

THE EFFECTIVENESS OF A SCHOOL-BASED HIV EDUCATION PROGRAM: A LONGITUDINAL COMPARATIVE EVALUATION

William F. Boyce
Wendy K. Warren
Alan J.C. King
Social Program Evaluation Group
Queen's University
Kingston, Ontario

Abstract: A school-based HIV/AIDS/STD education program was carried out and evaluated in four provinces. The Skills for Health Relationships program was developed from a conceptual model and included knowledge, attitudes, skills, and motivational supports. Teachers were trained in delivering the program and were given instruction on how to recruit and train student peer group leaders and how to encourage parental involvement. The evaluation used a quasi-experimental comparison group design with a student pre-test and three post-tests over a two-year period. The comparison group received their schools' usual sex education curriculum. The intervention group gained significantly in knowledge about STDs, in attitudes towards people living with AIDS, in intentions to communicate assertively in sexual situations, and in condom use skills. There were no significant differences in the proportions of students being sexually active or in actual use of condoms. The effect of a peer strategy was minimal in changing group norms.

Résumé: Un programme d'éducation VIH/SIDA/MTS dans les écoles fut mis en exécution et évalué dans quatre provinces. Le programme des compétences pour des relations saines fut développé à partir d'un modèle conceptuel et incluait connaissances, attitudes, habilités, et appuis motivateurs. Les professeurs étaient formés à livrer le programme, et des directives furent données sur comment recruter et former les dirigeants de groupe étudiant de support par les pairs et comment encourager l'implication des parents. L'évaluation a utilisé un projet de groupe de comparaison quasi-expérimental avec un pré-test étudiant et trois post-tests sur une période de deux ans. Le groupe de comparaison a suivi le curriculum habituel d'éducation sexuelle de leurs écoles. Le groupe d'intervention a avancé d'une façon significa-

tive en connaissances au sujet des maladies transmises sexuellement, en attitudes envers les personnes atteintes de SIDA, en intentions de communication affirmative dans les situations sexuelles, et en habilités d'utilisation du préservatif. Il n'y avait pas de différence significative dans les proportions d'étudiants sexuellement actifs ou dans l'utilisation actuelle de préservatif. L'effet d'une stratégie de soutien par les pairs fut minimale à changer les normes de groupe.

■ A recent United Nations and World Health Organization report warns that infection rates for HIV are exploding among teenagers and young adults, with 15 to 24 year olds accounting for one half of new infections worldwide (UNAIDS & WHO, 1998). HIV/AIDS educational programs for youth, both in schools and community settings, have been implemented widely since the 1980s. However, there is still a fear that AIDS education programs may cause young people to become more sexually active (Coates, 1992). An important question is whether prevention and educational programs are associated with improvements in knowledge and, most importantly, changes in risk behaviour.

The purpose of this article is to describe the effectiveness of a school-based risk reduction program for HIV/AIDS/STDs and pregnancy. Grade 9 Canadian youth in four provinces are the focus in the study because, at this age, many young people begin to engage in sexual activity and are vulnerable to unplanned pregnancy and contracting and transmitting sexually transmitted infections (King et al., 1988).

LITERATURE REVIEW

We briefly review epidemiological research in sexually transmitted diseases as well as research on youth knowledge, risk behaviours, and effectiveness of prevention programs. The rate of HIV infection in Canadian youth is relatively low, especially for infection transmitted through behavioural risks rather than through blood products (Bureau of HIV/AIDS & STD, 1996; Health Canada, 1998). The low rate appears to be due to a low incidence of "highest risk behaviours" (anal intercourse, intravenous drug use) in the majority heterosexual adolescent population. It also reflects the reality that most youth have not had extensive numbers of sexual contacts and thus their cumulative risk for HIV is low (Thomas, DiCenso, & Griffith, 1998).

