

Predictors of Sexually Transmitted Infection Testing Among Sexually Active Homeless Youth

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We examined the association between sexual risk behaviors and sexually transmitted infection (STI) testing in a sample of homeless youth. Of 261 youth interviewed, 50% had been sexually active in the past 3 months. Gender variation in sexual behaviors and risk were found. Boys were more likely than girls to engage in anal sex (46% vs. 15%), to have 3 or more sexual partners (46% vs. 17%) and to engage in anonymous sex (38% vs. 21%). Girls were less likely to use condoms consistently and more likely to engage in sex with a partner suspected of having an STI (20% vs. 4%). In the past 3 months, the STI testing rates were similar for boys and girls (46%). However, girls were more likely to have positive STI results (46% vs. 9%). In a multivariate logistic regression analysis, the only variable that was an independent predictor of STI testing was having either gotten someone or having become pregnant in the past 3 months. High-risk sexual behaviors did not predict STI testing in our sample. Outreach programs are needed that target sexually active homeless youth for early STI testing and treatment.

KEY WORDS: homeless youth; sexual behaviors; STI testing.

INTRODUCTION

More than 1 million youth in the United States are thought to be homeless (Robertson, 1992). By definition, homeless youth include those aged 12–20 who have spent at least one night on the street, a public space, or a shelter (Ringwalt *et al.*, 1998; Rotheram-Borus *et al.*, 1996). Homeless young people tend to be a hidden population and therefore difficult to systematically sample (Ennett *et al.*, 1999). The studies that are available on this pop-

ulation indicate that subgroups of homeless youth engage in high-risk sexual behaviors (Forst, 1994; Rotheram-Borus *et al.*, 1992) that place them at risk for sexually transmitted infections (STIs). Studies of homeless youth have found gender variation in sexual risk (MacKellar *et al.*, 2000) and for STI rates (Noell *et al.*, 2001). Despite the high rates of sexual risk behaviors and STIs among sexually active homeless youth, to our knowledge no study to date has investigated the association between youth's high-risk behaviors and STI testing. Such an association may be especially important in recently homeless youth, who tend to be young and who may not understand the need for regular STI testing.

The goal of our paper was to explore the characteristics of recently homeless, sexually active youth that are associated with STI testing, including age, gender, ethnicity, sexual orientation, and sexual risk behaviors. We hypothesize that sexual risk behaviors will not be predictive of STI testing, as many STIs may be asymptomatic, and youth may not

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realize the need for STI screening. If our hypothesis is supported, then our findings may be helpful in developing community STI prevention programs for sexually active homeless youth and may indicate a need for outreach programs for early STI detection and treatment.

METHODS

Participants

The homeless youth in this paper reflect the entire baseline cohort of youth from a longitudinal study that examines youth's pathways into and out of chronic homelessness. To be included in the longitudinal study, youth had to meet the following criteria: age ranging from 12 to 20; and spent at least two consecutive nights but less than 6 months away from home without their parents or guardians' permission, if aged less than 17 years, or been told to leave home. Informed consent was obtained from all participants, including emancipated minors and those 18 years and older. For participants who were minor *en locus parentis* consent was obtained from a member of the outreach (recruitment) team who was present, and assent was obtained from the minor. Participants were interviewed over a 12-month period from 2001 to 2002 using structured face-to-face interviews. Each youth was paid \$20 to participate in a 1-hr interview.

Procedures

Interviewers were sent out in pairs to predetermined sites, including shelters, drop-in centers, and street hang-outs, that covered the entire geographic region of Los Angeles County (i.e. Santa Monica/Venice Beaches, Hollywood, West Hollywood, East and West Los Angeles, Downtown Los Angeles, Pasadena/Glendale, South Bay/Long Beach, and San Fernando Valley) to screen and recruit homeless adolescents. These sites were selected through a systematic process. First, all of the potential recruitment sites for homeless adolescents in Los Angeles County were identified by interviewing line and supervisory staff in agencies that served homeless adolescents throughout Los Angeles County. Thirty sites were identified including 17 shelters and drop-in centers and 13 street hangout sites. The 30 sites were audited at preselected times and days per week over three different week-long time periods to

determine the numbers of homeless adolescents that could be found at each site. Each site was surveyed three times on different days of the week and different times of the day over a 3-week period in order to capture the youth homeless population more comprehensively. All of these sites were included as recruitment sites because the audit demonstrated sufficient numbers of homeless adolescents could be found at each site, including the street hangout sites. A previous study reports extensively on the sampling scheme (Witkin *et al.*, 2005).

