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Risk factors of repeated infectious disease incidence among substance-dependent girls and boys court-referred to treatment

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Abstract

Background—A small portion of Americans account for a disproportionate amount of the incidences of sexually transmitted infection observed over a short period of time. Studies with adults have begun to characterize this population, yet there is very little data on adolescent sexually transmitted infection repeaters (STIR). This study explores characteristics associated with STIR among 102 girls and 93 boys (aged 14–18) court-referred for residential treatment.

Methods—Background characteristics, substance use disorders, risky and interpersonal behaviors, and history of sexually transmitted infections were collected at intake using valid and reliable instruments. A negative binomial logistic regression was performed to determine the background, risky behaviors, and social patterns associated with adolescent STIR.

Results—Approximately two out of three adolescents (62%) did not use contraception the last time they had sex, and 15% had at least one sexually transmitted infection recorded in their medical chart. Sexually transmitted infection repeaters entered treatment with higher rates of cocaine abuse (13%) than youth without multiple infections (3%, $p < 0.05$). History of sexual abuse, having sex with a person who said no, higher exhibitionism, and social estrangement increased the odds of adolescent STIR. Main effects of exhibitionism and social estrangement on increased odds of STIR were more pronounced for sexually abused adolescents.

Conclusions—The findings suggest a need for incorporating HIV education during residential treatment to improve health outcomes and intervention strategies that further connectedness for youth and victims of sexual abuse.

Keywords

Adolescents; infection; risky sex; sexual abuse history; STD; substance use disorders

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Introduction

Sexually transmitted infections, identified antecedents of HIV infections (1), are not normally distributed in the population. Much like healthcare utilization, a small portion of Americans account for a disproportionate amount of the incidences of sexually transmitted infection. Epidemiological studies indicate that individuals with repeat infections may account for up to 38% all infections observed over a short period of time (2). Individuals who acquire more than one non-viral infection within a specific period of time, referred to as sexually transmitted infection repeaters (STIR), may behave differently than those without repeat infections. For example, recent increases in alcohol legislative tax corresponded with reduced incidence among populations without multiple infections but had no effect on STIR (3).

STIR research to date has largely been conducted with adult males in outpatient settings. Risky behaviors associated with adult STIR include criminal activity, alcohol and other drug (AOD) use, and risky sexual behaviors (2,4). There is evidence that STIR is associated with greater alcohol but not drug use, and socio-sexuality in terms of higher rates of unprotected sex, infidelity, and short-term relationships (2,4,5). Egocentric interpersonal patterns are also associated with STIR, including: higher exhibitionism in the sense of seeking the limelight; exploitative behaviors that take advantage of others for selfish purposes; and lower other-regard defined as behaviors performed without focus on another's needs and inclinations (6–8). Sexual abuse (SA) also elevates risk of STIR directly and indirectly by increasing STIR antecedent behaviors (9–11). Paradoxically, SA victims report greater number of partners, attention-seeking behaviors, pervasive emptiness, and social isolation (12–14).

In the 21st century, youth aged 13–25 are the group with the highest rates of sexually transmitted infections. High rates of intersecting antecedent behaviors increase risk of adolescent STIR, including binge-drinking, risky sex while intoxicated, use of intravenous drugs, unsafe methods of tattooing, and jail episodes (15–19). Ego-centric thinking is prominent during adolescence, which diminishes cognition of negative consequences to self and others and increases rationalization of AOD experimentation and unprotected sex. Given this landscape, the sparse data on adolescent STIR is surprising. The prior, pioneering STIR research has largely been conducted with adult males in outpatient settings. Few studies have sufficient sampling of girls and boys with criminal records, severe AOD use, and risky sexual activity to allow us to unravel the risky behaviors and social patterns that distinguish adolescent STIR. In an initial effort to fill the void in this area of research, this exploratory study reports on a sample of 103 girls and 93 boys court-referred to residential treatment. The primary goal was to determine the background, substance use disorders, risky behaviors, and interpersonal patterns associated with adolescent STIR. The influence of SA on risky and interpersonal behaviors associated with STIR was also explored. By understanding the ways that STIR relate to others, more targeted safe sex education approaches can be incorporated into care settings for high risk juveniles with substance dependency.

