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Childhood Traumatic Experiences and Receptive Anal Intercourse among Women

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Abstract

Context.—Receptive anal intercourse (RAI) has become an increasingly common sexual behavior among U.S. heterosexual women. However, it is linked to STI/HIV when unprotected and coercive. Further, traumatic experiences may increase sexual risk behavior and STI/HIV risk, but the relationship with RAI among women has not been explicitly examined.

Methods.—Using data from female participants from Waves I (1994–95), III (2001–02), and IV (2007–08) of the National Longitudinal Study of Adolescent to Adult Health (N=4,876), we examined associations between self-reported traumas before the age of 18 (neglect; emotional, physical and sexual abuse; parental binge drinking and incarceration; and witnessing, being threatened with, and experiencing violence) and cumulative number experienced, and RAI during adulthood using modified Poisson regression. We also explored the degree to which depression, self-esteem, drug use, relationship factors, and sex trade may explain the trauma-RAI relationship.

Results.—Forty percent of the sample reported receptive anal intercourse. After adjustment for sociodemographics, seven of the nine childhood traumas were significantly associated with RAI; the strongest was experience of violence. Each unit increase in the number of traumas yielded a 16% increase in RAI prevalence. In exploratory mediation analyses, only drug use and relationship factors very slightly attenuated the association between childhood trauma and RAI.

Conclusion.—Women with a history of childhood trauma may be at increased risk of engaging in anal intercourse, signaling the importance of screening and trauma-informed education in sexual health settings. Pathways linking childhood trauma to later RAI among women are complex and warrant further research.

Introduction

HIV persists as a critical public health concern in the United States (U.S.). In 2016, women in the U.S. accounted for approximately 20% of incident HIV cases, with approximately 80% of those cases attributed to heterosexual sexual contact.[1] Receptive intercourse, both vaginal and anal, results in a higher risk of HIV infection compared to insertive intercourse,

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with receptive anal intercourse (RAI) conferring the greatest risk[2] for the receptive partner whether they are male or female.[3] Compared to the vagina, the anus is more vulnerable to abrasions during sex, which facilitates infection transmission,[4] and its mucosa lacks immune barriers to protect against potential infection.[5] While there is evidence to support the role RAI plays in HIV risk for gay and bisexual men,[6] it may also play a critical role in driving the heterosexual HIV epidemic, including among women.[7] Other sexually transmitted infections (STI) such as chlamydia and gonorrhea are also prevalent among women reporting engaging in anal intercourse.[8–10] The prevalence of anal intercourse among heterosexual women with male partners has increased over the past decade[11] with evidence to suggest condom usage during is rare and that many erroneously believe risk of infection is lower with anal compared to vaginal intercourse.[12] Engagement in consensual and safe anal intercourse is not a behavior in need of reduction or prevention. However, given the link between RAI and STI/HIV, there is critical need to elucidate drivers of RAI among women to identify targets for education and STI/HIV testing.

A broad range of childhood traumatic experiences, including abuse, household dysfunction, and violence exposure, as well as the cumulative number of traumatic experiences, have been linked to sexual risk behaviors and STI among women.[13–17] However, in many of these studies, if included at all, receptive anal intercourse is not examined separately but typically combined with vaginal intercourse to assess overall sexual risk behaviors such as condomless sex or number of partners[18] among women. This is true as well for the few studies that have explored mediating pathways in the relationship between childhood trauma and STI/HIV-related sexual risk behavior, which also often focus solely on pathways from abuse and neglect.[19–21] Engagement in receptive anal intercourse may be a particularly salient STI/HIV correlate for women with a history of a broad range of childhood traumatic experiences and has not yet been thoroughly examined.

