

Medical students help bridge the gap in sexual health education among middle school youth

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ABSTRACT

BACKGROUND: School-based programs are important in addressing risky teenage sexual behavior. We implemented a sex education program using trained medical student volunteers.

METHODS: Medical students (n=30) implemented a seven-session curriculum, designed by medical students and faculty, to 7th and 8th grade students (n=310) at a local school. Middle school students completed pre- and post-assessments. Teachers and medical students completed questionnaires relating their perceptions of students' attitudes and understanding of sexual health.

RESULTS: Students completing the curriculum scored 5% higher on post- versus pre-assessment (84% vs 78.7%, $p < 0.001$). Statistically significant gains were noted in knowledge of reproductive system anatomy, community resources, and sexual decision making. Sixty percent of middle school teachers compared to only 16.7% of medical student volunteers reported discomfort teaching sexual health.

DISCUSSION: Sexual education delivered by trained medical student volunteers may improve middle schoolers' understanding of sexual health.

KEYWORDS: sexual health, teen pregnancy, sexually transmitted illnesses, middle school, medical students

INTRODUCTION

Teens in the United States are nearly twice as likely to give birth as those in Canada, three times more likely than those in Spain, and 13 times more likely than those in Switzerland.¹ Each year, teenagers account for about one-fifth of all unintended pregnancies.²⁻³ In 2013, there were 26.5 births per 1000 women aged 15–19 in the U.S., indicating a 10% drop in birth rate to teens from 2012, but the overall decrease in births masks regional differences.³ Teen birth rates in Rhode Island (RI) are significantly greater than in neighboring Massachusetts, Connecticut and New Hampshire, which have the three lowest teen birth rates in the U.S.⁴ RI's most affected city, Central Falls, has a teenage birth rate that is nearly triple the national average.⁵



Sex Ed by Brown Med volunteers. The program is currently in its third year of implementation. Students are now able to receive preclinical elective credits for the program from the medical school (BIOL 6525):

<https://www.brown.edu/academics/medical/education/preclinical-electives/biol-6525>

The program was recently featured in the Teach for America magazine. <https://www.teachforamerica.org/one-day-magazine/medical-students-fill-gap-sex-education>

The consequences of early and risky sexual behavior include unintended pregnancy, sexually transmitted infections (STIs), and school dropout.⁶ The children of teen parents are more likely to drop out of high school, be incarcerated, and become teenage parents themselves.⁶ Of the 34% of high school students nationally who reported sexual activity in 2013, 22.4% reported drinking alcohol or using drugs before having sex.⁷ In 2013, 27% of RI high school students reported being sexually active, 32% did not use a condom, 10% used no method of contraception during their last sexual intercourse, and 8% reported multiple sexual partners.⁹ Additionally, 17.5% of the aforementioned students reported never learning about AIDS or HIV in school.⁹ Over the past several years the number of new HIV youth cases in RI trended downward, from 17 cases in 2009 to just 5 in 2012.¹⁰ However, in 2013, there was a sudden increase to 16 new youth HIV cases.¹⁰ In 2013, RI ranked 29th among 50 states in chlamydial infections

and 43rd in gonorrheal infections.^{11,12} Of the 4132 cases of chlamydia reported in RI that year, 27.6% were present in adolescents aged 15-19, and 17% of the 454 reported cases of gonorrhea were reported in this same age group.^{8,13}

Formal sexual education programs in schools show encouraging results. Carnegie Mellon researchers developed a successful interactive video intervention for students to attempt to reduce STIs.¹⁴ A trial of a web-based sexual education program in New Mexico demonstrated positive post-intervention results, improving high school students' understanding and self-efficacy in condom use, contraceptive intentions, and sexual health behaviors.² In Los Angeles, a rights-based sexual education program (encompassing sexuality, gender norms, and sexual rights) designed for ninth grade students improved knowledge regarding sexual health and sexual health services, produced more positive attitudes about sexual relationship rights, increased communication about sex and relationships with parents, and greater self-efficacy at managing risky situations when compared to a control group.¹⁵ These interventions demonstrate comprehensive sexual education programs are potentially successful in the community.