Methods

Procedures

All subjects were recruited as part of an ongoing investigation of 12-step affiliation among juvenile offenders court-referred to AOD treatment (20). Recruitment for this study was conducted from February 2007 to August 2009 at New Directions, the largest adolescent residential treatment provider in northeast Ohio. Inclusion criteria included: aged 14–18 years, English speaking, stable address and telephone, met diagnostic criteria for current AOD dependency, not currently suicidal/homicidal, and medical clearance verifying the absence of acute intoxications and withdrawal symptoms. Participants were admitted into AOD treatment one week after a three-day AOD detoxification (if required). In the week before admission date, participants were sent an information packet with an invitation letter to participate in the study. On the day of admission, participants were approached to participate and given a brief description of the study. Eligible participants signed statements of informed consent/assent. Participants were paid $25 for completed assessments. All procedures of this study were approved by the Case Medical Center Institutional Review Board for human investigation, and a Certificate of Confidentiality from the National Institute on Alcohol Abuse and Alcoholism was obtained. Additional information regarding the study design and methods is detailed elsewhere (21).

Participants

A total of 482 adolescents were admitted into residential treatment during the enrollment period of the study. All youth with scheduled admission appointments and those unscheduled occurring during regular weekday hours (08:00–18:00 h), one weekday evening (17:00–20:00 h), and one weekend day (09:00–17:00 h) were approached by research staff. Of the 211 patients approached, none were ineligible and 16 refused, resulting in an enrollment sample of 195 participants. Initial analyses investigated potential differences between patients not enrolled versus enrolled for whom baseline data and discharge status were available. There were no significant differences between patients not enrolled ($n = 271$), enrolled ($n = 195$), and refusals ($n = 16$) in terms of background characteristics, trauma history, juvenile justice involvement, AOD severity, years of illicit drug use, HIV/AIDs incidence, proportion of adolescent parents, prescribed psychotropic medication, and rates of treatment completion. There were more females in the enrollment sample (50%) that the population not enrolled (17%; $p < 0.0001$) due to the gender stratification of the study design.

Measures

Data were gathered at intake via rater-administered, semi-structured interviews, medical chart review, biomarkers, clinician reports, and youth self-reports. Interviews were conducted by trained, experienced clinical interviewers whose levels of certification ranged from bachelor's level to doctor of medicine. Sixty-minute clinician-administered interviews were conducted at the scheduled admission appointment as part of clinical procedures. Ninety-minute baseline interviews were conducted with eligible and consenting participants within approximately one week following the admission interview (M = 7.5 days, SD = 1.2).

All individuals involved in collecting data from subjects completed the National Institute of Health required courses on human subjects' protection.

Background—Participant age, gender, minority status, single parent household, and parental education were assessed with the Health Care Data Form (22). SA history was assessed with the clinician-administered Childhood Sexual Abuse questionnaire (23).

Substance use disorders—Substance use disorders (current) were assessed using the Mini International Neuropsychiatric Interview Plus (MINI-Plus), a widely-used structured diagnostic interview for assessing substance abuse and dependency disorders and Axis I psychiatric disorders (24,25). Results of an inter-rater reliability study with 30 participants showed good to excellent inter-rater reliability for abuse and dependency disorders (κ = 0.63–0.96).

Risky behaviors—Felony history was assessed using adapted items from the Teen Treatment Services Review (26). Percent days abstinent (PDA) in the prior month was assessed using the rater-administered Time Line Follow Back Interview (27). Age of first consensual sex, condom use and AOD use at last intercourse, and sexual partner history were assessed with four Youth Risky Behavior Survey (YRBS) items (28), and one item from the Sexual Experiences Survey (29) indexed whether participants ever had sex with someone even after the person said no.

Interpersonal—Two subscales from the Narcissistic Personality Inventory (30,31) indexed exhibitionism (7 items, e.g. I like to show off my body), and exploitativeness (5 items, e.g. I find it easy to manipulate others). Using a YRBS item, volunteerism was indexed as the average number of hours/per month of charitable giving to others outside the home; a binary (Y/N) variable was created to indicate no volunteerism ("0 hours") versus at least some volunteerism (e.g. 1–21 hours). Feeling detached or estranged from others in the past six months (Y/N) was indexed using an item from the Post Traumatic Stress Disorder Checklist (PCL-C; 32). Test-retest reliability analysis of the PCL-C item collected at the clinician-administered admission interview and baseline interview (M = 7.5 days) showed substantial agreement (κ = 0.61). Prior work has shown the utility of single item ratings of social behavior with AOD populations (33,34).