The pathways from childhood traumatic experiences to later sexual behavior, including anal intercourse, are not well established. The extant conceptual models have focused primarily on sexual abuse, such as the traumagenic dynamics framework which posits abuse may negatively impact development of relationship dynamics, self-esteem, and mental health, and that these factors may then shape sexual behavior.[22] In numerous empirical studies conducted in a variety of populations, sexual abuse as well as other childhood traumatic experiences have documented strong associations with depression,[23] drug use,[16] relationship dynamics and intimate partner violence,[24] and sex trade involvement.[25] In turn, these factors are strong correlates of receptive anal intercourse among women,[26–31] suggesting their potential as pathways linking trauma to later RAI. Specifically, in a sample of young women living in an inner-city neighborhood in Brooklyn NY, those reporting their partner mostly takes the lead in deciding how and when they have sex were three times more likely to report engaging in unprotected RAI in the past year.[31] Similarly, in a sample of female university students, more than half of those who engaged in RAI reported the primary reason was for their partner's pleasure and that it was "always" their partner who decided to have RAI.[32] Qualitative studies of women's motivations for engagement in RAI have also described feelings of coercion from their partners.[27–30] Moreover, depression and low self-esteem are associated with reduced relationship power and sexual decision-making among women,[33,34] and both are independently linked to sexual risk behaviors, including RAI.[35] Women who

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exchange sex may be particularly vulnerable to RAI, as drug use and poor mental health are prevalent in this population and these women often lack sexual decision-making power.[36,37]

To expand our understanding of the influence of childhood traumatic experiences on STI/HIV risk among women, we examined the independent associations between nine forms of childhood traumas, as well the cumulative burden of trauma, and later engagement in receptive anal intercourse in a nationally-representative sample of women. Guided by conceptual models such as the traumagenic dynamics framework[22] and empirical research linking childhood trauma to later sexual risk behavior,[19,20,38] we also explored the relationships among childhood trauma and the factors we hypothesized may play a role in engaging in RAI among women, including depression, self-esteem, drug use, relationships factors, and sex trade involvement.

Methods

Study Sample

We conducted a secondary data analysis study using the National Longitudinal Study of Adolescent to Adult Health (Add Health); Add Health has been described in-depth elsewhere.[39,40] In brief, Add Health is a U.S. nationally-representative longitudinal study of approximately 20,000 individuals drawn from a random stratified sample of middle and high schools in 1994–1995 (Wave I). At that time and in three additional waves of data collection (Wave II 1996; Wave III 2001–2002; Wave IV 2007–2008), participants responded to an in-home interview regarding numerous topics including childhood traumatic experiences, drug use, sexual behaviors, and sociodemographics. At Wave I, a parent of the respondent also completed an in-home interview. The analytic sample in the present study uses data from female participants who responded to and had valid sample weights and complete data for the study measures at Waves I, III, and IV. This resulted in an analytic sample of 4,876 out of the original 6,684 female participants with survey weights at Waves I, III, and IV; the greatest sources of data loss were due to participants not having a parent participate in the Wave I parent interview (N=939) and/or not having complete data for all nine childhood traumatic indicators that comprised the cumulative trauma measure (N=1,410). Female participants were not excluded on the basis of sexual experience, as the vast majority (97%) had engaged in some form of sexual activity (e.g., vaginal and/or oral) by Wave IV. The NYU School of Medicine considered this analysis of de-identified data to be non-human subjects research.

Measures

Childhood traumas.—We measured nine dichotomous indicators of self-reported traumas experienced before the age of 18 assessed during Waves I, III, and/or IV in-home interviews. Neglect was based on two items measured at Wave III, defined as having been left alone when an adult should have been present and/or not having basic needs met six or more times by 6th grade. Emotional abuse was measured at Wave IV and defined as a parent/adult caregiver said hurtful things or made respondent feel unloved six or more times before the age of 18. Physical abuse defined as having been slapped, hit, kicked, and/or thrown by parent/adult caregiver six or more times, reported at Wave III as having occurred by 6th

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grade and/or Wave IV as having occurred before the age of 18. The categorization of "six or more times" was chosen in order to align with the Adverse Childhood Experiences (ACE) study, in which participants were considered to have experienced these forms of trauma if they reported they had happened "often."[41] Add Health's response scale was based on the frequency of the experiences, with options of never, once, twice, three to five times, six to ten times, and more than ten times; hence we dichotomized at six or more, as other Add Health studies have done,[42,43] in an attempt to capture a similar level to "often" in the ACE study.

