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Psychiatric disorder symptoms, substance use, and sexual risk behavior among African-American out of school youth

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Abstract

Purpose—To examine the association between symptoms of psychiatric disorder (i.e. depression, anxiety, and substance use) and sexual risk behavior in a sample of African-American adolescents and young adults in an employment training program.

Methods—Baseline data were used from a pilot study of an intervention to reduce depressive symptoms among youth disconnected from school and the workforce. Participants were recruited from two employment training programs in East and West Baltimore (N = 617; age 16–23 years). Data were collected through audio computer-assisted self interview (ACASI). Mental health indicators were measured using the Center for Epidemiological Studies Depression Scale and Beck Anxiety Inventory. Multivariate logistic regression was used to determine the odds of sexual risk behavior for each mental health condition and combinations of conditions.

Results—Lack of condom use at last sex was significantly associated with elevated anxiety symptoms. Number of sexual partners was associated with elevated depression symptoms and substance use. Early sexual debut was associated with substance use in the past 30 days. Also, there were differences in the likelihood of engaging in sexual risk behavior comparing groups with different combinations of mental health problems to those with no symptoms of disorder or substance use.

Conclusions—The results demonstrate the need for HIV prevention programs that target out-of-school youth, as they are likely to engage in risky sexual behavior. Our findings highlight the need to develop behavioral interventions that address disorder symptoms, substance use, and risky sexual behavior among youth in employment training programs.

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Keywords

HIV; Student dropouts; Depressive symptoms; Substance use; Risky sexual behavior

1. Introduction

Prevention of HIV-infection among adolescents and young adults is a leading public health challenge with youth comprising an estimated 50% of new infections (Centers for Disease Control and Prevention, 2001). Out-of-school youth are a large, yet grossly understudied population and are consistently identified as being at high risk of sexually transmitted diseases (STDs) and HIV-infection through risky sexual behavior (Centers for Disease Control and Prevention, 2002a). In 2007, approximately 3.3 million 16–24 year olds were not enrolled in high-school and had not earned a high-school diploma or GED (Cataldi et al., 2009). In many urban areas, fewer than 75% of students graduate from high school with this number falling below 50% in seventeen of the nation's 50 largest cities (Swanson, 2009). Inner-city, African-American adolescents and young adults have higher drop-out rates than their white counterparts and are especially vulnerable to HIV infection due to disproportionately high rates of HIV infection in disadvantaged, minority communities (Centers for Disease Control and Prevention, 2005). However, very few studies have examined correlates of sexual risk behavior in out-of-school adolescents or young adults because this population has been traditionally hard to reach. Mental health problems such as depression, anxiety, and substance use have been consistently identified as key correlates of sexual risk behavior in youth and are more prevalent among school drop-outs. Further examination of the relationship between key psychological and behavioral risk factors and sexual behavior is needed specifically with youth that have dropped out of school.

School dropout has been consistently identified as being a critical risk factor for risky behavior among adolescents and young adults (Office of the Surgeon General, 2001). Youth that have dropped out of school have higher rates of teenage pregnancy, problem drinking, and drug use (U.S. General Accounting Office, 2002; Kogan et al., 2005). Developed by Jessor & Jessor, Problem Behavior Theory is a social-psychological framework for understanding problem behavior in youth and suggests a shared underlying syndrome for problem behaviors (Jessor and Jessor, 1977). According to this theory, involvement in one problem behavior increases the likelihood of engagement in other problem behaviors, which is widely supported in the literature. As such, Problem Behavior Theory substantiates the importance of simultaneously examining risk behaviors that often occur together such as risky sex, drug use, and school dropout.

Several studies have found that out-of-school adolescents are more likely than in-school teens to engage in sexual risk behaviors like initiating sexual activity earlier and failing to use contraception and are more likely to have become pregnant and given birth (Mauldon and Luker, 1996; Manlove, 1998; Darroch et al., 1999). Out-of-school adolescents aged 14–19 years are significantly more likely than in-school adolescents to report ever having had sexual intercourse and having had four or more sexual partners (Centers for Disease Control and Prevention, 1994). Out of school youth in Job Corps have been found to have high rates of STDs, especially among minority youth (Satterwhite et al., 2010).