METHODS

Trained medical students (Teach for America alumni) and faculty at the Warren Alpert Medical School of Brown University founded Sex Ed by Brown Med, a student-led organization dedicated to teaching sexual health to middle school students in RI in 2014. The group collaborated with the RI Department of Education and the Board of the Central Falls School District to organize sex education workshops for students at a school in Central Falls – the city with the highest rates of teen pregnancy in RI.¹⁶ The objectives of Sex Ed by Brown Med include: (1) improving adolescents' knowledge of sexual health, pregnancy and STI prevention; (2) providing adolescents with a safe environment to voice concerns or experiences with sexual decision making without fear of reproach; and (3) teaching adolescents developmentally appropriate sexual risk avoidance and reduction-related knowledge, attitudes, skills, and practices.

We designed a comprehensive sex education curriculum based on the nationally validated Family Life and Sexual Health (FLASH) curriculum.¹⁷ Topics covered in the curriculum include reproductive system anatomy, teen pregnancy and parenthood, STIs, sexual decision making and communication, abstinence and birth control options, recognizing sexual violence, gender identity, and accessing community health resources. The curriculum was taught in seven 50-minute sessions during the home-room period to 8th grade students in the Fall of 2014 and 7th grade students in Spring 2015. First- and second-year medical student volunteers participated in seven 90-minute training sessions and delivered the sexual health lessons to a total of 310 middle schoolers. There were 11–15 middle schoolers, one teacher

and at least two medical student volunteers per classroom. The middle schoolers in each classroom were further separated by gender into smaller groups of 4–6 students led by a medical student of the same gender. English Language Learner (ELL) classrooms were taught by Spanish-speaking medical student volunteers.

The middle school's administrators sent an explanation of the program (in English and Spanish) and 'opt-out' slips to parents of students to inform them about the sexual education program. Students (n=3) who returned a signed copy of the 'opt-out' form were not eligible to participate in the sessions. Parental consent was implied when the parent/guardian(s) did not return the opt-out form by the set deadline.

Middle schoolers completed a pre- and post-assessment to evaluate their baseline knowledge about sexual health and their knowledge acquisition during the program. The teachers and medical student volunteers related their perceptions of middle schoolers' attitudes, understanding, and practice of sex, as well as their feelings of preparedness in teaching various sexual health topics (e.g. body image, healthy relationships, making healthy decisions, contraception, abstinence, pregnancy, STIs, sexual violence, and sexual identity) by choosing from 3 options which included "not prepared at all," "somewhat prepared," and "very prepared." The institutional review board at Memorial Hospital of RI approved the study as exempt.

Descriptive statistics were generated to characterize the sample of middle schoolers, teachers and medical student volunteers. The concepts evaluated by the middle schoolers' assessments were categorized into nine domains: Pregnancy Prevention, Reproductive System Anatomy, Puberty, General Knowledge of STIs, STI Prevention, Community Resources, Safe Sex Practices, Sexual Assault, and Sex Decision Making. Categorical variables were created for each one of the domains based upon a 60% correct cut-off point, as the passing score for assignments at the middle school level is set at 60% in all subjects. Due to student absences, more students completed the pre-assessment than the post-assessment. We presented a comparison of the baseline demographic and knowledge domains for those who only completed the pre-assessment versus those who completed both pre- and post-assessments using chi-square analysis to examine differences in these two groups (**Table 2**). Matched pre- and post-assessment data were compared using chi-square analysis to examine change in knowledge domains (**Table 3**). A paired t-test was also used to compare the continuous total knowledge score pre- and post-assessment. IBM SPSS version 20 was used for all analyses.

