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DEPRESSION, SEXUALLY TRANSMITTED INFECTION, AND SEXUAL RISK BEHAVIOR AMONG YOUNG ADULTS IN THE UNITED STATES

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Abstract

Objective—To measure associations among depression, sexual risk behaviors, and sexually transmitted infection (STI) among white and black youth in the United States.

Design—Analysis of prospective cohort study data. Wave I of the National Longitudinal Study of Adolescent Health occurred in 1995 when participants were in grades 7 through 12. Six years later, all Wave I participants who could be located were invited to participate in Wave III and provide a urine specimen for STI testing.

Setting—In-home interviews in the continental United States, Alaska, and Hawaii.

Participants—Population-based sample. Wave I (adolescence) and Wave III (adulthood) white and black respondents with sample weight variables (N=10,783).

Main Exposures—Chronic depression (adolescence and adulthood) and recent depression (adulthood only) versus no adult depression.

Outcome Measures—Multiple sexual partnerships and inconsistent condom use in the past year and a current positive test result for *C trachomatis*, *N gonorrhoeae*, or *T vaginalis* (adulthood).

Results—Recent or chronic depression in adulthood was more common among blacks (women: 19%, men: 12%) than whites (women: 13%, men: 8%). Among all groups, adult depression was associated with multiple partnerships but not with condom use. Among black men, depression was strongly associated with STI (recent: adjusted Prevalence Ratio (PR): 2.36, 95% Confidence Interval

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(CI): 1.26–4.43; chronic: adjusted PR: 3.05 95% CI: 1.48–6.28); multiple partnerships did not mediate associations between depression and STI.

Conclusions—Integration of youth mental health and STI programs is warranted. Further research is needed to elucidate how depression may influence infection among black men.

BACKGROUND

Approximately 19 million new sexually transmitted infections (STIs) occur in the United States (US) each year,¹ with nearly half occurring in youth aged 15 to 24 years.² Improved understanding of factors that contribute to adolescent and young adult STI is needed to inform prevention efforts.

Depression is a modifiable factor associated with high-risk sexual behaviors and STI among youth in the US.^{3–10} While sexual risk behaviors and STI are risk factors for depression,^{6, 9, 10} depression also may increase susceptibility to risk behaviors and infection.¹¹ Depression may impair cognitive function and memory;^{12, 13, 14, 15} decrease impulse control;^{16, 17} contribute to psycho-social impairment¹³ including emotional reactivity in peer relationships;¹⁸ reduce motivation;¹³ and increase fatalism.¹⁹ These depression-related effects may inhibit clear perception of STI risk and the ability to prevent risk behavior. Depression also is associated with substance use,^{20–35} a consistent correlate of STI and related behaviors.^{36–39, 29, 30, 40–49} While depression and substance use may influence STI risk by promoting high-risk sexual behaviors, adolescents affected by one or both of these disorders also may be more likely to have high-risk peers and sexual networks characterized by high levels of STI; this may increase the risk of sex with an infected partner^{50–52} and STI acquisition. Diagnosis and treatment of adolescent depression, important in themselves, also may constitute a component of adolescent STI prevention.

To our knowledge, only one study has assessed the longitudinal relationship between depression and STI among adolescents, using data from Wave I (adolescence) and Wave II (one year later) of the National Longitudinal Study of Adolescent Health (Add Health).⁶ In adjusted analyses, major depression predicted STI among boys, but not among girls. An important limitation was that measurement of STI was based on self report. Add Health Wave III is currently available and provides data on depression in adolescence and adulthood and biologically confirmed STI in young adulthood. Given the limited research into depression and STI from adolescence into adulthood, further study of depression and STI in the Add Health sample was warranted.

The purpose of this study was to measure the association between depression in adolescence and adulthood and sexual risk behaviors and biologically confirmed STI in adulthood using Waves I and III of Add Health. We investigated whether the associations between depression and outcomes differed for men *versus* women and for whites *versus* blacks, in order to obtain population-specific information needed to maximize intervention resources.

METHODS

Add Health is a prospective cohort study designed to investigate factors of health from adolescence into adulthood.⁵³ The original study population was a stratified, random, school-based sample representative of US middle and high schools students. During Add Health Wave I (1995), more than 20,000 adolescents completed a baseline interview assessing characteristics including sexual behavior and depression. Parents were also interviewed. During Wave III (2001 to 2002), Wave I participants were re-interviewed and urine specimens were collected for determination of *Chlamydia trachomatis* and *Neisseria gonorrhoea* by ligase chain reaction (Abbott LCx® Probe System, Abbott Laboratories, Abbott Park, IL) and *Trichomonas*

vaginalis by polymerase chain reaction (Amplicor CT/NG Urine Specimen Prep Kit, Roche Diagnostic Systems, Indianapolis, IN). The study design has been described in detail elsewhere.^{54–59}

We used measures from Waves I and III for this analysis of depression and STI. Ethical approval for this research was obtained from the University of North Carolina at Chapel Hill School of Public Health Institutional Review Board.

