attending peers. Bipolar disorder was less common in individuals attending college. College students were significantly less likely to receive past-year treatment for alcohol or drug use disorders than their non-college-attending peers.

**Conclusions:** Psychiatric disorders, particularly alcohol use disorders, are common in the college-aged population. Although treatment rates varied across disorders, overall fewer than 25% of individuals with a mental disorder sought treatment in the year prior to the survey. These findings underscore the importance of treatment and prevention interventions among college-aged individuals.

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**T**HE TRAGIC EVENTS OF APRIL 16, 2007, at Virginia Polytechnic Institute and State University and February 14, 2008, at Northern Illinois University have called attention to the mental health needs of college students and other young adults.<sup>1-3</sup> For many, young adulthood is characterized by the pursuit of greater educational opportunities and employment prospects, development of personal relationships, and, for some, parenthood. While all of these circumstances offer opportunities for growth, they may also result in stress that precipitates the onset or recurrence of psychiatric disorders.

Reports regarding the mental health of the college-aged population have indi-

cated a growing concern<sup>4-9</sup> and have been the subject of heightened attention by different agencies.<sup>5,8</sup> While no recent study actually examined time trends in the prevalence of psychiatric disorders among college-aged individuals, analysis of client descriptors completed by therapists at case closure across a 13-year period in a large Midwestern university indicated a progressive increase in the complexity and severity of the center's caseload.<sup>7</sup> According to the 2006 National Survey of Counseling Center Directors, 91.6% of respondents believe that the number of students with severe psychological problems has increased in recent years, representing a major concern for their centers.<sup>6</sup> Recently, several professional journals published reviews of the

treatment of psychiatric disorders among college-aged individuals,<sup>4,9</sup> and in response to the Virginia Polytechnic Institute and State University tragedy, recent legislative initiatives also sought to increase regulation of firearm possession in individuals with mental disorders and to improve communication between mental health care providers and court officials.<sup>10</sup>

Alcohol and drug use are common among college-aged individuals,<sup>11-13</sup> often leading to substance abuse and dependence.<sup>14,15</sup> Polysubstance abuse and dependence are more common among college-aged individuals than among other drug-using populations.<sup>16,17</sup> An earlier survey of college students showed tobacco use to be common, although rates were not reported for non-college-attending peers.<sup>18</sup> Furthermore, some reports indicate that the rate of depression has been steadily increasing in the last few years among this age group,<sup>19-22</sup> a particular concern given the high rates of suicide attempts in college-aged individuals.<sup>19-23</sup>

Approximately one-half (46.69%) of US young people aged 18 to 24 years are enrolled in college on a part-time or full-time basis.<sup>24-26</sup> Considerable controversy surrounds the question of whether rates of psychiatric disorders and mental health treatment differ between college students and their non-college-attending peers. In one report, no significant difference in the rate of alcohol use disorders was found between the 2 groups.<sup>27</sup> It has also been suggested that college students are less likely to receive treatment for alcohol use disorders than their peers,<sup>28</sup> but whether this finding extends to other psychiatric disorders remains unknown. The importance of the mental health of college students is highlighted by studies suggesting that psychiatric disorders interfere with college attendance<sup>29</sup> and reduce the likelihood of successful college completion,<sup>29,30</sup> while other studies suggest that college students have higher rates of substance use and alcohol use disorders.<sup>31-33</sup>

Several key methodological issues have constrained research on the mental health of college-aged individuals in the United States. Previous reports have been limited by nonvalidated measures of psychiatric disorder,<sup>19-21</sup> focus on a narrow range of disorders,<sup>15,27,28,32</sup> and failure to use community samples or a non-college-attending comparison group.<sup>19-21</sup> Our investigation seeks to overcome these constraints by drawing on a large and nationally representative epidemiologic study, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (N=43 093), that included psychometrically sound measures of a broad range of psychiatric disorders. Specifically, we sought to compare the following: (1) the 12-month prevalence of psychiatric disorders in college students vs their non-college-attending peers; (2) the sociodemographic characteristics of college-aged individuals with and without psychiatric disorders; and (3) rates of treatment seeking in college students with psychiatric disorders vs their non-college-attending peers.

## METHODS

### SAMPLE

The 2001-2002 NESARC is a nationally representative sample of the adult population of the United States conducted by the US Census Bureau under the direction of the National Insti-

tute on Alcohol Abuse and Alcoholism.<sup>34</sup> The NESARC target population was the civilian, noninstitutionalized population aged 18 years and older residing in households in the 50 US states and the District of Columbia. The final sample included 43 093 respondents drawn from individual households and group quarters that included military personnel living off base, boarding or rooming houses, nontransient hotels and motels, shelters, facilities for housing workers, college quarters, and group homes. The overall survey response rate was 81.00%. African American individuals, Latino individuals, and young adults (aged 18-24 years) were oversampled. Data were adjusted to account for oversampling and respondent and household nonresponse. The weighted data were then adjusted using the 2000 Decennial Census to be representative of the US civilian population for a variety of sociodemographic variables.