Sexual abuse was defined as a parent/adult caregiver touched or made the respondent touch them in a sexual manner or forced sexual relations at least once, reported as by 6th grade at Wave III and/or before 18 at Wave IV. Parental incarceration before the age of 18 was based on respondent report at Wave IV of a biological mother/father and/or mother/father figure having spent time in jail/prison, and if so, the age at which the parent was first incarcerated. Parental binge drinking was based on parent report at the Wave I parent interview of drinking five or more alcohol drinks on one occasion at least once in the past month. The three exposure to violence indicators were all measured at the Wave I participant interview and regarding the past twelve months. Witnessed violence was defined as saw someone shot or stabbed; threatened with violence was defined as another person pulled a knife and/or gun on the respondent; and experienced violence was defined as the respondent report of having been shot or cut/stabbed. We created an indicator of the cumulative number of traumas by summing each of the nine dichotomous indicators and categorized this into no trauma, one trauma, two traumas, and three or more traumas.

Receptive Anal Intercourse (RAI).—At Wave IV, participants reported if they had ever had anal intercourse, defined to them as "when a man inserts his penis into his partner's anus or butt hole", and if so, the age at which they first engaged in anal intercourse. We used these two items to measure RAI among female participants after the age of 18, to ensure that the outcome did not precede the childhood trauma. Participants were coded as not experiencing the outcome of RAI if they responded "no" to that questionnaire item and were coded as having experienced the outcome if they responded "yes" to having anal intercourse and reporting that is occurred for the first time after the age of 18 years; participants who reported engaging in anal intercourse before the age of 18 were coded as missing.

Hypothesized Mediators.—Unless otherwise noted, the hypothesized mediators were measured at the Wave III interview. Depression was measured based on nine items from the Centers for Epidemiologic Studies-Depression scale,[44] on which responses were summed and dichotomized at scores greater than or equal to ten to indicate depression. Self-esteem was based on summing four items from the Rosenberg scale coded so that higher scores indicated lower self-esteem,[45] which we dichotomized at the median to capture low self-esteem. Drug use was defined as self-reported use of marijuana, cocaine, methamphetamine use, and/or prescription pain reliever misuse in the past twelve months. Two forms of lifetime intimate partner violence were assessed at Wave IV: physical, defined as report of partner threatening violence, shoving, pushing, throwing something, slapped, hitting, or kicking the respondent; and sexual, defined as report of partner insisting on or making the

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respondent have sexual relations when she did not want to. At Wave IV, participants reported if they had ever been forced through non-physical means (e.g., threats, verbal pressure) to have sexual activity against her will, and if so, the age at which this occurred, and we created an indicator of pressured to have sex after the age of 18; those reporting having been pressured before the age of 18 were coded as missing. Sex with partners who use injection drugs was defined as reporting having ever had sex with a partner who takes/shoots street drugs with a needle. Sex trade involvement was defined as reporting buying and/or selling sex in the past twelve months.

Sociodemographic Characteristics.—We considered the following characteristics as potential confounders: age; race/ethnicity, categorized as non-Hispanic white, non-Hispanic Black, Hispanic, and other; poverty during adolescence, based on the parent report at the Wave I interview of being unable to pay housing and/or utility bills; and educational attainment at Wave IV, categorized as less than high school, high school/GED, and greater than high school.

Analyses

Analyses were conducted in Stata version 14 (College Station, TX: StataCorp LP) using survey commands and the sampling weight for eligible Wave I participants who were interviewed at Wave III and IV, in order to account for the complex study design. We followed Add Health analytic guidelines by creating a subpopulation to restrict analyses to females with complete data for all indicators given we were using multiple waves of data in the analysis.[46] We measured the prevalence of reported engagement in anal intercourse by each sociodemographic factor and by each hypothesized mediating factor. Given that the outcome of receptive anal intercourse was relatively common, we used modified Poisson regression with robust variance to estimate the prevalence ratios (PR) and 95% confidence intervals (CI) for associations between each form of trauma as well as the categorical indicator of the cumulative number of traumas and adulthood RAI.[47] In all adjusted models, we controlled for the aforementioned sociodemographic characteristics. We conducted similar analyses to estimate associations between the categorical number of traumas and hypothesized mediators, and between the hypothesized mediators and engagement in RAI. We explored the potential for mediation by additionally including the hypothesized mediators individually in the models adjusted for the sociodemographic factors and interpreted attenuation of the estimate obtained from those models relative to the adjusted model that did not include the mediator to suggest potential mediation. Because there was a relatively dose-response relationship between the number of traumas and RAI, as well as with the hypothesized mediators and RAI, we assessed mediation treating the number of traumas as an ordinal variable in the model, to be interpreted at the percent increase in the prevalence of RAI for each unit increase in the number of childhood traumas experienced.