Measures

Exposure: Depression—Depression was assessed using a modified version of the Center for Epidemiologic Studies Depression Scale (CES-D).⁶⁰ The original CES-D is composed of 20 items, each of which assesses the frequency of experiencing depressive symptoms in the past week (0 - never or rarely, 1 - sometimes, 2 - a lot of the time, 3 - most of the time/all of the time). Four items assess positive symptoms (i.e., frequency of happiness, whether enjoys life) and are reversed before the score is computed. The composite score based on the 20-item scale ranges from 0 to 60, with higher scores indicating increased severity of depression. The scores of 22 for males and 24 for females have been determined to be sensitive and specific indicators of major depressive disorder among adolescents.⁶¹

We used a modified version of the CES-D composed of a subset of nine items common to both Waves I and III (Appendix, available online) to calculate each participant's depression scores at Wave I and Wave III (possible score range: 0–27).

Following Shrier et al.,^{5, 6} we identified gender-specific cut-points for major depressive disorder based on a modified CES-D that were proportional to the cut-points for major depressive disorder based on the complete 20 item CES-D.⁶¹ Based on our nine-item CES-D, scores of 9.9 among males and 10.4 among females indicated major depressive disorder. For convenience, we identified male or female respondents with a score of 10 or greater as having a high likelihood of major depressive disorder. We subsequently refer to this high likelihood of major depressive disorder as “depression.”

Based on our categorizations of depression at Waves I and III, we defined a three-level depression exposure variable. We coded respondents with depression in adulthood (Wave III) who also had depression in adolescence (Wave I) as having *chronic depression*, respondents with depression in adulthood (Wave III) who did not have depression in adolescence (Wave I) as having *recent depression*, and respondents who were not depressed in adulthood (Wave III) as having *no adult depression*.

Outcomes: Sexual Risk Behaviors and STI (Wave III)—We measured associations between recent and chronic depressions and the following *sexual risk behaviors* in the year prior to Wave III: two or more sexual partners, six or more sexual partners, 10 or more sexual partners, 0% condom use, and less than 100% condom use (yes *versus* no). We also examined the association between depression and *biologically confirmed STI* at Wave III (a positive test result for *Chlamydia trachomatis*, *Neisseria gonorrhoea*, or *Trichomonas vaginalis* on Wave III urine specimen *versus* a negative result for all three tests).

Potential Confounding Variables—We considered each of the following covariates as a potential confounding variable based on its *a priori* causal relationship with the exposure and outcome: age; marital history; maternal education measured by Wave I self-report if the mother was interviewed, otherwise by adolescent's report; Wave III low functional income status in the past year; age at first vaginal intercourse; self-reported STI at Wave I (respondent-reported diagnosis of chlamydia, gonorrhea, or trichomoniasis *versus* no self-reported STI diagnosis);

Wave I frequent alcohol consumption in the past year, defined as drinking at least 3 days per week; Wave I lifetime marijuana use; and Wave I lifetime crack/cocaine use.

Data Analysis

For all analyses, we used survey commands in Stata Version 9.1 (Stata Corp., College Station, TX) to account for stratification, clustering, and unequal selection probabilities, yielding nationally representative estimates.

We used bivariable analyses to calculate weighted prevalences and 95% confidence intervals (CIs) of Wave III STI by demographic, socio-economic, mental health, and behavioral variables. We also investigated whether depression and mental health care differed between whites and blacks.

We estimated unadjusted prevalence ratios (PRs) and 95% confidence intervals (CIs) for associations between depression and outcomes (multiple partnerships indicators, condom use indicators, and STI), by gender and race (white *versus* black) using a Poisson model without an offset, specifying a log link and probability weights.^{62, 63} Adjusted models included demographic, socio-economic, depression, and adolescent STI risk and substance use variables.

Among populations in which we observed an association between depression and sexual risk behaviors (indicators of multiple sexual partnerships or inconsistent condom use) as well as STI, we explored whether the behavioral variables predicted by depression were mediators of the depression-STI relationship. We compared associations between depression and STI adjusted for original confounding variables with associations further adjusted for the intermediate sexual behavior determinants. If the associations between depression and STI were attenuated when further adjusting for the behavioral intermediates, we assumed these variables mediated the association between depression and STI.

RESULTS

Of the 18,924 participants in the weighted Wave I sample, 14,322 (75.7%) were located and re-interviewed during Wave III and had no missing values for sample weight variables.