Although the age range of the college population varies widely, the American College Health Association<sup>19</sup> estimates that the vast majority of college students (87.1%) are aged 18 to 24 years. Thus, we focused our analyses on that age group. To match the time frame of the diagnostic assessments (past 12 months), college students were not required to be enrolled in college at the time of the interview but rather were defined as those aged 19 to 25 years who attended college in the past 12 months (ie, when they were aged 18 to 24 years; n=2188). Consistent with the published literature,<sup>19-21,27,28,32</sup> we included individuals who attended on a part- or full-time basis regardless of the nature or content of their courses. Non-college-attending individuals were those aged 19 to 25 years not attending college during the past 12 months (n=2904). The phrase *college-aged individuals* refers to both groups together (n=5092).

## ASSESSMENT

Sociodemographic measures included sex, race/ethnicity, nativity, marital status, place of residence, and region of the country. College students (although not their non-college-attending peers) were also queried on their living arrangements and enrollment status (part-time vs full-time). Socioeconomic measures included personal and family income measured as categorical variables as well as insurance type (ie, source of funding for their medical care). All of the diagnoses were made according to *DSM-IV* criteria using the National Institute on Alcohol Abuse and Alcoholism Alcohol Use Disorder and Associated Disabilities Interview Schedule-*DSM-IV* version,<sup>35</sup> a valid and reliable fully structured diagnostic interview designed for use by professional interviewers who are not clinicians.

Axis I diagnoses included in the Alcohol Use Disorder and Associated Disabilities Interview Schedule-*DSM-IV* version can be separated into 3 groups: (1) substance use disorders (including alcohol abuse or dependence, drug abuse or dependence, and nicotine dependence); (2) mood disorders (including major depressive disorder, dysthymia, and bipolar disorder); and (3) anxiety disorders (including panic disorder, social anxiety disorder, specific phobia, and generalized anxiety disorder). The test-retest reliability of the Alcohol Use Disorder and Associated Disabilities Interview Schedule-*DSM-IV* version measures of *DSM-IV* diagnoses has been reported elsewhere.<sup>35,36</sup> Test-retest reliability was good for major depressive disorder ( $\kappa=0.65-0.73$ ) and good to excellent for substance use disorders ( $\kappa>0.74$ ). Reliability was fair to good for other mood and anxiety disorders ( $\kappa=0.40-0.60$ ) and personality disorders ( $\kappa=0.40-0.67$ ).<sup>37-43</sup>

History of conduct disorder and personality disorders were assessed on a lifetime basis. The latter included *DSM-IV* avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic, and antisocial personality disorders. Personality dis-

order diagnoses required long-term patterns of social and occupational impairment and substance-induced cases were excluded as explained in detail elsewhere.<sup>44</sup>

We also included variables measuring use of any substance, which included use of any drugs, alcohol, or tobacco in the last 12 months. The number of stressful life events was measured with 12 items from the Social Readjustment Rating Scale<sup>45</sup> such as having been fired from a job, moving residence, or having had one's property intentionally damaged by someone in the last 12 months.

## MENTAL HEALTH TREATMENT

To estimate rates of mental health service utilization, respondents were classified as receiving treatment for mood or anxiety disorders if they met the following criteria: (1) visited a physician, psychologist, or any other professional; (2) were a patient in a hospital for at least 1 night; (3) visited an emergency department; or (4) were prescribed medications. Respondents were classified as receiving treatment for substance use disorders if they met the following criteria: (1) visited a physician, psychologist, or any other professional; (2) were a patient in an inpatient ward of a hospital, an outpatient clinic, a drug detoxification or rehabilitation unit, or a methadone program; (3) visited an emergency department or crisis center; or (4) received treatment by a paraprofessional (eg, a member of the clergy), received treatment through an employee assistance program or through family or social services, or attended self-help groups.<sup>46</sup> Treatment utilization questions were disorder specific, and analyses were conducted on those who were diagnosed with the disorder of interest in the time frame under consideration. For instance, the prevalence of past-year treatment seeking for a mood disorder is calculated among those with a past-year diagnosis of a mood disorder using treatment utilization questions specifically asked about treatment for a mood disorder.