Results

Receptive Anal Intercourse, Sociodemographics, and Trauma

Approximately 40% of women reported engaging in receptive anal intercourse after the age of 18 by adulthood (ages 24–34). Engagement in RAI did not differ by age or poverty during

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adolescence (Table 1). Among Black women, 349 (32%) reported RAI versus 1131 (41%) of White women, which corresponded to a prevalence ratio (PR) of 0.79. Increasing educational attainment was associated with greater prevalence of RAI, while age and poverty did not appear associated.

Nine individual childhood traumas were evaluated for associations with RAI. For each form of childhood trauma, the prevalence of RAI was higher among those who experienced the trauma compared to those who did not. For example, 1643 (47%) of women who had experienced neglect reported engaging in anal intercourse compared to 256 (39%) who did not experience neglect, corresponding to an unadjusted PR of 1.21 demonstrating increased prevalence of RAI associated with childhood neglect. In models adjusted for sociodemographics, all forms of trauma were independently associated with the outcome, with the exception of parental binge drinking whose confidence interval crossed the null. Experiencing violence demonstrated the strongest association, with women experiencing violence during childhood having an approximately 50% increase in prevalence of RAI compared to women with no history of experiencing violence [adjusted prevalence ratio (APR) 1.54]. The prevalence of anal intercourse was approximately 35% among women who reported no history of childhood trauma. Compared to those with no childhood trauma, those who experienced one trauma had a 19% increase in the prevalence of RAI and those who experienced three or more had an almost 60% increase in prevalence (APR 1.58).

Cumulative Trauma and Mediators

The prevalence of the hypothesized mediators seemed to increase in a dose-response relationship with the cumulative number of traumatic experiences (Table 2). Among women with no history of trauma, the prevalence of depression was approximately 9% whereas approximately one-quarter of women who had experienced three or more traumas reported depression. The prevalence of both physical and sexual IPV was approximately two times higher among women with a history of childhood trauma, in which approximately 13% of women with no trauma reported physical IPV versus 29% who reported three or more traumatic experiences. The association between trauma and sex with partners who use injection drugs was relatively weak, with only the highest level of childhood traumas demonstrating a strong point estimate, though it was not statistically significant at the $p<0.05$ level (APR 1.81). Based on the point estimates, the hypothesized mediator with the strongest association with childhood trauma was sex trade involvement; compared to the approximately 1% prevalence among those with no trauma, the prevalence of sex trade involvement was approximately 3% among those who experienced one trauma, corresponding to over twice the prevalence (APR 2.26) and the prevalence was 4.5% among those who experienced three or more traumas corresponding to over four times the prevalence (APR 4.18).

Mediators and Anal Intercourse

The majority (5 of the 8) of the hypothesized mediators were associated with receptive anal intercourse in adjusted models (Table 3), with the exception of low self-esteem, sexual IPV, and sex trade involvement which all had relatively weak point estimates and were not significantly associated. Reporting having been pressured to have sex and sex with partners

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who use injection drugs demonstrated the strongest association with RAI, in which both had an approximately 60% increase in the prevalence.

Mediation between Trauma and RAI

After adjustment for sociodemographics, each unit increase in the number of childhood traumatic experiences was associated with a 16% increase in the prevalence of anal intercourse among females (APR 1.16, 95% CI: 1.12 – 1.21 p<0.0001; data not shown in tables). When additionally adjusting for each individual hypothesized mediator, there was essentially no attenuation in the association between childhood trauma and RAI, suggesting our hypothesized factors did not meaningfully mediate the relationship. Specifically, inclusion of depression, low self-esteem, sexual IPV, sex with partners who use injection drugs, and sex trade involvement all demonstrated prevalence ratios of 1.16. Only drug use, physical IPV, and pressured to have sex reduced the association, albeit only very slightly to a 15% increase in prevalence of RAI for each unit increase in trauma (APR 1.15). When all hypothesized mediators were included in the model, the association was attenuated to a 12% increase in the prevalence of RAI for each increase in the number of childhood traumas (APR 1.12, 95% CI: 1.07 – 1.18 p<0.0001).