STI testing procedures, participation, and results have been described in detail previously.^{58, 64, 65} Of Wave III participants (N=14,322), 1,130 (7.9%) refused to provide a urine specimen, 226 (1.6%) were unable to provide a specimen, 421 (2.9%) specimens could not be processed due to shipping or laboratory problems, and 951 (6.6%) did not have results for all three STI tests. The prevalence of missing or incomplete STI data was not significantly different by race/ethnicity.

We conducted analyses among the 10,783 white and black respondents with complete sample weight variables. Of these, the 8,794 white and black Wave III participants (81.6%) with a result for all three tests - *Chlamydia trachomatis*, *Neisseria gonorrhoea* and *Trichomonas vaginalis* – were included in the analyses of depression and STI.

Wave III STI Prevalence by Participant Characteristics

The analytic sample was 50.4% male; had a mean age of 21.8 years; and was 80.9% white and 19.1% black (Table 1).

The overall weighted prevalence of infection at Wave III with *Chlamydia trachomatis*, *Neisseria gonorrhoea*, or *Trichomonas vaginalis* was 6.1% (95% CI: 5.0–7.2%) (Table 1). STI

prevalence was higher among women than men (unadjusted OR: 1.61, 95% CI: 1.32–1.96) and markedly higher among blacks than whites (OR: 6.99, 95% CI: 5.38–9.09).

Depression and Mental Health Care

Overall, 11.5% had depression in adulthood; 7.2% had recent depression and 4.3% had chronic depression. Prevalence of recent or chronic depression was highest among black women (19.3%), followed by white women (13.0%), black men (11.9%), and white men (8.1%) (Table 1). Among those who were categorized as having recent or chronic depression at Wave III, blacks were much less likely than whites to report having received psychological or emotional counseling (blacks: 10.1%, white: 20.9%) or prescription medication for depression or stress (blacks: 5.4%, white: 17.0%) in the year prior to the survey.

Depression and Multiple Partnerships in the Past Year

White Men—Among white men, neither recent nor chronic depressions *versus* no adult depression were associated with having two or more partnerships in the past year in bivariable analyses and analyses adjusting for demographic, socio-economic, and adolescent STI risk and substance use variables (recent: adjusted PR: 1.23, 95% CI: 0.96–1.56; chronic: adjusted PR: 1.14, 95% CI 0.79–1.62) (Table 2).

While recent depression was not associated with having six or more partnerships in the past year (adjusted PR: 1.15, 95% CI: 0.46–2.87), chronic depression appeared to be associated with this outcome (adjusted 2.15, 95% CI: 0.90–5.15). This estimate was imprecise due to the low number of chronically depressed white men available for the analysis.

Recent and chronic depressions were not associated with having 10 or more partners in the past year (recent: adjusted PR: 0.56, 95% CI: 0.12–2.61; chronic: adjusted PR: 1.66, 95% CI 0.23–12.0).

White Women—Among white women, recent depression was moderately associated with having two or more partnerships in the past year (adjusted PR: 1.45, 95% CI: 1.19–1.76) (Table 2). Chronic depression was weakly and insignificantly associated with this outcome (adjusted PR: 1.24, 95% CI: 0.90–1.70).

In this group, recent and chronic depressions were strongly associated with having six or more partners in the past year (recent: adjusted PR: 2.13, 95% CI: 1.06–4.25; chronic: adjusted PR: 2.40, 95% CI: 0.98–5.90) and 10 or more partners in the past year (recent: adjusted PR: 6.87, 95% CI: 2.53–18.6; chronic: adjusted PR: 8.42, 95% CI: 3.23–22.0).

Black Men—Among black men, recent depression was not associated with having two or more partners in the past year (adjusted PR: 0.88, 95% CI 0.67–1.16) (Table 2). Chronic depression was not associated with having two or more partnerships in the past year in unadjusted analyses (unadjusted PR: 1.10, 95% CI 0.37–1.67) but was weakly associated with this outcome in adjusted analyses (adjusted PR: 1.37, 95% CI 0.96–1.95).

In this group, recent depression was not associated with having six or more partnerships in the past year (adjusted PR: 1.06, 95% CI: 0.53–2.11). While chronic depression was not associated with having six or more partnerships in the past year in bivariable analyses (unadjusted PR: 1.74, 95% CI: 0.66–4.54), it was strongly associated with the outcome in adjusted analyses (adjusted PR: 2.48, 95% CI: 1.05–5.82).

Among black men, recent and chronic depressions were not associated with having 10 or more partners in the past year (recent: adjusted PR: 0.51, 95% CI: 0.12–2.11; chronic: adjusted PR: 2.23, 95% CI: 0.77–6.47).

Black Women—Black women with recent or chronic depressions did not appear to have higher prevalence of two or more partnerships in the past year than black women with no depression (recent: adjusted PR: 1.12, 95% CI: 0.87–1.45; chronic: adjusted PR: 0.87, 95% CI: 0.64–1.18) (Table 2).