## STATISTICAL ANALYSES

Weighted means, frequencies, and odds ratios (ORs) of sociodemographic correlates, prevalence of psychiatric disorders, and rates of treatment seeking were computed. To provide a description of observable outcomes most relevant from the perspective of need for provision of services, we focus our analyses on the unadjusted ORs. We also provide adjusted ORs derived from multiple logistic regressions, which indicate associations between a specific outcome (eg, psychiatric disorders or rates of treatment seeking) and sociodemographic and socioeconomic correlates that differed between college students and their non-college-attending peers. Due to the cross-sectional nature of the study, both unadjusted and adjusted ORs are used as measures of association without implying any causal association. We consider 2 percentages to be different if the 95% confidence interval of their OR does not include 1.<sup>47</sup> All standard errors and 95% confidence intervals were estimated using SUDAAN version 9.0 software (Research Triangle Institute, Research Triangle Park, North Carolina) to adjust for design characteristics of the survey. For all of the analyses, non-college-attending individuals were considered the reference group.

As noted, we focused our analyses on the subset of NESARC respondents aged 19 to 25 years. However, to guard against the possibility of variations in the results due to different definitions of *college aged* and to increase the comparability of our results with those of prior reports that had used the age range of 19 to 21 years,<sup>27,32</sup> we conducted identical analyses with individuals aged 20 to 22 years at the time of the survey using the same considerations stated earlier (ie, they were aged 19-21

years at the time they were in college). Exclusion of 18-year-olds likely minimized capture of drinking behaviors that predated college enrollment. Similarly, exclusion of individuals older than 21 years served to restrict college graduates from the non-college-attending group.<sup>27,32</sup> We present the analyses conducted on the largest group (those aged 19-25 years) and indicate the main differences with the analyses of the more restricted sample. Full results of the additional analyses are available from us on request.

## RESULTS

The odds of attending college were significantly lower for men than for women. Odds were also lower for Hispanic, Native American, and black individuals than for white individuals, and they were lower for foreign-born individuals compared with US-born individuals. Individuals who were married or cohabiting, widowed, separated, or divorced, or living in a rural area at the time of the survey also had lower odds of attending college. Although an annual family income greater than \$70 000 increased the odds of attending college, an income between \$20 000 and \$70 000 decreased the odds of college attendance when compared with an income less than \$20 000. College students were also less likely to have public insurance or to be uninsured when compared with individuals who were not attending college (**Table 1**).

## PREVALENCE OF PSYCHIATRIC DISORDERS

The most prevalent disorders in the college students were alcohol use disorders (20.37%), followed by personality disorders (17.68%). In the non-college-attending individuals, personality disorders were most prevalent (21.55%), followed by nicotine dependence (20.66%). In the unadjusted analyses, the odds of any psychiatric disorder in the last 12 months were similar for college students and their non-college-attending peers (**Table 2**). The unadjusted likelihood of alcohol use in the previous 12 months was greater among college students, although drug use was similar across the 2 study groups. Consistent with the alcohol use association, college students were significantly more likely than their non-college-attending peers to have an alcohol use disorder in the last 12 months, a result that remained significant for alcohol dependence (but not abuse) when analyzed separately. College students were significantly less likely to have a diagnosis of drug use disorder or nicotine dependence (unadjusted or adjusted) or to have used tobacco than their non-college-attending peers (Table 2).

There were no differences in the odds of having at least 1 mood or anxiety disorder between college students and their non-college-attending peers. Overall, personality disorders were significantly more common among individuals who had not attended college than among college students of the same age. When examined individually, avoidant, dependent, paranoid, schizoid, and antisocial personality disorders were significantly less common among college students than among non-college-attending individuals. Odds for history of conduct disorder were significantly lower in the college-attending population. Most of the ORs retained their level

**Table 1. Sociodemographic and Socioeconomic Characteristics According to Population Subgroup of College Students and Non-College-Attending Individuals**