Little is known about the sexual risk behaviors of young adults (i.e. 20–24 years) that have not completed high-school. However, young adulthood has been shown to be a time of increased risk taking when compared to adolescence. Young adults report more past year sexual partners and have higher rates of condom non-use and STDs (Centers for Disease Control and Prevention, 2002b; Mosher et al., 2005; Park et al., 2006). Given the strong

association between education and other health outcomes, it is likely that young adults who have dropped out of school are at a higher risk of engaging in sexually risky behavior than young adults who have completed high school. The increased risk taking of adolescents and young adults have been well documented yet no studies to date have examined psychosocial correlates of sexual risk taking among youth who have dropped out of school. (Office of the Surgeon General, 2001; Weinstock et al., 2004; Centers for Disease Control and Prevention, 2009).

In addition to being vulnerable to STD and HIV infection, out of school adolescents are also at increased risk for both psychiatric disorders and HIV infection (Tresidder et al., 1997; Brener and Collins, 1998). According to the U.S. Department of Education, approximately 50% of students in the United States with an “emotional disturbance” which includes depression and anxiety disorders, and schizophrenia, aged 14 and older drop out of high school (U.S. Department of Education, 2007). Adolescents who have dropped out of school have also been found to have higher rates of illicit drug use than those that are in school (National Institute on Drug Abuse, 1993). Out-of-school youths are more likely than other youths to have psychiatric disorders like depression and anxiety (Brener and Collins, 1998; Bardone et al., 1998). Psychiatric disorders can lead to impaired decision making, misperceptions about personal risk, and feelings of helplessness which can lead to increased sexual risk taking (Bennett and Bauman, 2000).

Among studies using national samples of adolescents and young adults, most have shown a positive association between symptoms of psychiatric disorder or diagnosed disorder and sexual risk behavior. A study using data from the National Longitudinal Study of Adolescent Health (Add Health) (N=14,322), reported that ever being diagnosed with depression was significantly associated with a higher number of lifetime sexual partners and a younger age of sexual debut among young adults aged 18–27 years old (Buffardi et al., 2008). Another cross-sectional study using Add Health data (N=3192) found that symptoms of depression were associated with condom non-use for boys but not girls in a sample of 7th through 12th graders (Shrier et al., 2001). Khan et. al (2009) found that elevated symptoms of depression measured using the CES-D were associated with multiple sexual partners and biologically confirmed STDs in an Add Health sample of young adults 18–25 years old (n=10,783).

Psychiatric comorbidity occurs in approximately half of psychiatric cases, yet few studies to date have examined how co-occurring conditions may influence sexual risk behavior in a community sample of adolescents and/or young adults (Kessler et al., 1994). In a New Zealand birth cohort of 21 year olds, Ramrakha and colleagues (2000) analyzed seven disorders and found that participants with comorbid disorders were more likely to engage in sexual risk behavior than those with no disorder. In the United States, adolescents with co-occurring substance abuse and conduct disorder report high levels of HIV-risk behaviors, which include not using condoms, multiple sexual partners, and prostitution (Booth and Zhang, 1997; Mezzich et al., 1997; Whitmore et al., 2000). However, no studies to date have been conducted among U.S. youth examining the correlation between comorbid symptoms of disorder and sexual risk behavior.

A major gap in the sexual risk behavior literature exists since large national studies with data on mental health problems or substance use and sexual risk behavior among adolescents and young adults either exclusively target in-school youth or have small samples of out-of-school youth (e.g., Youth Risk Behavior Surveillance Survey and National Survey of Family Growth). As a result, little is known about the correlations between disorder symptoms, including substance use, and high-risk sexual behavior specifically among a large sample of out of school adolescents and young adults. Given the lack of studies specifically with out of

school youth, findings from existing studies are less than optimal for informing public health policy and programs aimed at HIV-prevention with youth in underserved communities. This is especially problematic given the increasing problem of school drop-out among minorities living in urban areas and racial disparities that exist in HIV infection rates. This study will be the first to examine the prevalence of sexual risk behavior, and the relationship between mental health problems and sexual risk behavior in a community sample of out-of-school adolescents and young adults. The aims of the current study are 1) to examine the relationship between depressive symptoms, anxiety symptoms, and substance use and sexual risk behavior and 2) to examine the relationship between co-occurring mental health conditions and sexual risk behavior.

