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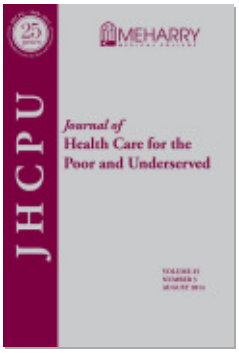

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Are Female College Students Who are Diagnosed with Depression at Greater Risk of Experiencing Sexual Violence on College Campus?

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Abstract: We examined the association between depression and sexual violence among 18–24 year-old female college students using National College Health Assessment survey. Data were collected from a nationally representative sample of 10,541 female students on 33 college campuses. Results showed that female students who were reportedly ever diagnosed with depression were 1.56 times more likely than those who had never been diagnosed with depression to have experienced sexual violence. Female students who had one or more sexual partners currently were found 3.17 times more likely than those who had no sexual partner to have experienced sexual violence; similarly, female students who engaged in binge drinking in the previous two weeks were found about two times more likely than their counterparts to have experienced sexual violence. Depression is a public health issue and must be addressed sooner rather than later in order to reduce and prevent sexual violence on college campuses.

Key words: Female college students ages 18–24, depression, sexual violence, sexual partners, marijuana use, housing arrangements, binge alcohol drinking.

At least one in every three women around the globe has been beaten, coerced into sex, or otherwise abused in her lifetime.[1] In recent years, physical, psychological, and sexual victimization, or violence against women, and a combination of them (known as *polyvictimization*) has become a universal phenomenon, prompting investigation into the association between sexual victimization and depression among college students.[2,3] The effects of violence can be devastating to a woman's physical and mental well-being. Estimations of the prevalence of violence against women vary depending on the type of violence in question. The World Health Organization (WHO) has corroborated a nationally representative report of the government of Ireland stating that the prevalence of violence against women is more common than previously acknowledged, in that about

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7% of women had been abused in the previous year by a partner or an ex-partner.[4] Eighteen percent of the women had been abused at some stage of their lives while 10% had experienced violence. One-third of these reported violence during pregnancy, and over one-third reported attempts to strangle and choke them. Generally, multiple forms of abuse were recorded as common. Researchers summarized the findings from the WHO multi-country study on women's health and domestic violence against women.[5] They interviewed women (ages 15–49 years) about their experiences of physically and sexually violent acts by a current or former intimate partner and about detected symptoms associated with physical and mental health. They found that women who reported intimate partner violence at least once in their life reported significantly more emotional distress, suicidal thoughts, and suicidal attempts than non-abused women.

According to the National Comorbidity Survey,[6] 17.1% of the general population in the United States have a lifetime history of a major depressive episode. Women are twice as likely as men to experience lifetime depression.[6] However, college women tend to be more depressed than average women.[6] Several factors may be responsible for this observation including: uncertainty of the new environment; sudden freedom away from home; identity crisis; fear of failure; low self-esteem; lack of social support; experimentation with drugs and alcohol; and a host of other social issues that make college women, mostly in their freshmen and sophomore years, more vulnerable to depression.[7,8,9] In a study of psychiatric in-patients, it was found that 65% of female patients and 23% of male patients had a history of lifetime partner violence.[10]

Sexual assault among college women. One recent study acknowledged that the United States has the highest rates of sexual violence against women among the developed countries.[11] Other researchers estimated that the chance of being sexually assaulted is about four times more likely for women ages 16–24 compared with women in the general population.[12] Most women attending college are typically within this age range and are therefore at higher risk of assault.

With the acknowledgment of violence against women as a public health phenomenon, international conventions such as the Vienna Accord of 1993 and, subsequently, the Beijing Platform of 1995 urged all governments around the world to prioritize the eradication of any form of violence against women.[13,14] The resolutions and white paper issued as sequels to these international conventions identified the types and nature of the worldwide phenomenon of violence against women to include but not to be limited to battering; sexual abuse of female children in the household; dowry-related violence; marital rape; female genital mutilation; killings in the name of 'honor'; non-spousal violence and violence related to exploitation, sexual harassments, and intimidation at work, educational institutions and other settings; trafficking in women; and forced prostitution and violence perpetrated or condoned by the State.

With many exhibiting symptoms of post-traumatic stress disorder (PTSD), a phenomenon referred to as stress generation through residual depressive symptoms.[15] Other than long-term PTSD and other forms of mental health problems, the authors argued that sexual assault of college women may result in some or all of the following: physical and emotional problems; poor academic performance; withdrawal and inability to cope with normal class load; dropping out of college; and 13 times the likelihood of attempted suicide compared with those who were not victims of sexual assault.