Characteristic	% (95% CI)		OR (95% CI)
	In College (n=2188)	Not in College (n=2904)	
Sex			
Male	47.44 (45.12-49.78)	51.42 (48.94-53.89)	0.85 (0.75-0.97)
Female	52.56 (50.22-54.88)	48.58 (46.11-51.06)	1 [Reference]
Race/ethnicity			
White	69.45 (64.86-73.69)	56.41 (51.73-60.98)	1 [Reference]
Black	11.43 (9.43-13.78)	14.45 (12.34-16.86)	0.64 (0.52-0.80)
Native American	1.18 (0.72-1.93)	1.80 (1.24-2.60)	0.53 (0.29-0.97)
Asian	7.62 (5.32-10.80)	3.88 (2.65-5.66)	1.59 (0.97-2.62)
Hispanic	10.32 (8.42-12.57)	23.46 (19.02-28.57)	0.36 (0.29-0.43)
Nativity			
US born	87.13 (84.41-89.44)	80.66 (76.56-84.20)	1.62 (1.30-2.03)
Foreign born	12.87 (10.56-15.59)	19.34 (15.80-23.44)	1 [Reference]
Marital status			
Married or cohabiting	21.48 (19.12-24.03)	34.48 (32.08-36.96)	0.51 (0.43-0.60)
Widowed, separated, or divorced	1.76 (1.24-2.49)	2.76 (2.12-3.59)	0.52 (0.33-0.82)
Never married	76.77 (74.06-79.28)	62.76 (60.25-65.20)	1 [Reference]
Individual income, \$			
≤19 999	73.25 (70.42-75.91)	72.72 (70.68-74.67)	1 [Reference]
20 000-34 999	19.35 (17.28-21.60)	21.29 (19.45-23.24)	0.90 (0.76-1.07)
≥35 000	7.40 (6.00-9.09)	5.99 (4.96-7.23)	1.23 (0.92-1.64)
Family income, \$			
≤19 999	40.66 (37.44-43.95)	37.59 (35.26-39.98)	1 [Reference]
20 000-34 999	19.51 (17.76-21.39)	24.32 (22.32-26.43)	0.74 (0.61-0.90)
35 000-69 999	24.38 (22.19-26.72)	27.77 (25.87-29.76)	0.81 (0.67-0.99)
≥70 000	15.45 (13.50-17.63)	10.32 (8.61-12.31)	1.38 (1.06-1.81)
Urbanicity			
Urban	83.77 (79.91-87.01)	79.80 (75.49-83.53)	1 [Reference]
Rural	16.23 (12.99-20.09)	20.20 (16.47-24.51)	0.77 (0.62-0.95)
Region			
Northwest	18.73 (12.73-26.69)	17.53 (11.64-25.54)	1.14 (0.89-1.46)
Midwest	23.36 (17.17-30.96)	22.73 (17.10-29.56)	1.10 (0.87-1.38)
South	35.08 (28.25-42.58)	35.40 (28.81-42.60)	1.06 (0.84-1.32)
West	22.83 (15.89-31.66)	24.34 (17.40-32.94)	1 [Reference]
Insurance			
Private	65.42 (62.60-68.13)	44.15 (41.36-46.97)	1 [Reference]
Public	6.04 (4.84-7.50)	14.22 (12.53-16.09)	0.29 (0.22-0.37)
None	28.55 (26.17-31.05)	41.64 (38.80-44.53)	0.46 (0.40-0.54)

Abbreviations: CI, confidence interval; OR, odds ratio.

of significance after adjusting for sociodemographic and socioeconomic variables. The odds of having any Axis I disorder and any substance use disorder became significantly lower among college students in the adjusted models. By contrast, alcohol use and alcohol dependence no longer reached significance.

#### SOCIODEMOGRAPHIC CORRELATES OF PSYCHIATRIC DISORDERS

When considering all individuals of college age, the overall risk of having a psychiatric disorder did not differ between college students and non-college-attending individuals. A number of other characteristics did increase risk, including being male, having a higher number of stressful life events in the past 12 months, having lost a steady relationship (eg, broken up with a girlfriend or boyfriend), being widowed, divorced, or separated, being US born, living in a rural setting, and living away from

their parents (the latter was examined only among college students but not their non-college-attending peers). By contrast, being black, Asian, or Hispanic, being married or cohabiting, and rating overall health as good to excellent decreased the odds of having a psychiatric disorder. An individual income between \$20 000 and \$35 000 increased the odds of having a psychiatric disorder (**Table 3**). Odds for psychiatric disorders did not differ among part-time and full-time students.

#### MENTAL HEALTH TREATMENT

Mental health treatment rates were low for all of the psychiatric disorders (**Table 4**). The highest rates for treatment seeking in the previous year were reported for mood disorders, whereas the lowest rates were reported for alcohol and drug use disorders. College students were significantly less likely to receive past-year treatment for alcohol or drug use disorders than others in both the ad-

**Table 2. Twelve-Month Prevalence of Any Axis I Psychiatric Disorders, Personality Disorders, and Substance Use in College Students and Non-College-Attending Individuals**