Among black women, recent depression was strongly associated with having six or more partnerships in the past year (adjusted PR: 2.58, 95% CI: 1.08–6.17). Black women with chronic depression were much less likely to have had six or more partners in the past year than black women with no depression (adjusted PR: 0.10, 95% CI: 0.01–0.76).

In this group, small stratum-specific sample size prevented estimation of the associations between depression and having 10 or more partners in the past year.

Depression and Condom Use in the Past Year

In all sub-groups, recent and chronic depressions were not associated with inconsistent condom use (less than 100% condom use or 0% condom use) (Table 3).

Depression and STI

White Men—Among white men, STI was not associated with recent depression (adjusted PR: 0.47, 95% CI: 0.15–1.51) or chronic depression (adjusted PR: 0.77, 95% CI: 0.16–3.72) (Table 4).

White Women—Among white women, STI was not associated with recent depression (adjusted PR: 1.23, 95% CI: 0.54–2.77) (Table 4). White women with chronic depression had lower levels of STI than those with no adult depression (adjusted PR: 0.20, 95% CI: 0.05–0.81).

Black Men—Among black men, STI was strongly associated with recent and chronic depressions in unadjusted analyses (recent: unadjusted PR: 1.93, 95% CI: 0.94–3.95; chronic: unadjusted PR: 2.07, 95% CI: 1.04–4.10) (Table 4). In analyses adjusting for confounding factors, these estimates strengthened (recent: adjusted PR: 2.36, 95% CI: 1.26–4.43; chronic: adjusted PR: 3.05, 95% CI: 1.48–6.28).

Black Women—Among black women, in both unadjusted and adjusted analyses, STI was not associated with recent depression (adjusted PR: 1.01, 95% CI: 0.63–1.61) or chronic depression (adjusted PR: 1.08, 95% CI: 0.66–1.76) (Table 4).

Do multiple partnerships mediate the depression-STI relationship among black men?

Among black men, chronic depression was associated with multiple sexual partnerships as well as STI. We sought to identify whether multiple partnerships mediated the relationship between chronic depression and STI. In analyses adjusting for original confounding factors and, additionally, variables hypothesized to mediate the depression-STI association (indicators of having two, six, or 10 or more partners in the past year), the association was not attenuated. In fact, the association between chronic depression and STI somewhat strengthened (adjusted PR: 3.44, 95% CI: 1.89–6.24). Having six or more partners in the past year did not mediate the association between chronic depression and STI.

While recent depression was associated with STI among black men, it was not associated with multiple partnerships or condom use. Other sexual behaviors or non-behavioral factors not measured in this study appeared to account for the strong association between recent depression and STI.

DISCUSSION

Among this nationally-representative sample, white and black young adults with recent or chronic depression were much more likely to engage in multiple sexual partnerships, an important determinant of STI, than those identified as having no depression in adulthood. Among black men, depression was associated with two to three times the prevalence of STI. In all groups, associations between depression and STI-related behaviors and infection remained when adjusting for demographic, socio-economic, and adolescent STI risk and substance use variables, suggesting that depression may influence STI risk independent of these factors. Because our analysis included components of a longitudinal study, including measurement of depression from adolescence and control of baseline STI risk, we interpret these findings to suggest that depression through adolescence likely contributed to STI risk among young adults. Our observations support prior findings that depression appears to predict STI and related behaviors among adolescents and young adults.^{6, 9} Given the strong associations between depression and STI risk, these findings highlight a need for improved integration of mental health and STI screening and prevention programs for adolescents and young adults in white and black communities.

Among black men, though chronic depression was associated with multiple partnerships, this behavior did not appear to mediate the association between depression and STI. Other factors underlie the association between depression and STI among black men. It is possible that chronic depression contributed to other sexual risk taking behaviors that we did not measure. In addition, chronically depressed black men may have high-risk social and sexual networks and hence experience greater risk of coming into contact with an infected sexual partner than black men who are not depressed. This may be the case, in part, because depression is strongly associated with substance use,¹³ and substance users have networks with high levels of STI.^{50–52} This study has pointed to a robust association between depression and STI risk in among black men. Since this study has not elucidated the mechanisms through which depression may increase STI in this group, it highlights the need for further research into the effects of depression on STI risk of black men and their sexual partners.

Among all groups, depression-related increases in multiple partnerships did not appear to translate to higher infection levels. Among whites, this finding was not surprising given the low prevalence of infection in white sexual networks. However, if infection were introduced into sexual networks of recently and chronically depressed whites, depression-associated increases in multiple partnerships may facilitate STI transmission.