Sexually transmitted infections—Sexually transmitted infection incidences were recorded in medical physical exams and were reviewed by registered nurses at the time of admission. Admission procedures required clients to bring original copies of a medical physical exam performed in the month prior to intake. Female clients were also required to bring OB/GYN exam records of a pelvic exam and PAP smear conducted within the 12 months prior to intake. Clients were screened for Chlamydia, Herpes, genital warts, syphilis, gonorrhea, crabs, pelvic inflammatory disease, trichomoniasis, hepatitis B, C, and HIV. A binary variable was created to indicate STIR (2+ infections) versus non-STIR (0–1 infection).

Statistical analyses

Statistical analyses were performed using the procedures CORR, FREQ, and GENMOD of SAS Version 9.2 (SAS Institute Inc., Cary, NC, USA). Distributions of variables were first examined for normality. Positively skewed variables (PDA, number of felonies, lifetime sexual partners) were given a log-transformation, and the negatively skewed PDA variable received an arcsine transformation (e.g. 35). Fisher's exact test for categorical variables and Wilcoxon Mann–Whitney rank-sum tests for continuous variables were used to test for differences between groups. To examine the association between explanatory variables and the probability of STIR, a fixed-effects zero-truncated Poisson model was specified with a logit link function and a Pearson correction for dispersion (36). Three explanatory variable sets (background, risky behaviors, interpersonal) were selected based on individual characteristics associated with sexually transmitted infection or AOD use (5,37,38). Initial descriptive analyses examined differences in explanatory variables between girls and boys with and without SA using the method of Tukey to preserve 1% pairwise comparisons between groups. Four interaction terms between SA and interpersonal variables were selected based on Tukey-Kramer comparisons with significance values greater than 90% (p < 0.01). A gender by SA interaction term was not included in the logit model given non-significant univariate comparisons and to preserve a recommended predictor/subject ratio (1:10–20). Because logit models yield superior estimates when all relevant covariates are included (39), model covariates included age, age of first sex, gender, minority status, parental marital status, and parental education. Preliminary analyses suggested that linear modeling was adequate, and the logit model showed a good fit, $\chi^2(179) = 165.74$, $p = 0.59$. Examination of the correlation matrix for explanatory variables found no correlation to exceed $r = 0.2$, and collinearity diagnostics indicated no problems. All p values were calculated with two-sided tests.

Results

Intake profile of sample

The intake profile of the sample is presented in Table 1. On average, participants were 16 years old (SD = 1.1) and in 10th grade (M = 10.1 years of education). Approximately half (48%) were male, from a single parent household (50%), and 27% had a parent with a bachelor's degree or more. Approximately one in four youths (23%) entered treatment with a history of SA, which was significantly higher among girls (19%) than boys (4%; $\chi^2 = 21.2$, $p < 0.0001$). Youths used AOD on 6 out of 10 days in the month prior to treatment. The majority had a history of parole/probation (85%) and a felony record (87%), with an average of 2.7 committed felonies in the prior 2 years. Ninety-five percent of the sample was heterosexual, 1% was homosexual, and 4% was bisexual. All juveniles had a sexual partner history (M = 2.2 partners) beginning at age 14 (M = 14.3 years), and 6% had sex with someone even after the person said no. Most (62%) did not use a condom or use AOD (89%) the last time they had sexual intercourse. Approximately one in four subjects (26%) felt estranged from others. Rates of no volunteerism (48%) were comparable to normative youth attending high school in the region (52%; 40). Intake characteristics of the sample (Table 1) were comparable to other youth populations in residential treatment (41–44).

Additional information regarding the clinical profile of the sample at intake is detailed elsewhere (21,34).

Descriptive analysis of explanatory variables

Given the gender stratification of the study design and high overlap of female gender and SA, initial descriptive analyses examined differences between girls and boys with and without SA (Table 1). There were no significant differences between SA boys and girls, and no gender distinction of variables (see 398 for a detailed report of gender comparisons). However, SA boys and girls were distinguished from their peers without SA in terms of more sexual partners (M = 2.8 vs. M = 2.1, F = 4.7, $p < 0.05$), and higher rates of unprotected sex (87% vs. 54%, F = 8.2, $p < 0.05$), exhibitionism (M = 3.5 vs. M = 2.8, F = 6.2, $p < 0.01$), estrangement (67% vs. 14%, $\chi^2 = 40.2$, $p < 0.0001$), and no volunteerism (80% vs. 59%, $\chi^2 = 6.9$, $p < 0.01$). There was no SA main effect on exploitative scores due to the similarity of exploitation scores between SA girls (M = 2.3) and boys without SA (M = 2.4; Table 1). However, SA boys (M = 3.8) had significantly higher exploitation scores than non-abused girls (M = 1.9; F = 6.5, $p < 0.05$) and boys (M = 2.4, F = 5.1, $p < 0.05$).