Most sexual assaults occurring in colleges are never reported despite the fact that colleges spend colossal amounts of resources on student safety. A national initiative conducted for the National Institute of Justice in the Bureau of Justice Statistics, through the National College Women Sexual Victimization (NCWSV) study, found that, of 86 incidents that were reported as rape, 48.8% of women did not see the event as a rape; 46.5% women recognized that the event as a rape; and 4.7% women said "didn't know." In the same study, in response to a question that has allows for more than one answer by the same respondent, 5% said they feared hostile treatment by the judicial system; 36% were not clear that a crime had been committed; 11% did not know how to report the crime; 22% thought the police would not take them seriously; 21% felt that the police would not want to be bothered; 32% were afraid of reprisal by the assailant; and 53% thought it was not serious enough to report.

Studies have shown that 40% of sexual assault survivors develop sexually transmitted diseases while other victims suffer chronic physical or psychological problems over time, and 25% to 50% of the victims seek mental health treatment.[16] Unwanted pregnancies and self-pity may result from sexual assault. Pregnancies resulting from sexual assault may lead to a higher likelihood of major depression in such college women, since in general, 10% of pregnant women are likely to undergo clinical depression with 10% to 15% of new mothers undergoing postpartum depression.[5]

Results from a study of 949 college women who completed a history form for routine gynecological care at their university health center, suggested that these women were significantly more likely than their peers to be sexually active, to report having abortions and pregnancies to term, or to report having experienced sexual dissatisfaction and depression.[17] Studies have also shown that victims may resort to self-destructive behaviors, including poor self-esteem, substance and alcohol abuse, and sadly, sexual irresponsibility, which leads to revictimization.[18] Predictors and consequences of sexual assault occurring before and after 16 years of age in a nonclinical sample of women were explored in a previous study, which concluded that child sexual abuse occurring before 16 years of age was a predictor of later assault among the identified, co-morbid risk factors for revictimization.[19] They also concluded that risk of re-victimization was not increased in cases of peer sexual abuse, the number of perpetrators, the age at the time of sexual abuse, or severity of the sexual abuse.

Depression and sexual assault among college women. Research has found depressive symptomatology among youth to be associated with earlier sexual debut; higher numbers of lifetime sexual partners; concurrent, multiple, and casual sexual partnerships; substance use at last episode of intercourse; pregnancy; non-use of contraception; and perceived barriers to condom use.[7,20] Sexual violence and other forms of coercive sexual behavior become a normal part of life for many male and female college students in this country. On college campuses, where drugs and alcohol are frequently used, there was an increase in the proportion of those who reported heavy, episodic drinking from 41.7% to 44.7% from 1998 to 2005 among college students between 18–24 years of age. This was a significant increase, and the trend continues.[21] As a result, violent sexual behaviors are becoming common; it is noteworthy that most of the sexual violence incidents occurring on college campuses involve people who know each other.[22,23]

College campuses have large concentrations of young women who drink alcohol,

suffer from depression, and have more than one sexual partner; as a result, college women are at a greater risk for rape and other forms of sexual violence than women in the general population. Some researchers reported that 20% to 25% of college-aged women are victims of sexual assault at some point during their college lifespan.[24]

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), *depression* is "a disorder with both physical and mental characteristics that negatively disrupts an individual's ability to function from day to day in social and work environments, for a period of two weeks or longer."[25] The DSM-IV suggests that at least five of the following eight symptoms/conditions must be persistently present in an individual for him or her to be diagnosed with depression: feelings of hopelessness or helplessness; loss of interest in daily activities; appetite or weight changes; sleep changes (insomnia/hyper insomnia); psychomotor agitation or retardation; loss of energy; self-loathing/suicidal thoughts; and a lack of concentration. A sample of 4,836 adults from the National Health and Nutrition Examination Survey (NHANES) from 2005 to 2008 data was analyzed.[26] Depressive symptoms among these adults were assessed using the Patient Health Questionnaire (PHQ-9) to determine overall prevalence, rates of treatment, and antidepressant control of mild, moderate, moderately severe, and severe depressive symptoms. About 20% of their sampled population reported having significant depressive symptoms (PHQ-9 $\geq$5).

