

ORIGINAL ARTICLE

Tapping Youth as Agents for Change: Evaluation of a Peer Leadership HIV/AIDS Intervention

DEBORAH N. PEARLMAN, Ph.D., LOIS CAMBERG, Ph.D., LAURIE JO WALLACE, M.A.,
PAUL SYMONS, M.B.A., AND LORENZ FINISON, Ph.D.

Purpose: To evaluate the impact of a community-based HIV/AIDS peer leadership prevention program on newly enrolled peer leaders and youth enrolled as peer educators for one or more years (repeat peer leaders).

Methods: Quasi-experimental nonrandomized design with two intervention groups (newly enrolled and repeat peer leaders) and one comparison group. The sample consisted of 235 adolescents, 164 peer leaders, and 71 comparison youth, drawn from nine communities in Massachusetts. The intervention consisted of a short course and ongoing group work with an adult advisor to plan and implement HIV/AIDS outreach activities for youth. A confidential questionnaire administered at baseline and postintervention measured change in (a) HIV/AIDS knowledge, (b) planning and presenting skills, (c) self-efficacy, (d) perception of one's self as a change agent in the community, and (e) sexual risk-taking behaviors. Information was collected from both groups of peer leaders on specific activities resulting from the program and perceived benefits. Data were analyzed by both descriptive and multivariate statistics.

Results: Over a 9-month period newly enrolled peer leaders had significantly higher mean scores for HIV/AIDS knowledge and perception of one's self as a change agent in the community than comparison youth. On all baseline outcome measures except risk-taking behaviors, repeat peer leaders reported higher scores than newly enrolled peer leaders. Post-intervention, HIV/AIDS knowledge continued to increase significantly more among repeat peer leaders compared with those newly

enrolled in the program. Repeat peer leaders also reported more benefits from peer leadership training.

Conclusions: A peer education program was found to have benefits to adolescent peer leaders. Benefits gained from the program were sustained and enhanced over time as evidenced by repeat peer leaders included in the study. © Society for Adolescent Medicine, 2002

KEY WORDS:

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Adolescents are at increased risk for contracting the human immunodeficiency (HIV) virus [1]. Prevention education remains the foremost weapon against the spread of HIV among youth. Many strategies have been developed to promote awareness of HIV risk, facilitate open discussion about HIV and other sexually transmitted diseases (STDs), and establish group norms in support of safer sex behavior. Peer education is one strategy that shows promise for educating young people about HIV/AIDS prevention [2], but the model has not been rigorously evaluated [3].

The short-term impact of HIV/AIDS peer education programs on youth audiences is well-documented. Studies evaluating peer education have shown a statistically significant intervention effect on adolescents' HIV/AIDS-related knowledge [4-11], attitudes or beliefs about risky sexual behaviors [6-8,12], self-efficacy [4,11], resistance to negative peer pressure about use of condoms [4-5], and

From the Medical Foundation, Boston, Massachusetts (L.J.W., L.F.); and Brandeis University, Waltham, Massachusetts (P.S.).

Dr. Pearlman is currently affiliated with Brown University; Dr. Camberg is currently an independent consultant.

Address correspondence to: Deborah N. Pearlman, Ph.D., Brown University, Box G-B 213, Providence, RI 02912. E-mail: deborah_pearlman@brown.edu.

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involvement in activities to help other youth avoid unprotected sex [4,11–12]. Some studies have shown changes in risk behaviors (e.g., intention to practice safer sex, delay of first sexual intercourse, use of condoms) [7,9–12], but only three used a comparison group design [7,9,11]. A rigorously designed study of middle school youth found that peer education did not have short-term effects on students' sexual or contraceptive behaviors [6]. Findings describing the long-term effects of peer education on HIV-related knowledge, attitudes and behavior change are unusual [6,13]. Little published work reports on the effect of HIV/AIDS peer education on the peer leaders themselves [4,7,11,12]. No published articles have focused on adolescents who enroll as peer leaders for more than one year (repeat peer leaders).

The present study evaluates the impact of a community-based statewide HIV/AIDS peer leadership prevention program on newly enrolled peer leaders and repeat peer leaders. The Protect Teen Health program, now in its 10th year, trains youth living in Massachusetts' communities with high rates of STD and HIV infection to become peer educators for HIV prevention.