Diagnostic or Substance Use Characteristic	% (95% CI)		OR (95% CI)	Adjusted OR (95% CI) <sup>a</sup>
	In College (n=2188)	Not in College (n=2904)		
Any psychiatric diagnosis	45.79 (42.99-48.61)	47.74 (44.72-50.78)	0.92 (0.81-1.06)	0.87 (0.75-1.00)
Any Axis I disorder	39.84 (37.00-42.75)	41.98 (39.10-44.92)	0.92 (0.80-1.05)	0.84 (0.72-0.97)
Any substance use disorder	29.15 (26.81-31.60)	31.51 (28.91-34.24)	0.89 (0.77-1.04)	0.83 (0.70-0.97)
Any alcohol use disorder	20.37 (18.14-22.79)	16.98 (15.21-18.91)	1.25 (1.04-1.50)	1.19 (0.98-1.44)
Alcohol abuse	7.85 (6.52-9.41)	6.76 (5.66-8.05)	1.17 (0.90-1.53)	1.16 (0.87-1.54)
Alcohol dependence	12.52 (10.86-14.40)	10.22 (8.79-11.85)	1.26 (1.01-1.56)	1.16 (0.93-1.46)
Any drug disorder	5.08 (4.08-6.29)	6.85 (5.60-8.35)	0.73 (0.54-0.97)	0.70 (0.50-0.98)
Drug abuse	4.25 (3.31-5.44)	5.35 (4.30-6.63)	0.78 (0.57-1.09)	0.73 (0.51-1.07)
Drug dependence	1.40 (0.96-2.06)	2.26 (1.69-3.02)	0.62 (0.37-1.02)	0.63 (0.37-1.07)
Nicotine dependence	14.55 (12.96-16.31)	20.66 (18.41-23.11)	0.65 (0.54-0.79)	0.60 (0.50-0.73)
Any mood disorder	10.62 (9.10-12.35)	11.86 (10.31-13.60)	0.88 (0.71-1.10)	0.81 (0.64-1.02)
MDD	7.04 (5.84-8.47)	6.67 (5.63-7.89)	1.06 (0.82-1.37)	0.96 (0.72-1.26)
Dysthymia	0.81 (0.49-1.35)	1.12 (0.74-1.71)	0.72 (0.37-1.40)	0.69 (0.35-1.36)
Bipolar disorder	3.24 (2.41-4.35)	4.62 (3.64-5.85)	0.69 (0.48-1.00)	0.67 (0.44-1.00)
Any anxiety disorder	11.94 (10.28-13.82)	12.66 (11.06-14.47)	0.93 (0.76-1.15)	0.84 (0.67-1.04)
Panic disorder	1.95 (1.39-2.72)	2.74 (2.00-3.73)	0.71 (0.44-1.13)	0.61 (0.37-1.03)
Social anxiety disorder	3.24 (2.43-4.30)	3.54 (2.74-4.56)	0.91 (0.61-1.36)	0.81 (0.53-1.24)
Specific phobia	8.06 (6.76-9.57)	8.75 (7.43-10.27)	0.91 (0.72-1.16)	0.83 (0.65-1.07)
GAD	1.64 (1.16-2.30)	2.07 (1.52-2.81)	0.79 (0.50-1.24)	0.77 (0.47-1.28)
Pathological gambling	0.35 (0.14-0.88)	0.23 (0.10-0.55)	1.51 (0.41-5.50)	1.27 (0.40-3.99)
Conduct disorder <sup>b</sup>	1.18 (0.80-1.74)	2.28 (1.70-3.04)	0.51 (0.31-0.86)	0.55 (0.30-0.99)
Any personality disorder <sup>b</sup>	17.68 (15.83-19.70)	21.55 (19.41-23.85)	0.78 (0.65-0.94)	0.82 (0.67-1.00)
Avoidant	2.31 (1.69-3.15)	4.61 (3.74-5.68)	0.34 (0.49-0.71)	0.47 (0.32-0.66)
Dependent	0.51 (0.24-1.07)	1.29 (0.87-1.91)	0.39 (0.16-0.93)	0.46 (0.20-1.03)
Obsessive-compulsive	8.24 (6.91-9.79)	8.00 (6.73-9.49)	1.03 (0.79-1.35)	1.02 (0.76-1.35)
Paranoid	4.86 (3.95-5.98)	8.74 (7.55-10.09)	0.53 (0.41-0.70)	0.63 (0.48-0.83)
Schizoid	3.31 (2.62-4.18)	5.58 (4.46-6.94)	0.58 (0.42-0.81)	0.67 (0.48-0.96)
Histrionic	3.47 (2.62-4.59)	4.43 (3.54-5.52)	0.78 (0.55-1.09)	0.79 (0.56-1.10)
Antisocial	4.70 (3.70-5.95)	8.51 (7.19-10.05)	0.53 (0.39-0.73)	0.55 (0.40-0.75)
Any substance use	79.29 (76.94-81.47)	76.60 (74.02-78.99)	1.17 (1.00-1.37)	0.94 (0.79-1.12)
Any tobacco use	29.45 (27.26-31.74)	41.48 (38.11-44.93)	0.59 (0.59-0.70)	0.53 (0.44-0.64)
Any alcohol use	77.09 (74.61-79.39)	71.97 (69.36-74.43)	1.31 (1.12-1.53)	1.07 (0.90-1.27)
Any drug use	15.21 (13.34-17.29)	15.63 (13.69-17.78)	0.97 (0.79-1.18)	0.84 (0.68-1.04)

Abbreviations: CI, confidence interval; GAD, generalized anxiety disorder; MDD, major depressive disorder; OR, odds ratio.