Discussion

In this U.S. nationally-representative sample of women, engagement in receptive anal intercourse after the age of 18 was quite common, with a prevalence of approximately 35% among women who had not experienced any childhood trauma. Those with a history of a wide range of childhood traumatic experiences reported a higher prevalence of RAI and there was a dose-response relationship between the cumulative number of traumas and RAI. While engaging in anal intercourse is not in itself a behavior in need of prevention and is frequently described as enjoyable for women,[12,48] when RAI takes place in the context of trauma, coercion, and reduced sexual autonomy, the risk of STI/HIV is likely increased and hence is a significant public health issue.[49–51] Our exploratory analyses indicated only very weak potential mediation in the trauma-RAI link by physical IPV, having been pressured to have sex, and drug use. Our findings suggest women with a history of childhood traumatic experiences may have increased prevalence of engaging in anal intercourse and that while relationship factors and drug use may be potential pathways, the pathways are likely complex and warrant further research.

Prior studies, including those conducted by our team, have documented robust associations between childhood traumatic experiences and later sexual risk behavior.[13,14,16,17,20] Research suggested increased prevalence of RAI among males and females with a history of physical and sexual abuse[20,21] and our findings build upon these previous studies by describing associations between anal intercourse and other prevalent yet understudied forms of childhood trauma, such as parental incarceration and experiencing violence, which were as strong if not stronger than associations seen with the more well-studied traumas such as sexual and physical abuse. Women with a broad range of childhood traumatic experiences are a priority population for screening and education regarding safer sexual behavior, including RAI given its efficiency to transmit STI including HIV.

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We found moderate to strong associations between childhood trauma and relationship factors, such as IPV and having been pressured to have sex, which were in turn associated with increased prevalence of RAI. In our exploratory analysis, these were some of the only factors to suggest playing a role in the trauma-RAI relationship, albeit very weakly. This is similar to findings from one of the few prior studies to assess mediation, which highlighted young adulthood risky relationships, defined based on aspects of instability (e.g., non-monogamy), as the strongest pathway from trauma to anal intercourse.[20] In the context of traumagenic dynamics framework, this suggests that the relationship factors linking childhood trauma to later RAI may be more subtle than the measures we used that were defined based on violence and coercion. Indeed, in qualitative studies of motivations for engaging in anal intercourse, coercion and force are far less frequently described compared to wanting to please their partner.[27,48] However, drug use, either in exchange sex or a means of coping with discomfort, is another oft-cited reason for engaging in RAI,[27] and this was the only other hypothesized mediator that appeared to partially explain the childhood trauma-RAI link in our analysis. Considering that drug use in the context of sex is associated with lack of condom use and other STI/HIV risk factors,[52–54] alcohol and drug use may be important targets for intervention for women with a history of trauma as well as for those who engage in RAI in order to reduce STI/HIV risk.

Irrespective of childhood traumatic experiences, engagement in anal intercourse was frequently reported by the young adult women in this study, closely mirroring estimates from other nationally-representative U. S. samples, in which approximately one-third of women report having had anal intercourse.[55,56] Also similar to these prior studies are our findings that the prevalence of reporting RAI was higher among non-Hispanic white women and among women with higher levels of education. Specifically, in the 2013 National HIV Behavioral Surveillance survey, approximately 30% of Black women reported anal intercourse compared to 40% of white women,[55] and in the 2006–2008 National Survey of Family Growth, 32% of women with less than a high school education reported RAI while the prevalence was approximately 39% across the higher education levels.[26,56] These differences in reporting anal intercourse could reflect cultural differences and preferences[57] or could reflect perceived norms and stigma surrounding the behavior.[48] This perceived stigma around anal intercourse, as well as other sensitive topics in this study, could lead to social desirability bias, though the use of audio computer-assisted self-interview surveys such as those in Add Health increases the accuracy of reporting for sensitive topics such as sexual behavior.[58] Considering the prevalence of anal intercourse and a lack of knowledge regarding its potential risk for STI/HIV, there is need to reduce stigma regarding this common sexual behavior to encourage an open dialogue between women, their partners, and their sexual health care providers.