RESULTS

Demographic characteristics of the students, teachers, and medical student volunteers who participated in the program appear in **Table 1**. The survey response rate yielded 100% for teachers (35/35) and medical students (30/30),

62.9% for middle schoolers completing only the pre-assessment (195/310), and 30.0% for those completing both the pre- and post-assessment (94/310). Seventy-seven percent (n=27) of teachers who participated in the program were female and 40.0% (n=14) were between 30 to 39 years old. Teachers most frequently chose "Math/Art" (25.7%, n=9) and "Other/All subjects" (40.0%, n=14) as subjects they taught. Participating teachers exhibited a wide range of teaching experience, with a majority at 42.9% (n=15) reporting 11–20 years of teaching experience. Medical students were 63.3% female (n=19) and were distributed evenly among first- and second-year students at 53.3% (n=16) and 43.3% (n=13), respectively. Middle schoolers enrolled in the Sex Ed program were 45.5% male (n=140) and 47.7% female (n=148), 81.6% (n=253) between 11 and

12 years old, and 62.6% (n=194) self-identified as Hispanic.

Student performance results on pre- and post-assessments (17 questions total) appear in **Table 3**. Students' overall performance improved after completion of the program. Students scored 5% higher on the post-assessment than on their matched pre-assessment (i.e. one additional question answered correctly), which was statistically significant (84% vs 78.7%, abs diff = 5.3%, p<0.001). Assessment questions were divided into subgroups (domains) based on various themes in sexual health education. The improvement reaches statistical significance for knowledge of reproductive anatomy, STIs, and safe sex practices.

The demographics for teachers and medical students appear in **Table 1**. Survey results showed that most teachers (54.3%) and medical students (63.3%) believed that up to a

Table 1. Characteristics of Key groups involved in Sex Ed by Brown Med Program

Variable	n (%)
MIDDLE SCHOOL TEACHERS (n=35)	
Gender	
Male	5 (14.3)
Female	27 (77.1)
Refused	3 (8.6)
Age	
20-29 years	7 (20.0)
30-39 years	14 (40.0)
40-49 years	6 (17.1)
50+ years	4 (11.4)
Refused	4 (11.4)
Grades taught	
Grades 5-6	8 (22.9)
Grades 7-8	16 (45.7)
Grades 5-8	8 (22.9)
Refused	3 (8.6)
Subjects taught	
Health, PE, Science	5 (14.3)
Math, Arts	9 (25.7)
Humanities, History, Foreign Language	3 (8.6)
Other/All	14 (40.0)
Refused	4 (11.4)
Length of time teaching	
1 year or less	5 (14.3)
2-10 years	9 (25.7)
11-20 years	15 (42.9)
more than 20 years	5 (14.3)
Refused	1 (2.9)

Variable	n (%)
MEDICAL STUDENT VOLUNTEERS (n=30)	
Gender	
Male	11 (36.7)
Female	19 (63.3)
Year in medical school	
First	16 (53.3)
Second	13 (43.3)
Refused	1 (3.3)
MIDDLE SCHOOL STUDENTS (n=310)	
Gender	
Male	140 (45.2)
Female	148 (47.7)
Refused	22 (7.1)
Age	
11 years old	101 (32.6)
12 years old	152 (49.0)
13 years or older	30 (9.6)
Refused	27 (8.7)
Race/Ethnicity	
Hispanic	194 (62.6)
Non-Hispanic Black	36 (11.6)
Non-Hispanic White	27 (8.7)
Non-Hispanic Other	15 (4.9)
Unknown	38 (12.3)
Academic Grade	
Grade 7	143 (46.1)
Grade 8	167 (53.9)

quarter of their students are sexually active, and only one quarter of those sexually active students practice safe sex. Both groups also reported that sexual health resources for students are severely limited, with 60.0% of teachers and 70.0% of medical students citing that they believe that less than 25% of students have access to accurate sexual health information outside of the school setting. Only 60% of teachers discussed sexual health in their classroom during the 2013–2014 school year with 31.4% discussing it only 1–2 times. A total of 37.1% of teachers reported never discussing sexual health at all. Approximately half of teachers (51.4%) reported that zero students initiated a discussion about sexual health, while the other half (48.6%) reported that they had student-initiated talks about sexual health with at least one or more of their students.