Sexually transmitted incidence outcomes

Fifteen percent of the sample entered treatment with a history of at least one sexually transmitted infection, half of whom were STIR (8%). The most common infection was chlamydia (9%), followed by HPV (8%), gonorrhea (6%), genital herpes (3%), syphilis (3%), crabs (2%), and hepatitis C (2%). Initial comparisons between youth with no infection history (85%) and those with one infection (8%) found no significant differences with two exceptions; youth with one infection were more likely to be female (100% vs. 46%, respectively, $\chi^2 = 11.1$, $p < 0.001$) and used AOD the last time they had sex (43% vs. 9%, $\chi^2 = 11.4$, $p < 0.001$).

Factors associated with STIR

Initial comparisons explored current substance use disorders associated with adolescent STIR (Table 2). The majority of youth entered treatment with drug dependence (99%), and 61% met the criteria for alcohol dependence, as reported in detail elsewhere (21). The most common substance dependency disorder was marijuana (92%), followed by narcotics (30%) and hallucinogens (29%), with rates comparable to other youth populations in residential treatment (45,46). STIR had similar rates of substance abuse and dependency disorders as youth without multiple infections with exception to higher rates of cocaine abuse (13% vs. 3%, $\chi^2 = 4.5$, $p < 0.05$).

The logit model next examined background, risky behaviors, and interpersonal factors associated with STIR (Table 3). Controlling for other variables in the model, the predicted odds of STIR for SA victims were 7 times the odds for youth without SA. As shown in Table 3, other significant factors increasing the odds of STIR were feeling estranged from others, higher exhibitionism, and having sex with a person who said no. When interaction terms between SA and interpersonal variables were added to the logit model, results showed pronounced effects of exhibitionism and estrangement on increased odds of STIR for youth with SA (Table 3).

Discussion

Results of this study indicate distinctive differences between youth with and without multiple STIs. Fifteen percent of juveniles entered AOD treatment with a sexually transmitted infection, approximately half of whom were STIR. The rate of infection (15%) is consistent with other young adult populations with AOD dependency (47–49) and less severe AOD use (19,50), but double the rate of normative youth with no AOD history from the same region (40,51). Youth with one infection were similar to peers with no infection with exception to a greater proportion of girls and higher rates of substance-involved sex. Anatomical and physiological differences may increase girls' risk of infection; male genitalia are less susceptible to infection sequelae (52) and become impaired from intoxication, which reduces male exposure to infection transmission (53–55). Results suggest gender-specific sex education approaches to reinforce the female vulnerability of sexually transmitted infection acquisition and negative impact of AOD use.

Risk factors other than gender and AOD-involved sex appear to drive the behavior of adolescent STIR. While indistinguishable in terms of criminal activity, percent days abstinent, and abuse and dependency of most substances, STIR were more likely to abuse cocaine, a drug associated with increased hypersexuality and risk of infection acquisition (56). Other differences that distinguished adolescent STIR point to themes of social disconnectedness and low other-regard. The higher rate of having sex with a person who said no associated with adolescent STIR can be understood through AA's theorized trait of self-centeredness carried to the extreme (e.g. "My whole life seemed to be centered around doing what I wanted to do without regard for the wishes or privileges of others" (57). Another interpretation points to genetic causes with growing evidence of addicts' blunted responsivity to others from neuroimaging genetic research (58). Yet the higher levels of estrangement and exhibitionism associated with STIR suggests a deficit in social connectedness despite attention-seeking behaviors. This dichotomy is well synthesized in 12-step literature. "Almost without exception, alcoholics are tortured by loneliness… that we didn't quite belong. Either we were shy or we were apt to be noisy and craving attention and companionship" (59). As opposed to psychopaths, study findings suggest that STIR are innately social beings (60). Social skills deficits are implicated in the social anxiety-problematic drinking that this report expands to include infectious disease.