Our study has important limitations. The measures used are all self-reported and subject to recall bias, including for traumas defined based on the number of times they occurred. However, this is likely non-differential and thus would have biased estimates towards the null. While we found significant associations between trauma and our hypothesized mediators and between our hypothesized mediators and RAI, our exploratory analysis did not suggest substantial mediation. This could be due to insensitive measurement of the mediators, such as relationship dynamics based on violence rather than quality/stability, or

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issues with temporality; while we were able to measure childhood trauma occurring before the age of 18 and RAI engagement occurring after the age of 18, we were not able to establish the timing of some mediators. Further, there is potentially overlap between some of our mediators; for example, one could report feeling pressured to have sex by an intimate partner, thus coinciding with reporting sexual IPV. However, given the only other research assessing mediation between childhood trauma and RAI is entirely cross-sectional, we believe our findings add to the literature and we hope will spur future research in longitudinal samples that can more rigorously ascertain temporality among these factors and use other methods to assess mediation, as ours was relatively conservative. Our analytic sample, while drawn from a large national dataset, includes only the women who participated in the three waves of data collection and provided data on all of our measures. We found that the women retained in our analysis were more likely to be White and have higher education levels, and less likely to have experienced poverty; Add Health has also reported differential attrition based on these factors.[59] This, combined with Add Health's use of a school-based cohort, could limit the generalizability of our findings and potentially bias our findings, though our estimates of prevalence of childhood trauma and anal sex engagement are very similar to estimates from other representative cohorts. Finally, our indicator of RAI did not include whether it was protected, which is what would lead to increased STI/HIV acquisition risk. We also could not examine women's specific experiences and perceptions surrounding the RAI event(s), such as pleasure or consent, or the context of relationships in which women had anal intercourse. Future research should examine the context surrounding RAI, including whether specific aspects of women's relationships may influence engagement and if those vary in association with childhood traumatic experiences.

In conclusion, this study is among the first to document a strong dose-response relationship between childhood traumatic experiences and receptive anal intercourse during adulthood among women, with diverse types of traumas associated with increased prevalence. Given RAI is a correlate of STI/HIV for women, sexual health providers should screen for anal intercourse engagement. Identification of anal intercourse may warrant trauma screening and potential treatment given anal intercourse may constitute a form of revictimization in order to promote safety and empowered sexual decision-making, and reduce potential STI/HIV risk.

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Table 1.

Associations between Individual Traumatic Experiences and the Cumulative Number of Traumatic Experiences with RAI after the Age of 18 among Women (N=4,876)

	N (%) Engaged in RAI After Age 18 within Each Category of Childhood Trauma	PR (95% CI)	APR (95% CI)
Childhood Traumatic Experiences			
Neglect			
No	1643 (38.8)	Ref	Ref
Yes	256 (47.0)	1.21 (1.06 – 1.39) **	1.21 (1.06 – 1.38) **
Emotional Abuse			
No	1496 (38.0)	Ref	Ref
Yes	403 (47.5)	1.25 (1.14 – 1.37) ***	1.24 (1.13 – 1.35) ***
Physical Abuse			
No	1644 (38.5)	Ref	Ref
Yes	255 (50.0)	1.30 (1.14 – 1.48) ***	1.29 (1.13 – 1.47) ***
Sexual Abuse			
No	1684 (38.4)	Ref	Ref
Yes	215 (53.2)	1.38 (1.22 – 1.56) ***	1.40 (1.24 – 1.59) ***
Parental Binge Drinking			
No	1674 (39.4)	Ref	Ref
Yes	225 (42.9)	1.09 (0.95 – 1.24)	1.10 (0.96 – 1.26)
Parental Incarceration			
No	1667 (38.8)	Ref	Ref
Yes	232 (49.2)	1.27 (1.12 – 1.45) ***	1.32 (1.16 – 1.51) ***
Witnessed Violence			
No	1726 (39.4)	Ref	Ref
Yes	173 (44.0)	1.12 (0.97 – 1.23)	1.17 (1.01 – 1.36) *
Threatened with Violence			
No	1764 (39.3)	Ref	Ref
Yes	135 (48.5)	1.23 (1.05 – 1.45) *	1.28 (1.09 – 1.51) **
Experienced Violence			