Among blacks, though depression was associated with multiple partnerships, STI was alarmingly high among blacks with both high and low levels of depression and multiple partnerships. These findings validate a prior Add Health study which found that STI is disproportionately high among blacks compared with whites, even among blacks with relatively low levels of risk behaviors.⁶⁶ The study concluded that factors other than individual-level risk behaviors likely drive high infection rates among blacks. Sexual mixing between high and low risk groups is much more common among blacks than whites and likely contributes to disproportionate STI transmission in black populations.⁶⁶ It is possible that structural and contextual factors play a more important role than individual-level behaviors in driving STI transmission among blacks, by contributing to sexual mixing patterns and the concentration of infection in black communities.

The prevalence of depression was higher among blacks than whites, and we observed a race differential in levels of counseling and treatment for depression. These differences support existing evidence of a race disparity in mental health care^{67–69} and further indicate that undiagnosed, untreated depression constitutes an important public health concern among

blacks. These results documented the high prevalence of depression and inadequate diagnosis of and care for mental health needs among blacks, as well as strong associations between depression and STI risk in this group, highlighting the importance of improving mental health care in black communities.

The most important limitation of this research was our inability to conduct a fully longitudinal study, because we sought to examine chronic depression from adolescence into adulthood and adulthood STI. In particular, the long duration of time between data collection in adolescence (Wave I) and young adulthood (Wave III) limited our ability to definitively assess the causal role of depression in sexual risk behavior and STI. To establish whether adolescent depression is causally associated with acquisition of STI in adulthood among minorities, a longitudinal study should be conducted to accurately measure depression, STI, and important covariates such as substance use at *frequent* time intervals to disentangle the specific effects of each variable of interest on STI.

This research was also potentially limited by our use of the CES-D. Our nine-item modified CES-D was not validated against a clinical diagnosis of depression, which may have resulted in misclassification of depression. Further, we assumed that the CES-D functioned similarly in white and minority groups. While some research has shown that the CES-D measures differing underlying phenomenon for different racial/ethnic adolescent groups,⁷⁰ other studies have suggested that the scale functions comparably in both white and African American populations⁷¹ and has good sensitivity and moderate specificity to detect depression in minority populations.⁷²

This study provided further evidence that youth in the US with high STI risk also experience disproportionate risk of depression, highlighting the need for improved integration of mental health and STI diagnosis, treatment, and prevention. Because levels of depression and STI were higher and the associations between these variables were stronger among blacks than whites, minority youth should be prioritized when allocating resources to improve mental health care. Improved diagnosis and care for depression is needed not only because depression constitutes an important public health concern in itself, but also because addressing depression may lead to improved physical health including lower STI risk.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Respondent Characteristics and Wave III Sexually Transmitted Infection (STI) * among White and Black Young Adults Aged 18–25 Years in the United States (N=10,783).

	N [†]	Weighted % [‡]	Weighted % with STI [‡]	Unadjusted Odds Ratio (95% Confidence Interval)
Socio-demographic Characteristics				
Sex				
Female	5,799	49.6	7.4	1.61 (1.32–1.96)
Male	4,984	50.4	4.8	1.
Age (Years)				
18–20	2,682	28.7	5.6	1.
21	1,867	17.0	7.3	1.32 (0.86–2.00)
22	1,981	16.4	6.9	1.24 (0.83–1.85)
23	1,995	15.6	6.0	1.08 (0.67–1.74)
24–28	2,258	22.4	5.3	0.94 (0.56–1.57)
Race/ethnicity				
White	7,741	80.9	3.2	1.
Black	3,042	19.1	18.6	6.99 (5.38–9.09)
Ever Married				
No	8,767	81.8	6.6	1.
Yes	2,003	18.2	4.0	1.70 (1.23–2.35)
Socio-economic Background				
Mother's Education (Wave I)				
<High School Graduate	1,183	11.9	11.9	2.70 (2.03–3.60)
High School Graduate	3,422	35.1	6.1	1.29 (1.01–1.66)
≥College	5,952	53.0	4.8	1.
Respondent/Household could not Afford Housing/Utilities in Past Year (Wave III)				
No	9,098	85.9	5.7	1.
Yes	1,554	14.1	8.5	1.54 (1.17–2.04)
Mental Health				
Adult Depression Status [§]				
No Depression (not Detected at Wave III)	9,450	88.5	5.8	1.
Recent Depression (Detected at Wave III only)	827	7.2	8.3	1.48 (1.05–2.09)
Chronic Depression (Detected at Waves I and III)	472	4.3	8.6	1.53 (1.03–2.29)
Received Psychological or Emotional Counseling in the Past Year				
No	9,965	92.2	6.2	1.
Yes	812	7.8	4.5	0.72 (0.44–1.15)