Methods

Design

A quasi-experimental nonrandomized design was used. The sample consisted of 235 adolescents drawn from nine communities in Massachusetts. Peer leaders ($n = 164$) were recruited from Protect Teen Health Programs in Boston ($n = 34$), Cambridge ($n = 15$), Brockton/New Bedford ($n = 15$), Lawrence ($n = 18$), Salem ($n = 16$), Framingham ($n = 16$), Worcester ($n = 9$), Springfield ($n = 37$), and Holyoke ($n = 4$). Adolescents participating in community and school-based programs served as a comparison group ($n = 71$). The community programs offered health-related services such as parenting skills for teenage mothers. School-based health education classes covered a broad range of topics, including human sexuality. Sex education, however, focused on reproduction and the unit was not designed to help youth understand social and peer pressures to have sex or to develop and apply resistance skills to peer pressure. None of the comparison youth came from programs that used peer education as an approach to adolescent health promotion.

Priority was placed on matching newly enrolled peer leaders and a comparison group by age, gender, and race/ethnicity. Most comparison youth had

some knowledge of HIV/AIDS. In the 1999 Massachusetts Youth Risk Behavior Survey a majority of high school students (93%) knew about HIV/AIDS [14].

The intervention consisted of two components: (a) a short Peer Leadership Preventing AIDS course required of all youth who wanted to be a peer leader, and (b) ongoing group work with an adult advisor to learn about HIV transmission, to model and practice communication and negotiation skills around sexual risk-taking behaviors, and to plan HIV-related activities for other youth. Peer leaders were paid \$6.00 to \$7.00 per hour of training and were considered employees of the local agency sponsoring the Protect Teen Health program over the 9-month intervention period.

Parental consent was sought in a written form (English and Spanish) given to all participants. Only teens with signed permission slips participated in the study. Identical surveys were administered at baseline and at the end of the 9-month intervention. This allowed the measurement of short-term effects for newly enrolled peer leaders and long-term effects for repeat peer leaders. Both surveys measured: (a) HIV/AIDS knowledge, (b) planning and presenting skills, (c) self-efficacy, (d) perception of one's self as a change agent in the community, and (e) sexual risk-taking behavior. In addition, the end-of-study survey for peer leaders included questions on outreach activities and peer leaders' perceptions of the Protect Teen Health Program. The survey instruments were pilot-tested with 58 newly enrolled peer leaders and 24 comparison group youth matched to peer leaders on age, race/ethnicity, and gender.

The Medical Foundation (Boston, Massachusetts) designed and conducted the evaluation. All study procedures were approved by the Massachusetts Department of Public Health HIV/AIDS Bureau and formally presented to the Medical Foundation's board of directors to ensure that the study protected the anonymity and confidentiality of participants.

In all locations, all reasonable precautions were taken to ensure confidentiality. A statement ensuring that all information would remain confidential and anonymous was read before administering the baseline and end-of-study surveys and was printed on the cover page of the surveys. Only those who expressed an interest in doing the surveys completed the questionnaires. Participation in the Protect Teen Health program was not affected by an adolescent's refusal to participate in the survey. Participants put their completed questionnaires in a separate envelope and sealed the envelope before they were

Table 1. Baseline Characteristics of Sample

Characteristics	Study I ^a		Study II ^a	
	New Peer Leaders (n = 97)	Comparison Youth (n = 71)	New Peer Leaders (n = 97)	Repeat Peer Leaders (n = 67)
Age				
Mean age (yrs)	15.2	15.6	15.2	16.6**
Gender	% (n)	% (n)	% (n)	% (n)
Female	66.0 (64)	58.6 (41)	66.0 (64)	69.7 (46)
Male	34.0 (33)	41.4 (29)	34.0 (33)	30.3 (20)
Race/ethnicity				
Hispanic	40.6 (39)	31.4 (22)	40.6 (39)	31.3 (21)
Black	12.5 (12)	22.9 (16)	12.5 (12)	19.4 (13)
White	25.0 (24)	32.9 (23)	25.0 (24)	17.9 (12)
Other races	21.9 (21)	12.9 (9)	21.9 (21)	31.3 (21)
Sexually active				
No	69.1 (67)	54.9 (39)	69.1 (67)	62.7 (42)
Yes	30.9 (30)	45.1 (32)	30.9 (30)	37.3 (25)
Pressured to have sex				
No	63.2 (60)	52.1 (37)	63.2 (60)	63.6 (42)
Some/a lot	36.8 (35)	47.9 (34)	36.8 (35)	36.4 (24)
Chance of getting HIV				
Not high	74.7 (71)	77.1 (54)	74.7 (71)	85.1 (57)
High/very high	25.3 (24)	22.9 (16)	25.3 (24)	14.9 (10)