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	N (%) Engaged in RAI After Age 18 within Each Category of Childhood Trauma	PR (95% CI)	APR (95% CI)
No	1819 (39.2)	Ref	Ref
Yes	80 (59.8)	1.52 (1.29 – 1.80) ***	1.54 (1.29 – 1.82) ***
Cumulative Number of Traumas			
No Trauma	838 (34.9)	Ref	Ref
One Trauma	543 (41.0)	1.18 (1.05 – 1.31) **	1.19 (1.07 – 1.34) **
Two Traumas	286 (46.3)	1.33 (1.18 – 1.49) ***	1.36 (1.21 – 1.53) ***
Three or More Traumas	232 (53.5)	1.53 (1.35 – 1.74) ***	1.58 (1.39 – 1.80) ***
Sociodemographics			
	N (%) Engaged in RAI After Age 18 within Each Category of Sociodemographics	**PR (95% CI)**	**APR (95% CI)**
Age at Wave IV			---
24–27 Years	483 (38.0)	Ref	
28–30 Years	1093 (42.4)	1.12 (1.00 – 1.26)	
31 or Older	323 (35.4)	0.93 (0.79 – 1.10)	
Race/Ethnicity			---
White	1131 (40.9)	Ref	
Black	349 (31.9)	0.79 (0.65 – 0.93) *	
Hispanic	287 (46.2)	1.13 (0.99 – 1.28)	
Other	132 (35.1)	0.86 (0.70 – 1.04)	
Poverty at Wave I			---
No	1553 (39.6)	Ref	
Yes	346 (40.8)	1.03 (0.92 – 1.15)	
Education at Wave IV			---
Less than High School	87 (30.5)	Ref	
High School/GED	247 (44.0)	1.44 (1.10 – 1.88) **	
Greater than High School	1565 (39.8)	1.30 (1.02 – 1.66) *	

Abbreviations: RAI = Receptive Anal Intercourse; PR = Prevalence Ratio; APR = Adjusted Prevalence Ratio; CI = Confidence Interval

* p≤0.05;

** p≤0.01;

*** p≤0.001

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Table 2.

Associations between the Cumulative Number of Childhood Traumatic Experiences and Hypothesized Mediators among Women (N=4,876)

	N (%) Reporting the Hypothesized Mediator within Each Category of Childhood Trauma	PR (95% CI)	APR (95% CI)*
Depression			
No Trauma	229 (8.7)	Ref	Ref
One Trauma	204 (14.6)	1.69 (1.29 – 2.20) ***	1.58 (1.21 – 2.06) ***
Two Traumas	96 (16.1)	1.85 (1.45 – 2.37) ***	1.75 (1.34 – 2.27) ***
Three or More Traumas	121 (25.1)	2.89 (2.24 – 3.73) ***	2.54 (1.95 – 3.32) ***
Low Self-Esteem			
No Trauma	1144 (47.2)	Ref	Ref
One Trauma	687 (53.0)	1.12 (1.02 – 1.23) *	1.16 (1.06 – 1.27) **
Two Traumas	326 (54.4)	1.15 (1.04 – 1.28) **	1.20 (1.08 – 1.32) ***
Three or More Traumas	280 (60.0)	1.27 (1.14 – 1.41) ***	1.30 (1.17 – 1.44) ***
Drug Use in Past Year			
No Trauma	765 (32.6)	Ref	Ref
One Trauma	513 (40.2)	1.23 (1.09 – 1.39) ***	1.28 (1.13 – 1.44) ***
Two Traumas	269 (44.2)	1.36 (1.18 – 1.57) ***	1.43 (1.24 – 1.64) ***
Three or More Traumas	225 (47.0)	1.44 (1.23 – 1.69) ***	1.49 (1.28 – 1.74) ***
IPV (Hit/Shoved)			
No Trauma	306 (12.5)	Ref	Ref
One Trauma	266 (20.1)	1.61 (1.34 – 1.94) ***	1.49 (1.24 – 1.81) ***
Two Traumas	136 (20.9)	1.67 (1.29 – 2.17) ***	1.58 (1.21 – 2.03) ***
Three or More Traumas	147 (29.3)	2.35 (1.87 – 2.95) ***	2.06 (1.63 – 2.60) ***
IPV (Sexual)			
No Trauma	97 (3.2)	Ref	Ref
One Trauma	73 (6.0)	1.87 (1.23 – 2.85) **	1.71 (1.13 – 2.57) *
Two Traumas	32 (5.0)	1.57 (0.89 – 2.76)	1.43 (0.91 – 2.51)
Three or More Traumas	56 (12.0)	3.73 (2.43 – 5.70) ***	3.20 (2.06 – 4.98) ***
Pressured to Have Sex			

