

# **Consequences of Sex Education on Teen and Young Adult Sexual Behaviors and Outcomes**

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## **Introduction**

Formal sex education—curriculum based programs both in and out of school— is a key strategy for promoting safer sexual behaviors and improved outcomes for adolescents and young adults [1]. During the past decade, increased funding for abstinence-until-marriage instruction led to substantial shifts in the content of formal sex education. Between FY1997 and FY2008, the federal government provided over \$1.5 billion to education programs focused solely on abstinence-until-marriage. Paralleling this funding stream, from 1995 to 2002 there were significant increases in the proportion of teenagers receiving instruction only about abstinence (males, 9% to 24%; females, 8% to 21%) and decreases in the proportion receiving instruction about both abstinence and birth control methods (males, 65% to 59%; females, 84% to 65%) [2].

These changes occurred without scientific evidence supporting the effectiveness of abstinence-only programs [3]. Although one recent study on younger teens identified some positive impacts of abstinence-only education that promoted delaying the onset of sex [4], it leaves intact the body of evidence in several systematic reviews concluding that abstinence-until-marriage programs are ineffective in delaying sexual debut or reducing sexual risk behaviors among sexually experienced teens [5, 6]. In sharp contrast, evaluations of comprehensive sex education programs find greater efficacy; in Kirby's most recent review, two-thirds of 48 comprehensive programs teaching both abstinence and the use of birth control had positive behavioral effects [7].

A handful of studies have examined the influence of sex education at the population level using data from nationally representative surveys. Three analyses of the 2002 NSFG examined the association between sex education prior to first intercourse and select measures of adolescent sexual behaviors. Kohler et al. estimated that receipt of comprehensive sex education was

marginally associated with less likelihood of vaginal intercourse and a significantly reduced likelihood of teen pregnancy, but found no association between abstinence-only education and these outcomes [8]. A second study, which did not distinguish between abstinence and comprehensive sex education, found that receipt of sex education was associated with delayed onset of sexual activity among both genders, and increased likelihood of birth control use at first sex among males, but not females [9]. Another study among females found that contraceptive use at first sex did not vary between those receiving abstinence or comprehensive sex education, but did not contrast these with no instruction [10].

These population-level studies examining the effect of sex education on the onset of sexual activity either use a dichotomous indicator of ever had sex [8, 9] or truncate to experiences prior to age 15 [9]; both approaches potentially bias the estimated relationships. Instead of using cross-sectional models, it is more appropriate to use life-table models which can take into account the age at which those who have sex do so for the first time. In addition, in using this approach, respondents who have never had sex also contribute their years of life experience to the model up until the point of interview.

We used data from the 2006-08 NSFG to extend and refine prior research in a number of important ways. We examined the association between receipt of formal sex education by type and key behaviors during a more recent time period. Second, this round of the NSFG measured sex education among respondents ages 15-24, instead of only adolescents, permitting examination of sex education's longer-term impacts. Additionally, we expanded the outcomes examined to better reflect the range of topics potentially addressed in formal sex education, including timing of first sex, contraceptive use, prevention of pregnancy and STIs, as well as the

development of healthy relationships. When appropriate we adjusted for censoring by using life-table methods (event history analysis) to improve estimation.

## **METHODS**

### **Data**

The data analyzed were from the 2006-08 NSFG, a nationally representative household survey of males and females ages 15-44 in the United States. The survey used a multi-stage, stratified, clustered sampling frame to collect interviews continuously from June 2006-December 2008. Detailed survey methodology has been described elsewhere [11]. Information about the receipt of formal reproductive health education was collected in face-to-face interviews from respondents ages 15-24. Additionally, an audio computer-assisted, self-administered interview (ACASI) section contained items on sensitive topics including pregnancy and sexually transmitted infections.

### **Measures**

#### Formal Instruction

Respondents ages 15-24 were asked in separate questions whether they had received formal instruction prior to age 18 on “how to say no to sex,” or “methods of birth control” and the grade of first receipt of each. Formal sex education referred to any sex education that was provided in schools, church, or other community organizations.

Following the approach developed in prior research, we calculated respondents’ age at sex education by adding five years to the grade in which they first received sex education in each topic [12]. For sexually experienced respondents, we calculated whether instruction was

received prior to first vaginal intercourse. Respondents who had never had sex but who had received sex education were categorized as having received the instruction before first sex.