** $p < .01$.

^a Sample size for specific characteristics may be less than total sample owing to missing data.

mailed to the outside evaluator. The evaluator and persons responsible for supervising and/or employing participants were not involved in questionnaire administration. Confidential identification numbers were used to match baseline and end-of-study questionnaires and to ensure that the evaluator could link the surveys without using participants' names.

Measures

Demographics and sexual history. Ages in years, gender, race/ethnicity, self-report of sexual experience, pressure to be sexually active, and perceptions of personal risk of getting HIV were measured. Table 1 displays the categories for these variables.

Knowledge of HIV/AIDS. Six items tested information concerning HIV/AIDS transmission and high-risk behaviors. Knowledge was scored as the sum of correct responses (1 = "correct"; 0 = "incorrect"). The possible test score range was 0 to 6. The six items came from the Peer Leadership Preventing AIDS curriculum [15].

Knowledge of planning and presenting skills. To measure knowledge of planning and presenting skills, peer leaders responded to a scenario describing the need to organize an HIV/AIDS activity in the com-

munity. The comparison group responded to a scenario describing the need to organize an HIV/AIDS activity in their school. Eight items, each with a 4-point response scale, were used, including questions on knowing who will be in the audience, getting others to help plan, and knowing how to stop anti-gay comments and jokes. Response options ranged from "not important" to "very important." Based on an examination of participants' responses at baseline, each item was collapsed as follows: 0 = "not important/somewhat important," and 1 = "important/very important." There was a possible score range of 0 to 8, δ reliability was .62.

Self-efficacy. Seven items, each with a 4-point response scale, measured self-efficacy. The scale was developed and validated by Rosenberg [16], and measured adolescents' control over their daily lives (e.g., "There is little I can do to change many of the important things in my life," "I can do just about anything I really set my mind to do"). Response options ranged from "strongly agree" to "strongly disagree." Self-efficacy was scored as the sum of the 7 items and ranged from 0 to 28, δ reliability was .70.

Perception of self as a change agent. Participants were asked to rate their level of confidence in educating others about HIV/AIDS transmission and

prevention (e.g., talking to students at their school, talking to same-age peers, talking to adolescents who self-identify as being gay, lesbian, or bisexual). A 4-point response scale ranged from "very confident," "confident," "somewhat confident," and "not confident." Perception of self as a change agent was scored as the sum of 10 items and ranged from 0 to 40, δ reliability was .86. A group with expertise in peer leadership and HIV/AIDS prevention developed the scale.

Sexual risk-taking behavior. To measure sexual risk-taking behavior, a 3-item scale was developed using questions asking participants about having vaginal, oral, and/or anal sex in the 3 months prior to the survey, and frequency of condom use ("never," "sometimes," "always"). Responses were assigned a risk score: 0 for "never had sex," 5 for "minimal risk" (sexually active and always use condom), 10 for "some risk" (sexually active and sometimes use condom), and 15 for "substantial risk" (sexually active and never use condom). There was a possible score range of 0 to 45, δ reliability was .79. In addition, each item was analyzed separately, and the scale score range was from 0 to 15.

Perceptions of the Protect Teen Health program. Eight items, each with a 4-point response scale, measured peer leaders' perceptions of the benefits of the Protect Teen Health program (e.g., become a better leader, make it easier for young people to get HIV/AIDS information). Response options were coded as follows: 0 for "no, a little or some benefit," 1 for "substantial benefit." An activity list on the end-of-study survey was used to document outreach activities.