Alcohol drinking, marijuana use, and living arrangements. Are women who use alcohol and drugs more likely to live in ways that put them at a greater risk of being sexually abused by men? The answers are not definitively established. A longitudinal study conducted by Kilpatrick and his colleagues sought the answer to this question.[27] They found that women who used illicit drugs, but not those used alcohol, were at increased risk of being assaulted over the next two years of follow-up. Their findings suggest that increased alcohol use is more of an after-the-fact coping response to victimization, whereas drug use increases the risk of being mistreated and victimized at the same time that victimization increases the likelihood of using drugs.[27] A study conducted by Freeman and Templefound that adolescents living with one parent significantly associated with history of sexual assault victimization after controlling for potential confounders.[28] and Confidence Intervals [author: spell out] for each types (living with one parent, living with grandparent, and others) of the living situations reveals that each was associated with significantly increased odds of victimization (Odds Ratios 2.50–5.54), relative to those adolescents who lived with both parents.

Research questions and hypotheses. The specific aim of this study is to examine the association between depression and sexual violence among female college students ages 18–24. This research will also allow us to examine the relationship between alcohol drinking and having multiple sexual partners and sexual violence among female college students ages 18–24.

The Confluence Model of sexual assault hypothesizes two developmental pathways of hostile masculinity and impersonal sex.[2] This study focuses on impersonal sexual violence predictors of depression, multiple sexual partners, and binge drinking among female college students on campuses, and prompted the following research question: Is there a significant relationship between depression and experience of sexual violence among female college students even after controlling for the effect of risky sexual and

drinking behavior? We hypothesize that female college students who reported ever being diagnosed with depression would be more likely to have experienced sexual violence than those who had never been diagnosed with depression, after controlling for the effect of risky sexual and drinking behavior and socio-demographic and economic characteristics.

Methods

This study uses data from the National College Health Assessment (NCHA) survey conducted in the Spring of 2003 by the American College Health Association (ACHA). The NCHA data were collected from 33 college campuses from a sample size of 20,724 students. Of the 33 campuses surveyed, 20 were public and 13 were private colleges/universities. The colleges are located around the country, with six in the Northeast, 12 in the Midwest, five in the South and 10 in the West. This research uses only data from female students of ages 18–24 (about 10,991). Because of missing responses for some of the variables, our final sample size for the study comprised 10,541 female students ages 18–24 years.

The NCHA survey instrument was developed by extracting items from The National College Health Risk Behaviors Surveys, The Study Health Survey at The University of Minnesota, The Core Survey, The College Alcohol Study, The Annual Student Health Behavior Assessment Monitoring the Future, and The National Health Objectives as outlined in *Healthy People 2010*. A detailed description of the data is available (refer to http://www.acha-ncha.org/data_highlights.html). The NCHA survey instrument has 50 multi-part questions. The survey uses self-report, and the students complete the survey instrument in pencil. The NCHA survey has seven content areas: (1) Health, Health Education and Safety; (2) Alcohol, Tobacco and Drugs; (3) Sex Behavior, Perceptions and Contraception; (4) Weight, Nutrition and Exercise; (5) Mental and Physical Health; (6) Impediments to Academic Performance; and (7) Demographics.

Three pilot studies using the NCHA survey instrument were undertaken: (a) in 1998, at nine institutions of higher education with a combined sample size of 2,007; (b) in early 1999, at 10 institutions of higher education with a combined sample size of 3,531 students; and (c) in the fall of 1999, at seven institutions of higher education with a combined sample size of 3,649 students.[29] The pilot data collections were done for the purpose of comparing results from the National College Health Risk Behavior Survey (NCHRBS) and the Center for Disease Control and Prevention (CDC) National Study conducted in 1995. Item reliability was assessed.[29] The survey items were not changed based on these comparative analyses as the NCHA survey pilot demonstrated strong statistical alignment with the NCHRBS. Internal consistency and reliability using Cronbach's alpha for the sexual-related scales of the NCHA survey ranged from 0.35 to 0.67.[29]

Variable definitions and measurements. *Depression*. Depression was measured using the question, Have you ever been diagnosed with depression? The responses were either "yes" or "no." For the purpose of the analysis, depression was then dichotomized as 1 for "yes" and 0 for "no." Depression is one of the independent variables.

Sexual violence. Documentation of the occurrence of sexual violence was constructed

from the following four questions: "Within the last school year, have you experienced: (a) verbal threats for sex against your will; (b) sexual touching against your wish; (c) attempted sexual penetration against your will; and (d) sexual penetration against your will?" For each of these questions, there were two answer choices: either "yes" or "no", which constituted our dependent variable. If the response was "yes" in any of these four questions the "experiencing sexual violence" variable was coded as 1, and as 0 otherwise. For examining the reliability of the instrument that was used for constructing sexual violence, a Cronbach's alpha, of 0.66 was calculated from these four indicators of sexual violence.