Among teacher respondents, 60% did not feel prepared to discuss any of the mentioned topics in the survey and 14.3% cited feeling prepared to teach students in all delineated sexual health topics. Teachers expressed feeling that they were “very prepared” in discussing topics related to body image (34.3%) and healthy relationships (28.6%), and they reported feeling “not at all prepared” in facilitating discussions about good sexual decision making (31.4%), contraceptive use (34.3%), abstinence (28.3%), pregnancy (25.7%), STIs (25.7%), sexual violence (40.0%), and sexual identity (34.3%). Medical students reported feeling “very prepared” in discussing topics in body image (33.3%), healthy relationships (43.3%), contraceptive use (66.7%), abstinence (53.3%), pregnancy (46.7%), and STIs (43.3%), and reported feeling “not at all prepared” in teaching topics in sexual violence (26.7%) and sexual identity (23.3%).

DISCUSSION

Local education officials are tasked with delivery of sex education in the U.S. since no federal laws require sex education in schools; thus, standards and curriculums differ widely across the country.¹⁸ RI is one of 24 states that require that sexual health education be provided to students.¹⁹ The state requires that public schools deliver instruction that is age and culturally appropriate, medically accurate, and covers STIs.²⁰ At the school our program was based in, sex education was typically taught by the physical education teacher to about 40 middle schoolers at a time. Our program, which provided comprehensive sexual health education, was enthusiastically supported by both the Central Falls School District and the RI Department of Education.

Our results suggest that sexual health education in schools may be improved through the use of trained medical student volunteers. Sixty percent of the middle school teachers in our survey, who are charged with delivering instruction in the current model of sexual health education, reported not being prepared to discuss any of the topics in our curriculum, as compared to 16.7% of our medical student volunteers. With their specialized training in anatomy, experience

Table 2a. Comparison of Students Completing Both Pre- and Post-Assessment to Those Completing Only Pre-Assessment: Demographics

	Only Pre Completed	Both Pre/Post Completed
Variable	n (%)	n (%)
Gender		
Male	107 (54.9)	33 (35.5)
Female	88 (45.1)	60 (64.5)
Age		
11 years old	74 (38.9)	27 (29.0)
12 years old	97 (51.1)	55 (59.1)
13 years or older	19 (10.0)	11 (11.8)
Race/Ethnicity		
Hispanic	124 (68.1)	70 (77.8)
Non-Hispanic Black	26 (14.3)	10 (11.1)
Non-Hispanic White	22 (12.1)	5 (5.6)
Non-Hispanic Other	10 (5.5)	5 (5.5)
Academic Grade		
Grade 7	92 (42.6)	51 (54.3)
Grade 8	124 (57.4)	43 (45.7)

Due to student absences, more students completed the pre-assessment than the post-assessment. We presented a comparison of the baseline demographic and knowledge domains for those who only completed the pre-assessment versus those who completed both pre- and post-assessments using chi-square analysis to examine differences in these two groups.

Table 2b. Comparison of Students Completing Both Pre- and Post-Assessment to Those Completing Only Pre-Assessment: Baseline Knowledge for Sex Education Core Domains (achievement of satisfactory score*)

	Only Pre Completed	Both Pre/Post Completed	p-value
Core Domains	n (%)	n (%)	
Pregnancy prevention	192 (88.9)	85 (90.4)	0.69
Reproductive system/anatomy	140 (64.8)	76 (80.9)	0.01
Puberty	43 (19.9)	21 (22.3)	0.63
General knowledge of STIs	60 (27.8)	27 (28.7)	0.87
STI prevention	155 (71.8)	77 (81.9)	0.06
Community resources	183 (84.7)	89 (94.7)	0.01
Safe sex practices	160 (74.1)	76 (80.9)	0.20
Sexual assault	105 (48.6)	52 (55.3)	0.28
Sex decision making	128 (59.3)	68 (72.3)	0.03
Total Knowledge Percentage	130 (60.2)	74 (78.7)	<0.01
* ≥ 60% for individual domains and ≥ 65% for aggregated domains (total knowledge).			

