Childhood Physical Neglect and STI Risk in Young Adulthood

Childhood maltreatment is associated with a number of health consequences in adolescence and young adulthood. Recent estimates based on retrospective reports from a nationally representative sample of young adults indicate that individuals with a history of maltreatment are more likely to report violence perpetration, drug use, binge drinking, depression, overweight, and fair/poor general health.[1] Maltreatment has also been associated with sexual victimization, inconsistent contraceptive use, and greater numbers of sexual partners in community samples.[2-4]

Despite its apparent association with sexual risk behavior, evidence on the relationship between childhood maltreatment and sexually transmitted infections (STIs) in adolescence and adulthood is mixed. Existing literature suggests that maltreatment, particularly sexual abuse, elevates STI risk.[2, 3, 5-7] However, such findings are based upon non-probability samples and generally rely upon self-reported STI status as their outcome variable. Those studies that employ test-identified measures of STI status tend to report diminished or non-significant associations between maltreatment and STIs (although it is also important to note that test-identified and self-reported STI status do not necessarily measure the same thing, since test-identified measures only capture current STIs). [8, 9]

Neglect is the most common[1, 10, 11] but least studied[12] form of child maltreatment. In comparison with other types of maltreatment, much less is known about the developmental and health-related consequences of childhood neglect.[12] The "neglect of neglect"[13, 14] is particularly problematic given that its consequences are at least as severe as those associated with physical and sexual abuse.[15] Because of its typically chronic nature, early childhood neglect may predict negative developmental and health outcomes not associated with other maltreatment types.[16-19] Research on the association between childhood neglect and reproductive health outcomes in young adulthood is particularly limited.[12] For example, a recent analysis using a nationally representative sample found that history of childhood physical or sexual abuse did not increase the likelihood of testing positive for an STI during young adulthood, but did not consider the relationship between STI status and neglect.[9]

The overall goal of this paper is to examine the association between childhood neglect and STI status in young adulthood by addressing the following research questions:

1) What is the association between STI status in young adulthood and childhood neglect, after controlling for other forms of child maltreatment? Is this association similar to that seen between maltreatment and physical or sexual abuse (controlling for neglect)?
2) Do patterns of association between neglect and STI status vary by age, race/ethnicity and biological sex?
3) If an association between neglect and STI status in young adulthood exists, to what extent does condom use or number of sexual partners mediate this relationship?

These analyses will extend existing research by using a national probability sample to obtain population-level estimates; employing both self-reported and test-identified measures of STI status; and distinguishing between four different types of maltreatment, including neglect, to examine the effect of each after controlling for other maltreatment histories.

Methods

Sample

Data are drawn from Waves I and III of the National Longitudinal Study of Adolescent Health (Add Health), a national probability sample of US adolescents in grades 7-12 in 1994-1995. Schools serve as the primary sampling unit in the Add Health design. Eighty high schools were selected with unequal probability of selection using a stratification scheme based on the Quality Education Database. For each high school, a feeder middle school was also selected with probability proportional to its contribution to the high school student

population. All students from participating schools who were present on the day of survey administration were eligible to complete in-school questionnaires.

From the in-school sample of over 90,000 students, 20,745 respondents (drawn from the population of all students on the school rosters and all students who completed the in-school questionnaire) were selected to complete a ninety minute Wave I in-home questionnaire. Wave III in-home interviews were completed between 2001 and 2002 for 15,197 respondents between the ages of 18 and 26. The analytic sample for the present study consists of respondents who were interviewed at Wave I and Wave III, had a valid Wave III sample weight, and who had complete data on all variables used in present analyses (n=10,059).

Measures

Outcome variables for this analysis consist of two dichotomous measures of STI status. At Wave III, respondents were asked to provide a specimen of first stream urine for STI testing. These specimens were analyzed for the presence of *C. trachomatis, N. gonorrhoeae*, and *T. vaginalis*. Tests used ligase chain reaction (LCR) to detect the presence of *C. trachomatis,* and *N. gonorrhoeae* DNA. PCR-ELISA tests were used to detect *T. vaginalis* DNA. Individuals with positive results on one or more STIs are given a value of 1 on the STI test variable while those with negative results on all three STIs receive a value of 0. Individuals who are missing data on any single STI are categorized as missing. In the Wave III in-home survey, respondents also reported whether or not they had been told by a doctor or nurse that they had *C. trachomatis, N. gonorrhoeae*, or *T. vaginali* in the past twelve months. Responses for the STI self-report variable are coded using the same coding scheme as for the STI test variable.

The primary predictor variable, exposure to childhood maltreatment, was assessed retrospectively at Wave III using responses to four questions on physical assault, contact sexual abuse, supervision neglect, and physical neglect. These measures were modified versions of items from prior surveys[10, 20] and were administered using computer-assisted self-interviewing. The following statement preceded questions regarding abuse and neglect: "The next set of questions is about your parents or other adults who took care of you before you were in 6th grade. How often had each of the following things happened by the time you started 6th grade?" Specific types of maltreatment were assessed as follows. *Supervision neglect*: "By the time you started 6th grade, how often had your parents or other adult care-givers left you home alone when an adult should have been with you?" *Physical neglect*: "How often had your parents or other adult care-givers not taken care of your basic needs, such as keeping you clean or providing food or clothing?" *Physical assault*: "How often had one of your parents or other adult care-givers slapped, hit, or kicked you?" *Contact sexual abuse*: "How often had one of your parents or other adult care-givers touched you in a sexual way, forced you to touch him or her in a sexual way or forced you to have sexual relations?" Responses to each question are dichotomized (1=this type of maltreatment happened; 0=this type of maltreatment never happened).