We combined the responses into a categorical variable for sex education received prior to first sex: “how to say no” only, both “how to say no” and birth control, or neither topic. For the purpose of this analysis, we refer to these as only abstinence and comprehensive sex education (CSE). Following the approach of Kohler et. al, we also excluded respondents reporting receipt of only formal birth control instruction without mentioning abstinence ( $n=366$ ) as this did not fit within the definitions of abstinence-only or comprehensive programs. Our measures provide reasonable proxies given the available data, although they are not directly comparable to federal definitions.

### Dependent Variables

Twelve dependent variables related to young people’s sexual and reproductive health (SRH) and risk-taking were examined, across a range of sexual partnership, contraception and outcome measures. For each measure we created a dichotomous indicator (0=no, 1=yes). Measures referring to first vaginal sexual intercourse include: timing of first sex, effective contraceptive use at first sex and condom use at first sex. Partnership measures include if first sex was: with a romantic partner, with an age-discrepant partner (age difference of three years or more in either direction), or unwanted. First sex was identified as “unwanted” if respondents agreed with the statement, "I really didn't want it to happen at the time" about the first time they had sex.

Lifetime outcomes measured at the time of the interview included: having had six or more sexual partners, ever been (or gotten a partner) pregnant, and STD treatment in the past 12 months (there was not an adequate measure of lifetime STD outcomes). The two last outcomes

incorporated ACASI reports. We also included two measures of contraceptive use at last sex (any effective method or condom use).

### Sociodemographic Variables

Each model included measures of age at interview (integer ages 15-24), race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, other), household income level (<100% of the federal poverty level, 100-199%, 200% or greater), mother's education (less than high school, high school graduate or GED, some college or more), living arrangements at age 14 (residing with two biological/adoptive parents vs. other), frequency of attendance at religious services age 14 (often, sometimes, never) and community type (urban, suburban, rural). Models referring to the time of the interview included measures of current union status. Some of the models limited to sexually experienced respondents included age at first sex (integer years 15-24); controlling for both age at interview and age at first sex also controls for duration of time since first sex.

### Analytical Approach

The analytical sample was limited to respondents ages 15-24 at the time of the interview. We excluded respondents who reported age of first intercourse before age 10 ( $n=12$ ). As indicated above, we also excluded respondents who reported receipt of only formal birth control instruction without mentioning abstinence, as well as 14 cases with missing information on sex education. After these exclusions, the total sample comprised 2,505 females and 2,186 males ages 15-24.

All analyses were conducted separately by gender. Analyses were weighted and use the *svy* command prefix in Stata 11.1 to adjust for the complex survey design of the NSFG.

Bivariate analyses using  $\chi^2$  tests examined associations between receipt of sex education and 1) the sociodemographic covariates and 2) the SRH outcomes. Kaplan-Meier survival curves, stratified by receipt of formal sex education, were used to examine the timing of the transition to first sex.

We estimated discrete-time logistic hazard rate models of the association between type of sex education and the transition to first sexual intercourse before age 20, incorporating censored cases. Separate observations, or person-years, were created for each year that a respondent was at risk of having first sex; data were censored for respondents who have not had sex or not reached the completed age by the time of interview. Time was measured as a series of single-year categorical variables indicating respondent's age at each person-year, allowing the risk of initiation of sexual activity to vary with age. The socio-demographic variables were included as fixed covariates.

We estimated multivariate logistic regression models of the association between formal sex education received prior to first intercourse and the other SRH behaviors and outcomes. Models estimating characteristics of first intercourse were limited to sexually experienced respondents with non-missing data on the timing of sex education (n= 1647 females, n=1360 males). Models estimating lifetime outcomes were limited to never-married sexually experienced respondents with non-missing data (n=1383 females, n=1242 males); for ever-married respondents, the health and well-being implications were unclear. In all models, type of sex education was included as a categorical variable. For each outcome, we estimated two nested models, the first including the socio-demographic covariates and the second adding a measure of age at first vaginal sex.

## **Results**

### Bivariate

Two-thirds of females and 55% of males received CSE prior to first vaginal sex (Table 1). About one in five respondents reported receiving only abstinence education prior to first sex. Sixteen percent of sexually experienced females and 24 % of sexually experienced males reported not receiving instruction in either topic prior to first sex. Receipt of sex education varied significantly by most of the covariates examined. Not receiving instruction in either topic was more common among respondents who were black or Hispanic, living in a poorer household, whose mothers' had lower education, who were not living with two parents at age 14 (females only), and who attended religious services less frequently (females only). There was no significant variation by community type or age at interview for either gender.