	N [†]	Weighted % [‡]	Weighted % with STI [‡]	Unadjusted Odds Ratio (95% Confidence Interval)
Received Prescription Medication for Depression or Stress in the Past Year ^{//}				
No	10,188	94.2	6.3	1.
Yes	585	5.8	2.7	0.42 (0.23–0.74)
Adolescent STI Risk				
Age at First Vaginal Sex (Years)				
≤15	3,183	30.6	9.1	2.99 (1.83–4.91)
16	1,854	17.4	6.3	2.01(1.20–3.39)
17–18	2,926	26.7	4.6	1.44 (0.87–2.38)
19–25	1,383	12.8	4.5	1.41 (0.78–2.54)
Never had sex	1,293	12.5	3.2	1.
Self-reported STI in Adolescence (Wave I)				
No	10,147	96.3	5.7	1.
Yes	444	3.7	16.4	3.27(2.24–4.77)
Substance Use in Adolescence (Wave I)				
Drank ≥3 Days per Week in Past year in Adolescence Wave I				
No	10,427	96.6	6.0	1.
Yes	337	3.4	9.0	1.55 (0.90–2.69)
Ever Used Marijuana in Adolescence (Wave I)				
No	7,785	72.6	5.9	1.
Yes	2,891	27.4	6.5	1.10 (0.84–1.45)
Ever Used Crack/Cocaine in Adolescence (Wave I)				
No	10,360	96.7	6.0	1.
Yes	306	3.3	9.7	1.69 (0.95–3.00)

* Overall, 6.1% of the analytic sample was confirmed to have a positive test result with *Chlamydia trachomatis*, *Neisseria gonorrhoea* or *Trichomonas vaginalis*.

[†]Totals may not sum to 13,123 due to missing values.

[‡]Use of survey commands to account for stratification, clustering, and unequal selection probabilities yielded nationally representative estimates of white and black young adults.

[§]Prevalence of recent or chronic adult depression was highest among black women (19.3%), followed by white women (13.0%), black men (11.9%), and white men (8.1%).

^{//}Among those who were categorized as having recent or chronic depression at Wave III, blacks were much less likely than whites to report having received psychological or emotional counseling (blacks: 10.1%, white: 20.9%) or prescription medication for depression or stress (blacks: 5.4%, white: 17.0%) in the year prior to the survey.

Table 2

Prevalence Ratios (PRs) and 95% Confidence Intervals (CIs) for the Associations between Recent and Chronic Depression and Multiple Partnerships in the Year Prior to Wave III among White and Black Young Adults Aged 18–25 Years in the United States.*

	Men			Women				
	N	Weighted % with Multiple Partnerships [†]	Unadjusted PR (95% CI)	Adjusted PR (95% CI) [‡]	N	Weighted % with Multiple Partnerships [†]	Unadjusted PR (95% CI)	Adjusted PR (95% CI) [‡]
WHITE								
<u>≥2 Sexual Partnerships in Past Year</u>								
No Depression (not Detected at Wave III)	2,856	35.8	Referent	Referent	3,090	24.9	Referent	Referent
Recent Depression (Detected Wave III only)	173	43.3	1.21 (0.96–1.52)	1.23 (0.96–1.56)	277	36.1	1.45 (1.19–1.77)	1.45 (1.19–1.76)
Chronic Depression (Detected Waves I and III)	68	40.9	1.14 (0.80–1.63)	1.14 (0.79–1.62)	185	31.3	1.25 (0.94–1.67)	1.24 (0.90–1.70)
<u>≥6 Sexual Partnerships in Past Year</u>								
No Depression (not Detected at Wave III)	2,856	4.9	Referent	Referent	3,090	2.0	Referent	Referent
Recent Depression (Detected Wave III only)	173	4.8	0.98 (0.39–2.48)	1.15 (0.46–2.87)	277	4.9	2.43 (1.23–4.79)	2.13 (1.06–4.25)
Chronic Depression (Detected Waves I and III)	68	11.6	2.37 (0.90–6.22)	2.15 (0.90–5.15)	185	5.4	2.68 (1.10–6.50)	2.40 (0.98–5.90)
<u>≥10 Sexual Partnerships in Past Year</u>								
No Depression (not Detected at Wave III)	2,856	1.7	Referent	Referent	3,090	0.5	Referent	Referent
Recent Depression (Detected Wave III only)	173	1.0	0.54 (0.13–2.37)	0.56 (0.12–2.61)	277	3.2	6.95 (2.45–19.8)	6.87 (2.53–18.6)
Chronic Depression (Detected Waves I and III)	68	4.1	2.37 (0.33–17.2)	1.66 (0.23–12.0)	185	3.8	8.32 (2.59–26.7)	8.42 (3.23–22.0)
BLACK								
<u>≥2 Sexual Partnerships in Past Year</u>								
No Depression (not Detected at Wave III)	994	49.4	Referent	Referent	1,230	33.3	Referent	Referent
Recent Depression (Detected Wave III only)	98	47.0	0.95 (0.73–1.24)	0.88 (0.67–1.16)	151	42.2	1.27(0.97–1.66)	1.12 (0.87–1.45)
Chronic Depression (Detected Waves I and III)	40	54.4	1.10 (0.73–1.67)	1.37 (0.96–1.95)	120	28.6	0.86 (0.61–1.21)	0.87 (0.64–1.18)
<u>≥6 Sexual Partnerships in Past Year</u>								
No Depression (not Detected at Wave III)	994	10.2	Referent	Referent	1,230	2.7	Referent	Referent [§]
Recent Depression (Detected Wave III only)	98	14.6	1.44 (0.76–2.73)	1.06 (0.53–2.11)	151	7.1	2.60 (1.01–6.65)	2.58 (1.08–6.17)
Chronic Depression (Detected Waves I and III)	40	17.7	1.74 (0.66–4.54)	2.48 (1.05–5.82)	120	0.3	0.12 (0.02–0.60)	0.10 (0.01–0.76)
<u>≥10 Sexual Partnerships in Past Year</u>								
No Depression (not Detected at Wave III)	994	4.8	Referent	Referent	1,230	0.6	Referent [¶]	Referent [¶]
Recent Depression (Detected Wave III only)	98	2.6	0.54 (0.15–1.96)	0.51 (0.12–2.11)	151	2.6	-----	-----
Chronic Depression (Detected Waves I and III)	40	7.9	1.65 (0.42–6.41)	2.23 (0.77–6.47)	120	0.1	-----	-----