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	N (%) Reporting the Hypothesized Mediator within Each Category of Childhood Trauma	PR (95% CI)	APR (95% CI)*
No Trauma	219 (9.6)	Ref	Ref
One Trauma	126 (10.9)	1.14 (0.86 – 1.51)	1.23 (0.92 – 1.63)
Two Traumas	77 (14.4)	1.51 (1.14 – 2.01) **	1.63 (1.24 – 2.15) ***
Three or More Traumas	76 (22.2)	2.31 (1.79 – 2.99) ***	2.59 (2.00 – 3.34) ***
Sex with Partners who Use Injection Drugs			
No Trauma	34 (1.4)	Ref	Ref
One Trauma	23 (1.7)	1.17 (0.61 – 2.26)	1.16 (0.60 – 2.24)
Two Traumas	11 (1.7)	1.18 (0.48 – 2.93)	1.15 (0.44 – 2.99)
Three or More Traumas	12 (2.9)	2.00 (0.97 – 4.13)	1.81 (0.85 – 3.85)
Sex Trade Involvement			
No Trauma	24 (0.9)	Ref	Ref
One Trauma	29 (2.6)	2.82 (1.46 – 5.47) **	2.26 (1.20 – 4.27) *
Two Traumas	22 (3.3)	3.62 (1.75 – 7.50) ***	2.82 (1.40 – 5.67) **
Three or More Traumas	21 (4.5)	5.01 (2.38 – 10.53) ***	4.18 (2.01 – 8.69) ***

Abbreviations: RAI = Receptive Anal Intercourse; PR = Prevalence Ratio; APR = Adjusted Prevalence Ratio; CI = Confidence Interval; IPV = Intimate Partner Violence

* p≤0.05;

** p≤0.01;

*** p≤0.001

Note: No traumatic experiences were reported by 53.9% of participants; one trauma reported by 27.0%; 2 traumas reported by 11.7%; and three or more by 7.5%

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Table 3.

Associations between Hypothesized Mediators and RAI after the Age of 18 among Women (N=4,876)

	N (%) Reporting RAI within Each Category of the Hypothesized Mediator	PR (95% CI)	APR (95% CI)
Depression			
No	1603 (38.8)	Ref	Ref
Yes	291 (46.9)	1.21 (1.07 – 1.37) **	1.24 (1.09 – 1.40) ***
Low Self-Esteem			
No	913 (38.2)	Ref	Ref
Yes	986 (41.3)	1.08 (0.99 – 1.18)	1.07 (0.98 – 1.17)
Drug Use in Past Year			
No	1041 (35.0)	Ref	Ref
Yes	851 (47.6)	1.36 (1.25 – 1.48) ***	1.35 (1.24 – 1.47) ***
IPV (Hit/Shoved)			
No	1487 (37.7)	Ref	Ref
Yes	412 (49.9)	1.32 (1.18 – 1.49) ***	1.36 (1.21 – 1.52) ***
IPV (Sexual)			
No	1782 (39.6)	Ref	Ref
Yes	117 (43.7)	1.10 (0.90 – 1.36)	1.14 (0.92 – 1.40)
Pressured to Have Sex			
No	1346 (35.4)	Ref	Ref
Yes	274 (56.4)	1.59 (1.42 – 1.78) ***	1.58 (1.42 – 1.76) ***
Sex with Partners who Use Injection Drugs			
No	1837 (39.4)	Ref	Ref
Yes	55 (64.2)	1.63 (1.30 – 2.03) ***	1.58 (1.27 – 1.96) ***
Sex Trade Involvement			
No	1856 (39.9)	Ref	Ref
Yes	42 (42.7)	1.07 (0.81 – 1.42)	1.15 (0.87 – 1.52)

Abbreviations: RAI = Receptive Anal Intercourse; PR = Prevalence Ratio; APR = Adjusted Prevalence Ratio; CI = Confidence Interval; IPV = Intimate Partner Violence

* p≤0.05;

** p≤0.01;

***p≤0.001

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