For both genders, healthier behaviors and outcomes were generally positively associated with receipt of sex education of either type, while riskier behaviors were more likely among respondents not receiving instruction in either topic (Table 2). Exceptions were the lack of significant associations between sex education and either recent STD treatment or effective contraceptive use at last sex.

Figures 1a and 1b illustrate the failure curves of onset of first vaginal sex, before age 20, by receipt of sex education. For both genders, the timing of first vaginal sex had significantly earlier onset among those reporting no sex education. The curves for receiving only abstinence or CSE were severely overlapping and indistinguishable on the graph. Before turning age 20, 86% of females and 88% of males without sex education had vaginal sex; in contrast 77-78% had sex before age 20 among those receiving only abstinence or CSE.

## Multivariate

**Initiation of Vaginal Sex:** After adjusting for other socio-demographic covariates of engaging in vaginal intercourse, and adjusting for censoring, receipt of either CSE or only abstinence instruction prior to first intercourse was significantly associated with the transition to first sex before age 20 among females and males. Receipt of sex education, regardless of type, reduced the likelihood of having vaginal sex by about half as compared to not receiving instruction in either topic.

**Contraceptive Use at First Sex:** In Model 1, females reporting receipt of CSE were significantly more likely to have used any contraception ( $OR_{adj}=2.01$ ) or a condom ( $OR_{adj}=1.62$ ) at first sexual intercourse than those not receiving sex education. There was no significant association with receipt of only abstinence education. Among males, in Model 1 receipt of either CSE or only abstinence education was significantly associated with an increase in the likelihood of using any effective contraception or a condom at first sex as compared to no instruction. However, after controlling for age at first sex in Model 2, receipt of only abstinence education was no longer significant for males, while receipt of CSE remained significant for both males and females. Taken together, these models indicated that CSE had a direct positive association with contraceptive or condom use at first sex among both genders, while receipt of only abstinence education may indirectly influence contraceptive or condom use for males through increasing their age at first sex.

**First Partnership Characteristics:** In the first set of models (Model 1), receipt of CSE was significantly associated with a reduced likelihood of having an age-discrepant partner among females ( $OR_{adj} = .64$ ) and among males ( $OR_{adj} = .36$ ). Receipt of CSE reduced the likelihood of reporting that first sex was unwanted by more than half ( $OR_{adj} = .40$ ) among females; the association was negative ( $OR_{adj} = .39$ ) among males, but not statistically significant at conventional levels ( $p = .06$ ). Males receiving either only abstinence ( $OR_{adj} = 1.59$ ) or CSE ( $OR_{adj} = 1.85$ ) were significantly more likely to have a romantic partner at first sex; there was no significant association among females. In Model 2, the association between romantic first partner and CSE for males was no longer significant. Other differences between models were minimal, indicating that CSE maintained a direct association with partnership characteristics at first sex.

**Lifetime and Recent SRH Outcomes:** Table 4 reports limited associations between sex education and the lifetime outcomes of having 6 or more partners or ever being (or getting a partner) pregnant. In Model 1, CSE was associated with reductions in the likelihood of having 6+ partners for both genders; receipt of only abstinence education was negatively associated only among males. After controlling for age at first sex in Model 2, none of these associations remained statistically significant. Similarly, CSE was negatively associated with ever making a partner pregnant among males in Model 1 ( $OR_{adj} = .49$ ), but was not significant in Model 2. These models indicated that any influence of sex education on the lifetime outcomes was totally moderated by age at first sex.

Among females, Models 1 and 2 showed no significant associations between sex education and the recent SRH measures. Among males, in Model 1 CSE was positively associated with condom use at last sex ( $OR_{adj} = 1.86$ ), and negatively associated with recent STD

treatment ( $OR_{adj} = .44$ ). In Model 2, neither relationship was statistically significant after controlling for age at first sex. The two sets of models indicate that CSE indirectly influenced recent behaviors among males through delaying first sex, but had no significant association with recent behaviors for females.

## **Discussion**

In this study, receipt of CSE before first sex, that included instruction about both delaying sex and birth control, was associated with a range of healthier behaviors and outcomes among adolescents and young adults as compared to receiving instruction in neither topic. CSE was associated with delayed onset of first sex, greater use of contraception or condoms at first sex and healthier partnerships at first sex. While there were no direct associations between CSE and longer term behaviors and outcomes, there were indirect influences through later age at first sex, particularly among males, reducing their likelihood of having gotten a partner pregnant, multiple partnerships, and recent STD treatment, and increasing the likelihood of condom use at most recent sex.

