

RESEARCH ARTICLE

Protective Effects of Middle School Comprehensive Sex Education With Family Involvement

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ABSTRACT

BACKGROUND: School-based comprehensive sex education programs can reduce early adolescents' risky sexual behavior. The purpose of this study was to assess the effectiveness of a 3-year comprehensive sex education program in delaying vaginal sex for middle school students and whether the family component of the intervention contributes to its effectiveness.

METHODS: This longitudinal evaluation followed a cohort of 6th graders (N = 2453) through the end of 8th grade. The design used random assignment of 24 schools into treatment and comparison conditions. The analysis included multiple-group logistic regression to assess differences in delay of sex between intervention and comparison groups.

RESULTS: In schools where the program was taught, 16% fewer boys and 15% fewer girls had had sex by the end of 8th grade compared to boys and girls at comparison schools. Completing family activities during the first year of the program predicted delayed sexual debut for boys.

CONCLUSIONS: Theory-based, developmentally appropriate, comprehensive sex education programs that include parent involvement can be effective in delaying vaginal sex for middle school students. Parent involvement is particularly important for boys, as family activities may encourage parents to talk with their sons earlier and more frequently.

Keywords: sexuality education; adolescents; middle school; family sexuality communication; sexual behavior.

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Risky sexual behavior has adverse health and academic consequences for adolescents and young adults, such as sexually transmitted infections (STIs),^{1,2} unintended pregnancy,³ and school dropout.^{4,5} Evidence shows that school-based comprehensive sex education programs are associated with reductions in adolescents' risky sexual behavior.^{6,7} Some programs also offer opportunities to engage parents in sexuality communication with their teens.⁸ Middle school programs can play an important protective role, as beginning sex education *before* teens have sex is critical in effectively reducing risky sexual behavior.^{9,10} In this report we examine whether a 3-year comprehensive sex education program for middle school students that includes family activities is associated with delaying vaginal sex, and whether the family component contributes to its effectiveness.

School-Based Sex Education Programs

Middle school sex education programs show mixed findings for their effectiveness in delaying sex for early adolescents. Two evaluations of the *It's Your Game: Keep It Real* curriculum demonstrate its effect of delayed sex for both boys and girls,^{11,12} whereas another program showed no effects on sexual behavior.¹³ Other research has shown that program effects can vary for boys and girls.⁶ Specifically, 2 randomized controlled trial evaluations showed reduced sex for boys, but not for girls.^{14,15} In contrast, another longitudinal program evaluation found delayed sex only for girls.¹⁶

Family Components of Sex Education Programs

Evaluations seldom assess the unique contribution of family activities to the overall effectiveness

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of school-based sex education interventions, although adolescents name their parents as central resources in their sexual decision-making.¹⁷ Family sexuality communication can reduce teen sexual risk-taking,¹⁸⁻²⁰ but parents often report lacking knowledge, skills, and confidence to conduct those conversations.²¹ Programs can support parent comfort and competence by providing specific directions and structure for communication and resources to guide participation.⁸ A small number of evaluations were done on programs that include family components and show their effectiveness in delaying sex.^{12,22} In one of the few evaluations that directly compared school-based interventions with and without parent components, a program that did not include parents was equally effective in reducing frequency of recent intercourse as one that did.¹⁵

The Intervention

Get Real: Comprehensive Sex Education That Works is a middle school sex education program developed by the Planned Parenthood League of Massachusetts that aims to delay sexual intercourse. As a comprehensive program it emphasizes delaying sex as a healthy choice while providing medically accurate information about protection. It includes 9 lessons each in Grades 6, 7, and 8 and provides culturally sensitive and age-appropriate information, focusing on relational skill-building as a means to make healthy choices regarding sexual relationships.²³ The curriculum is organized around an ecological systems perspective²⁴ and draws from the theory of planned behavior.^{25,26} Preliminary research on the impact of the first 9 lessons²⁷ and accompanying family activities¹⁸ showed that both are associated with lower rates of early sexual debut (Erkut et al²⁷ contains details).

Get Real designates parents as the primary sexuality educators of their children: the school-based curriculum provides knowledge and skill-building, while family activities (8 in each grade) give parents (or other caring adults) an opportunity to transmit their values about sex and relationships. Furthermore, family activities aim to increase families' comfort in talking about those topics (Grossman et al¹⁸ contains more details). Family activities include talking about healthy and unhealthy relationships; discussing media images of sexuality; answering true/false questions about HIV

and AIDS; practicing how to say "no" to unwanted activities. To support parent participation in activities and overall sexuality communication with their teens, each activity is communicated through a letter sent home and made available online, accompanied by resources.