Sexual abuse appears to further magnify the impact of estrangement and exhibitionism on increased risk of STIR. SA youth had more sexual partners, higher rates of unprotected sex, estrangement, less volunteerism, and higher levels of exhibitionism than their peers without SA. The loneliness often described by SA victims (10,13) may drive higher rates of attention-seeking behaviors in attempts for meaningful connections that they may fear would be broken by assertion of contraceptive use. While rates of SA were higher among girls than boys, the impairment associated with SA was similar for both genders. However, there was evidence to suggest higher exploitative behaviors among SA boys. Future research is warranted with higher sampling of SA males to determine whether exploitative behaviors are pronounced among SA males that increases their risk of STIR and transmission. Nonetheless, the interpersonal patterns associated with STIR that are pronounced among SA victims have implications for STI/HIV interventions in addressing how STIR relate to

others. Longitudinal investigations with treatment-seeking adults suggests that helping others may shift an object-orientation of others to increased other-oriented awareness and interest (34). Prospective study of youth service participation in 12-step contexts is needed to determine the impact of this activity on rehabilitated behaviors and social interactions.

Some limitations of our study merit attention. First, contextual information of infection acquisition was not assessed, and it is possible that multiple infections accrued from repeated unprotected sex with an infected partner. This information would be useful to collect particularly among SA victims to discern if infection acquisition and high rates of unprotected sex stem from issues of self-esteem, insensitivity, or mistaken invincibility. Second, data were gathered concurrently at intake and causal ordering cannot be inferred. Prospective studies are needed to discern the course of youth behaviors in relation to infectious disease. Third, findings may not generalize to youth populations with less severe AOD use and without judicial involvement. However, rates of infection, SA, risky sex, and social patterns are comparable to young adult populations with less severe AOD use and related problems (31,42,50,61). Despite these limitations, our results extend previous work conducted largely with adult Caucasian males to a mixed gender sample of juveniles with high representation of minority youth. Data were collected with valid instruments that employed multiple informants and methods (i.e. semi-structured interviews, medical records, clinician assessments, youth reports).

Conclusions

Results implicate the incorporation of assertiveness training, condom skills, and HIV education into gender-specific trauma therapies during treatment to improve youth skills in relating to others. Increased awareness of how their actions impact others may further other-oriented behaviors that are associated with decreased risk of infection acquisition and AOD relapse (20,51). Helping youth get engaged service in 12-step contexts may prevent acquisition and transmission of new infections by reducing AOD use and substance-involved risky sex while furthering social connectedness and consideration of others.

Acknowledgments

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Table 1

Intake profile of boys and girls with and without sexual abuse (SA).

	195 (100%)	Boys (93, 48%)		Girls (102, 52%)	
		SA 8 (4%)	No SA 85 (44%)	SA 37 (19%)	No SA 65 (33%)
Background					
Age	16.2 (1.1)	17.1 (1.0)^a	16.0 (1.1)^a	16.0 (1.1)^a	16.4 (1.0)^a
Minority	59 (30%)	4 (50%)^a	30 (35%)^a	7 (19%)^a	18 (28%)^a
Single parent household	98 (50%)	4 (50%)^a	37 (44%)^a	16 (43%)^a	41 (63%)^a
Parent with BA+	53 (27%)	1 (13%)^a	22 (26%)^a	11 (30%)^a	19 (29%)^a
Risky behavior					
Prior felonies	2.7 (2.4)	3.0 (3.5)^a	3.0 (2.4)^a	2.6 (2.6)^a	2.4 (2.0)^a
Percent days abstinent	0.4 (0.4)	0.4 (0.4)^a	0.4 (0.4)^a	0.3 (0.4)^a	0.4 (0.4)^a
Substance use with sex	22 (11%)	0 (0%)^a	8 (9%)^a	5 (14%)^a	9 (14%)^a
Had sex with person who said no	11 (6%)	0 (0%)^a	5 (6%)^a	1 (3%)^a	5 (8%)^a
Age of first sex	14.3 (1.7)	14.0 (1.5)^a	14.7 (1.6)^a	14.3 (1.6)^a	14.1 (1.7)^a
No. sexual partners	2.2 (1.2)	3.0 (1.0)^b*	2.0 (1.3)^a*	2.7 (1.0)^b*	2.0 (1.2)^a*
Unprotected sex	120 (62%)	6 (75%)^b*	40 (47%)^a*	33 (90%)^b*	41 (63%)^a*
Interpersonal					
Exhibitionism	2.9 (1.6)	3.3 (1.5)^a**	2.8 (1.6)^b**	3.6 (1.7)^a**	2.9 (1.8)^b**
Exploitation	2.2 (1.6)	3.8 (1.8)^c*	2.4 (1.4)^b*	2.3 (1.6)^{bc}*	1.9 (1.4)^a*
No volunteerism	93 (48%)	6 (75%)^b**	39 (46%)^a**	26 (70%)^b**	22 (34%)^a**
Estrangement	51 (26%)	2 (25%)^b**	8 (9%)^{a,b}**	28 (76%)^d**	13 (20%)^{b,c}**