<sup>a</sup>Adjusted for age, sex, race, nativity, marital status, urbanicity, insurance, and family income.

<sup>b</sup>Assessed on a lifetime basis.

justed and unadjusted analyses. There were no other differences in rates of mental health treatment between college students and their non-college-attending peers with psychiatric disorders.

#### ANALYSES OF THE SAMPLE AGED 20 TO 22 YEARS

Although there were some minor differences between identical analyses of the sample aged 19 to 25 years and those conducted when restricting the sample to those aged 20 to 22 years, the overall pattern of results remained the same (results available on request). Most differences involved changes in the level of significance of the findings (but never change in direction) due to the smaller size of the sample aged 20 to 22 years compared with the sample aged 19 to 25 years. Two important exceptions were the lower prevalences of drug abuse and the rates of past-year mental health treatment for any disorder among college students, which reached statistical significance only in the sample aged 20 to 22 years.

#### COMMENT

To our knowledge, this is the first study to examine a broad range of Axis I and Axis II *DSM-IV* disorders in a nationally representative sample of college students and their non-college-attending peers. We found that psychiatric disorders are common in this age group, that the distribution of disorders differs by educational status, and that treatment rates are low for both college students and their non-college-attending peers.

Almost one-half of the college students and their non-college-attending peers met *DSM-IV* criteria for at least 1 psychiatric disorder in the previous year. The most common disorders in college students were alcohol use disorders and personality disorders. In non-college-attending respondents, the most common disorders were personality disorders and nicotine dependence. However, the prevalence of mood and anxiety disorders was also high in both groups. The prevalence of psychiatric disorders in college-aged individuals was similar to the

**Table 3. Sociodemographic and Socioeconomic Correlates of College-Aged Individuals With and Without Psychiatric Disorders<sup>a</sup>**

Characteristic	% (95% CI)		OR (95% CI)
	College-Aged Individuals With Psychiatric Disorders (n=2323)	College-Aged Individuals Without Psychiatric Disorders (n=2769)	
In college	45.12 (42.22-48.05)	47.07 (44.58-49.58)	0.92 (0.81-1.06)
Sex			
Male	52.27 (49.72-54.81)	47.22 (44.63-49.83)	1.22 (1.05-1.42)
Female	47.73 (45.19-50.28)	52.78 (50.17-55.37)	1 [Reference]
Race/ethnicity			
White	68.08 (63.78-72.09)	57.45 (52.88-61.89)	1 [Reference]
Black	11.58 (9.81-13.61)	14.36 (12.23-16.79)	0.68 (0.57-0.81)
Native American	1.98 (1.39-2.82)	1.10 (0.68-1.79)	1.52 (0.85-2.71)
Asian	4.24 (3.10-5.78)	6.81 (4.93-9.33)	0.53 (0.37-0.74)
Hispanic	14.12 (11.12-17.76)	20.28 (16.80-24.27)	0.59 (0.49-0.70)
Nativity			
US-born	89.58 (87.08-91.64)	78.42 (74.48-81.90)	2.37 (1.91-2.92)
Foreign-born	10.42 (8.36-12.92)	21.58 (18.10-25.52)	1 [Reference]
Marital status			
Married or cohabiting	26.43 (24.03-28.97)	30.28 (27.83-32.85)	0.85 (0.73-0.98)
Widowed, separated, or divorced	3.29 (2.54-4.26)	1.42 (1.04-1.95)	2.25 (1.50-3.36)
Never married	70.28 (67.67-72.76)	68.30 (65.72-70.76)	1 [Reference]
Individual income, \$			
≤19 999	71.87 (69.32-74.28)	73.93 (71.61-76.13)	1 [Reference]
20 000-34 999	22.04 (19.98-24.25)	18.94 (17.17-20.85)	1.20 (1.02-1.40)
≥35 000	6.09 (5.03-7.37)	7.13 (5.84-8.66)	0.88 (0.66-1.17)
Family income, \$			
≤19 999	39.38 (36.50-42.34)	38.67 (36.30-41.10)	1 [Reference]
20 000-34 999	23.94 (22.08-25.90)	20.48 (18.65-22.44)	1.15 (0.96-1.37)
35 000-69 999	25.26 (23.19-27.45)	27.04 (25.12-29.05)	0.92 (0.77-1.09)
≥70 000	11.42 (9.73-13.35)	13.80 (11.95-15.89)	0.81 (0.64-1.04)
Urbanicity			
Urban	79.79 (75.47-83.51)	83.26 (79.39-86.54)	1 [Reference]
Rural	20.21 (16.49-24.53)	16.74 (13.46-20.61)	1.26 (1.02-1.56)
Region			
Northwest	16.47 (11.68-22.71)	19.51 (12.52-29.10)	0.83 (0.59-1.17)
Midwest	26.64 (20.81-33.42)	19.83 (13.96-27.39)	1.32 (0.98-1.78)
South	33.04 (27.08-39.59)	37.21 (29.85-45.21)	0.87 (0.67-1.13)
West	23.85 (17.51-31.61)	23.45 (15.85-33.26)	1 [Reference]
Student status <sup>b</sup>			
Full-time	72.89 (69.49-76.04)	73.92 (70.36-77.20)	0.95 (0.75-1.20)
Part-time	27.11 (23.96-30.51)	26.08 (22.80-29.64)	1 [Reference]
Living arrangement <sup>b</sup>			
With parents	39.00 (35.54-42.58)	46.42 (42.29-50.59)	0.74 (0.61-0.89)
Away from parents	61.00 (57.42-64.46)	53.58 (49.41-57.71)	1 [Reference]
Broke off a steady relationship	18.60 (16.99-20.34)	7.99 (6.76-9.42)	2.63 (2.10-3.30)
Good, very good, or excellent overall health	87.51 (85.17-89.53)	94.52 (93.25-95.57)	0.41 (0.31-0.54)