The current study has 2 aims. First, it compares treatment and comparison groups to assess the 3-year, longitudinal impact of *Get Real* on delaying sex among middle school girls and boys. Second, it examines whether there is a unique contribution of family activity participation on delaying sex among treatment participants.

METHODS

Participants

A total of 2453 students participated over 3 years. Baseline surveys were administered to 2018 students (48% treatment). In Grade 7, 1943 students took the survey, and 1754 in Grade 8. Overall, 56% of students completed surveys in all 3 years, while 44% either: (1) completed the baseline survey but had a missing survey in Grades 7 or 8; or (2) did not complete the baseline survey, but took the 7th and/or 8th grade survey. The fluctuating sample reflects high residential mobility in participating school districts. Mobility tends to be higher among students in low income households²⁸ as is the case in our sample. Rates of residential mobility were exacerbated by economic conditions during and immediately following the Great Recession (2008-2010), which also disproportionately affected minority and low-income individuals²⁹ and which coincided with the beginning of data collection. We describe in the Data Analysis section how we address missing data resulting from students' mobility.

Instruments

Sexual activity. Students answered (yes/no) "Have you ever had sex? Having sex means when a boy puts his penis inside a girl's vagina. Some people call this 'making love' or 'doing it.'"

Age. Age was calculated using date of birth.

Race/ethnicity. Students who chose any single category for race/ethnicity were identified as such

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(ie, Black, White, Asian, Latino). Those who reported being biracial or chose more than 1 race were coded as biracial/multiracial. Consistent with US Census definitions that Hispanics can be of any race,³⁰ students who self-identified as any Latino ethnicity were coded as Latino.

Two-parent family. Students were asked “Who do you live with?” Responses included “2 parents in 1 place,” “1 parent,” “2 parents in different places,” “grandparents or other family members,” or “other.” Students who chose the first were coded as having a 2-parent family structure.

Median household income. Family income level was obtained for the census tract associated with the address provided in the 8th grade survey. When an address was not available, the median household income for the tract for their school was used as a proxy. This variable was somewhat positively skewed, reflecting most students’ modest family incomes.

Grades. Typical grades received correspond to response categories 1 = Mostly As, 2 = Mostly As and Bs, 3 = Mostly Bs, 4 = Mostly Bs and Cs, 5 = Mostly Cs, 6 = Mostly Cs and Ds, 7 = Mostly Ds, 8 = Mostly Ds and Fs.

Parent/guardian closeness. Combined responses from “How close do you feel to your mother or female guardian?” and “How close do you feel to your father or male guardian?” (1 = not at all to 5 = very much) were taken from the Grade 8 survey.

Social desirability. An abbreviated version of Baxter et al³¹ social desirability index was used. Item scores were summed, with higher scores representing higher social desirability.

Get Real dosage. Student attendance at *Get Real* lessons ranged from 0 to 27 possible lessons.

Get Real family activity participation. Completion of family activities was calculated from 24 possible assignments.

Procedure

This evaluation involved random assignment at the school level into treatment and comparison conditions of 24 middle schools in the greater Boston area (13 public, 9 charter, and 2 private). Schools signed up *before* random assignment, which avoids bias due to a school’s preference for either condition. In treatment schools, educators trained by the curriculum developer taught all classes, whereas students in comparison schools received sex education as currently taught in their schools. To assess change in their knowledge, attitudes, and behaviors related to relationships and sexual health, students were administered surveys at 3 time points: beginning of Grade 6 (baseline, starting in 2009), beginning of Grade 7, and end of Grade 8 (completed by 2012).

Parent/guardian informed consent forms were distributed in multiple languages. Schools decided whether to use passive or active consent. All 12 treatment schools chose passive consent whereas 5 comparison schools chose active consent. Eighteen parents in active consent schools opted out, and 84 did not return consent forms in 6th grade (30% of students in those 5 schools; 4% of total students). Thirteen parents opted out in passive consent schools (<1% of students in those schools; <1% of all students). By the time students were in 8th grade, all schools had adopted passive consent. Although active consent schools had a higher proportion of white students and students from 2-parent families, student race/ethnicity and family structure did not predict missing data. All students provided written assent prior to completing surveys, with an average of 9 students opting out each year.