Risky behavior and demographic variables. Four indicator variables were used for measuring risky behavior of the study participants—number of current sexual partners, ever use of marijuana, binge alcohol drinking in past two weeks, and current living arrangements. In addition, member of social fraternity/sorority was used as control in the analysis. The number of sexual partners was categorized as: (1) no sexual partner; (2) one sexual partner; and (3) more than one sexual partner. The use of marijuana in the last 30 days was also categorized into three categories: (1) never used marijuana; (2) did not use in the last 30 days; and (3) used one or more days during last 30 days. Binge drinking was measured from the question: "Thinking back over the last two weeks, how many times, if any, have you had five or more alcoholic drinks in a sitting?" The responses were categorized into four categories—(1) none; (2) one time; 3) two times; (4) more than two times. The living arrangement variable was categorized into three categories—(1) living on the campus; (2) living off campus but not with parents; and (3) living with parents. Member of social fraternity/sorority was categorized as 1 for "yes" and 0 for "no." Two demographic indicators—age and race—were used. Race was categorized into five groups: (1) White; (2) Black; (3) Hispanic; (4) Asian; and (5) Others. Age was broken down categorized into three categories: (1) ages 18–19; (2) ages 20–21; and (3) ages 22–24.

Statistical analysis. The analysis was performed using the statistical software, STATA Version 11.0.[30] To explore the distribution of the study sample, a descriptive analysis was performed. To measure the association between the dependent variable and all independent variables separately, several chi-square tests of independence analyses were performed. Since the dependent variable is dichotomous, several crude and adjusted logistic regression models were estimated for measuring the association between having ever been diagnosed with depression and experiencing sexual violence during the past school year. Three logistic regression models were used: (1) crude association between depression and experiencing sexual violence; (2) association between depression and experiencing sexual violence adjusted for the effect of risky sexual and drinking behavior; and (3) association between depression and experiencing sexual violence, controlling for the effect of risky sexual and drinking behavior, and socio-demographic and economic characteristics of the study participants. The multiple logistic regression model

$$\text{logit}\,(p) = \beta_0 + \beta_1 D_1 + \beta_l Z_l + \beta_k X_k$$

where p is the probability of experiencing sexual violence by a female student ages 18–24 on college campus; β_1 is the regression coefficient for the depression variable D_1; β_l is

the vector of regression coefficients for the vector of risky behavior variables Z_i; and β_k is the vector of regression coefficients for the vector of demographic characteristics X_k.

Four separate logistic regression models were also estimated for predicting the four indicators of sexual violence: experiencing verbal threats for sex against her will, sexual touching against her will, attempted sexual penetration against her will, and sexual penetration against her will.

Results

Table 1 shows the descriptive statistics of the study sample. A sample of 10,541 female college students of ages 18–24 was analyzed. Of these, 79.7% were Whites, 4.0% were African Americans, 5.7% were Hispanic, 7.3% were Asians, and 3.3% were of other races. The mean age of the study sample was 20 years. About half (45.8%) of the female students reported that they had had one sexual partner and 24.4% of the female students reported that they had had more than one sexual partner. About two-thirds (64.5%) of the female students reported that they had never smoked marijuana. About one-fifth (20.1%) of the female students reported that they had ever used marijuana but not in the last 30 days. Fifteen percent reported that they had smoked marijuana in the last 30 days. More than one-third (35.8%) of the female students reported that they had had five or more alcoholic drinks in one sitting at least once in the last two weeks. One-sixteenth (5.8%) of the study sample reported that they were ever diagnosed with depression. One-sixth (15.6%) of the study sample of female college students reported experiencing sexual violence.

Bivariate results. Bivariate results are presented in Table 2. Chi-square (χ^2) tests of independence for each of the independent variables with the dependent variable (experiencing sexual violence) were performed. Depression is significantly ($p<.001$) associated with experiencing sexual violence. Of female students who reported ever being diagnosed with depression, 24.0% of them reported experiencing sexual violence. Fifteen percent of those who had never been diagnosed with depression reported experiencing sexual violence. Marijuana use is significantly ($p<.001$) associated with experiencing sexual violence. Of the female students who used marijuana in the last 30 days, 27.1% of them reported experiencing sexual violence. Of the female students who never used marijuana, 11.9% of them reported experiencing sexual violence. Binge drinking behavior was also significantly ($p<.001$) associated with experiencing sexual violence. Of the female students who were involved in binge alcohol drinking more than twice in the last 30 days, 30.4% of them reported experiencing sexual violence. Number of current sexual partners, living arrangements and age are also significantly ($p<.001$) associated with experiencing sexual violence. Of the female students who reported having more than two sexual partners, 29.7% of them reported experiencing sexual violence. Of female students who reported living on campus, 17.2 percent of them reported experiencing sexual violence. Of female students who were 18–19 years of age, 18.5% of them reported experiencing sexual violence. More than one-sixth (17.4%) of female students who were Black reported experiencing sexual violence, whereas 15.8% of White female students reported experiencing sexual violence on college campuses.