For the nearly 20% of adolescents and young adults who reported receipt of only abstinence education, we found few associations between this instruction and SRH behaviors and outcomes. Receipt of only abstinence education, without additional instruction about birth control, was associated with delayed onset of vaginal sex. However, across the other behaviors and outcomes examined, receipt of only abstinence education provided no direct benefits as compared to receiving no instruction. The older age at first sex associated with receiving only abstinence education (as compared to no instruction) indirectly influenced some later contraceptive and partnership behaviors among males, but not females.

Contrary to some critics of formal sex education, we found no evidence that receipt of either type of sex education was associated with earlier onset of sex, greater risk taking, or poorer SRH outcomes. Since both receipt of CSE or only abstinence education significantly increased age at first sex, it appears that talking with adolescents about sex—before they have first have sex—seems to be what is important, regardless of the specific subject matter. More research and policy attention needs to be given to the importance of the timing of sex education.

This study is among the first to demonstrate associations between CSE and selection of partners, illustrating the potential reach of CSE. Unwanted first sex and age-discrepant partnerships are associated with poorer reproductive health outcomes, including STIs, pregnancy and less contraceptive use [13-16]. Further research should work to identify and strengthen the mechanisms underlying the links between CSE and first partnership, whether through decision-making and selection or less exposure to riskier situations such as alcohol or drug use before sex. In contrast, with its explicit message that all sexual partnerships prior to marriage are negative, receipt of only abstinence education does not appear to directly influence safe or healthy first sexual partnerships.

The lack of direct associations between sex education and longer term behaviors and outcomes, highlight the need for sex education beyond initial classroom instruction as well as linkages to reproductive health care services. While parents can be a source of information, their knowledge about contraception or other sexual health topics may often be inaccurate or incomplete [17]. Additionally, the Web sites teens turn to for sexual health information often have inaccurate information [18]. Health care providers, who are a highly trusted source of information among this age group, can supplement and reinforce prior formal instruction [19].

Increasing access is imperative, especially for young men, who are substantially less likely to talk with a health care provider about sexual health issues.

Given these findings and others which support the positive consequences of CSE [7, 8], the significant socio-demographic differentials in the receipt of sex education before first sex are troubling. Nearly a third of young men of color did not receive instruction on either abstinence or birth control methods before first sex. Among both males and females, receipt of CSE was less likely among those who were lower income, had lower maternal education, or were black or Hispanic; these demographic groups have poorer SRH outcomes, including higher rates of STIs and teen pregnancy, highlighting the unmet need for formal instruction in sex education.

The findings reported here face a number of limitations. The measures of receipt of instruction are quite limited, in that they only report if any instruction occurred, but tell us nothing about other important aspects of the education, such as its quantity, quality or specific content. Additionally, these self-reported measures of reproductive health instruction reflect adolescents' recall of such instruction. Finally, observational studies such as this always face challenges in ascribing causality. Our results are strengthened by the use of multivariate models which control for a range of socio-demographic characteristics temporally distant from the outcomes which may be correlated with both sex education and the outcomes under study. Additionally, our investigation of multiple outcome measures offers validation of general patterns. [20]

While it is unlikely that core disagreements about formal sex education will be resolved anytime soon, it is important to bring facts to bear in these controversies. After a decade of policy and funding initiatives that mandated narrowly-conceived abstinence-only education over CSE [21, 22], Congress recently funded new initiatives to support evidence-based interventions,

as well as others that have demonstrated promise . However, Congress also renewed the previous Title V abstinence-only program for five years, making available \$50 million annually for grants to the states to promote sexual abstinence outside of marriage [23]. Thus, even though the Obama administration has taken a step back from support for rigid abstinence-only education, there remains funds and advocacy for this approach.

This study demonstrates that formal sex education which includes instruction about both waiting to have sex and methods of birth control can improve the health and well-being of adolescents and young adults. The protective influence of sex education is not limited to the questions of if or when to have sex, but extend to issues of partner selection, contraceptive use, and reproductive health outcomes. Creating access to medically accurate comprehensive sex education, and reducing socio-demographic disparities in its receipt, should remain a primary goal for improving the well-being of teens and young adults. At the same time, recognizing that maintaining sexual and reproductive health is an ongoing process, access to relevant information, services and support should remain available over the course of a lifetime.

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