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Sexually Transmitted Infections In A Sample Of At-Risk Youth: Roles Of Mental Health And Trauma Histories

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Abstract

Little is known about whether there are specific subpopulations of youth with known problem behaviors that are more likely to engage in sexual risk behaviors. This study's sample (n=4,117) was drawn from a larger longitudinal administrative data, consisting of young adults with child abuse and/or poverty histories and records of some form of high-risk behavior or mental health diagnosis during adolescence. A cluster-controlled, logistic regression resulted in eleven statistically significant relationships. Youth treated for a mental health disorder and experienced multiple forms of abuse were more likely to be treated for Sexually Transmitted Infections (STIs). Youth who were delinquent, treated for substance abuse and had substance use related offenses were less likely to be treated for STIs. Youth treated for STIs were more likely to be identified through mental health systems or child protective services system than through known delinquent behaviors. Health care providers treating youth for STIs should explore the possible role of mental health and trauma histories.

Keywords

adolescents; trauma; mental health; child abuse; sexually transmitted infections; youth; child protective services; mental health systems

Introduction

Among sexually active youth, only about 60% report using a condom and nearly half of the 19 million Sexually Transmitted Infections (STIs) each year are among young people ages 15–24 (Center for Disease Control, National Center for HIV/AIDS, Viral Hepatitis, STD, & Prevention, n.d.). STIs pose a significant cost to society and can cause long-term health issues (Chesson, Blandford, Gift, Tao, & Irwin, 2004). While some high-risk behaviors, such as substance use or delinquency, are frequent risk factors for sexual risk behaviors, little is known about whether or not there are unique predictors of sexually transmitted infections among youth, who display a range of internalizing or externalizing behaviors. Among populations of foster care, maltreated, and/or runaway youth, those who experience (most often sexual) abuse (Ahrens, Katon, McCarty, Richardson, & Courtney, 2012), abuse

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substances (Clatts, Goldsamt, Yi, & Gwadz, 2005; Hudson & Nandy, 2012), or engage in delinquent activity (Mason et al., 2010; Tolou-Shams, Brown, Gordon, & Fernandez, 2007) are often shown to be more likely to engage in sexual risk behaviors. Similarly, among youth treated for substance abuse, child maltreatment has also been a consistent predictive factor of sexual risk behavior (Oshri, Tubman, & Jaccard, 2011; Tubman, Oshri, Taylor, & Morris, 2011). While it is clear that behavioral problems can overlap, the subset of youth who may be particularly prone to sexual risk behavior is less clear. This study explores whether or not there are unique predictors of STI treatment history among low-income youth, who are engaged in a range of risky behaviors or displaying mental health problems, while controlling for prior trauma.

Sexual Risk Behavior and Sexually Transmitted Infections among Youth

Sexual risk behaviors range from having unprotected sex with a single partner to engaging with multiple partners to trading sex. Any of these may result in acquiring an STI. There appears to be some consistency in associations between sexual risk behavior and prior sexual abuse (Elze, Auslander, McMillen, Edmond, & Thompson, 2001; Jones, Kashy, Villar-Loubet, Cook, & Weiss, 2013). Some studies suggest that young people with histories of sexual or multiple types of abuse are also at risk for trading sex or sexual favors, as well (Kramer & Berg, 2003; Reid, 2011; Roe-Sepowitz, 2012; Senn & Carey, 2010). Other studies suggest a more complex relationship. For example in a study of older youth in foster care, sexual abuse as a main effect was not associated with HIV-risk behaviors once externalizing behaviors and demographics were controlled. Further posthoc analysis of subgroups indicated that those who endorsed both sexual abuse and externalizing behaviors were most at risk with no differences between externalizing only, sexual abuse only and neither (Auslander, Mcmillen, Elze, Thompson, & Stiffman, 2002).

Drug and alcohol use have been associated with adolescent sexual risk but the samples and measurement make its exact relationship unclear. For example, among detained adolescents, there is historically strong support between alcohol/drug use with concurrent unprotected sexual activity, in addition to higher rates of STIs (Voisin, Hong, & King, 2012). Few delinquents are actually detained as compared to receiving a citation or probation. Other studies showing associations between substance abuse and sexual risk have focused on self-reported alcohol and marijuana use or abuse (Malow, Dévieux, Rosenberg, Samuels, & Jean-Gilles, 2006; Mason et al., 2010; Marina Tolou-shams et al., 2012).