*
$p < 0.05$,

**
$p < 0.01$;

Data are unadjusted means (SD) or n (%). Levels not sharing the same letter are significantly different based on Tukey-Kramer post hoc analysis. Groups sharing the same letter indicate that there are no significant differences between them.

Table 2

Substance use disorders associated with sexually transmitted infection repeaters (STIR).

Substance use disorder (current)	Total 195 (100%)	Non-STIR 179 (92%)	STIR 16 (8%)
Alcohol			
Abuse	36 (18%)	35 (20%)	1 (6%)
Dependency	118 (61%)	90 (89%)	11 (69%)
Drug			
Abuse	12 (6%)	11 (6%)	1 (6%)
Dependency	193 (99%)	178 (99%)	15 (94%)
Marijuana			
Abuse	18 (9%)	17 (10%)	1 (6%)
Dependency	179 (92%)	165 (92%)	14 (88%)
Narcotics			
Abuse	22 (11%)	20 (11%)	2 (13%)
Dependency	58 (30%)	54 (30%)	4 (25%)
Hallucinogen			
Abuse	16 (8%)	16 (9%)	0 (0%)
Dependency	57 (29%)	51 (29%)	6 (38%)
Cocaine			
Abuse	8 (4%)	6 (3%)	2 (13%)*
Dependency	50 (26%)	48 (27%)	2 (13%)
Stimulants			
Abuse	11 (6%)	9 (5%)	2 (13%)
Dependency	49 (25%)	46 (26%)	3 (19%)
Inhalants			
Abuse	5 (3%)	5 (3%)	0 (0%)
Dependency	11 (6%)	11 (6%)	0 (0%)
Tranquilizers			
Abuse	14 (7%)	14 (8%)	0 (0%)
Dependency	39 (20%)	35 (20%)	4 (25%)

*$p < 0.05$.

Table 3

Clinical factors associated with sexually transmitted infection repeaters (STIR).

	β	SE	^{I} LR χ^2	95% CI	P
Background					
Age	0.41	0.20	4.02	[0.00, 0.82]	0.06
Male	−1.38	0.82	2.84	[−3.11, 0.21]	0.10
Minority	−0.78	0.41	3.75	[−1.59, 0.01]	0.20
Single parent household	0.19	0.40	0.21	[−0.61, 0.98]	0.64
Parent with BA+	0.63	0.50	1.62	[−0.28, 1.70]	0.20
Sexual abuse (SA)	2.00	1.89	6.85	[1.26, 3.87]	0.01**
Risky behavior					
Prior felonies	0.15	0.41	0.14	[−0.65, 0.96]	0.70
Percent days abstinent	0.55	0.59	0.89	[−0.60, 1.71]	0.35
Substance use with sex	0.44	0.32	1.24	[−0.09, 2.35]	0.23
Number of sexual partners	0.34	0.31	1.14	[−0.28, 0.96]	0.29
Had sex with person who said no	0.40	0.22	3.15	[0.49, 2.12]	0.01**
Unprotected sex	0.38	0.49	0.60	[−0.58, 1.34]	0.44
Interpersonal					
Exhibitionism	1.55	0.65	4.51	[0.02, 2.65]	0.03*
Exploitation	0.29	0.23	1.46	[−0.18, 0.75]	0.23
No volunteerism	0.35	0.30	1.36	[−0.24, 0.95]	0.24
Estrangement	1.60	0.75	4.49	[0.12, 3.08]	0.03*
Interactions					
SA * Exhibitionism	−0.60	0.25	2.59	[−0.35, −0.02]	0.03*
SA * Exploitation	0.27	0.26	0.86	[−0.85, 0.29]	0.31
SA * No volunteerism	0.30	0.37	0.63	[−0.34, 1.21]	0.43
SA * Estrangement	−1.32	1.01	2.78	[−3.30, −0.01]	0.04*

*
$p < 0.05$,

**
$p < 0.01$;

*I*LR, likelihood ratio.