Analysis

Analyses were conducted using an intention-to-treat protocol, irrespective of the number of Protect Teen Health activities peer leaders attended. Study I compared newly enrolled peer leaders and a comparison group of youth. Study II compared newly enrolled and repeat peer leaders.

Data were analyzed by both descriptive and multivariate statistics. To examine differences between baseline and end-of-study scores, multiple regression models were used with age, race/ethnicity, gender, and the relevant baseline score for the domain in question entered as covariates. Race/ethnicity was entered as three dummy variables with Whites serving as the reference group. To examine

differences between newly enrolled peer leaders and comparison youth, intervention status (1 = "new peer leader," 0 = "comparison youth"), was entered into the model for study I. Repeat peer leaders were excluded from the analyses because this group had been exposed to the intervention. To test for the dose effect, number of years as a peer leader was entered into the model for study II (1 = "5 years," X = "2.0 years"). The model excluded comparison youth because, by definition, their intervention dose was 0. To examine peer leaders' perceptions of the benefits of program participation, logistic regression analyses were used with intervention exposure (0 = "newly enrolled peer leader," 1 = "repeat peer leader") and age entered as covariates. Data were analyzed using the SPSS software package [17].

Results

Characteristics of Peer Leaders

Table 1 displays the characteristics of study groups I and II. There were no significant demographic differences between newly enrolled peer leaders and comparison group youth, except for age. Newly enrolled peer leaders were slightly younger than comparison youth. Most newly enrolled peer leaders and comparison youth reported that they were not sexually active, did not feel pressured to have sex, and did not perceive their risk of HIV infection as high.

Repeat peer leaders were, on average, 1.4 years older than newly enrolled peer leaders (16.6 years vs. 15.2 years, $p < .01$), but there were no significant differences between the two intervention groups by gender or race/ethnicity. Comparable proportions of newly enrolled and repeat peer leaders reported that they were not sexually active and did not feel pressured to have sex.

Baseline Scores for Study Domains

The five multi-item measures of program domains were compared at baseline for newly enrolled peer leaders and comparison youth (Table 2, Study I). The mean score for perception of self as a change agent was slightly higher for newly enrolled peer leaders than for comparison youth (30.3 vs. 27.7, $p = .01$). There were no statistically significant differences for the other four domains.

There were significant differences between newly enrolled and repeat peer leaders' scores on four of the five domains at baseline (Table 2, Study II).

Table 2. Comparison of Questionnaire Scores at Baseline by Study Group

Domain ^a (Score Range)	Study I			Study II		
	New Peer Leaders (n = 97) Mean Score	Comparison Youth (n = 71) Mean Score	<i>p</i>	New Peer Leaders (n = 97) Mean Score	Repeat Peer Leaders (n = 67) Mean Score	<i>p</i>
Knowledge of HIV/AIDS (0 to 6)	3.4	3.5	ns	3.4	3.9	.04
Knowledge of planning and presenting skills (0 to 8)	6.1	6.1	ns	6.1	6.8	.01
Self-efficacy (0 to 28)	21.8	22.3	ns	21.8	23.2	.01
Perception of self as change agent (0 to 40)	30.3	27.7	.01	30.3	32.9	.01
Sexual risk-taking behaviors (0 to 45)	5.3	7.7	ns	5.3	4.6	ns

^a Only domains measured as interval variables shown in table. Each domain coded so the outcome has the highest value. ns = not statistically significant.

Compared with newly enrolled peer leaders, repeat peer leaders had significantly higher mean scores on knowledge of HIV/AIDS, knowledge of planning and presenting skills, self-efficacy, and perception of self as a change agent. No significant differences were found for sexual risk-taking behaviors.

Outcomes

Of the five multi-item outcome measures, there were significant differences in two of them: (a) knowledge about HIV/AIDS transmission and high-risk behaviors, and (b) perception of self as a change agent for

HIV education and prevention. At 9 months, newly enrolled peer leaders have had significantly more knowledge about HIV/AIDS than comparison youth. Although not statistically significant, trends suggested potential differences in HIV/AIDS knowledge between girls and boys (Table 3, Model I). In the model estimated for peer leaders only, number of years enrolled as a peer leader proved to be important. After 9 months, repeat peer leaders were more knowledgeable about HIV/AIDS than those newly enrolled in the program (Table 3, Model II).