Interviewers determined if youth were eligible for study participation by using a 13-item screening instrument. The instrument was designed to mask the eligibility criteria, confirm eligibility, and establish the length of time the young person had been away from home. All homeless youth who were eligible and agreed to participate were included in study.

Participants were assured confidentiality and the informed consent process was reviewed. All participants were made aware that study participation was voluntary and that all information provided would be confidential. However, participants were also told that interviewers were required to report physical or sexual abuse (if under 17 years) and serious suicidal or homicidal feelings. The interviewers received approximately 40 hr of training, which included lectures, role-playing, mock surveys, ethics training, emergency procedures, and technical training. All interviews were conducted face-to-face by trained interviewers using an audiotaped computer assisted interview schedule (audio-CASI). Interviews were conducted in English (96%) or Spanish (4%), based on preferred language of the study participant.

Measures

Among the 261 youth interviewed, 50% had been sexually active in the preceding 3 months ($n = 131$). For our study, we selected the subset of youth who had been sexually active in the preceding 3 months. The sociodemographic characteristics (race/ethnicity, gender, age, sexual orientation), sexual risk behaviors, substance use, and STI testing rates and results were assessed for the preceding 3 months.

Sexual Risk Behaviors

The sexual risk behavior questions (Meyer-Balhbarg *et al.*, 1988) focused on the number of sex

partners, type of sex (vaginal/anal), having had unwanted sex, practicing survival sex (exchanging sex for money, drugs, food, or a place to stay), engaging in anonymous sex (engaging in sex with persons whom the youth did not know and was not planning on seeing again), condom use, and pregnancy. For condom use, youth were asked, "In the past 3 months, how often did you or your partner use condoms for vaginal sex (never, sometimes, most of the time, always)?" A similar question was asked for condom use and anal sex. Only youth who responded "always" were considered consistent condom users. Pregnancy history was assessed using previously used measures (Murphy *et al.*, 1998), "In the past 3 months, have you been or have you gotten someone pregnant?" Risk behaviors were assessed for the previous 3 months only; previous studies have found reliability of self-reported sexual behavior is higher when the period of recall is shorter (Catania *et al.*, 1990; Orr *et al.*, 1997).

Substance Use

Use of substances, including cigarettes, alcohol, marijuana, amphetamines/stimulants, cocaine/crack, heroin, and injecting drug use were ascertained for the previous 3 months with measures from the National Institute of Drug Abuse (NIDA, 1991).

STI Testing Rates and Results

To obtain STI testing rates and results, youth were asked, "Have you been tested for an STI, over the past 3 months?" using previously used methods (Ellen *et al.*, 1998) and "Have you tested positive for an STI, over the past 3 months?"

Data Analysis

We first compared the sexual risk behaviors and substance use patterns among males and females, using chi-square tests. Then we used logistic regression analysis to examine the association between youth's sociodemographic characteristics, sexual risk behaviors, and substance use and receiving an STI test in the past 3 months. First, unadjusted associations between each independent variable and STI testing were identified with bivariate logistic regressions. Then, multivariate logistic regression was used (including all of the independent variables in the model)

to examine the association between each independent variable and STI testing. For the logistic regression, dummy variables were constructed for all categorical independent variables (race/ethnicity, gender, age group, sexual orientation, vaginal sex, anal sex, condom use, anonymous sex, sex with partner suspected of having an STI, history of having either gotten someone or having become pregnant, and substance use).

RESULTS

Two hundred and sixty-one youth agreed to be interviewed (five youth refused the interview). One-half had been sexually active in the preceding 3 months and this subset of youth constituted the sample for our analysis ($n = 131$). In terms of sample characteristics, ethnicity of the youth was 44% Latino, 23% African American, 20% White, 13% mixed race. Sixty percent were females. The mean age was 15.4 years ($SD = 1.8$). Eighty-four percent of youth were born in the United States and 96% spoke English well. Most youth self-labeled as heterosexual (84%). All youth were living away from home: 80% were currently living in shelters, 10% in a family group home, 4% in a friend's house, 2% in foster care, and 2% on the street or in an abandoned building.