2. Methods

2.1. Participants

Participants for the study were 680 African-American out-of-school youth between 16 and 23 years old enrolled in two Youth Opportunity (YO!) Centers in Baltimore, MD. The YO Centers are job training programs that provide GED classes, job training, and job placement services for out-of-school youth in Baltimore City. Inclusion criteria included being an enrolled and active member of the YO! Center as indicated by using any YO services at least once in the past 3 months. Because the study focused on sexual risk behaviors, this study only used data from participants that reported being sexually active, which was 90.7% of the entire sample (N=617). Seventy-one percent of the sample was recruited at the YO! Center in East Baltimore and 29% were from the center in West Baltimore. Participants who were minors in foster care were not recruited for study participation.

2.2. Procedures

This study was approved by the Johns Hopkins Bloomberg School of Public Health's Committee on Human Research. From September 2006 to February 2008, approximately 80% of participants were recruited for the study in-person at the YO! Center and 20% were recruited by phone. Of the youth contacted for the study, 50 refused study participation. All participants were consented by trained research staff before joining the study. For participants under 18 years old, parental consent was also obtained. All surveys were administered in-person at the East or Westside YO! Centers by a member of our research staff. Data were collected using a health assessment questionnaire that was administered to participants using Audio Computer Assisted Interview (ACASI) software. The entire interview was self-administered by the participant on the computer using headphones. The assessment questions were both read aloud to the participants by a recorded voice and appeared on the screen. Each interview lasted an average of 45 minutes. After completion of the baseline assessment, participants received \$20 as payment for their time.

2.3. Measures

The health questionnaire combined several instruments and measured age, gender, race/ethnicity, education and employment, substance use, sexual behavior, and mental health status.

2.3.1. Depression—Depression was assessed using the Center for Epidemiological Studies-Depression scale (CES-D), a 20-item self-report scale which asks respondents to report on the frequency of a list of symptoms over the past week. Scores range from 0–60. Scores of 16 and above have been identified as indicating depressive symptomatology in previous studies using the CES-D with adolescents and adults (Ensel, 1986; Zich et al., 1990; Roberts et al., 1990; Radloff, 1991). With adolescents, the scale has been shown to have good internal consistency reliability ($\alpha = 0.87$), adequate test-retest reliability ($r =$

0.61), and good criterion validity with depression diagnoses (Garrison et al., 1991; Radloff, 1991). In the present study, the Cronbach alpha was 0.85.

2.3.2. Anxiety—Anxiety was assessed using the Beck Anxiety Inventory (Beck et al., 1988). The Beck Anxiety Inventory (BAI) assesses the presence and severity of common symptoms of anxiety. On the BAI, participants rate how much each symptom bothered them in the past month on a four- point response scale. Responses are summed and total scores range from 0 to 63. Scores of 0 to 7 indicate no anxiety, 8 to 15 mild anxiety, 16 to 25 moderate anxiety, and scores 26 or higher severe anxiety (Beck et al., 1988). With adolescent clinical samples, the BAI has shown high internal-consistency reliability ($\alpha = 0.90$ or higher) and moderate test–retest reliability ($r = 0.75$) (Beck et al., 1988; Jolly et al., 1993; Kumar et al., 1993; Steer et al., 1995). For our sample, Cronbach alpha was 0.88.

2.3.3. Substance Use—Substance use questions were adapted from the illicit drug use items on the 2003 Youth Risk Behavior Surveillance Survey (YRBSS) (Centers for Disease Control and Prevention, 2004). These items include ever use and frequency of past 30 day use of marijuana, cocaine, heroin, methamphetamines, ecstasy, and inhalants.

2.3.4. Sexual risk behavior—was assessed using items that asked age of sexual debut, number of lifetime sexual partners, and condom use at last sex. The items were reproduced exactly as they appear in the sexual health section of the 2003 YRBSS.