On the other hand, viral sexually transmitted diseases (STDs), especially genital herpes and venereal warts, are on the increase (Bureau of HIV/AIDS & STD, 1996). Genital chlamydia is the most common bacterial STD, and its incidence is highest among youth 15–19 years of age. Although these problems are not generally life-threatening and can be treated with good results, STD infections do pose a serious long-term threat to health. For example, the virus associated with venereal warts is believed responsible for nearly 85% of cervical cancer (Picker, 1995), and genital chlamydia can cause pelvic inflammatory disease if left undetected. An untreated STD infection can also increase the risk of HIV transmission by causing micro-lesions in the genital area (Piot, 1988). Finally, although births to females aged 15 to 19 years comprise only about 5% of all Canadian births, the pregnancy rate for this age group increased by 15% between 1987 and 1995 (Canadian Council on Social Development, 1998; Statistics Canada, 1995).

An assessment of the knowledge, attitudes and behavioural practices of over 38,000 young people aged 12, 14, 16, 18, and 19 years was undertaken in Canada in the late 1980s (King et al., 1988). The *Canada Youth and AIDS Study* reported findings from a representative sample of youth on a national basis as well as for each Canadian province and territory. Results showed that young Canadians were able to accurately define AIDS and were knowledgeable about routes of transmission, but a large proportion did not know the benefits of using condoms and spermicides to protect themselves against HIV infection and knew even less about protection from STDs. Since this study, no national data on student knowledge, attitudes, and/or behaviours have been collected in Canada, although numerous smaller scale studies have been conducted.

The bombardment of HIV/AIDS information from a variety of sources in the public domain has resulted in a high level of knowledge about sexually transmitted infections and safer behavioural intentions among youth (Brown, Barone, Fritz, Cebollero, & Nassau, 1991; Brown, Fritz, & Barone, 1989; DiClemente, 1989; Huszti, Clopton, & Mason, 1989; Lanier & McCarthy, 1989; Ramsum, Marion, & Mathias, 1993; Rickert, Gottlieb, & May, 1990.) However, in general, researchers consistently report a discontinuity between students' knowledge of HIV risks, and their sexual attitudes and behaviours. Changes in the actual risk behaviours of young people are the best measures of progress in the area of HIV prevention in youth. However, about one-quarter to one-third of sexually active

Canadian adolescents report that they do not use any method of contraception at first intercourse (Schnirer, 1996; Wadhera & Millar, 1997). Despite widespread educational and health-promotion initiatives, young people continue to engage in unprotected sexual intercourse (Bibby & Posterski, 1992; Myers & Clement, 1994; Otis, Longpre, Gomez, & Thomas, 1994; Ramsum et al., 1993; Schnirer, 1996; Wadhera & Millar, 1997). However, most studies fail to identify a consistent relationship between condom use and demographic variables, AIDS knowledge, fear, or number of sexual partners, indicating that a complex set of factors are at play.

The emphasis in Canadian school-based sexual health curriculum has generally been on the development of HIV/AIDS knowledge and, to a lesser degree, attitudes, while attention paid to skills development and motivational elements has been minimal. Recent reviews of the HIV prevention literature and the existing Canadian Provincial Education Ministry/Department curricular guidelines indicate a number of limitations of current HIV/AIDS educational efforts (CMEC, 1999; Radford, 1998). AIDS-related interventions and curricula have tended to be atheoretical; have not assessed pre-intervention knowledge, attitudes, skills, and motivators; and have rarely provided the skills training required to practice AIDS preventive behaviours (Boyer & Shafer, 1990; Kelly, St. Lawrence, Betts, Brasfield, & Hood, 1990; Kelly, St. Lawrence, Hood, & Brasfield, 1989 are exceptions). Interventions have also neglected to include motivators for behavioural change and have not systematically evaluated the curriculum delivery process. Furthermore, these data can only be generalized to in-school adolescents. Thus, the relationship between HIV education, or knowledge acquisition, and risk behaviour remains unclear at this time.