Abbreviations: CI, confidence interval; OR, odds ratio.

<sup>a</sup>The college-aged individuals with psychiatric disorders had a mean of 3.22 (95% CI, 3.10-3.35) stressful life events, and the college-aged individuals without psychiatric disorders had a mean of 1.64 (95% CI, 1.55-1.73) stressful life events ( $t=22.37$ ;  $P<.001$ ).

<sup>b</sup>Information queried only to students.

prevalence of psychiatric disorders in the United States with the exception of alcohol and substance use disorders, which were more than 2-fold the prevalence found in the general adult population.<sup>48-51</sup> Previous research has shown that the hazard rate for onset of alcohol use disorders peaks at age 19 years and becomes much lower in the following years.<sup>49</sup> Furthermore, about one-half of individuals with alcohol use disorders at age 19 years continue to have these disorders at age 25 years.<sup>52,53</sup>

The high prevalence and low rate of treatment for alcohol use disorders found in this study mirror findings in the US general population across all ages of adult-

hood<sup>49</sup> but were even more accentuated in college students. Given the lifelong mental and general medical health consequences of alcohol use disorders, the implementation of effective interventions to reduce or prevent the onset of alcohol use disorders in college-aged individuals is an important public health goal. Heavy drinking and alcohol use disorders in college have been associated with a broad range of high-risk behaviors and adverse health outcomes, including driving while intoxicated, unsafe sexual activity, physical and sexual assault, physical injuries, and death from unintentional injuries.<sup>13,54</sup> Interventions that decrease the rates of alcohol

**Table 4. Prevalence of Mental Health Service Utilization Among College Students and Non-College-Attending Individuals**

Past-Year Mental Health Treatment	% (95% CI)		OR (95% CI)	Adjusted OR (95% CI) <sup>a</sup>
	In College (n=998)	Not in College (n=1325)		
For any disorder <sup>b</sup>	18.45 (15.49-21.83)	21.49 (18.46-24.87)	0.83 (0.63-1.09)	0.78 (0.59-1.05)
For mood disorder <sup>c</sup>	34.11 (27.31-41.62)	34.80 (28.71-41.43)	0.97 (0.63-1.50)	0.99 (0.63-1.55)
For anxiety disorder <sup>d</sup>	15.93 (11.48-21.68)	12.37 (9.10-16.60)	1.34 (0.81-2.23)	1.33 (0.78-2.27)
For alcohol or drug disorder <sup>e</sup>	5.36 (3.59-7.94)	9.82 (7.25-13.17)	0.52 (0.30-0.90)	0.49 (0.28-0.87)

Abbreviations: CI, confidence interval; OR, odds ratio.

<sup>a</sup>Adjusted for age, sex, race, nativity, marital status, individual income, urbanicity, and family income.

<sup>b</sup>Among those with a past-year diagnosis of alcohol use disorder, drug use disorder, any mood disorder, or any anxiety disorder.

<sup>c</sup>Among those with a past-year diagnosis of major depressive disorder, dysthymia, or bipolar disorder.

