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Original article

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

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A B S T R A C T

Purpose: This study examined whether formal sex education is associated with sexual health behaviors and outcomes using recent nationally representative survey data.
Methods: Data used were from 4,691 male and female individuals aged 15–24 years from the 2006–2008 National Survey of Family Growth. Weighted bivariate and multivariate analyses were conducted by gender, estimating the associations of sex education by type (only abstinence, abstinence and birth control, or neither) before first sexual intercourse, and sexual behaviors and outcomes.
Results: Receipt of sex education, regardless of type, was associated with delays in first sex for both genders, as compared with receiving no sex education. Respondents receiving instruction about abstinence and birth control were significantly more likely at first sex to use any contraception (odds ratio [OR] = 1.73, females; OR = 1.91, males) or a condom (OR = 1.69, females; OR = 1.90, males), and less likely to have an age-discrepant partner (OR = .67, females; OR = .48, males). Receipt of only abstinence education was not statistically distinguishable in most models from receipt of either both or neither topics. Among female subjects, condom use at first sex was significantly more likely among those receiving instruction in both topics as compared with only abstinence education. The associations between sex education and all longer-term outcomes were mediated by older age at first sex.
Conclusions: Sex education about abstinence and birth control was associated with healthier sexual behaviors and outcomes as compared with no instruction. The protective influence of sex education is not limited to if or when to have sex, but extends to issues of contraception, partner selection, and reproductive health outcomes.

IMPLICATIONS AND CONTRIBUTION

This study expands on previous research on the association of formal sex education with sexual health and behaviors, and finds that formal sex education that 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.

Formal sex education—curriculum-based programs both in and out of school—is a key strategy for promoting safer sexual behaviors for adolescents and young adults [1]. Between fiscal years 1997 and 2008, the federal government provided more than $1.5 billion to education programs focused solely on abstinence until marriage. Federal guidance prohibited programs using these funds to discuss contraceptive methods, except to emphasize their failure rates [2]. 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%) [3]. Data from the 2006–2008 National Survey of Family Growth (NSFG) indicate that these patterns recently remained stable, leaving many adolescents without formal instruction about birth control (males, 38%; females, 30%), whereas most adolescents received abstinence education (males, 81%; females, 87%) [4,5].

These changes in the content of formal sex education occurred without scientific evidence supporting the effectiveness of abstinence-only programs [6]. Although one recent study on younger teens identified some positive impacts of abstinence-

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only education that promoted delaying the onset of sex [7], 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 [8,9]. 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 [10].

A handful of studies have examined the influence of sex education at the population level. Three analyses of the 2002 NSFG examined the association between sex education before 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 [11]. 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 male, but not female, adolescents [12]. Another study of female adolescents found that contraceptive use at first sex did not vary among those receiving abstinence or comprehensive sex education, but did not contrast these findings with no instruction [13].

We used data from the 2006–2008 NSFG to extend and refine previous 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. The 2006–2008 NSFG measured sex education among respondents aged 15–24 years, instead of only adolescents, permitting examination of sex education's longer-term impacts. Additionally, we examined a wider range of outcomes, including timing of first sex, contraceptive use, prevention of pregnancy and sexually transmitted infections (STIs), as well as the development of healthy relationships.

Methods

Data

The data analyzed were from the 2006–2008 NSFG, a nationally representative household survey of U.S. male and female persons aged 15–44 years. The survey used a multistage, stratified, clustered sampling frame to collect interviews continuously from June 2006 to December 2008. Detailed survey methodology has been described elsewhere [14]. Information about the receipt of formal reproductive health education was collected in face-to-face interviews from respondents aged 15–24 years. An audio, computer-assisted, self-administered interview contained items on sensitive topics, including pregnancy and STIs.

Measures

Formal instruction. Respondents aged 15–24 years were asked whether they had received formal instruction before age 18 years on "how to say no to sex" or "methods of birth control" and the grade of first receipt of each. We added 5 years to the reported grade to estimate age at first receipt [15]. Comparing age at instruction and age at first sex, we calculated whether instruction was received before first vaginal intercourse.

We combined these responses into a categorical variable for sex education received before first sex: "how to say no" only, both "how to say no" and birth control (Ab + BC), or neither topic. Past studies using NSFG data have categorized receipt of instruction about both "how to say no" and birth control methods as comprehensive sex education [3,11,13]. However, this no longer seems appropriate, given the recognition that abstinence programs may highlight the ineffectiveness of contraceptive methods. As we do not have information about the content or tone of instruction about birth control methods, we cannot label these as comprehensive instruction that would teach about birth control methods as a means to prevent pregnancy.

Dependent variables. Twelve dependent variables related to young people's sexual and reproductive health (SRH) behaviors and outcomes were examined. For each measure, we created a dichotomous indicator (0 = no, 1 = yes). Measures referring to first vaginal sexual intercourse include timing of first sex, contraceptive use at first sex, and condom use at first sex. Partnership measures at first sex include with a romantic partner (vs. a casual partner), with an age-discrepant partner (age difference of 3 years or more in either direction), or unwanted first sex (respondents agreed with the statement, "I really didn't want it to happen at the time"). Lifetime and current SRH indicators measured at the time of the interview included having had six or more sexual partners, ever been (or gotten a partner) pregnant, STI treatment in the past 12 months, and contraceptive use at last sex (any effective method or condom use). The first three incorporated audio, computer-assisted, self-administered interview reports.

Sociodemographic variables. Each model included measures of age at interview (integer ages: 15–24 years), race/ethnicity, poverty level, mother's education, living arrangements at age 14 years, frequency of attendance at religious services at age 14 years, and community type. Models referring to the time of the interview included measures of current union status.

Analytical approach

The analytical sample was limited to respondents aged 15–24 years at the time of the interview. We excluded respondents who reported age of first intercourse before age 10 years (n = 12). Following the approach of Kohler et al, we also excluded respondents reporting only receiving formal birth control instruction without mentioning abstinence (n = 366), as well as 14 cases with missing information on sex education. After these exclusions, the total sample comprised 2,505 female and 2,186 male individuals aged 15–24 years.

All analyses were conducted separately by gender. Analyses were weighted and use the *svy* command prefix in Stata 11.1 (StataCorp, College Station, TX) to adjust for the complex survey design of the NSFG. Bivariate analyses using χ^2 tests examined associations between receipt of sex education and (1) the sociodemographic covariates and (2) the SRH behaviors and outcomes. Kaplan–Meier survival curves, stratified by receipt of formal sex education, were used to examine the bivariate association between type of sex education and the timing of the transition to first sex.

We estimated multivariate discrete time logistic hazard rate models of the association between type of sex education and the transition to first sexual intercourse before age 20 years, incorporating censored cases. Separate observations, or person-years, were created for each year that a respondent was at risk of having