Depression at Wave I and/or Wave III was based on having a CES-D score ≥ 10 out of a total of 27.

- [†] Use of survey commands to account for stratification, clustering, and unequal selection probabilities yielded nationally representative estimates of white and black young adults.
- [‡] Adjusted for age (18–20 years, 21 years, 22 years, 23 years, or 24–28 years), marital history (ever married *versus* never married), mother's education (<HS graduate, HS graduate, or \geq college graduate), respondent's functional income at Wave III (respondent or respondent's household did not have enough money to pay rent/mortgage payment or utilities in the past year *versus* no problems paying housing and utilities), age at first vaginal intercourse (≤ 15 years, 16 years, 17–18 years, 19–25 years, never had sex), Wave I self-reported STI (respondent reported diagnosis with chlamydial infection, gonorrhea, trichomoniasis, syphilis, genital herpes, or HIV *versus* no self-reported STI diagnosis), ever use of marijuana in adolescence (Wave I), ever use of crack/cocaine in adolescence (Wave I), and consumption of alcohol at least three days a week in the past 12 months in adolescence (Wave I).
- [§] All black women with 6 or more partners in the past year had used of crack/cocaine by Wave I and had consumed alcohol at least three days a week in the past 12 months prior to the Wave I interview. Hence, these substance use variables were omitted from the multivariable model use that estimated the association between depression and having 6 or more partners.
- ^{||} Stratum-specific sample size was too small to yield reliable estimates.

Prevalence Ratios (PRs) and 95% Confidence Intervals (CIs) for the Associations between Recent and Chronic Depression and Inconsistent Condom Use in the Year Prior to Wave III among White and Black Young Adults Aged 18–25 Years in the United States.*

Table 3

	Men			Women				
	N	Weighted % with No Condom Use [†]	Unadjusted PR (95% CI)	Adjusted PR (95% CI) [‡]	N	Weighted % with No Condom Use [†]	Unadjusted PR (95% CI)	Adjusted PR (95% CI) [‡]
WHITE								
<u><100% Condom Use</u>								
No Depression (not Detected at Wave III)	2,562	76.4	Referent	Referent	2,855	83.3	Referent	Referent
Recent Depression (Detected Wave III only)	154	82.5	1.08 (0.98–1.19)	1.09 (0.98–1.21)	258	83.9	1.01 (0.93–1.10)	0.99 (0.90–1.08)
Chronic Depression (Detected Waves I and III)	54	86.9	1.14 (0.98–1.32)	1.06 (0.90–1.26)	174	87.9	1.05 (0.98–1.14)	0.99 (0.91–1.09)
<u>0% Condom Use</u>								
No Depression (not Detected at Wave III)	2,562	29.0	Referent	Referent	2,855	35.9	Referent	Referent
Recent Depression (Detected Wave III only)	154	31.4	1.08 (0.80–1.47)	1.14 (0.82–1.60)	258	37.1	1.03 (0.88–1.22)	1.03 (0.86–1.23)
Chronic Depression (Detected Waves I and III)	54	32.5	1.12 (0.69–1.82)	0.85 (0.51–1.41)	174	43.7	1.22 (1.00–1.48)	1.09 (0.87–1.36)
BLACK								
<u><100% Condom Use</u>								
No Depression (not Detected at Wave III)	924	66.5	Referent	Referent	1,128	73.7	Referent	Referent
Recent Depression (Detected Wave III only)	91	65.4	0.98 (0.76–1.27)	1.11 (0.90–1.38)	134	84.1	1.14 (1.03–1.26)	1.13 (1.01–1.26)
Chronic Depression (Detected Waves I and III)	39	80.7	1.21 (0.99–1.50)	1.17 (0.94–1.47)	109	78.8	1.07 (0.96–1.19)	1.05 (0.94–1.18)
<u>0% Condom Use</u>								
No Depression (not Detected at Wave III)	924	17.0	Referent	Referent	1,128	22.5	Referent	Referent
Recent Depression (Detected Wave III only)	91	19.0	1.12 (0.60–2.08)	1.26 (0.62–2.56)	134	23.2	1.03 (0.62–1.74)	1.06 (0.70–1.61)
Chronic Depression (Detected Waves I and III)	39	32.3	1.90 (0.99–3.64)	1.50 (0.60–3.70)	109	26.9	1.20 (0.84–1.71)	1.04 (0.70–1.53)