For perception of self as a change agent, there were significant differences between newly enrolled

Table 3. Pre- to Post-intervention Changes in HIV/AIDS Knowledge^a

Dependent Variable HIV/AIDS Knowledge	Model I ^b		Model II ^b	
	New Peer Leaders vs. Comparison		Peer Leaders Only	
	Coefficient (<i>t</i> -statistic)	<i>p</i>	Coefficient (<i>t</i> -statistic)	<i>p</i>
Independent variables				
Group status	Not entered in Model II			
Comparison youth	Reference			
New peer leaders	.244 (3.126)	.002		
Number years peer leader	Not entered in Model I	.205 (2.250)	.026	
Baseline knowledge score	.001 (-.005)	ns	.053 (.657)	ns
Age (yrs)	.013 (.164)	ns	.115 (1.235)	ns
Gender				
Male	Reference			
Female	.140 (1.815)	.071	.030 (.380)	ns
Race/ethnicity				
White	Reference			
Hispanic	-.102 (-1.075)	ns	-.116 (-1.143)	ns
Black	-.146 (-1.628)	ns	-.037 (-.393)	ns
Other	-.077 (-.835)	ns	-.064 (-.655)	ns
Constant	3.040 (2.552)	.012	2.428 (2.063)	.041
Variation explained (R ² unadjusted) .103 (R ² adjusted) .063	Variation explained (R ² unadjusted) .104 (R ² adjusted) .064			
Significance of model F = 2.565 <i>p</i> = .016	Significance of model F = 2.561 <i>p</i> = .016			

^a Pre- to post-intervention was 9 mos.

^b Multivariate regression model. Standardized regression coefficients (Betas) shown. ns = not statistically significant.

Table 4. Pre- to Post-intervention Changes in Perception of Self as Change Agent^a

Dependent Variable	Model III ^b		Model IV ^b	
	New Peer Leaders vs. Comparison		Peer Leaders Only	
Perception of Self as Change Agent	Coefficient (t-statistic)	p	Coefficient (t-statistic)	p
Independent variables				
Group status			Not entered in Model IV	
Comparison youth	Reference			
New peer leaders	.239 (3.236)	.001		
Number years peer leader	Not entered in Model III	-.032 (-.393)	ns	
Baseline change agent score	.220 (2.958)	.004	.346 (4.713)	<.001
Age (yrs)	.178 (2.367)	.019	.251 (3.011)	.003
Gender				
Male	Reference			
Female	.207 (2.839)	.005	.157 (2.191)	.030
Race/ethnicity				
White	Reference			
Hispanic	-.050 (.570)	ns	-.122 (-1.323)	ns
Black	-.055 (-.667)	ns	-.074 (-.880)	ns
Other	-.074 (.881)	ns	-.024 (-.276)	ns
Constant	8.048 (1.344)	ns	6.730 (1.153)	ns
Variation explained (R ² unadjusted) .240 (R ² adjusted) .205		Variation explained (R ² unadjusted) .273 (R ² adjusted) .240		
Significance of model F = 6.977 p < .001		Significance of model F = 8.227 p < .001		

^a Pre- to post-intervention was 9 mos.

^b Multivariate regression model. Standardized regression coefficients (Betas) shown.

ns = not statistically significant.

peer leaders and comparison youth. Intervention status was significant even after controlling for the pre-intervention change agent score, indicating that newly enrolled peer leaders benefited from their training as change agents for HIV prevention. Age and gender also were significant; that is, older adolescents and girls expressed greater confidence in being agents of change for HIV/AIDS prevention than younger adolescents and boys (Table 4, Model III). Statistically significant differences were not found between newly enrolled and repeat peer leaders for perception of self as a change agent. Among peer leaders, older adolescents and girls were more likely to see themselves as role models for HIV/AIDS prevention than younger-aged adolescents and boys (Table 4, Model IV).

Identifying the factors associated with sexual risk-taking behaviors was more difficult as most respondents reported that they were not sexually active. Less than one-third of newly enrolled peer leaders (30.9%), 34.3% of repeat peer leaders and 45.1% of comparison youth indicated that they were sexually active in the 3 months prior to the survey ($p = .16$). Among sexually active youth ($n = 85$, 36%), no significant differences were found at baseline between the comparison youth and the two intervention groups in type of sexual intercourse (oral, anal,

or vaginal) or consistency in condom use, using ANOVA (data not shown).