Table 1.

DISTRIBUTION OF SOCIO-DEMOGRAPHIC, BEHAVIORAL AND PSYCHO-SOCIAL CHARACTERISTICS OF FEMALE COLLEGE STUDENTS PARTICIPATED IN NATIONAL COLLEGE HEALTH ASSESSMENT (NCHA) SURVEY, 2003

Variables	Percentage (%)	Sample (n)
Experienced sexual violence		
Yes	15.6	1,644
No	84.4	8,897
Ever diagnosed with depression		
Yes	5.8	608
No	94.2	9,933
Ever used marijuana		
Never used	64.5	6,800
Ever used but did not use in last 30 days	20.1	2,120
Used in last 30 days	15.4	1,621
Five or more alcoholic drink in one sitting in past 2 weeks		
None	64.2	6,775
One time	14.2	1,492
Two times	8.9	937
More than two times	12.7	1,337
Number of current sexual partners (mean: 1.3; sd: 1.62)		
None	29.8	3,138
One partner	45.8	4,837
Two or more partners	24.4	2,566
Living arrangement		
On campus	54.8	5,780
Outside campus but not with parents	33.7	3,553
With parents	11.5	1,208
Race		
White	79.7	8,396
Black	4.0	425
Hispanic	5.7	600
Asian	7.3	767
Other races	3.3	353
Age (Mean: 20 years; sd: 1.52)		
18–19	43.7	4,602
20–21	39.0	4,114
22–24	17.3	1,825
Member of a social fraternity or sorority		
Yes	10.1	1,060
No	89.9	9,481
Total sample	100.0	10,541

Table 2.

BI-VARIATE RELATIONSHIP OF DEPRESSION, RISK BEHAVIORS AND DEMOGRAPHIC CHARACTERISTICS WITH EXPERIENCED SEXUAL VIOLENCE AMONG FEMALE COLLEGE STUDENTS AGED 18–24, NATIONAL COLLEGE HEALTH ASSESSMENT (NCHA) SURVEY, 2003

	Experiencing sexual violence					
	No		Yes			
Variables	**N**	**%**	**n**	**%**	**χ^2**	**p-value**
Ever diagnosed with depression					34.72	<.001
Yes	462	76.0	146	24.0		
No	8,435	84.9	1498	15.1		
Ever used marijuana					246.40	<.001
Never used	5,989	88.1	811	11.9		
Used but not in last 30 days	1,726	81.4	394	18.6		
Used in last 30 days	1,182	72.9	439	27.1		
Binge alcohol drinking in past two weeks					322.76	<.001
Not binge drinking	5,985	88.3	790	11.7		
Binge drinking one time	1,239	83.0	253	17.0		
Binge drinking two times	742	79.2	195	20.8		
Binge drinking two plus times	931	69.6	406	30.4		
Number of current sexual partners					528.32	<.001
No sexual partner	2,849	90.8	289	9.2		
One sexual partner	4,245	87.8	592	12.2		
Two or more sexual partners	1,803	70.3	763	29.7		
Living arrangement					42.63	<.001
On campus	4,784	82.8	996	17.2		
Outside campus but not with parents	3,025	85.1	528	14.9		
With parents	1,088	90.1	120	9.9		
Race					4.30	.366
White	7,070	84.2	1,326	15.8		
Black	351	82.6	74	17.4		
Hispanic	516	86.0	84	14.0		
Asian	654	85.3	113	14.7		
Other races	306	86.7	47	13.3		
Age (in years)					55.99	<.001
18–19	3,751	81.5	851	18.5		
20–21	3,539	86.0	575	14.0		
22–24	1,607	88.1	218	11.9		
Member of a social fraternity or sorority					38.69	<.001
Yes	825	77.8	235	22.2		
No	8,072	85.1	1,409	14.9		