Other indicators of poor adolescent functioning have received less attention in the STI literature. Some evidence suggests that less studied factors, such as depression or other mental health issues, may have a greater impact on sexual risk behavior (Tolou-shams, Brown, Houck, & Lescano, 2008), or that age differences in substance use may account for differences in substance abuse and risky sex comorbidity (Mason et al., 2010). Research on disability and STIs is sparse and predominantly limited to HIV risk (Groce et al., 2013). At least one study indicated that a large portion of youth with learning disabilities were engaging in sexual risk behaviors (Blanchett, 2000). Some work has also shown a relation between housing instability, poverty or other structural disadvantages and sexual risk behavior (Voisin et al., 2012) but it is not known if this is a risk factor or comorbid

condition. Further, homeless youth experience increased risk for trading sex for food, money, or drugs (Hudson & Nandy, 2012; Lankenau, Clatts, Welle, Goldsamt, & Gwadz, 2004; Tyler, Whitbeck, Hoyt, Cauce, & Whitbeck, 2004), which may be related to sexual risk behavior.

While there are some differences in sexual risk behavior among female and male youth, this is a complicated issue. In a study of 372 homeless youth, females were more than four times more likely to engage in survival sex with a friend, while males were more than six times more likely to engage in survival sex with a stranger (Tyler et al., 2004). Engaging in survival sex in itself is also a strong risk factor for “indoor” and “outdoor” (commercialized) forms of prostitution (Miller et al., 2011) and other more extreme behavior. In a study of youth in foster care, white females had the highest risk of sexual risk behavior compared to males and other youth of color (Auslander et al., 2002).

While the prevention of STIs is of great concern, the existing literature is not consistent in regard to its relation to other indicators of poor functioning in adolescence. It is also unclear as to what extent various service systems may encounter these youth and, thus serve as potential platforms for intervention. If sexual risk behaviors are primarily predicted by externalizing behaviors, then a purely behavioral educational approach may be appropriate. If, on the other hand, sexual risk behaviors are more closely related to trauma or mental health concerns in some populations, then a different intervention may be necessary. Such information can be utilized to more effectively tailor interventions. The present study seeks to help fill gaps in the existing literature by examining predictors of STI treatment history among low-income youth engaged in various risky behaviors or displaying mental health problems while controlling for history of abuse or neglect.

Methods

Sample

Data for this analysis was drawn from a larger longitudinal administrative data study that tracked a range of service system contacts and outcomes for children with histories of poverty only or poverty and maltreatment in a Midwestern metropolitan region. The larger study consisted of three groups of participants (one child randomly selected per family) born 1982–1994: those with a report of child abuse and neglect (CAN) but no record of family receipt of Aid to Families with Dependent Children (AFDC), children residing in families who received AFDC with no history of a report of CAN, and children with records of both CAN and AFDC at study start ($n=12,409$). The sampling frame for CAN reports was 1993–1994 (when children were birth through age 11), but other administrative records for birth, health care, and some parent variables were available prior to this sampling period. Because medical records outside hospital care were based on services reimbursable by Medicaid or state funds for lower income families, the sample for the present study was limited to those children with poverty histories (CAN and AFDC or AFDC only). Since the interest in attempting to understand whether or not youth with records of STI treatment appeared similar or different from youth with other known risky behaviors or mental health problems, the data were further restricted to those with at least one record of delinquency, substance use, STI treatment, runaway behavior/housing risk, or treatment for a mental health disorder

during adolescence. Due to low sample sizes of individuals identifying racially as other than African American (black) or white, persons identifying as Asian, Latino, Native American, mixed races, and other were deleted from the sample. Finally, the sample was restricted to youth at least 18 years old at the study's end in 2009 ($n=4,117$).