2.4. Data Analysis

Data were analyzed using STATA version 9.2 (StataCorp, 2007). Because the study was interested in sexual risk behavior, those who reported never having had sexual intercourse were excluded from the analysis. For purposes of analysis, sexual risk behavior was considered to be having five or more lifetime sexual partners, having first sex before 15 years old, and not using a condom at last sex. Thirty-two participants had at least one item missing from the CES-D or BAI and were removed from the analysis. To address our primary aim, we examined the relationship between the three mental health variables (symptoms of depression, symptoms of anxiety, and frequency of past 30 day illicit substance use) and sexual risk behavior using multivariate logistic regression. The regression analysis was conducted using depression and anxiety scores as continuous variables and then categorized as binary variables using the score of 16 as the cut-off. Previous studies of disorder symptoms and sexual risk behavior have categorized depression scores using empirically validated cut-off points (Shrier et al., 2002; Khan et al., 2009). This method has been found to ease interpretation and translation for screening instruments used by non-clinical settings and best approximates youth at risk for actual disorder (Shrier et al., 2001; Khan et al., 2009). Participants with a score of 16 or greater for the CES-D were considered to have elevated or clinical-level symptoms of major depressive disorder and a score of 16 or greater for the BAI indicated elevated symptoms of generalized anxiety disorder. These cutoffs have received widespread empirical support as having good criterion validity when compared to a psychiatric diagnoses (Roberts et al., 1990; Radloff, 1991; Kumar et al., 1993; Osman et al., 2002). However, categorization of continuous variables minimizes statistical variation which could impact the association between dependent and independent variables. To analyze the potential impact of categorization, we compared the coefficients and alpha values of the regression model using the continuous depression and anxiety scores with the analysis using the binary variables. There were no differences in the significance of the associations between the continuous and categorical depression and anxiety scores. As a result, to allow for comparability of our study with other studies of disorder symptomatology and sexual risk behavior, findings from the analysis using the binary variables are reported. In ACASI, frequency of past 30 day use of each illicit

substance was measured as a six category variable. For this analysis, past 30 day drug use variables were re-coded into one four-category variable representing frequency of any illicit substance use in the past 30 days. The four categories represent none, low (1–9 times in the past month), moderate (10–19 times), and high (20 or more times) use of any illicit drugs. For participants who used more than one substance, the value of the most frequently used substance was used for the analysis. The analyses for our primary aim examined the odds of engaging in each type of sexual risk behavior for those participants with each of the mental health problems. Age and gender were determined a priori to be confounders and controlled for in all regression analyses due to significant differences in sexual risk taking behavior reported in previous studies among young adults compared to older adolescents (Park et al., 2006), older adolescents compared to younger adolescents, and among male compared to female adolescents (Centers for Disease Control and Prevention, 2010). Each condition was examined in association with each sexual risk behavior first using bivariate analysis and then in multivariate analysis while controlling for age, gender and symptoms of the other two mental health problems.

To address our second aim, the binary depression and anxiety variables were used to allow for comparisons between groups with different combinations of mental health problems. The frequency of substance use variable was collapsed into a binary variable to represent any substance use in the past 30 days. A categorical variable was created to represent all possible combinations of psychiatric symptoms, including any substance use, and was used to examine sexual risk behavior among people with single and co-occurring mental health problems compared to those with no conditions. Controlling for age and gender, multivariate logistic regression was performed using dummy variables for each single or co-occurring symptom category with those who had no symptoms of any disorder serving as the reference group. The sample sizes vary slightly between parameters due to missing data.

3. Results

3.1. Prevalence of sexual risk behaviors, disorder symptoms, and substance use

Descriptive characteristics of the sample are summarized in Table 1. In our sample, the mean age was 18.7 years old ($SD=1.76$). The sample had a roughly equal percentage of males ($n=308$) and females ($n=309$). The majority (69%) of our sample had dropped out of school between 9th and 11th grade. More than half of the sample reported having 5 or more lifetime sexual partners (65%) and having sex before 15 years old (62%). Approximately 42% of the sample did not use a condom at last sex.

As shown in Table 1, 46% percent of our sample ($n=275$) reported using any illicit substance in the past 30 days. Twenty-four percent of our sample reported using substances 1–9 times in the past month, 7% reported using 10–19 times, and 15% reported using drugs almost every day or more (20 or more times). Of those who reported past 30 day substance use, the most common drugs used were marijuana (98% or $n=270$) and ecstasy (14% or $n=38$). Approximately 2% of the sample ($n=5$) reported using heroin, cocaine, methamphetamines, or inhalants. Among past 30 day marijuana users, 41% reported low use, 16% reported moderate use, and 43% reported high use. Among past 30 day ecstasy users, 84% reported low or infrequent use, 13% reported moderate use, and 3% reported high use (data not shown). Mostly all ecstasy users, were also marijuana users (87% or $n=33$) and as a result, all bivariate and multivariate analysis used a combined any substance use variable.