<sup>d</sup>Among those with a past-year diagnosis of panic disorder, social anxiety disorder, specific phobia, or generalized anxiety disorder.

<sup>e</sup>Among those with a past-year diagnosis of alcohol or drug abuse or dependence.

use and alcohol use disorders in this population are an important public health priority. Despite doubts about the effectiveness of treatment for drinking problems,<sup>55-57</sup> recent reviews and meta-analyses have shown that brief interventions with college students, including skills-based interventions, motivational interviewing, and personalized normative feedback, are effective methods for reducing drinking by college students.<sup>58,59</sup> In view of the high prevalence and low rate of treatment of alcohol use disorders in college students, greater efforts to implement screening and intervention programs on college and university campuses are warranted. The centralized delivery of campus student health services might offer an advantageous structure for carrying out such screening and interventions. Additional prevention and intervention efforts could be implemented at many levels, including the organizational (fraternity and sorority, campus-wide, and community-wide).

Our study also documents that the correlates of psychiatric disorders among college students and their non-college-attending peers parallel those of the general population. Indicators of loss of social support (eg, being widowed, separated, or divorced or breaking up with a college romantic partner) were associated with increased risk for psychiatric disorders. Alternatively, important social supports might have been lost by those with psychiatric disorders. These findings underscore the powerful influence of relationships in the lives of young people. The results also highlight the need to encourage youth to develop social support networks that may help to buffer the effects of romantic disappointments and other interpersonal losses. Life stressors were relatively uncommon in this population but, when present, increased the risk for psychiatric disorders. College-aged individuals may have less well-developed coping mechanisms or less experience than older adults with romantic disappointments and interpersonal losses, making them particularly vulnerable to the effects of these and related stressors. By contrast, foreign-born individuals and those from racial/ethnic minorities were at lower risk for psychiatric disorders, confirming reports in the general population.<sup>49</sup> Identification of the mechanisms underlying the protective effect of racial/ethnic minority status may offer some clues to increase the resilience in ethnoracial majority populations.

Most college-aged individuals with psychiatric disorders did not seek treatment in the previous year regardless of their educational status. Treatment rates were lowest for substance use disorders and highest for mood disorders, consistent with patterns previously documented in the general population.<sup>49-51</sup> Lower treatment rates for substance use disorders may be related to the stigma often associated with these conditions<sup>60-65</sup> and failure by the individuals or their friends and family members to recognize early signs and symptoms or their need for care.<sup>66,67</sup> It is also possible that the lag between onset of substance use disorders and the manifestation of their more severe consequences<sup>68,69</sup> interferes with mental health treatment seeking for behaviors that can be so powerfully reinforced during young adulthood, especially among college students. Higher treatment rates for mood disorders may be the result of educational campaigns by the government, advocacy groups, and the pharmaceutical industry, which have led to the growing recognition of these disorders as medical conditions,<sup>70</sup> although the fact that more than one-half of the individuals with mood disorders and more than 80.00% of individuals with anxiety disorders did not seek treatment suggests substantial unmet need. Delays or failures to seek early treatment for substance use or other psychiatric disorders are important to avoid because they often lead to future relapses and a more chronic course of the disorder.<sup>14,71,72</sup>

Our study has limitations common to most large-scale surveys. First, information on educational status was based on self-report and not confirmed by collateral informants. However, the weighted numbers of college students in the NESARC match very closely to the yearly estimates of college enrollment,<sup>73</sup> suggesting the degree of possible misclassification to be small in our study. Second, the cross-sectional design does not allow attribution of causality to the associations between psychiatric disorders and college attendance. Third, although the NESARC provides the most extensive assessment of psychiatric disorders among college students and their non-college-attending peers, some disorders such as oppositional defiant disorder, attention-deficit/hyperactivity disorder, and learning disabilities were not assessed in this study. Fourth, the NESARC did not systematically assess respondents' perceived need for treatment and its influence on rates of treatment seeking. Fifth, because

the mental health treatment results rely on respondent linkage to specific disorders, they may underestimate the proportion of affected young people who received any mental health care during the past year.

Despite these limitations, the NESARC constitutes the largest nationally representative survey to date to include information on psychiatric disorders in college students and their non-college-attending peers. The prevalence of psychiatric disorders is high in this population at a particularly vulnerable time of development. Groups with particularly high prevalence were identified and should be the focus of prevention, assessment, and intervention efforts. The vast majority of disorders in this population can be effectively treated with evidence-based psychosocial and pharmacological approaches. Early treatment could reduce the persistence of these disorders and their associated functional impairment, loss of productivity, and increased health care costs. As these young people represent our nation's future, urgent action is needed to increase detection and treatment of psychiatric disorders among college students and their non-college-attending peers.

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