Data Analysis

We conducted analyses separately for girls and boys for several reasons. First, prior sex education evaluations have shown mixed effects on girls’ and boys’ sexual behavior.^{14,16} Second, boys’ and girls’ sexual experiences and processes may differ due to sex-specific physiological changes of adolescence³² and proscribed norms for dating and sexual activity.^{33,34} Finally, baseline rates of self-reported sexual activity differed significantly by sex; 3.6% of girls, compared to 10.5% of boys, reported having had sex by the start of Grade 6 ($\chi^2 = 30.30$, $df = 1$, $p < .001$, Odds ratio = 0.32). By conducting the analyses separately, we also avoid the assumption that the covariates have the same effects on having had sex regardless of gender.

A number of control variables were included as covariates in our regression models. Older age and lower levels of family income are known risk factors for early sexual activity, whereas living with 2 parents is protective.³⁵ These characteristics, as well as race, differed significantly between treatment and comparison groups at baseline (Table 1) and were, therefore, included as covariates. Social desirability and students’ grades were included to distinguish their influences from program effects. We also included 6th grade reports of sexual activity because 6th graders may not have understood and defined sexual behavior accurately,³⁶ and therefore, may have incorrectly reported having had sex. As is standard practice when comparing groups, we centered covariates on their grand mean, rather than on group-specific means and held covariate effects to be invariant across groups so that adjusted outcomes are directly comparable across groups.

Typically, tests of treatment effects are conducted using a simple logistic regression equation model

Table 1. Descriptive Characteristics of the Comparison and Treatment Groups

	Comparison (N = 1231)			Treatment (N = 1221)			Cohen's d	t-test	df
	N	Mean	SD	N	Mean	SD			
Age at 8th	1231	14.00	0.74	1221	13.88	0.78	.16	4.05	2450***
Median household income	653	\$ 46,416	20266	684	\$ 57,964	27646	-.48	-8.68	1335***
Social desirability bias	1178	0.31	0.27	1185	0.28	0.27	.11	2.46	2361*
Poor grades at baseline	642	2.90	1.45	810	2.76	1.38	.10	1.90	1450
Dosage during 6th				1221	6.71	3.36		n/a	
Dosage during 7th and 8th				1221	10.17	6.73		n/a	
Activities during 6th				1221	2.72	2.97		n/a	
Activities during 7th and 8th				1221	3.74	4.49		n/a	
	N	%		N	%		Odds Ratio	$\chi^2(1)$	
Female	1231	48%		1221	55%		1.32	12.12	***
Biracial	1231	14%		1221	14%		1.00	0.10	
Latino	1231	37%		1221	35%		.92	1.02	
Black	1231	42%		1221	32%		.65	36.12	***
White	1231	14%		1221	31%		2.76	111.38	***
Asian	1231	7%		1221	4%		.55	15.51	***
2-parent household	771	47%		789	51%		1.17	6.71	*
Baseline sexual activity	757	6%		868	7%		1.18	0.56	
8th grade sexual activity	799	28%		877	21%		.68	10.92	**

*p < .05, **p < .01, ***p < .001.

Note: For dosage and family activities, Grades 7 and 8 were combined because assessments took place at the beginning of Grade 7 and at the end of Grade 8, a 2-year span.

in which treatment assignment, along with relevant covariates, predicts sexual outcomes. However, the clustered sampling design, missing data due to residential mobility leading to attrition, and our need to assess both overall group effects and effects of family activities within the treatment group introduce complexities better handled by a more flexible modeling paradigm, namely structural equation modeling (SEM).^{37,38} We apply a multiple group logistic regression model with adjustment for the clustered sampling design and with missing data handling, using the Mplus statistical modeling program (v7.11).³⁹

Clustered Sampling Design

Regression modeling assumes that the sample is comprised of independent cases. However, when students are sampled from within schools, their responses may not be truly independent.⁴⁰ Therefore, similarity of students within schools must be accounted for in the analysis model. As Asparouhov and Muthén⁴¹ advocate for sampling designs with few clusters, we used an adjusted LRT statistic to account for this design effect.⁴²

To assess both overall group effects and the influence of family activities within the treatment group, we estimated group differences in likelihood of sexual onset in a multiple group model in which covariate effects are held invariant across groups. As Muthén and Satorra⁴³ explain, the intercept of a logistic regression equation estimated as a structural equation model is expressed as a threshold parameter.