Categorical variables were created for each one of the domains based upon a 60% correct cut-off point, as the passing score for assignments at the middle school level is set at 60% in all subjects.

Table 3a. Pre-Post Survey Results for Matched Student Surveys Showing Percent Reaching Passing Level(Passing level is defined as scoring $\geq 60\%$ for individual domains and $\geq 65\%$ for aggregated domains (total knowledge))

Domain	Overall (n=94)			7th Grade (n=51)			8th Grade (n=43)		
	Pre %	Post %	Change	Pre %	Post %	Change	Pre %	Post %	Change
Pregnancy prevention	90.4	97.9	+7.5	86.3	96.1	+9.8	95.3	100.0	+4.7
Reproductive system/anatomy	80.9	77.7	-3.2*	74.5	66.7	-7.8*	88.4	90.7	+2.3
Puberty	22.6	36.6	+14.0	20.0	38.0	+18.0	25.6	34.9	+9.3
General knowledge of STIs	28.7	45.7	+17.0	25.5	31.4	+5.9	32.6	62.8	+30.2
STI prevention	81.9	83.0	+1.1*	76.5	72.5	-4.0	88.4	95.3	+6.9
Community resources	94.7	94.7	0.0	94.1	92.2	-1.9	95.3	97.7	+2.4
Safe sex practices	80.9	83.0	+2.1*	76.5	72.5	-4.0*	90.7	90.7	0.0
Sexual assault	55.3	66.0	+10.7	54.9	66.7	+11.8	55.8	65.1	+9.3
Sex decision making	72.3	77.7	+5.4	68.6	80.4	+11.8	74.4	76.7	+2.3
Total Knowledge Percentage	78.7	84.0	+5.3*	76.5	68.6	-7.9*	90.7	93.0	+2.3

* $p < 0.01$

Table 3b. Pre-Post Survey Results for Matched Student Surveys (n=94)("Passed" is defined as scoring $\geq 60\%$ for individual domains and $\geq 65\%$ for aggregated domains (total knowledge))

Domain	Pre-Test		Post-Test		Chi-square
	# passed (n)	% passed	# passed (n)	% passed	p-value
Pregnancy prevention	85	90.4	92	97.9	1.00
Reproductive system/anatomy	76	80.9	73	77.7	<0.01
Puberty	21	22.6	34	36.6	0.50
General knowledge of STIs	27	28.7	43	45.7	0.23
STI prevention	77	81.9	78	83.0	0.01
Community resources	89	94.7	89	94.7	0.24
Safe sex practices	76	80.9	78	83.0	<0.01
Sexual assault	52	55.3	62	66.0	0.24
Sex decision making	68	72.3	73	77.7	0.65
Total Knowledge Percentage	74	78.7	79	84.0	<0.01

in discussing difficult issues in the clinical setting, and comfort teaching a variety of sexual health topics, trained medical student volunteers may be ideally suited to fill the gaps in the current model of sexual health education. Of note, however, it must be emphasized that while we believe that there are reasons to strongly favor the use of trained medical student volunteers in the delivery of sexual health instruction, we did not compare their efficacy with other trained volunteers and thus cannot determine their relative effectiveness.

While we are encouraged by our program, this particular study was limited. Our results achieved statistical significance, but our program's true efficacy will not be known for

many years as its primary objective is to reduce the teenage pregnancy rate of the students involved in the program. Given the fact that matched data on pre- and post-assessment only existed for 30% of students, it is difficult to generalize these results to all students participating in the program. The 5% increase in total knowledge indicates the potential for comprehensive sex education programs to improve participants' knowledge should the limitations outlined be addressed. Although we were fortunate to have a steady supply of medical student volunteers, it is unclear if such a group can be recruited in other areas of the country. More data will be necessary before recommending development of similar programs in other districts.

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Disclosure

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