The mean depression score was 14 ($SD=10$) and the mean anxiety score was 7 ($SD=8$). Thirty-six percent (36%, $n=210$) reported elevated depressive symptoms and 12% reported elevated anxiety symptoms ($n=77$). The distribution of singular versus co-occurring disorder

symptoms for the sample is in Table 2. The most common co-occurring condition was depression and substance use (11.1%).

3.2. Sexual risk behavior and symptoms of mental disorder

Table 3 shows the unadjusted and adjusted odds ratios for each type of sexual risk behavior for symptoms of depression and anxiety and frequency of drug use. The adjusted odds ratios controlled for age, gender and the two other disorder symptoms. Only anxiety was significantly associated with condom use at last sex. When controlling for elevated symptoms of depression, substance use, age and gender, study members with elevated anxiety symptoms, were 2.5 times more likely to not have used a condom at last sex (AOR: 2.55, 95% CI: 1.45–4.47, $p < .01$). Depression and substance use were each independently associated with number of lifetime sexual partners. Elevated depression symptoms were associated with a 2.12 increased odds of having five or more lifetime sexual partners (AOR: 2.12, 95% CI: 1.35–3.33, $p < .01$). Individuals with low (AOR: 2.81, 95% CI: 1.73–4.58, $p < .001$) or high (AOR: 3.27, 95% CI: 1.77–6.04, $p < .001$) frequency of substance use were significantly more likely to have multiple lifetime sex partners than those not reporting any substance use. Low or high frequency of substance use was significantly associated with having an early sexual debut (AOR: 2.84, 95% CI: 1.76–4.57, $p < .001$ and AOR: 2.54, 95% CI: 1.46–4.39, $p < .01$, respectively). We also examined if there were differences in the odds ratios of early sexual debut and multiple sexual partners between youth with high versus low frequency of drug use and we found no significant differences. Given expected correlations between sexual risk behaviors, we examined the association of mental health problems with condom use and multiple sexual partners controlling for sexual debut. Controlling for sexual debut did not significantly change the relationship between mental health problems and any of the other sexual risk behaviors.

3.3. Sexual risk behavior and co-occurring conditions

Given low rates of anxiety, individuals with elevated symptoms of only anxiety and no other co-occurring mental health problems were excluded from the analysis of co-occurring condition groups and sexual risk behavior shown in Table 4. Youth with elevated levels of depression and any past 30 day substance use compared to those with no conditions were at increased odds of having more than 5 lifetime sexual partners (AOR: 5.39, 95% CI: 2.54–11.46, $p < .001$) and early sexual debut (AOR: 2.85, 95% CI: 1.49–5.43, $p < .01$). Youth with elevated symptoms of both depression and anxiety were significantly more likely to not use condoms at last sex than youth without elevated symptoms of disorder or substance use (AOR: 4.06, 95% CI: 1.58–10.40, $p < .01$). Youth with all three mental health conditions (i.e. elevated depression and anxiety symptoms and any past 30 day substance use) compared to those with no conditions were more likely to not have used a condom at last sex (AOR: 4.80, 95% CI: 2.25–10.27, $p < .001$), more likely to have multiple sexual partners (AOR: 5.37, 95% CI: 2.17–13.27, $p < .001$), and more likely to have had an earlier sexual debut than those with no disorder (AOR: 2.68, 95% CI: 1.25–5.73, $p < .05$).

4. Discussion

To our knowledge, this is the first study to examine the relationship between sexual risk behavior and symptoms of psychiatric disorder in an exclusively out-of-school adolescent and young adult population. Findings from this study support previous work conducted with in-school adolescents and young adults that have found a positive association between sexual risk behavior and symptoms of psychiatric disorder. Our findings indicate that condom use at last sex was significantly associated with anxiety symptoms while number of sexual partners was associated with depressive symptoms and substance use. Early sexual debut was also associated with substance use. It is interesting to note that significant

associations between substance use and sexual risk behaviors existed for both light and heavy drug users. Unlike a previous study examining frequency of drug use and sexual risk behavior among high school students (Shrier et al., 1997), we found that frequency of drug use did not impact risk behaviors in our sample of out-of-school youth. Any illicit drug use, regardless of frequency, predisposed youth to increased sexual risk taking.