A comparison of thresholds estimated for the treatment and comparison group constitutes a test of the relative risk across groups.⁴⁴

Missing Data Handling

As noted in the Participants section, our sample reflected a highly mobile population. We have 2 groups of “movers,” namely “leavers” who contribute only baseline data and subsequently leave the study, and “joiners” who contribute only follow-up data by joining after baseline. Without including these students, we run the risk of biasing our results to reflect only the “stayers”—those who remain across the entire period, which would restrict the generalizability of the findings.⁴⁵ Differences between “movers” and “stayers” are a real concern in our sample. “Movers” reported higher likelihood of having had sex at baseline ($t = 7.75, p < .01$) and at the end of Grade 8 ($t = 10.17, p < .01$). They reported demographic characteristics that have been associated with higher sexual risk,^{7,35} including lower median income ($t = 4.17, p < .01$) and lower likelihood of living with 2 parents ($t = 8.70, p < .01$). There were also racial differences ($\chi^2 = 80.02, p < .001$), with “movers” more likely to be black and less likely to be white. By including “movers” in the analyses we were able to retain students who have higher risk for early sexual debut.

We also assessed differences between the 2 groups of “movers.” We did not find significant differences with respect to age, sex, median household income, family structure, race/ethnicity (with the exception of the biracial category), or the likelihood of having had

sex. This comparability supports the argument that data from participants who joined after baseline can be used to offset attrition to more accurately estimate treatment effects of students in participating schools.

For these reasons, we used strategies to statistically handle the resulting missing data rather than conducting analyses with listwise deletion.⁴⁶ Estimated values for missing independent variables were imputed (Soulmer et al⁴⁷ describe this approach) using the NORM statistical program, which generates empirically derived values for missing data in continuous and categorical variables.⁴⁸ In contrast, missingness in the dependent variable was handled by means of full-information maximum likelihood estimation (FIML), which adjusts standard errors of the estimates rather than assigning individual values. Based on the assumption that the data are missing at random (MAR) or missing completely at random (MCAR), these methods of handling missing data are unbiased.⁴⁹ We conducted a set of post hoc analyses (described briefly in the Results section) to test the robustness of our results with respect to violations of this assumption.

Effects Within the Treatment Group

A second set of models estimated variability in risk *within* the treatment group by examining predictive effects of *Get Real* lesson attendance (dosage) and completion of family activities. This poses a challenge in a multiple group model because dosage and activities do not exist in the comparison group. To test differences within and across groups simultaneously, we used “phantom variables” to estimate these models.⁵⁰ We introduced a small amount of random noise with a negligible range (−.001 to .001) in place of dosage and family activities in the comparison group and set to zero the variances and covariances of these variables and their corresponding regression effects, while freely estimating these parameters in the treatment group. For these models, all the previous covariates were included along with parent/guardian closeness, an important control when exploring the effects of family activities, to assess whether the influence of family communication about sex extends beyond the effects of close family relationships.

RESULTS

Baseline Covariates in Treatment and Comparison Schools

Treatment group participants’ mean age in 8th grade was 13.88 (SD = .78), younger than the mean age of 14.00 in the comparison group (SD = .74); they were also more likely to be white (31% vs. 14%), whereas comparison group participants were more likely to be black (42% vs. 32%) or Asian (7% vs. 4%). More treatment participants lived with 2 parents in the

same home (51% vs. 47%) and had a higher median family income (\$57,964 vs. \$44,416) but there were no significant differences between groups in report of having had sex at baseline. Table 1 contains descriptive statistics and tests of mean differences between groups.

Intervention and Comparison Group Outcomes

Tables 2 and 3 present results of the models testing treatment/comparison group differences for girls and boys respectively, adjusted for covariate effects, where a higher threshold value implies a lower probability of having had sex. Table 2 shows that, for girls, there is a significant difference between the groups (thresholds: comparison = 1.03, treatment = 1.24, Wald test = 3.98, $df = 1$, $p < .05$). The adjusted rate of sexual debut (or the implied likelihood of sexual debut) for girls in the treatment group, 22.4%, is 15% lower than the adjusted rate for girls in the comparison group, 26.3%. Similarly, Table 3 shows that, for boys, the difference between the treatment and comparison group in the likelihood of having had sex by Grade 8 is also significant (thresholds: comparison = 0.42, treatment = 0.70, Wald test = 4.04, $df = 1$, $p < .05$). For boys, the adjusted rate of sexual debut for the treatment group, 33.2%, is 16% lower than the adjusted rate for the comparison group, 39.6%.