Data were linked using a common state level identifier when possible, with matching on identifiers used for all other cases. Matches were cross-checked across data sets to assess validity. Data cleaning was accomplished in three stages. First if cross-checking a variable, such as gender, revealed inconsistencies across data bases that could not be resolved, that subject was deleted. Second, a comprehensive review of data entry procedures and the official use of various variables was accomplished by consulting with each contributing agency (Department of Health, Mental Health, Social Services, Juvenile Court, and Special Education) and then reviewing binary associations with agencies to further assure the investigators were correctly interpreting the meaning of the variable. Finally, all associations are compared against existing literature to check for appropriate direction of relationships. For example, poverty has a strong association with maltreatment; so if this was properly coded, one would expect a positive association between those variables. Social services data included addresses which were geocoded and linked to tract level US Census information. All identifying information was removed prior to creating datasets used for analysis. Human subject approval was granted by XXX (removed for blind review) and each participating agency.

Measures

A binary variable indicating at least one treatment for STI served as the dependent variable in this study and was derived from billing information obtained from Medicaid, the state's expanded health care system for low income children, or emergency room (ER) data ($1=STI$ Treatment, $0=No$ STI Treatment).

Control variables consisted of demographic variables, including race ($1=African$ American, $0=white$), sex ($1=female$, $0=male$), and a binary poverty neighborhood (census tract) variable determined by average poverty for a family of four in 1990 ($1=Family$ living in poverty, $0=Family$ not in poverty) (HHS Poverty Guidelines, 2014). All families in the present analysis had histories of AFDC use at study start, but not all families lived in equally poor census tracts. Youths' disabilities were categorized to reflect youth with learning disabilities ($1=learning$ disability, $0=no$ learning disability), youth with mental retardation ($1=mental$ retardation, $0=no$ mental retardation), and youth with another type of special education issue ($1=other$ special education, $0=no$ other special education). Participants who had ever entered into foster care were categorized as such ($1=ever$ been in foster care, $0=never$ been in foster care).

Trauma history

Child maltreatment report records were available throughout childhood and adolescence and served as the measure of prior trauma in the present study. Reports were coded according to youth that were reported for physical abuse only ($1=physical$ abuse, $0=no$ physical abuse),

sexual abuse only ($1=$ sexual abuse, $0=$ no sexual abuse), neglect only ($1=$ neglect, $0=$ no neglect), and mixed abuse ($1=$ multiple types of abuse or neglect, $0=$ no abuse).

Mental Health and behavioral risk history

Subject mental health problems were measured according to ICD-9 diagnoses in state Department of Mental Health records, health care providers, or suicide-related hospitalizations records ($1=$ mental health issue, $0=$ no mental health issue). Substance abuse was measured through two variables. A substance abuse treatment variable was created through data collected from emergency room, medical care, or substance abuse treatment ($1=$ substance abuse treatment, $0=$ no substance treatment), while another substance variable identified youth who either disclosed substance abuse in a shelter intake but were not currently receiving related services or were involved in petitions or offenses related to substance abuse ($1=$ substance abuse risk, $0=$ no substance abuse). The latter substance abuse category included possession and dealing of a controlled substance or alcohol and drug use when driving under the influence. Juvenile delinquency was based on juvenile court petition for a delinquent offense or an arrest record through highway patrol ($1=$ delinquent, $0=$ not delinquent). A runaway variable was created for youth who utilized runaway shelter services or had a court petition as a runaway ($1=$ runaway, $0=$ not runaway).

Data Analysis

All analyses were conducted in SAS 9.4. Descriptive and bivariate analyses were used to examine sample characteristics, determine relationships between outcome and independent variables and to examine potential issues of multicollinearity. All independent variables with associations with the outcome variable or controls were then entered into a logistic regression model. A cluster-corrected model using PROC SURVEYLOGISTIC was used to control for clustering of observations within census tracts (Allison, 2012). Final model selection was based upon the changes in Wald chi-square statistic that indicates the variables improved the fit over a null model and the c statistic which is a measure of predictive accuracy. In models using only binary predictors, the odds ratio is considered equivalent to a measure of effect size.

Results

Descriptive Findings

Descriptive characteristics of the study sample are presented in Table 1. The final sample consisted of 4,117 young men and women, of whom 781 (approximately 19%) had treatment records for a sexually transmitted infection during adolescence. Table 1 summarizes variable and sample information. Of those with treatment records for STIs during adolescence, almost 72% ($n=559$, $p<.0001$) were female and less than 9% ($n=67$, $p<.0001$) were white (Caucasian). Over 37% ($n=292$, $p<.0001$) had lived in high poverty census tracts. About 50% ($n=387$, $p<.0001$) were considered delinquent. Approximately 11% ($n=87$, $p=.62$) were also treated for substance abuse issues while less than 3% ($n=22$, $p<.0007$) were identified as having used substances. Youth treated for STIs did not completely overlap with other indicators of risky behaviors or mental health problems.