Logistic regression results. Crude (Model 1) and adjusted logistic regression models (Models 2 and 3) were estimated to examine the relationship between ever being diagnosed with depression and experiencing sexual violence. Odds ratios and related 95% confidence intervals (CI) are presented for all three models in Table 3. Results show that female college students who reported ever being diagnosed with depression were more than 1.75 times (OR: 1.78; 95% CI: 1.47, 2.16) significantly ($p<.001$) more likely to have experienced sexual violence compared with those who had never been diagnosed with depression (Model 1). Female college students who reported ever being diagnosed with depression were over 1.5 times (OR: 1.53; 95% CI: 1.25, 1.87) significantly ($p<0.001$) more likely to have experienced sexual violence compared to those who had never been diagnosed with depression, adjusting for the effect of several risk factors of sexual violence (Model 2). The odds of experiencing sexual violence on college campuses remained high (OR: 1.56; 95% CI: 1.27, 1.91) and significant ($p<.001$), adjusting for the effect of available demographic characteristics in addition to indicators of risk behavior (Model 3).

Female college students who reported using marijuana in the past 30 days were nearly 1.45 times (OR: 1.44; 95% CI: 1.24, 1.68) significantly ($p<0.001$) more likely to have experienced sexual violence compared with those who never used marijuana, adjusting for the effect of other risk factors and demographic characteristics of the student (Model 3). Those who reported binge drinking more than twice in the past two weeks were almost 2.0 times (OR: 1.89; 95% CI: 1.60, 2.22) significantly ($p<0.001$) more likely to have experienced sexual violence than those who did not, after controlling for the effect of other risky behavior and demographic characteristics of the student (Model 3).

The number of sexual partners was also significantly associated with sexual violence. Results suggest that those who reported having two or more sexual partners were at a greater risk of sexual violence. Female students who reported having two or more sexual partners were more than 3.0 times (OR: 3.17; 95% CI: 2.69, 3.74) significantly ($p<.001$) more likely to have experienced sexual violence than those who had no sexual partner, adjusting for the effect of other risky behavior and demographic characteristics of the student (Model 3).

Becoming a member of a social fraternity or sorority group appeared to be significantly associated with sexual violence. Female students who reported being a member of a social fraternity or sorority group were more than 1.25 times (OR: 1.33; 95% CI: 1.13, 1.58) significantly ($p<.001$) more likely to have experienced sexual violence compared with those who were not members of those social groups while adjusting for the effect of other risky behaviors, depression, and demographic characteristics (Model 3).

Age and race are significantly associated with sexual violence. Students who were younger were significantly more likely to have experienced sexual violence. African Americans and Asians were significantly more likely to have experienced sexual violence compared with Whites. Findings from Models 2 and 3 are similar suggesting that there is no mediation effect of risks behavior and demographic characteristics on the relationship between depression and experiencing sexual violence.

In addition, four adjusted logistic regression models (Models 4–7) were estimated using separately all four indicators of sexual violence: "verbal threat of sex," "unwanted

Table 3.

CRUDE AND ADJUSTED ODDS RATIOS WITH 95% CONFIDENCE INTERVAL FOR THE LOGISTIC REGRESSION ESTIMATES FOR THE ASSOCIATION BETWEEN DEPRESSION AND EXPERIENCING SEXUAL VIOLENCE AMONG FEMALE COLLEGE STUDENTS AGED 18–24, NATIONAL COLLEGE HEALTH ASSESSMENT (NCHA) SURVEY, 2003

	Model 1		Model 2		Model 3	
Covariates	**Odds Ratios**	**95% CI**	**Odds Ratios**	**95% CI**	**Odds Ratios**	**95% CI**
Ever diagnosed with depression						
No (Reference Category or RC)	1.00	—	1.00	—	1.00	—
Yes	1.78***	1.47, 2.16	1.53***	1.25, 1.87	1.56***	1.27, 1.91
Risk Behavior:						
Ever used marijuana						
Never used (RC)	—	—	1.00	—	1.00	—
Used but not in last 30 days	—	—	1.16*	1.01, 1.34	1.17*	1.02, 1.35
Used in last 30 days	—	—	1.48***	1.27, 1.72	1.44***	1.24, 1.68
Binge alcohol drinking in past two weeks						
Not binge drinking (RC)	—	—	1.00	—	1.00	—
Binge drinking one time	—	—	1.18*	1.01, 1.39	1.22*	1.03, 1.43
Binge drinking two times	—	—	1.38***	1.14, 1.66	1.41***	1.17, 1.70
Binge drinking two plus times	—	—	1.83***	1.56, 2.15	1.89***	1.60, 2.22
Number of current sexual partners						
No sexual partner (RC)	—	—	1.00	—	1.00	—
One sexual partner	—	—	1.31***	1.12, 1.52	1.36***	1.17, 1.59
Two or more sexual partners	—	—	3.13***	2.66, 3.69	3.17***	2.69, 3.74