Many of the existing HIV education evaluation efforts fall short of definitive research. One systematic review in Great Britain indicated that only one in five evaluation studies was methodologically sound (Peersman & Levy, 1998). Fullerton, Holland, and Oakley (1995) reviewed the program evaluation efforts of European AIDS/HIV researchers and concluded that only a small proportion of HIV/AIDS prevention interventions had been evaluated in such a way as to come to reliable conclusions about demonstrated effectiveness. Methodological problems with evaluation work included a lack of adequate control groups, small or unbalanced sample sizes, and the failure to take account of substantial and differential attrition between intervention and control groups. One example of a controlled

study of knowledge acquisition was conducted by Hamalainen and Keinanen-Kiukaanniemi (1992) who considered the effect of a 45-minute lesson on HIV/AIDS knowledge and attitudes with 15-year-old school children in 18 classes in nine elementary schools in Oulu, Finland. An increase in HIV/AIDS knowledge following the lesson was demonstrated in the intervention group, however follow-up evaluation of knowledge and behaviours was not undertaken. While increased knowledge is a desired impact of HIV/AIDS educational efforts, there is no demonstrated link between knowledge and behaviour, and follow-up behavioural assessments are often not included in HIV/AIDS education evaluation studies.

In sum, there have been few comparative evaluations with appropriate follow-up of school-based HIV prevention programs applied to a broad spectrum of youth. The purpose of this article is to report on a study of the effectiveness of an HIV prevention program in four provinces in Canada. The overall intent of the evaluation was to determine effectiveness in important outcome areas of a new school-based approach to HIV education. Due to resource limitations and to the multiple sources of variation in program delivery across provincial jurisdictions, the evaluation was not designed to be a tightly controlled study of the process of teacher and peer leader training nor a comprehensive study of class and home activities. These controlled approaches are suitable for demonstrating the effectiveness of model pilot programs, although there are often severe limitations in their application to real school settings.

INTERVENTION

The new program was introduced in the same manner in which educational innovations are commonly disseminated across Canada — through in-service training of interested teachers and through provision of written materials. This approach, while neither controlling nor maximizing the strength of intervention elements, reflects the reality of Canadian teacher professional education and may illustrate the program results one can expect in real school situations.

Conceptual Model

The intervention program, Skills for Healthy Relationships (SHR), was based on a global review of HIV/AIDS/STD education (King & Wright, 1990) and on a conceptual model that placed emphasis on

the acquisition of knowledge, responsible attitudes (including behavioural intentions), motivational supports, and skills development — all factors believed to influence behavioural change (Ajzen & Fishbein, 1980; King et al., 1989). The program was developed after careful examination of the AIDS education and prevention literature, all of the Canadian provinces' and territories' Ministry of Education guidelines, and consultation with advisors and teachers of health education. The conceptual framework was based on the generally accepted health education principle that the development of healthy behaviours requires not only the transmission of knowledge but also depends on the adoption of healthy attitudes and appropriate skills. The importance of external motivational supports is reflected by a focus on activities mediated by youth peer leaders and cooperative learning. Parent participation was also encouraged to foster better communication about sexuality and support for the youth in the home.

Goals and Objectives

The SHR program was intended to accomplish four principal goals: (1) to prolong decisions by non-sexually active youth to remain abstinent; (2) to change the sexual behaviour of sexually active youth so that they revert to abstinence; (3) to decrease the risks and increase protective measures taken by sexually active youth; and, (4) to develop tolerance in students toward alternate sexual orientation and compassion toward people living with HIV/AIDS.

Components, Duration, Materials

Designed on the basis of results from the *Canada Youth and AIDS Study* (King et al., 1988), SHR comprises four units: (1) Information about AIDS and other STDs; (2) Responsible Behaviour: Abstinence; (3) Responsible Behaviour: Safer Sex; and (4) Health-Enhancing Supports. The entire program takes approximately 20 hours to teach and contains 31 learning activities for Grade 9 students to complete. Twenty-five of the activities are to be completed with teacher direction in class and in small groups with peer leaders. Six of the activities are designed to be completed by students at home with their parents. SHR materials include teacher, student, peer leader, and parent manuals, condom activity materials, a videotape on assertiveness training, and audiovisual presentation materials (Robertson, Petracek, King, Warren, & Beazley, 1994).

Teacher Inservice Training

The SHR program was accepted by ministries of education in four provinces as a voluntary initiative for school jurisdictions. A three-day inservice training session prepared volunteer teachers for the program's implementation and evaluation. The training agenda consisted of working through all parts of the SHR curriculum with the teachers and emphasizing ways to handle sensitive issues in the classroom, to understand and teach the more difficult activities, and to integrate the recommended teaching strategies and audiovisual aids prepared for the program.