Multivariate Model Findings

A logistic regression controlling for clustering at the census tract level was used to predict the effects of all previously described independent variables on sexual risk (see Table 2 for summarized results). The model was significant (Wald $\chi^2=397.48$, $p<.0001$) with an $R^2=.12$, Max-rescaled $R^2=.23$ and the c statistic equaled .75, indicating acceptable model fit and reasonable predictive utility (Hosmer & Lemeshow, 2000).

Eight variables had statistically significant relationships with the STI treatment outcome variable (see Table 2). Whites were more than four times less likely to be treated for STIs than African Americans (Blacks) (OR=.23, CI= .16–.31, $p<.0001$) and females were over four times more likely to be treated for STIs than their male counter parts (OR=4.11, CI= 3.25–5.00, $p<.0001$). Youth living in high poverty areas were 48% more likely to be treated for STIs than those not living in high poverty areas (OR=1.48, CI= 1.19–1.83, $p=.0004$). Individuals with mental health issues were 41% more likely to be treated for STIs (OR=1.41, CI= 1.13–1.77, $p=.0003$). Individuals who were treated for substance abuse were 45% less likely to have a record of treatment for STIs (OR=.69, CI= .50–.95, $p=.03$). Youth with delinquency petitions or those with status offenses related to substance abuse were three times less likely to have treatment records for STIs (OR=.31, CI= .25–.38, $p<.0001$ and OR=.33, CI= .19–.57, $p<.0001$ respectively). Compared to youth with no maltreatment report history, those who had experienced multiple types of abuse were 38% more likely to have been treated for STIs (OR=1.38, CI= 1.03–1.85, $p=.03$).

Discussion

Our study attempted to better understand which youth appear in the healthcare system for STI treatment within a high-risk sample. Our findings that STI treatment was more common for youth with mental health disorders and less common for those with records of other forms of risky behaviors was somewhat inconsistent with prior literature linking delinquent behavior or criminal activity and substance abuse with sexual risk behaviors (Ahrens et al., 2012; Auslander et al., 2002; Clatts et al., 2005; Hudson & Nandy, 2012; Mason et al., 2010; Tolou-Shams et al., 2007). Prior work, however, focused on delinquency as measured by youth who were detained. Delinquency in the present study was measured by any juvenile court petition and, thus, reflects a much broader population than youth who are detained or incarcerated. It is possible that the high comorbidity for detained youth (Voisin et al., 2012) relates to the provision of health exams, which are not required of non-detained delinquent youth. Furthermore, much of the studies of substance abuse relied on self-report, whereas youth in our study were receiving some form of intervention. Among youth in substance abuse treatment, one study found that more severe maltreatment profiles were associated with having unprotected sex at higher rates than less severe maltreatment profiles (Tubman et al., 2011). Youth who are in treatment for substance use/abuse may be less likely to be engaging in sexual risk behaviors than youth who are using substances but are receiving no services.

Previous literature examining the relationship between history of maltreatment and sexual risk behavior focused mainly on prior sexual abuse (Ahrens, Katon, McCarty, Richardson, & Courtney, 2012b; Senn & Carey, 2010). Using official maltreatment report data available

over time, we were able to capture a more complex history of alleged maltreatment. In the present analyses, youth reported for single types of maltreatment did not differ from the non-maltreated group in terms of likelihood of STI treatment. However, youth with histories of multiple forms of maltreatment were more likely to be among the STI treatment group. This is partly consistent with prior research (Auslander et al., 2002). Moreover, this is consistent with previous literature indicating that children who experience multiple forms of abuse may be at higher risk for many negative outcomes (Finkelhor, Turner, & Hamby, 2011).