(Continued on p. 1352)

Table 3. (*continued*)

Covariates	Model 1		Model 2		Model 3	
	Odds Ratios	95% CI	Odds Ratios	95% CI	Odds Ratios	95% CI
Living arrangement						
With parents (RC)	—	—	1.00	—	1.00	—
On campus	—	—	1.60***	1.30, 1.96	1.45***	1.17, 1.79
Off campus but not with parents	—	—	1.14	0.92, 1.42	1.28*	1.02, 1.60
Member of a social fraternity/sorority						
No (RC)	—	—	1.00	—	1.00	—
Yes	—	—	1.29**	1.09, 1.52	1.33***	1.13, 1.58
Demographic Characteristics:						
Race						
White (RC)	—	—	—	—	1.00	—
Black	—	—	—	—	1.35*	1.03, 1.76
Hispanic	—	—	—	—	1.01	0.78, 1.28
Asian	—	—	—	—	1.27*	1.02, 1.57
Other races	—	—	—	—	0.92	0.66, 1.27
Age (in years)						
18–19	—	—	—	—	1.60***	1.33, 1.93
20–21	—	—	—	—	1.15	0.96, 1.37
22–24 (RC)	—	—	—	—	1.00	—
–2 Log Likelihood	9095.71		8444.16		8400.32	
LR chi-square	30.97***		682.52***		726.36***	
Observation	10,541		10,541		10,541	
Degrees of freedom	1		11		17	

*p < .05
**p < .01
***p < .001
CI=Confidence Interval

sexual touching," "attempted unwanted sexual penetration," and "unwanted sexual penetration" (Table 4).

Findings in Models 4–7 were similar and consistent with the findings that were observed in Model 3. Female students who reported ever being diagnosed with depression were 1.90, 1.60, 1.93 and 2.62 times, respectively, significantly ($p<.001$) more likely to report "verbal threat of sex," "unwanted sexual touching," "attempted unwanted sexual penetration," and "unwanted sexual penetration," respectively, adjusted for the effects of risky behavior and demographic characteristics.

Discussion

Public health research has focused more on infectious and chronic diseases like cancer, heart disease, stroke, diabetes, obesity, HIV/AIDS, and flu than on issues related to depression. Research documented that more Americans suffer from depression than from coronary heart disease (17 million), cancer (12 million), or HIV/AIDS (1 million). Epidemiological data show that up to 60% of clinically depressed individuals die by suicide. Hence, depression should be given as much attention as cardiovascular disease, cancer, and other leading diseases. This study showed that depression is positively associated with sexual violence experienced by female students ages 18–24 on college campuses in the U.S. A previous study suggested a firm scientific basis for recognition and treatment of posttraumatic psychiatric morbidity associated with domestic violence.[31]

As college women are disproportionately represented among people with depression, their treatment merits urgent attention.[4] We recommend the following:

- Regular informational meetings should be held within colleges to create awareness among college women about their safety on and off campus, as well as to provide an environment of social support.
- Public health should focus more on depression in preventive care, conduct campaigns with public service announcements to create and raise awareness of symptoms of depression, and to expel myths and negative cultural perspectives about the disease.

Limitations:

DSM-IV suggests that at least five of the eight items of symptoms must be present while determining depression. In this study, depression was measured from a self-reported question "have you been diagnosed with depression?" which may have introduced some reporting bias.

The use of the student sample was not necessarily representative of the general population; however, this sample did appear to fairly and accurately reflect the population of American college students. Only schools that randomly selected students or surveyed students in randomly selected classrooms were part of the database. Because the schools were self-selecting, the NCHA survey cannot be said to be generalizable to all schools in the United States. The data are part of a cross-sectional survey and

Table 4.

ADJUSTED ODDS RATIOS FOR THE LOGISTIC REGRESSION ESTIMATES FOR THE ASSOCIATION BETWEEN DEPRESSION AND EXPERIENCING FOUR DIFFERENT INDICATORS OF SEXUAL VIOLENCE AMONG FEMALE COLLEGE STUDENTS AGED 18–24, NATIONAL COLLEGE HEALTH ASSESSMENT (NCHA) SURVEY, 2003