Peer Educator Training

Male and female peer educators in each class were selected by teachers or nominated by students. Peer training included skills in how to help small groups work effectively as well as how to model responsible attitudes and behaviours. Peer training occurred according to individual teachers' schedules and time availability, as happens in reality in schools.

SAMPLE

Intervention and Control Groups

Grade 9 high school students were chosen as the target group for a number of reasons. Most students in Grade 9 have formed a sexual identity and are at an age (approximately 15 years) when experimentation and pursuit of excitement can be key motivators for their behaviours. Consequently, it is important to ensure that they understand the risk of HIV/AIDS/STDs and develop appropriate skills before high-risk behaviour patterns are entrenched. Furthermore, Grade 9 students are at a developmental stage when they are able to understand that they might need information about sexual intercourse and STD protection, and educators are able to implement more advanced methods of sexuality education involving skills development. Finally, Grade 9 is frequently the last opportunity for formal health education in Canadian secondary schools.

In total, 52 teachers from 59 schools taught the SHR intervention program in 123 classes to 2606 students. The classes included family life classes in New Brunswick, science classes in Manitoba, per-

sonal development and relationships classes in Nova Scotia, and physical and health education classes in Ontario. Over two-thirds of the classes were co-educational. A similar number of health education classes were selected as a comparison group, from the same provinces, that were comparable in school size, urbanicity, language of instruction, and religion. In the comparison group, 1906 students received their school's usual HIV/AIDS/STD educational program which focused principally on knowledge and attitudes, not on relationship skills and motivational supports from peers and parents.

DATA COLLECTION

The evaluation involved a quasi-experimental, non-randomized control group design employing comparable school jurisdictions. Four sets of questionnaires, developed by the authors using items from the CYAS study, were administered to the students in intervention and comparison classes. Steps were taken to assure confidentiality during test administration. The evaluation design entailed a pre-test and post-test questionnaire during Grade 9 as well as two delayed post-tests — one administered to the students in the fall of Grade 10 and the second when they reached Grade 11 for a total follow-up of two years. Data concerning program implementation were not collected rigorously and therefore this evaluation is unable to draw firm evaluative conclusions.

The vast majority of the students in the 123 classes in which the program was taught participated in the evaluation. Only a few students did not receive consent from their parents or refused to participate (between 0.8% and 1.7% among the schools). Table 1 shows the number of students who completed questionnaires at each stage, the attrition from one stage to the next, and a summary of reasons for attrition. Only the data of students who responded to all four questionnaires over the two years and could be matched with their earlier responses were included in the final analysis (1358 intervention; 965 comparison).

FINDINGS

The unit for analysis is considered to be the individual student since there is no evidence that student data on these sexual risk behaviour issues are clustered by class or school. At pre-test, the groups were equivalent on gender, age, and grade as well as on most study

variables. However, the groups differed on some variables with the comparison group showing higher scores on assertiveness, comfort in buying condoms, and actual sexual experiences. The intervention group, however, reported a greater use of condoms at pre-test. Repeated measures analysis of variance was utilized with alpha levels set at $p < .05$.

Knowledge

One unit of SHR concentrated on developing knowledge about HIV/AIDS and other STDs. The results of all three post-tests revealed that the students in the intervention group showed significantly greater knowledge about HIV, AIDS, and other STDs than the com-

Table 1
Student Questionnaires Received and Matched — Pre-test to Post-test 3

Questionnaires	Group	% Attrition* of Pre-test Participants	Number of Forms Returned**	Number of Forms Matched
Pre-test	Intervention	—	2606	—
	Comparison	—	1906	—
	Total	—	4512	—
Post-test 1	Intervention	7.1	2421	2017
	Comparison	4.6	1819	1436
	Total	6.0	4240	3453
Post-test 2	Intervention	3.3	2522	1755
	Comparison	9.2	1731	1263
	Total	5.7	4253	3018
Post-test 3	Intervention	26.9	1905	1358
	Comparison	20.7	1511	965
	Total	24.3	3416	2323

* Attrition of the original population in the intervention (2606) and comparison (1906) groups was due to absentees (between 1.0% and 3.5% across all three post-tests), withheld parent consent and refusal (between 0.8% and 1.7%); and unreturned questionnaires by schools (between 0.9% and 11% due to teacher work-to-rule campaigns, tracing difficulties, student relocation, and administrative complications).