As supported by extant literature, this study finds race and sex continue to be factors impacting high-risk sexual behavior as measured by STI treatment. Consistent with other studies, African Americans had higher likelihood of STI treatment than whites (Biello, Niccolai, Kershaw, Lin, & Ickovics, 2013; Harris, Gordon-Larsen, Chantala, & Udry, 2006). Reasons for these disparities are disputed. Using condoms and having fewer sexual partners reduces one's risk; however, studies controlling for this have not fully explained racial disparities in STI risk (Biello et al., 2013). While all youth lived in lower income households in this study, neighborhood poverty was associated with a higher likelihood of STI treatment. Research has found that by examining both contextual poverty and family poverty, the racial disparity is even more stark (Drake & Rank, 2009). Thus, it seems likely that the African American youth in the present sample lived in more concentrated poverty areas than the White youth. In literature exploring HIV infection, poverty is thought to increase risk both through lack of access to medical care and lowered ability to negotiate use with a male partner (Hodder et al., 2010).

Also consistent with prior research, females were more likely to have records of STI treatment than males (Lopez et al., 2011; Raiford, Seth, & DiClemente, 2013; Valente & Auerswald, 2013). However consistent, the underlying phenomenon is not well understood. Generally, young males more frequently report having sex and having multiple partners (Grunbaum et al., 2002). A recent study employing person-based analytic approaches, found that black males were more likely than white males to be in self-report high risk behavior groups including substance use, multiple partners, etc., and yet there were higher reports of STDs among females with lower risk behaviors (Halpern et al., 2004). While gender differences in treatment seeking may help explain our findings, at least one prior study found that females were more likely to delay care than males (Fortenberry, 1997). More work is needed to understand the relationship between gender and STIs and how this may impact prevention and intervention approaches.

The association of having a learning disability and STI treatment approached significance in multivariate models (OR= 1.25, CI= .99–1.57, $p=.06$). Youth with learning disabilities have previously been shown to be at an increased level of vulnerability to coerced or voluntary sexual risk behavior (Blanchett, 2000), but the research in this area is very limited. Further research is necessary to explore the relationship of youths' disabilities by type of disability to sexual risk behaviors.

Limitations

This study contains several limitations but also advances the literature regarding exploration of variables like service use and disability. Although the pseudo-r square available in logistic

regression cannot be interpreted in the same manner as the r-square in linear regression, our model's pseudo r-square is clearly modest. This indicates that much remains to be known about low income youth who access STI treatment. Much more research is needed with a large enough sample to further explore youth characteristics and the import of environmental context.

For example, the demographics of the region at the time of sampling precludes the ability to examine other racial groups in addition to African American and White youth; nor were there separate measures of ethnicity in the data. Additionally, this study was additionally not able to incorporate data regarding sexual orientation and gender identity, which has been documented as an important construct in sexual risk behavior and victimization (Clatts et al., 2005; Forney & Miller, 2012; Lankenau et al., 2004; Marshall, Shannon, Kerr, Zhang, & Wood, 2010; Masters, Beadnell, Morrison, Hoppe, & Wells, 2013)

While administrative data has certain advantages, it presents limitations, as well. Data for this study was based on observations of providers in systems that is already available in most states and enhances applicability to practice and policy. Understanding which system sees which youth and the subsequent impact from those systems is separate from this study's focus to understand the patterns of these problem behaviors among high-risk youth.

On the other hand, administrative data limits our understanding of variables to what is recorded by public service systems. We were unable to capture sexual risk behavior separate from medical treatment for STIs. Further research is needed that can compare characteristics of youth treated for STIs as compared to those self-reporting sexual risk behaviors. Moreover, although the sexual risk variable was measured by STIs, there was no ability to distinguish between forced, coerced, or participatory sexual acts or behaviors leading to that diagnosis. We did, however, eliminate STI treatment that occurred in childhood concurrent with a child sexual abuse report. Administrative data also preclude identifying individuals who may have experienced substance abuse, mental health issues, or any type of risk behaviors but were not identified by public services.

The use of administrative data, similarly, limited our ability to control for maltreatment or other trauma which has not been officially documented (Fallon et al., 2010). Few studies have been able to compare reported maltreatment with self-reported maltreatment, often with substantial differences reported between the two methods (Hardt & Rutter, 2004; Widom & Morris, 1997; Widom & Shepard, 1996). Prior research, however, using the parent data set for the present study has found significant differences between the children reported for maltreatment and those without such reports over time (Jonson-Reid, Drake & Kohl, 2009). Ideally future studies would incorporate both methods.