	Odds Ratios			
Covariates	**Model 4: Verbal threat for sex**	**Model 5: Sexual touching**	**Model 6: Attempted sexual penetration**	**Model 7: Sexual penetration**
Ever diagnosed with depression				
No (Reference Category or RC)	1.00	1.00	1.00	1.00
Yes	1.90***	1.60***	1.93***	2.62***
Risk Behavior:				
Ever used marijuana				
Never used (RC)	1.00	1.00	1.00	1.00
Used but not in last 30 days	1.01	1.15	0.93	1.18
Used in last 30 days	1.40**	1.42***	1.11	1.46*
Binge alcohol drinking in past two weeks				
Not binge drinking (RC)	1.00	1.00	1.00	1.00
Binge drinking one time	0.87	1.27**	1.20	0.91
Binge drinking two times	1.09	1.44***	1.15	0.76
Binge drinking two plus times	1.12	1.92***	1.47**	1.02
Number of current sexual partners				
No sexual partner (RC)	1.00	1.00	1.00	1.00
One sexual partner	1.50**	1.38***	2.26***	2.79***
Two or more sexual partners	3.68***	3.21***	8.69***	11.66***

(Continued on p. 1355)

Table 4. (continued)

Covariates	Odds Ratios			
	Model 4: Verbal threat for sex	Model 5: Sexual touching	Model 6: Attempted sexual penetration	Model 7: Sexual penetration
Living arrangement				
With parents (RC)	1.00	1.00	1.00	1.00
On campus	1.41	1.44**	0.86	0.72
Off campus but not with parents	1.09	1.37**	0.79	0.67
Member of a social fraternity/sorority				
No (RC)	1.00	1.00	1.00	1.00
Yes	1.12	1.36***	1.76***	2.29***
Demographic Characteristics:				
Race				
White (RC)	1.00	1.00	1.00	1.00
Black	0.79	1.50**	1.14	0.63
Hispanic	0.80	1.02	0.75	0.56
Asian	1.24	1.35*	1.30	1.57
Other races	0.99	1.05	1.05	1.28
Age (in years)				
18–19	2.15***	1.56***	1.48*	1.18
20–21	1.45*	1.16	1.15	0.97
22–24 (RC)	1.00	1.00	1.00	1.00
–2 Log Likelihood	3599.29	7502.88	3446.10	2067.11
LR chi-square	236.98***	641.67***	414.68***	282.81***
Observation	10,541	10,541	10,541	10,541
Degrees of freedom	17	17	17	17

*p < .05
**p < .01
***p < .001

therefore the researchers assume only an association between risk factors and sexual violence and are not making any conclusion about causality.

This research is based on self-reported behavior. It cannot be determined whether the respondents tended to over-report or under-report certain behaviors. The validity and reliability of sexual violence remains unclear, in part because of social stigma and other pressures emerging from the process, which may contribute to low rates of sexual violence among this sample. This may affect both self-identifying and subsequent self-reporting of sexual violence resulting in low prevalence of sexual violence.

Appendix A.
DESCRIPTION OF THE SURVEY INSTRUMENT:

The American College Health Association (2001) developed the National College Health Assessment Survey. The instrument is a self-report, paper and pencil tool asking 50 multi-part questions. The survey has seven content areas: 1) health, health education and safety; 2) alcohol, tobacco, and drugs; 3) sex behavior, perceptions and contraception; 4) weight, nutrition and exercise; 5) mental and physical health; 6) impediments to academic performance; and (7) demographics. The last section asks questions pertaining to demographics. Three pilot studies using these instruments were undertaken and the reliability and the validity of these instruments were assessed.[34]

Depression variables:
Question: Have you ever diagnosed with depression? (no=0; yes=1)
Sexual violence variables:
Question: Within the last school year, have you experienced:

a. Verbal threats for sex against your will (no=0; yes=1)
b. Sexual touching against your will (no=0; yes=1)
c. Attempted sexual penetration (vaginal, anal, oral intercourse) against your will (no=0; yes=1)
d. Sexual penetration (vaginal, anal, oral intercourse) against your will (no=0; yes=1).

Appendix B.
DISTRIBUTION OF INDICATORS OF SEXUAL VIOLENCE AMONG FEMALE COLLEGE STUDENTS PARTICIPATED IN NATIONAL COLLEGE HEALTH ASSESSMENT (NCHA) SURVEY, 2003

Variable	Percentage (%)	Sample (n)
Experienced sexual violence during last school year		
Verbal threats for sex against her will		
Yes	4.5	469
No	95.5	10,072
Sexual touching against her will		
Yes	13.0	1370
No	87.0	9,171
Attempted sexual penetration against her will		
Yes	4.5	473
No	95.5	10,068
Sexual penetration against her will		
Yes	2.4	248
No	97.6	10,293
Total sample	100.0	10,541

Notes

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