We examined the sexual risk behaviors and substance use patterns of youth who had been sexually active in the past 3 months. As shown in Table I, the rates for vaginal sex were high for both boys and girls (89%) but rates for anal sex were higher for boys. Girls, however, were less likely to use condoms for vaginal or anal sex. We also found gender differences for other sexual risk behaviors, with boys more likely to have three or more sexual partners and to engage in anonymous sex. Girls were more likely to have engaged in sex with a partner suspected of having an STI. Substance use among youth who had been sexually active in the past 3 months was high: alcohol (67%), marijuana (72%), amphetamines (19%). Although similar rates for STI testing were found among boys and girls (46%), girls were more likely to report positive STI results (46% vs. 9%, $\chi^2 = 9.1$, $df = 1$, $p < .01$).

Table II shows the association between youth's sociodemographic characteristics, sexual behaviors, substance use, and STI testing in the past 3 months. In bivariate analyses, we found that older age (OR 2.3; 95% CI 1.1–4.7) having gotten someone pregnant or being pregnant (OR 4.5, 95%

Table I. Risk Behaviors and Gender Differences Among Sexually Active Youth, for the Past 3 Months

| | Boys (<i>N</i> = 50) <i>N</i> (%) | Girls (<i>N</i> = 81) <i>N</i> (%) | (χ^2) ^a |
|-----------------------------------|---------------------------------------|--|---------------------------|
| Sexual risk behaviors | | | |
| Had vaginal sex | 40 (80) | 77 (95) | 7.3** |
| Condom use inconsistent | 19 (48) | 58 (75) | 9.1** |
| Had anal sex | 23 (46) | 12 (15) | 15.4** |
| Condom use inconsistent | 2 (9) | 10 (83) | 19.5** |
| Got someone/became pregnant | 5 (10) | 9 (11) | 0.0 |
| No. of sex partners ≥ 3 | 23 (46) | 14 (17) | 12.6** |
| Anonymous sex | 19 (38) | 17 (21) | 4.5* |
| Survival sex | 0 | 4 (5) | 2.5 |
| Sex with partner suspected of STI | 2 (4) | 16 (20) | 6.5* |
| Substance use | | | |
| Used alcohol | 30 (60) | 58 (72) | 1.9 |
| Used marijuana | 42 (84) | 52 (64) | 6.0** |
| Used amphetamines | 13 (26) | 12 (15) | 2.5 |
| Used injection drugs | 0 | 2 (2) | 1.2 |
| Received STI test | 23 (46) | 37 (46) | 0.0 |
| STI test positive | 2 (9) | 17 (46) | 9.1** |

^a*p* values based on chi-square tests, *df* = 1.

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

CI 1.6–12.7) and having more than three sexual partners (OR 2.5, 95% CI 1.2–5.2) to be positive predictors of STI testing. However, in our multivariate model, which included all independent variables in model, we found that only one independent variable was a significant positive predictor of STI testing, having gotten someone pregnant or being pregnant (OR 4.7, 95% CI 1.1–19.6). Other sexual risk behaviors were not significant predictors of STI testing.

DISCUSSION

Homeless youth are at high risk for STIs. Half of our sample was sexually active in the preceding 3 months and a significant proportion engaged in high-risk sexual behaviors and used substances. Although 46% of sexually active youth in our sample had received an STI test in the past 3 months, youth's high-risk sexual behaviors were not associated with STI testing. This finding supports our hypothesis. A need exists for the development of outreach programs that target sexually active homeless youth for early STI detection and treatment.

The STI rate found in our study (32%) is a higher than in another study of homeless youth (23%; Goodman and Berecochea, 1994). Although this rate is high, it is likely an underestimate of STI

rates in sexually active homeless youth. Some STIs can be asymptomatic (e.g. Chlamydia and genital herpes) and unless youth receive laboratory screening, they are unlikely to know they are infected. In addition, a previous study has shown that youth are likely to underreport STIs (Clark *et al.*, 1997). Further, we only assessed STI testing for the prior 3 months; past year STI rates may be higher in this group.

In our study, although sexually active boys and girls had similar rates for STI testing, girls were significantly more likely to have positive STI results than boys. This finding may be explained by the lower use of condoms among sexually active girls compared to boys. Our findings are consistent with a previous study that found sexually active homeless girls were at higher risk for STIs than boys because of inconsistent condom use (Noell *et al.*, 2001). We also found a history of pregnancy or getting someone pregnant to be the only predictor of STI testing. A likely explanation for our findings is that physicians are likely to offer pregnant girls STI testing, as this is a standard of care.