Potential mediators of the relationship between child maltreatment and STI status consist of two measures of sexual risk behavior: number of partners in the past 12 months and condom use in the past 12 months. Respondents are classified as having zero, one, two to three, or four or more partners in the last twelve months. Those who reported having had intercourse in the last year were asked on how many occasions they or their partner used a condom. Responses are categorized as using condoms sometimes, none of the time, or all the time. For the purposes of this analysis, virgins are coded as having no sexual partners in the past 12 months and as having used condoms all of the time, since these categories represent the lowest behavioral risk. All sexual risk behavior measures were drawn from Wave III.

Control variables include sociodemographic characteristics associated with both child maltreatment and STI risk. Family structure is classified as two biological parents, other two parent family (e.g., stepfamily), single mother, single father, or other family structure. Respondents' self-identified race and Hispanic ethnicity were used to derive a five-category, mutually exclusive combined measure of race/ethnicity: Hispanic, any single race; Non-Hispanic Black; Non-Hispanic White, Multi-racial, and Other. Respondent's report of the highest educational level attained by each resident parent consists of a five-category variable with the following response categories: less than high school; high school diploma or GED; some college or post-high school business, trade, or vocational education; college graduate; or missing. In households where both parents were present, the higher of the two educational levels attained was used in analyses. All control variables were measured at Wave I.

Analysis plan

After examining descriptive statistics for all variables, binary logistic regression models will be estimated to assess the relationship between each type of maltreatment and self-reported and test-identified STI status, respectively. Three models will be estimated for each maltreatment type and STI outcome measure. Model 1 examines the unadjusted relationship between each type of maltreatment and STI status. Model 2 adds sociodemographic characteristics. Finally, Model 3 includes all four types of abuse, in addition to sociodemographic controls, in order to estimate the effect of each type of maltreatment after controlling for all others. To explore whether the association between maltreatment and STI status varies by biological sex, all models are stratified by sex (research question 2). Results from these models are presented as preliminary results in the following section.

To further address research question 2, interaction terms for race/ethnicity and age will be added. Statistical significance for these interactions will be assessed at $p<0.1$. For those maltreatment types found to be significantly related to STI status, we will assess mediation effects by examining the extent to which maltreatment coefficients are reduced after adding sexual risk behavior variables to the model.[21] This approach does not explicitly define the level of reduction required to conclude mediation; for the purposes of this analysis, reductions in regression coefficients of twenty percent or more will be considered evidence of mediation effects. All analyses will be conducted in STATA/SE 9.0 and will employ STATA survey commands to adjust for Add Health's complex survey design. Sampling weights will be used to yield national population estimates.

Preliminary results

Forty percent of respondents in the analysis sample reported a history of supervision neglect, 28% reported physical assault, 11% reported physical neglect, and 5% reported contact sexual abuse. Six percent of respondents tested positive for at least one STI, while approximately four percent of respondents reported receiving a diagnosis of Chlamydia, Gonorrhea, or Trichomaniasis in the last twelve months.

Adjusted and unadjusted odds ratios for the association between each type of maltreatment and self-reported and test-identified STI status are presented in Table 1. Among females, the odds of testing positive for an STI in young adulthood were more than twice as high among individuals who reported a history of physical neglect compared to those with no history of neglect (OR=2.21; 95% CI=1.47, 3.31), even after controlling for sociodemographic characteristics and other types of abuse. There were no significant relationships between other types of maltreatment and a positive STI test. Using self-reported STI diagnosis as the outcome of interest yielded a different pattern of results. All four types of maltreatment were significantly associated with an increased odds of self-reported STI diagnosis in the past twelve months in unadjusted models among females; however, after controlling for sociodemographic characteristics and other maltreatment histories only physical assault remained significant (OR=1.54; 95% CI=1.03, 2.32). Among males, there were no significant relationships between child maltreatment and either measure of STI status once sociodemographic characteristics were controlled. Subsequent analyses will explore interactions by race/ethnicity and age as well as tests of mediation.

Discussion

Preliminary results suggest that, compared to other types of maltreatment, a history of physical neglect uniquely predicts having a current STI in young adulthood, but only among females. In contrast to previous research relying on non-probability samples and self-reported STI status, these analyses do not find significant associations between STI risk and other types of child maltreatment. Findings will be further discussed in terms of the importance of distinguishing between different types of child maltreatment and considering neglect as an early predictor of reproductive health risk.

Table 1: Odds ratios from regression of STI status on history of child maltreatment, by sex and STI measure.

	Male (n=4,623)						Female (n=5,436)					
	Test-identified STI			Self-reported STI			Test-identified STI			Self-reported STI		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Sex abuse	2.17*	1.54	1.32	3.08*	2.23	2.34	1.0	0.87	0.67	2.57**	2.40**	1.60
Phys assault	1.27	1.16	1.03	1.16	1.15	0.91	1.08	1.02	0.96	1.98**	1.90**	1.54*
Sup neglect	1.28	1.22	1.14	1.20	1.24	1.13	1.08	1.02	0.90	1.76**	1.65**	1.33
Phys neglect	1.70*	1.29	1.10	1.67	1.33	0.95	2.34**	1.94**	2.21**	2.32**	1.84**	1.24

(1): Unadjusted
(2): Adjusted for family structure, race/ethnicity, age, parent education.
(3) Adjusted for family structure, race/ethnicity, age, parent education, and all other maltreatment types.

* $p<0.05$ ** $p<0.01$

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