No statistically significant differences were found between comparison youth and newly enrolled peer leaders (Study I) or between newly enrolled and repeat peer leaders (Study II) using the 3-item sexual risk-taking scale as the dependent measure or using each scale component as dependent measures. In all analyses, only the pretest score for sexual risk-taking behavior was statistically significant, suggesting that the pre-intervention risk score, whether a young person was sexually active or not yet sexually active, was the only factor that influenced sexual behavior 9 months later. In the analyses for newly enrolled peer leaders and comparison youth, a nonsignificant trend suggested that boys were more likely to engage in sexual risk-taking behaviors than girls ($p = .07$, data not shown).

Perception of Protect Teen Health

Over 9 months, newly enrolled and repeat peer leaders implemented over 300 outreach activities in their schools and neighborhoods (data not shown). The activities ranged from putting on skits in school to hosting "safety net parties." A safety net party is a group skill-building activity that helps youth talk

Table 5. Logistic Regression Results for Peer Leaders' Perceptions of the Protect Teen Health Program^a

Dependent Variables	Agree A Lot		Exp (B)	p
	Newly Enrolled vs. Repeat Peer Leaders			
	% (n)	% (n)		
Improved ability to make presentations	59.1 (55)	78.8 (52)		.008
<i>Covariates</i>				
Peers			Reference	
Newly enrolled			2.37	.03
Repeats			1.06	.65
Age				
Better leadership skills	57.9 (55)	77.3 (51)		.010
<i>Covariates</i>				
Peers			Reference	
Newly enrolled			2.32	.03
Repeats			1.04	.72
Age				
Greater acceptance of people different from self	46.8 (44)	67.7 (44)		.009
<i>Covariates</i>				
Peers			Reference	
Newly enrolled			2.03	.05
Repeats			1.13	.32
Age				
Higher self-esteem	40.8 (38)	60.3 (38)		.012
<i>Covariates</i>				
Peers			Reference	
Newly enrolled			2.31	.02
Repeats			.99	.93
Age				

^a Post-intervention results.

about methods of protection to reduce the risk of HIV infection in a safe setting.

Peer leaders identified the impact of the Protect Teen Health program on themselves and the community. There were significant differences between newly enrolled and repeat peer leaders in reported benefits from program participation, using logistic regression analysis and controlling for age. The benefits for repeat peer leaders included greater acceptance of people different from one's self, higher self-esteem, better leadership skills, and improved ability to make a presentation. There were no significant differences between repeat peer leaders and newly enrolled peer leaders in perceptions of the impact of the program on the community (Table 5).

Discussion

This first outcome evaluation of the Protect Teen Health program examined the impact of a peer leadership program on newly enrolled adolescent peer leaders and adolescents who re-enrolled as peer educators (repeat peer leaders). To determine program effectiveness we compared newly enrolled

peer leaders and a comparison group. To assess durability of results we compared newly enrolled and repeat peer leaders. To date, the published literature has not addressed the effect of peer leadership prevention programs on adolescents who reenroll as peer leaders.

The analyses of these study data suggest that peer leadership can be an effective strategy for increasing adolescent peer leaders' knowledge about HIV and confidence to be a change agent for HIV information. Nine months after the initiation of the evaluation newly enrolled peer leaders were more knowledgeable about HIV/AIDS and more confident about being youth leaders for HIV prevention than the comparison group.

The intervention had both lasting and value-added benefits for program participants who re-enrolled as peer leaders. During the study period, HIV/AIDS knowledge increased more among repeat peer leaders than those newly enrolled in the program. Moreover, the finding that repeat peer leaders were not engaging in more sexual risk-taking behaviors than newly enrolled peer leaders might be seen as evidence of the success of the Protect Teen Health

program in helping youth avoid high-risk situations, even among older adolescents. Although knowledge alone is insufficient to change behavior, an increased understanding of HIV/AIDS may be a necessary prerequisite to change behaviors that put one at risk of HIV transmission [18].