Conclusion and Implications

Despite its limitations, this study has implications for identification and referral for a set of the youth population engaged in risky sexual behaviors that is not visible to systems like juvenile justice. Our study does indicate that there is subset of youth presenting for STI treatment whose primary indicators are living with multiple forms of abuse and mental

health needs, rather than engaging in other risky behaviors. While interventions for high-risk youth or delinquent youth are needed for those engaged in the juvenile justice systems (Bontrager Ryon, Winokur Early, Hand, & Chapman, 2013; Evans-Chase & Zhou, 2012), results from this study indicate that a substantial number of youth engaged in sexual risk behaviors that lead to STIs are not engaged in this system. Our findings indicate that the mental health and child protective services (CPS) are important platforms for prevention of STIs. Similarly, health care providers treating youth for STIs should explore the possible role of mental health and trauma histories. This may provide an opportunity for more effective prevention of continued sexual risk behaviors, which may require clinical support to decrease their vulnerability.

It is hoped that this study will encourage further investigation into the development of sexual risk behaviors and the identification of platforms for screening and prevention activities. For example, it is not known how frequently mental health or child welfare workers working with adolescents raise the issue of safe sexual behaviors. Similarly, it is not known what proportion of health care providers may ask youth about comorbid or risk factors outside of safer sex practices. Understanding current practice will help facilitate the development of new screening and prevention programming.

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Table 1

Descriptive Statistics of Sample (n=4,117)

Variables	No STI Infection (0) n = 3336 % of column	STI Infection (1) n=781 % of column
General Characteristics		
Female **	36.09	71.57
White (Caucasian) **	27.70	8.58
Ever in Foster Care	17.90	19.85
Poverty **	24.16	37.39
Presenting issue with:		
Learning Disability	28.06	26.89
Mental Retardation	2.37	3.46
Other Special Education *	3.33	1.54
Mental Health Issue	47.00	49.68
Substance Abuse Treatment	11.78	11.14
Substance Abuse Issue	5.82	2.82
Runaway	9.35	7.68
Delinquency **	72.21	49.55
Report of Abuse		
Physical (only) *	38.46	34.31
Sexual (only) **	10.13	15.24
Neglect (only) *	59.23	63.12
Multiple types *	11.96	16.52

Notes:

* p<.05

** p<.0001

Table 2
Logistic Regression Results of Youths' Treated for sexually transmitted infections

	df	Estimate	SE	Wald Chi-Sq	p-value	Adjusted Odds Ratio	95% Wald Confidence Limits
Intercept	1	-1.55	0.15	114.06	<.0001		
Demographics							
Race (1=White)	1	-1.49	0.17	79.44	<.0001	0.23	0.16
Sex (1=Female)	1	1.39	0.11	161.02	<.0001	4.03	3.25
Poverty	1	0.39	0.11	12.59	0.0004	1.48	1.19
Identified with/as:							
Learning Disability	1	0.22	0.12	3.42	0.06	1.25	0.99
Mental Retardation	1	0.08	0.29	0.07	0.80	1.08	0.61
Other Special Education	1	-0.65	0.39	2.78	0.10	0.52	0.25
Mental Health Issue	1	0.35	0.12	9.02	0.0003	1.41	1.13
Substance Abuse Treatment	1	-0.37	0.17	4.79	0.03	0.69	0.50
Substance Abuse Issue	1	-1.12	0.29	15.16	<.0001	0.33	0.19
Physical Abuse (only)	1	-0.07	0.11	0.38	0.54	0.93	0.75
Sexual Abuse (only)	1	0.23	0.15	2.15	0.14	1.25	0.93
Neglect (only)	1	0.19	0.11	2.93	0.09	1.20	0.97
Multiple Types of Abuse	1	0.32	0.15	4.58	0.03	1.38	1.03
Runaway	1	-0.26	0.19	1.91	0.17	0.77	0.53
Ever in Foster Care	1	-0.28	0.15	3.62	0.06	0.76	0.57
Delinquency	1	-1.19	0.11	121.24	<.0001	0.31	0.25
							0.38