Treatment Effects Within the Intervention Group

In the models testing both between-group differences and within-group effects neither dosage nor family activity effects are significant for girls, but the effect of completing family activities during Grade 6 was statistically significant for boys ($B = -0.04$, $SE = 0.02$, odds ratio = 0.97, 95% CI = 0.934, 0.998; Table 4). In these models, the overall effect of participating in *Get Real* remains statistically significant for both girls and boys.

Sensitivity Analysis

We tested the robustness of our results to missing data by conducting sensitivity analyses and comparing results of analyses with missing data handling in the full sample to results obtained with a smaller sample of only students who provided complete data (listwise deletion). With the exception of the model for girls, from which baseline reports of having had sex were excluded as they were too rare to model, these analyses used parallel models. Similar to our models with missing data handling, analyses that used listwise deletion showed that treatment students were significantly less likely to have had sex (girls: thresholds: comparison = 1.03, treatment = 1.62, Wald test = 5.03, $df = 1$, $p < .05$; boys: thresholds: comparison = .40, treatment = 1.26, Wald test = 9.88, $df = 1$, $p < .01$). The results of this sensitivity analysis support the robustness of our findings.

Table 2. Results of the Multiple Group Logistic Regression Model Predicting the Probability of Becoming Sexually Active by the End of 8th Grade, Controlling for Clustering at the School Level—Girls

	Comparison (N = 592)		Treatment (N = 673)		Test of Group Differences	
	Estimate	SE	Estimate	SE	Wald (1)	
Threshold	1.03	0.07	1.24	0.08	3.98*	
Implied Proportion	26.3%		22.4%			
	B	SE	OR (95% CI)	B	SE	OR (95% CI)
Baseline sexual activity	1.35	0.18	3.85 (2.719-5.462)	1.35	0.18	3.85 (2.719-5.462)
Age at 8th	0.23	0.04	1.26 (1.159-1.372)	0.23	0.04	1.26 (1.159-1.372)
Biracial	0.83	0.21	2.28 (1.524-3.417)	0.83	0.21	2.28 (1.524-3.417)
Latino	0.59	0.16	1.81 (1.312-2.486)	0.59	0.16	1.81 (1.312-2.486)
Black	0.45	0.16	1.57 (1.135-2.159)	0.45	0.16	1.57 (1.135-2.159)
2-parent household	-0.38	0.11	0.68 (0.554-0.840)	-0.38	0.11	0.68 (0.554-0.840)
Median household income	-0.12	0.07	0.89 (0.778-1.019)	-0.12	0.07	0.89 (0.778-1.019)
Poor grades at baseline	0.17	0.07	1.18 (1.032-1.358)	0.17	0.07	1.18 (1.032-1.358)
Social desirability bias	-0.13	0.05	0.88 (0.793-0.972)	-0.13	0.05	0.88 (0.793-0.972)

*p < .05, **p < .01, ***p < .001.

Note: Covariate effects have been constrained to be equal across groups to reflect direct effects on having had sex, rather than interaction effects with treatment group assignment.

Table 3. Results of the Multiple Group Logistic Regression Model Predicting the Probability of Becoming Sexually Active by the End of 8th Grade, Controlling for Clustering at the School Level—Boys