The perceived benefits of peer leadership were greater for repeat peer leaders than those newly enrolled in the program, even after controlling for age differences between the two groups. The majority of repeat peer leaders reported improved presentation and leadership skills, greater acceptance of people different from one's self, and higher self-esteem. Our findings support the growing body of evidence that adolescent peer leaders benefit most from their training when they have a sufficient window of opportunity to implement activities that are meaningful to themselves, for which they assume responsibility and have some control [19–20].

Limitations in our study design must be considered. First, the quasi-experimental design was necessary to evaluate a program that was already functioning and to ensure "buy-in" by agencies sponsoring the Protect Teen Health program. This resulted in lack of subject randomization. Since the primary focus of Protect Teen Health is to train peer leaders to educate other youth about HIV, some selection bias based on commitment and motivation is probable in recruiting adolescents to a peer leadership program. There also may have been selection bias in retention of repeat peer leaders. Adolescents who chose to reenroll in Protect Teen Health may have been more likely than those who dropped out of the program to see peer leadership training as a beneficial experience. On the other hand, Protect Teen Health recruits at-risk youth from low-income communities. Those who dropped out of the program also may have seen peer leadership training as beneficial, but the program stipend may have been insufficient to keep them in the program. Future studies need to employ a randomized design to measure the longer-term effect of peer leadership on adolescents who reenroll as peer educators and those who drop out.

Second, this study evaluated a multi-centered intervention environment. Although the Peer Leadership Preventing AIDS course uses a standardized curriculum, the 9 months of ongoing training and outreach activities did not follow a standard protocol. Peer leaders, with the support of their adult advisor, selected and developed their own youth-focused outreach activities in response to the need for HIV/AIDS education in the local community and

schools. Accounting for additional variation in interventions modified to meet local needs might prove useful.

Third, this study relied on self-reported measures rather than observed behavior changes. As with all evaluations that rely on self-reported sexual behavior data, there exists the possibility that young people may be reluctant to reveal information about their sexual activity and may have tended toward socially acceptable responses [21]. Although our data on frequency of sexual activity among adolescents are consistent with 1999 Massachusetts Youth Behavior Survey data, which can be generalized to apply to public high schools across Massachusetts [14], some overreported and some underreported behavior may nevertheless have occurred in our study. Such inaccuracies, however, apply equally across the study groups and thus do not invalidate our conclusions [21,22]. The small sample of sexually active adolescents in this study and low statistical power available for subgroup analyses suggest caution, however, in interpreting the results for sexual risk-taking behaviors.

Given findings from our study, as well as others attempting to modify adolescents' HIV-related knowledge, attitudes and sexual risk-taking behaviors [4–13], there is a need to investigate further which components of peer leadership programs are particularly important for helping young people become informed and credible peer educators with the confidence to avoid high-risk situations that may lead to HIV infection. Research on peer-led interventions implemented in classroom settings generally find that effective programs convey positive regard for peer educators, are well-organized, and have adult advisors that adolescents perceive as empathetic and similar to themselves in terms of characteristics such as race/ethnicity [23]. To this list we add the incorporation of incentives to retain adolescents in leadership roles as peer educators. It may be unrealistic to expect any adolescent HIV/AIDS peer leadership program to modify young people's sexual risk-taking behaviors without intensive and sustained participation of those enrolled in the program [24].

Retaining young people as HIV/AIDS peer educators is challenging. Peer leadership prevention programs demand a great deal from participants. Peer leaders must buy into HIV/AIDS prevention, champion HIV/AIDS prevention messages to adolescent and young adult audiences, and apply HIV/AIDS prevention in their own daily lives despite social pressures and other barriers that often inhibit

condom use. Nevertheless, the sustained involvement of young people as HIV/AIDS peer educators has the potential of helping adolescent peer leaders become more knowledgeable about AIDS prevention and theoretically enhances the possibility of behavior change. Additionally, the role of young people as agents of change should not be underestimated. The strength of the peer leadership intervention evaluated in our study was its ability to train young people to effectively contribute to HIV/AIDS awareness in their schools and communities. Supervised training of adolescents to develop and deliver HIV/AIDS prevention messages to other youth is a viable and effective means of increasing adolescent peer leaders' confidence to participate meaningfully in community health HIV/AIDS prevention efforts.

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