* Depression at Wave I and/or Wave III was based on having a CES-D score ≥ 10 out of a total of 27.

[†] Use of survey commands to account for stratification, clustering, and unequal selection probabilities yielded nationally representative estimates of white and black young adults.

[‡] Adjusted for age (18–20 years, 21 years, 22 years, 23 years, or 24–28 years), marital history (ever married *versus* never married), mother's education (<HS graduate, HS graduate, or \geq college graduate), respondent's functional income at Wave III (respondent or respondent's household did not have enough money to pay rent/mortgage payment or utilities in the past year *versus* no problems paying housing and utilities), age at first vaginal intercourse (≤ 15 years, 16 years, 17–18 years, 19–25 years, never had sex), Wave I self-reported STI (respondent reported diagnosis with chlamydia infection, gonorrhea, trichomoniasis, syphilis, genital herpes, or HIV *versus* no self-reported STI diagnosis), ever use of marijuana in adolescence (Wave I); ever use of crack/cocaine in adolescence (Wave I), and consumption of alcohol at least three days a week in the past 12 months in adolescence (Wave I).

Table 4

Prevalence Ratios (PRs) and 95% Confidence Intervals (CIs) for the Associations between Recent and Chronic Depression and Sexually Transmitted Infection (STI) among White Black Young Adults Aged 18–25 Years in the United States.*

	Men			Women			
	N	Weighted % with STI [†]	Unadjusted PR (95% CI)	Adjusted PR (95% CI) [‡]	Weighted % with STI [†]	Unadjusted PR (95% CI)	Adjusted PR (95% CI) [‡]
WHITE							
No Depression (not Detected at Wave III)	2,718	0.37	Referent	Referent	2,924	3.8	Referent
Recent Depression (Detected Wave III only)	170	1.0	0.38 (0.11–1.24)	0.47 (0.15–1.51)	251	4.7	1.25 (0.60–2.63)
Chronic Depression (Detected Waves I and III)	70	2.2	0.82 (0.18–3.68)	0.77 (0.16–3.72)	172	1.5	0.38 (0.12–1.24)
BLACK							
No Depression (not Detected at Wave III)	943	12.6	Referent	Referent	1,142	22.3	Referent
Recent Depression (Detected Wave III only)	97	24.2	1.93 (0.94–3.95)	2.36 (1.26–4.43)	137	24.6	1.10 (0.71–1.71)
Chronic Depression (Detected Waves I and III)	37	25.9	2.07 (1.04–4.10)	3.05 (1.48–6.28)	112	25.4	1.14 (0.73–1.77)

* Depression at Wave I and/or Wave III was based on having a CES-D score ≥ 10 out of a total of 27. Participants with a positive test result with *Chlamydia trachomatis*, *Neisseria gonorrhoea*, or *Trichomonas vaginalis* were coded as having an STI.

[†] Use of survey commands to account for stratification, clustering, and unequal selection probabilities yielded nationally representative estimates of white and black young adults.

[‡] Adjusted for age (18–20 years, 21 years, 22 years, 23 years, or 24–28 years), marital history (ever married *versus* never married), mother’s education (<HS graduate, HS graduate, or ≥college graduate), respondent’s functional income at Wave III (respondent or respondent’s household did not have enough money to pay rent/mortgage payment or utilities in the past year *versus* no problems paying housing and utilities), age at first vaginal intercourse (≤15 years, 16 years, 17–18 years, 19–25 years, never had sex), Wave I self-reported STI (respondent reported diagnosis with chlamydial infection, gonorrhea, trichomoniasis, syphilis, genital herpes, or HIV *versus* no self-reported STI diagnosis), ever use of marijuana; ever use of crack/cocaine, and consumption of alcohol at least three days a week in the past 12 months.