The sampling procedures used in this study were designed to recruit a cohort of homeless youth who had been homeless for less than 6 months. All youth who met criteria for being homeless for less than 6 months were included in our study and we had a low refusal rate. The distinction between newly homeless young people who have been out of home

Table II. Logistic Regression Analyses Predicting STI Testing Among Sexually Active Homeless Youth, Past 3 Months ($N = 131$)^a

| Independent variables | STI test past 3 months, N (%) | Unadjusted OR | 95% CI | Adjusted OR | 95% CI |
|---|----------------------------------|---------------|----------|-------------|----------|
| Race/ethnicity | | | | | |
| White | 13 (25) | 1.0 | | 1.0 | |
| Latino | 22 (21) | 0.8 | 0.4–1.9 | 0.6 | 0.2–2.2 |
| African American | 17 (29) | 1.2 | 0.6–2.9 | 0.7 | 0.2–2.0 |
| Mixed | 8 (25) | 1.0 | 0.4–2.8 | 2.0 | 0.4–9.2 |
| Gender | | | | | |
| Male | 24 (23) | 1.0 | | 1.0 | |
| Female | 38 (25) | 0.9 | 0.5–1.6 | 1.8 | 0.6–5.0 |
| Age | | | | | |
| 12–14 | 11 (15) | 1.0 | | 1.0 | |
| 15–20 | 51 (28) | 2.3* | 1.1–4.7 | 1.6 | 0.6–3.9 |
| Sexual orientation | | | | | |
| Heterosexual | 49 (23) | 1.0 | | 1.0 | |
| Gay/lesbian/bisexual | 13 (31) | 0.7 | 0.3–1.4 | 0.9 | 0.3–2.6 |
| Condom use | | | | | |
| Consistent | 11 (28) | 1.0 | | 1.0 | |
| Inconsistent | 32 (43) | 1.9 | 0.8–4.4 | 2.2 | 0.8–5.9 |
| Got someone/became pregnant | | | | | |
| No | 53 (22) | 1.0 | | 1.0 | |
| Yes | 9 (56) | 4.5* | 1.6–12.7 | 4.7* | 1.1–19.6 |
| Sex partners, past 3 months | | | | | |
| < 3 | 47 (22) | 1.0 | | 1.0 | |
| ≥3 | 15 (41) | 2.5* | 1.2–5.2 | 1.5 | 0.6–4.1 |
| Sex with partner suspected of STI | | | | | |
| No | 54 (24) | 1.0 | | 1.0 | |
| Yes | 8 (28) | 1.2 | 0.5–2.9 | 0.5 | 0.1–1.7 |
| Substance use, past 3 months^b | | | | | |
| No | 10 (42) | 1.0 | | 1.0 | |
| Yes | 38 (37) | 0.8 | 0.3–2.0 | 0.6 | 0.2–1.9 |

^aOR, odds ratio; CI, confidence interval.

^bAny use of alcohol, marijuana, amphetamines, injection drugs.

* $p < .05$.

for a short period of time and chronic experienced homeless young people has been overlooked in the research literature (Milburn *et al.*, 2005). Classifying homeless young people by time out of home provides a greater understanding of the heterogeneity of homeless young people. However, there are limitations to this study that need to be mentioned. First, our data are cross-sectional and did not allow for temporal sequencing of risk behaviors and STI testing or the causal relationships of risk behaviors and STI testing. Second, the low prevalence of behaviors, such as survival sex and intravenous drug use, limited our ability to examine high-risk behaviors for HIV that may be either positively or negatively associated with STI testing. Third, all of our data are based on self-reports and therefore may be subject to report-

ing biases. To minimize bias, risk behaviors were assessed only over the previous 3 months and all sensitive data were collected using Audio-CASI. The use of Audio-CASI has been shown to increase the accuracy of responses obtained in self-administered questionnaires (O’Reilly *et al.*, 1994; Turner *et al.*, 1992, 1995).

Future research that evaluates STI rates and risks among sexually active homeless youth would benefit from physiologic assessments rather than relying on youth’s self-report of STIs. In addition, future research should explore individual and institutional factors that facilitate or serve as barriers to STI testing in homeless youth. Some of these barriers may include youth being unaware of the need for STI screening if having sex without condoms and the lack

of availability of screening services. In addition, longitudinal studies should examine subgroups of sexually active homeless youth who continue to engage in high-risk sexual behaviors and changes in their STI testing patterns over time.

Our findings indicate STI outreach programs for sexually active homeless youth that offer early STI testing and treatment are needed. Such programs can provide individual as well as societal benefits. Early STI detection and treatment is an effective HIV prevention strategy.

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