	Comparison (N = 639)		Treatment (N = 548)		Test of Group Differences	
	Estimate	SE	Estimate	SE	Wald (1)	
Threshold	0.42	0.11	0.70	0.09	4.04*	
Implied Proportion	39.6%		33.2%			
	B	SE	OR (95% CI)	B	SE	OR (95% CI)
Baseline sexual activity	1.14	0.16	3.13 (2.290-4.270)	1.14	0.16	3.13 (2.290-4.270)
Age at 8th	0.24	0.04	1.27 (1.182-1.372)	0.24	0.04	1.27 (1.182-1.372)
Biracial	1.03	0.18	2.79 (1.943-3.997)	1.03	0.18	2.79 (1.943-3.997)
Latino	1.17	0.14	3.23 (2.468-4.223)	1.17	0.14	3.23 (2.468-4.223)
Black	1.06	0.17	2.88 (2.087-3.984)	1.06	0.17	2.88 (2.087-3.984)
2-parent household	-0.38	0.08	0.69 (0.586-0.802)	-0.38	0.08	0.69 (0.586-0.802)
Median household income	-0.12	0.05	0.89 (0.806-0.980)	-0.12	0.05	0.89 (0.806-0.980)
Poor grades at baseline	-0.01	0.05	0.99 (0.905-1.088)	-0.01	0.05	0.99 (0.905-1.088)
Social desirability bias	-0.07	0.04	0.94 (0.862-1.016)	-0.07	0.04	0.94 (0.862-1.016)

*p < .05, **p < .01, ***p < .001.

Note: Covariate effects have been constrained to be equal across groups to reflect direct effects on having had sex, rather than interaction effects with treatment group assignment.

DISCUSSION

Boys and girls both benefit from *Get Real*, making it one of only a few middle school programs that show reduced risky sexual behavior for both boys and girls.^{11,12} This suggests that a theory-based program that provides developmentally appropriate information and builds skills to negotiate healthy relationships can delay sexual debut for middle school students. Our finding that the completion of family activities during the first year of the program predicted delayed sexual debut for boys, suggests that early support for family communication was particularly critical for boys' sexual health.

In schools where *Get Real* was taught 16% fewer boys and 15% fewer girls had had sex by

Grade 8 compared to students who received sex education curriculum as currently taught in their schools. This program's success may reflect both its focus on relational skill-building to help adolescents translate their intentions into behaviors, as well as its developmental approach, by targeting lessons to students' grade and maturity level.

The additional delay in having sex among boys who complete 6th grade family activities extends prior findings for effectiveness of sex education programs that include family components, but that do not directly assess their contribution to sexual behavior outcomes.^{12,22} Including family activities in Grade 6 may be influencing boys' behavior by encouraging parents and sons to talk about sexual issues *earlier*

Table 4. Results of the Multiple Group Logistic Regression Model Predicting the Probability of Becoming Sexually Active by the End of 8th Grade, Controlling for Clustering at the School Level—Boys

	Comparison (N = 639)			Treatment (N = 548)		Test of Group Differences
	Estimate	SE		Estimate	SE	Wald (1)
Threshold	0.42	0.12		1.23	0.32	5.55*
	B	SE	OR (95% CI)	B	SE	OR (95% CI)
Baseline sexual activity	1.00	0.15	2.72 (2.026-3.647)	1.00	0.15	2.72 (2.026-3.647)
Age at grade 8	0.26	0.05	1.29 (1.176-1.425)	0.26	0.05	1.29 (1.176-1.425)
Biracial	0.98	0.18	2.66 (1.867-3.795)	0.98	0.18	2.66 (1.867-3.795)
Latino	1.05	0.13	2.85 (2.193-3.709)	1.05	0.13	2.85 (2.193-3.709)
Black	0.92	0.15	2.51 (1.885-3.341)	0.92	0.15	2.51 (1.885-3.341)
Two-parent household	-0.31	0.08	0.73 (0.632-0.851)	-0.31	0.08	0.73 (0.632-0.851)
Median HH income	-0.12	0.05	0.89 (0.813-0.977)	-0.12	0.05	0.89 (0.813-0.977)
Poor grades at baseline	0.01	0.05	1.01 (0.923-1.105)	0.01	0.05	1.01 (0.923-1.105)
Parent closeness	-0.09	0.06	0.91 (0.812-1.027)	-0.09	0.06	0.91 (0.812-1.027)
Social desirability bias	-0.21	0.14	0.81 (0.624-1.063)	-0.21	0.14	0.81 (0.624-1.063)
Dosage during 6th	0	0	0	0.01	0.01	1.01 (0.983-1.034)
Dosage during 7th and 8th	0	0	0	0.01	0.02	1.01 (0.977-1.040)
Activities during 6th	0	0	0	-0.04	0.02	0.97 (0.934-0.998)
Activities during 7th and 8th	0	0	0	-0.03	0.03	0.97 (0.910-1.031)

*p < .05, **p < .01, ***p < .001.