Similar to other studies, different psychiatric disorder symptoms were associated with different types of sexual risk behavior (Stiffman et al., 1992; Ramrakha et al., 2000). Across our sample, only anxiety symptoms were associated with not using a condom. Particularly for sufferers of anxiety, symptoms could be associated with the social interaction needed to negotiate condom use with a partner (Brooks-Gunn and Paikoff, 1997). As a result, anxious individuals may be less likely to attempt such negotiation. Unlike previous studies (Koopman et al., 1994), substance use was not significantly associated with use of a condom at last sex for the entire sample. This finding is likely due to the high prevalence of substance use found in this sample. It is possible that because illicit drug use is normative for our sample, a stronger predictor of condom non-use could be specifically using substances before having sex or with sex partners, which has been shown to be associated with decreased condom use in urban, minority youth (Ford and Norris, 1994).

Our findings that substance use and depressive symptoms were related to a greater number of lifetime sexual partners is consistent with previous research conducted with adolescents and young adults (Khan et al., 2009). This finding is also consistent with Problem Behavior Theory as our sample of out-of-school adolescents and young adults simultaneously engaged in substance use and increased sexual risk taking behavior—i.e., greater number of sexual partners. Longitudinal studies that have examined the temporal ordering of these variables have suggested that substance use often precedes initiation of sex (Elliott and Morse, 1989; Rosenbaum and Kandel, 1990; Mott and Haurin, 1998) and sexual behavior and substance use predict depression (Hallfors et al., 2005). Given that our study is the first to our knowledge to examine substance use, depressive symptoms, and number of sexual partners in an out-of-school population, additional research—ideally conducted using a longitudinal research design—is needed to disentangle the relationship between these constructs.

Only substance use was associated with early sexual debut. Several hypotheses exist to explain this finding. It is likely that the psychosocial and environmental factors (e.g. parental support and monitoring, peer influence and norms, and neighborhood disadvantage) that may lead to substance use are better predictors of early sexual debut than depression or anxiety. Other studies have suggested that certain youth may have a predisposition toward risk taking or impulsivity that results in substance use and risky sexual behavior (Deas-Nesmith et al., 1999; Voisin et al., 2006). Alternatively, Jessor and Jessor (1977) have argued that teens who are more vulnerable to influence from their peers than families are more likely to engage in these problem behaviors. This is especially plausible since both substance use and initiation of sex has been linked to peer norms and perceived peer behaviors (Bachanas et al., 2002). In a study of risky sexual behavior in urban youths, Smith (1997) reported that the pressures to become involved with substance use and sexual intercourse are high for many African American teens in urban, impoverished neighborhoods. Alternatively, it has been suggested that adolescent are likely to initiate sex at younger ages while under the influence of alcohol or drugs (Millstein and Moscicki, 1995). This hypothesis is supported by studies that reported prior use of marijuana and other illicit drugs greatly increased the risk of early sexual activity among adolescents and young adults (1990).

Co-occurring conditions are associated with an increased likelihood of sexual risk behavior compared to those with no mental health problems. Our results support the findings of a

study of New Zealand young adults showing that comorbid conditions are associated with increased sexual risk (Ramrakha et al., 2000). However, in the New Zealand study, psychiatric diagnoses (i.e. depression, anxiety, eating disorder, substance dependence, antisocial disorder, mania, and schizophrenia) was assessed using the diagnostic interview schedule of the DSM III-R and not disorder symptoms. Additionally, the study only examined comorbidity of depression, substance dependence, and antisocial disorders. Similar to our study, depression and substance use was the most common comorbid disorder and was significantly associated with initiation of sex at an early age and risky sex with multiple sexual partners. Our study suggests that mental health conditions are a critical determinant of sexual risk behavior, such that even in the absence of a psychiatric diagnosis, adolescents and young adults with elevated symptoms of disorder are more likely to engage in sexual risk behavior. Other studies have suggested that comorbid conditions are indicative of more severe psychiatric disorder and thus impairment, which may explain the lower rates of condom use and higher rates of having multiple sexual partners in our sample (Kandel et al., 1999).