Note: Covariate effects have been constrained to be equal across groups to reflect direct effects on having had sex, rather than interaction effects with treatment group assignment. Dosage and activities have been centered at the maximum value (best case scenario).

than they would have otherwise, which is critical to delaying sex.^{9,10} Moreover, they also may increase the frequency of these conversations, which is often greater for girls than boys.^{51,52} Therefore, *Get Real* may promote change in both the starting point and frequency of conversations about sex between boys and their families. Findings for the effectiveness of family activities for boys but not for girls also suggest the need for further research that goes beyond the “does it work” question, to investigate “which part” and “for whom.”

We did not find a significant effect for dosage for boys or girls. This was somewhat surprising, as we would expect that students who attended more lessons would show reduced risk. However, the lack of statistical significance may reflect how dosage was modeled, namely estimating the effect of *each lesson attended*. The small effect of a single lesson on delayed sexual debut that is in the expected direction, albeit not statistically significant, suggests that there may be a protective *cumulative* influence over the 3 years.

These results are informative in light of negative educational and health correlates of early sexual debut, like school dropout,^{4,5} sexually transmitted infections,^{1,2} and unintended pregnancy.³ Nationwide, 18% of adolescents report having had sex by Grade 8 (30% of 8th graders in urban schools).⁵³ Given findings that communication about sexual issues should begin *before* teens become sexually active,^{9,10} programs that support early access to both school- and parent-based sex education are important to adolescents’ healthy development.

Limitations

The high level of participant mobility is considered a critical threat to the generalizability of an impact evaluation, due to the likelihood of sampling bias. Our strategy of including data from students who enter the study as a “replacement” for lost information from students who leave is our attempt to avoid sampling bias due to mobility, which affects most long-term impact evaluations of interventions with at-risk populations. The defensibility of this strategy rests on the comparability of “leavers” and “joiners” which is supported for the demographics we tested in this study, and on the viability of the missing data handling employed in the analysis. Moreover, violations to MAR/MCAR assumptions for missing data, even in conditions of high attrition, often have minimal impact on results of impact evaluations.⁴⁶

Baseline differences between treatment and comparison groups are also a limitation. The goal of random assignment is to create equal groups. However, working with a relatively low number of cases (such as 24 schools) can result in the groups being imbalanced by chance. Although we attempted to address this concern by including variables in which these groups differed as controls in study analyses, we cannot dismiss the possibility that the groups represented populations of students with different characteristics not captured in our models. Therefore, we encourage larger-scale replication studies to test the generalizability of our results.

Although we included a social desirability measure to buffer the limitations of self-report data, we

acknowledge the need for more diverse data collection methods. The focus on vaginal sex limits applicability to students who engage in non-vaginal sex, and does not fully assess sexual behaviors of lesbian, gay, and bisexual students. Whereas other types of sex were addressed within the *Get Real* curriculum, the impact of the program on these behaviors was not assessed through this evaluation.

Conclusions

In sum, findings support the assertion that theory-based, developmentally appropriate, comprehensive sex education programs that include parent involvement can be effective in delaying sex for middle school students. Parent involvement may be particularly important for boys, as family activities may encourage parents to talk with their sons earlier and more frequently. These results support other findings that early sex education interventions are important for protecting youth from the negative health and academic consequences of early sexual debut.

IMPLICATIONS FOR SCHOOL HEALTH

Despite research documenting the effectiveness of comprehensive sex education programs,^{12,14} state policies vary in their requirements for sex education.⁵⁴ In addition, research shows high levels of parent support for comprehensive sex education, which is at times inconsistent with state practice and federal funding for abstinence-only sex education.^{55,56} Greater connection between research, policy, and practice can help to support programs with actual potential to reduce adolescents' risky sexual behavior.

Get Real provided online and paper resources to support parents' sexuality communication with their teens. Parents differ in their receptiveness to talking with their middle school-aged children about sexual health. In some locales more outreach and education may be needed to further develop and strengthen parent components of sex education programs. Once programs are in place, support is needed to maximize student attendance and completion of family activities in order to achieve full protective effects. School educators and counselors can encourage parents and teens to talk to each other about sex by linking them to critical resources.^{57,58}

Human Subjects Approval Statement

The research was approved by Wellesley College's Institutional Review Board and by relevant review bodies for participating schools. The study adhered to all human subjects' protections.

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