Several study limitations should be considered in interpreting our findings. First, all our data were collected via self-report. Since questions asked about sensitive topics such as sexual behavior, youth may have been less likely to accurately report socially undesirable behaviors. However, reporting bias is likely to have been reduced by use of ACASI, which has been found to increase reporting of sensitive behaviors, including sexual risk behavior, among adolescents (Turner et al., 1998). Relatedly, we measured self-reported depressive and anxiety symptoms rather than conduct clinical interviews to diagnose depressive or anxiety disorder. Symptom checklists are commonly used by community based studies, including those examining associations between mental health and sexual behavior, as they are less costly and time consuming than clinical interviews. Second, we used a cross-sectional design that does not allow us to determine the temporal relationships among our study variables. Specifically, it is unclear whether depression, anxiety, and substance abuse preceded sexual risk behavior since we did not assess these mental health constructs prior to the initiation of the sexual risk-taking behavior. Third, some of our measures required study participants to recall behavior that occurred beyond the last few months (e.g., age of sexual debut), potentially affecting the accuracy of these data. Fourth, unlike some other studies examining sexual risk taking behavior, we did not measure consistency of condom use or HIV-risk of study participants' sexual partners. These additional measures may be more reliable predictors of HIV risk than the measures we employed—i.e., condom use at last sex and number of sexual partners. Finally, these findings are not generalizable to all out-of-school youth. The participants in this study are not likely to represent the highest segment of out-of-school youth as they have self-selected into an employment training program.

In spite of these methodological limitations, our findings have important implications for public health practitioners. Our results show high rates of substance abuse and depression among out-of-school adolescents and young adults. Given the limited attention this group of adolescents and young adults has received from public health researchers and practitioners, efforts to integrate screening for psychosocial risks into employment training programs are recommended. By screening for psychosocial risks in employment training programs for adolescents and young adults, public health practitioners may also better position themselves to effectively address sexual risk behavior in this population. For example, knowing that an adolescent or young adult has elevated anxiety symptoms suggests that he/she may lack the negotiation skills to discuss condom use with a partner.

However, effective strategies are needed to provide services and interventions for adolescents and young adults in employment training programs who have mental health and substance abuse problems that are associated with sexual risk-taking behavior. Given our

study findings that depression, anxiety, and substance use are comorbid with at least one type of high-risk sexual behavior, cognitive-behavioral intervention approaches seem warranted. Cognitive-behavioral approaches have been demonstrated to be efficacious in treating depression and anxiety as well as preventing HIV infection (Semaan et al., 2002). Central to many cognitive-behavioral approaches is a focus on problem solving, assertiveness training, and promoting social support—skills that are applicable not only for addressing poor mental health but also promoting healthy sexual behavior. While cognitive-behavioral interventions in employment training settings may not effectively prevent early onset of sexual behavior given the age group using such programs, the skills taught using such approaches have the potential to increase condom use and reduce number of sexual partners.

The rates of poor mental health and sexual risk behavior in our out-of-school population are similar to previous studies of high-risk African American adolescents and young adults (Boyer et al., 1999). It is imperative that future research confirms the associations among mental health and sexual risk behavior in other out-of-school populations, preferably using longitudinal designs that allow the temporality of these associations to be better understood. Given the paucity of sexual risk behavior research on out-of-school youth, additional research studies are also needed to determine whether our study findings generalize to out-of-school youth in other employment training sites as well as other populations of out-of-school youth who are not engaged in employment training programs. Given the large number of youth in urban areas who are disconnected from school settings, understanding the contribution of substance use and psychiatric disorder symptoms to the sexual risk behavior of out-of-school youth has the potential to have a significant public health impact.

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Table 1

Sociodemographic and psychosocial characteristics of out-of-school youth

	% (n)
Total	N=617
<i>Socio-Demographics</i>	
Age (years) Mean (SD)	18.7 (1.76)
16–17	26.9 (166)
18–23	73.1 (451)
Gender	
Male	49.9 (308)
Female	50.1 (309)
Highest completed grade	
12 th grade or higher	17.0 (105)
9 th –11 th grade	68.9 (425)
0–8 th grade	14.1 (87)
Have a GED	2.6 (14)
<i>Sexual Risk Behavior</i>	
Condom use at last sex	
No	41.9 (256)
Yes	58.1 (355)
Number of lifetime partners	
1	6.2 (37)
2	7.2 (43)
3	9.3 (55)
4	12.6 (75)
5	15.3 (91)
6 or more	49.3 (293)
Age of sexual debut	
11 yrs old or younger	9.7 (59)
12 yrs old	12.0 (73)
13 yrs old	18.6 (113)
14 yrs old	21.9 (133)
15 yrs old	14.8 (90)
16 yrs old	14.3 (87)
17 yrs old or older	8.7 (53)
<i>Mental Health</i>	
No disorder	33.1 (204)
Depression	
Mean (SD)	14.5 (9.7)
Score of 16+	35.6 (210)
Score of <16	64.4 (380)
Anxiety	

	% (n)
Mean (SD)	6.8 (7.6)
Score of 16+	12.7 (77)
Score of <16	87.3 (530)
Frequency of Past Month Substance Use	
None	54.5 (329)
Low	23.7 (143)
Moderate	6.8 (41)
High	15.1 (91)
Type of Drug Used in Past Month	
Marijuana	98.1 (270)
Ecstasy	13.8 (38)
Heroin/Cocaine/Other Drugs	1.8 (5)

Table 2

Distribution of co-occurring mental conditions among out-of-school youth

<i>N</i> =573	%	(n)
No condition	35.6	(204)
Depression only	13.3	(76)
Anxiety only	1.0	(6)
Substance use only	26.7	(153)
Depression & Anxiety	4.2	(24)
Substance use & Anxiety	1.0	(6)
Depression & Substance use	11.1	(64)
All three types of disorder	7.0	(40)

Table 3

Unadjusted and adjusted^a odds ratios of sexual risk behavior for symptoms of depression and anxiety and frequency of substance use.

Psychiatric symptoms	Did not use a condom at last sex		More than 5 lifetime partners		Sexual debut before age 15	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Depression	1.89 (1.35–2.68) ***	1.26 (0.85–1.86)	1.66 (1.14–2.40) **	2.12 (1.35–3.33) **	1.14 (0.80–1.62)	1.32 (0.87–1.99)
Anxiety	3.20 (1.93–5.30) ***	2.55 (1.45–4.48) **	1.03 (0.62–1.17)	0.70 (0.37–1.31)	1.06 (0.65–1.75)	0.80 (0.45–1.44)
Substance use						
None (ref)						
Low	0.98 (0.65–1.46)	1.06 (0.69–1.65)	2.77 (1.77–4.34) ***	2.82 (1.73–4.58) ***	2.84 (1.82–4.43) ***	2.84 (1.77–4.57) ***
Moderate	1.03 (0.53–1.99)	1.18 (0.59–2.38)	1.82 (0.91–3.65)	1.58 (0.76–3.30)	1.34 (0.69–2.62)	1.11 (0.55–2.24)
High	1.42 (0.89–2.27)	1.52 (0.92–2.52)	3.81 (2.12–6.84)	3.27 (1.77–6.04) ***	2.61 (1.55–4.39) ***	2.54 (1.46–4.39) **

^aOdds ratios adjusted for age, gender and the other two mental health conditions.

**
p<.01.

p<.001

Table 4

Adjusted^a odds ratios for sexual risk behavior comparing single and co-occurring mental condition groups to participants with no conditions

Co-occurring condition groups (n)	Did not use a condom at last sex	More than 5 lifetime sexual partners	Sexual debut before age 15 years
Depression only (76)	1.23 (0.71–2.14)	1.83 (1.03–3.28) *	1.31 (0.76–2.28)
Substance use only (153)	1.30 (0.83–2.04)	2.42 (1.50–3.88) ***	2.36 (1.48–3.77) ***
Depression & substance use (64)	1.28 (0.71–2.30)	5.39 (2.54–11.46) ***	2.85 (1.49–5.43) **
Depression & anxiety (24)	4.06 (1.58–10.40) **	1.35 (0.54–3.40)	1.22 (0.50–2.95)
Depression & substance use & anxiety (40)	4.80 (2.25–10.27) ***	5.37 (2.17–13.27) ***	2.68 (1.25–5.73) *

^aOdds ratios are adjusted for age and gender

*
p<.05

**
p<.01

p<.001