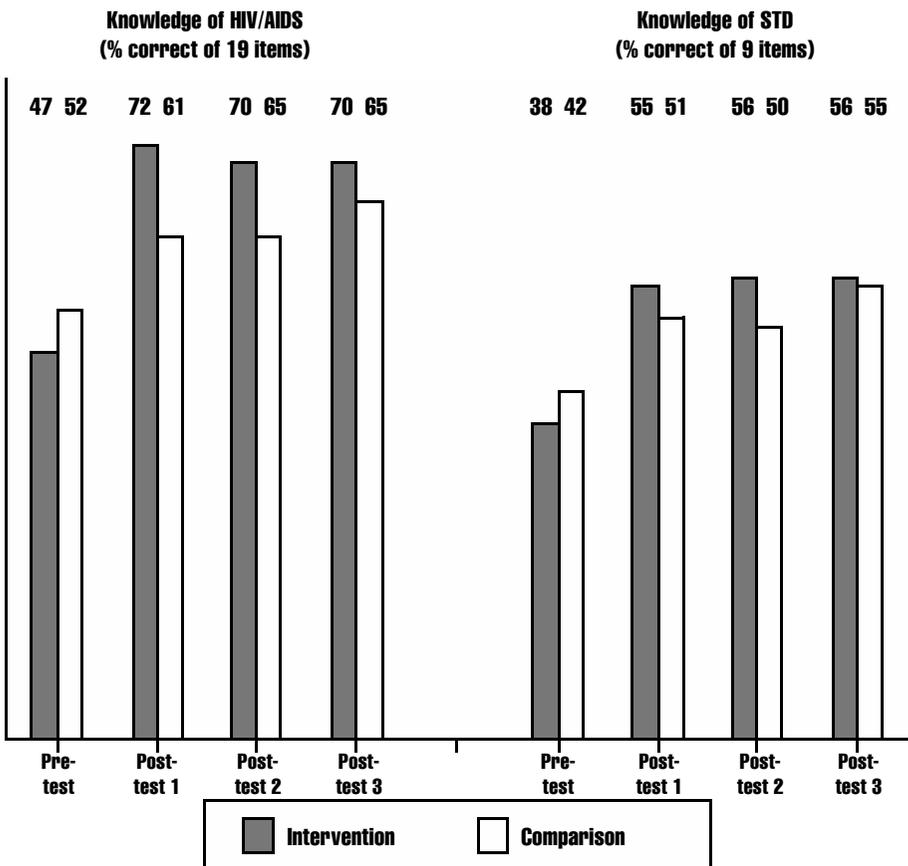
** Many returned questionnaires were unusable due to students not responding to the items used for matching a questionnaire to the previous one.

parison group on their composite scores, even though both groups had increased their knowledge since the pre-test (see Figure 1). At post-test 3, the intervention groups' scores averaged 70% correct on the 19 HIV/AIDS knowledge items while the comparison groups' scores averaged 65% correct ($p < .05$). By contrast, at the three post-tests, there was no significant difference between intervention and comparison groups on the nine STD knowledge items.

Attitudes

Another unit of SHR (Health-Enhancing Supports) had a number of activities in which the objectives were to develop tolerance toward

Figure 1
Knowledge of HIV/AIDS and Knowledge of STD



persons of alternate sexual orientation and compassion toward people with HIV/AIDS. Five items were combined to measure discrimination/compassion on the questionnaires ($\alpha = .80$). Even though the students in both groups at pre-test had generally positive, non-discriminatory attitudes about gay/lesbian/bisexual persons and about persons with HIV and those living with AIDS, the mean score on the discrimination/compassion scale by the intervention group at all three post-tests was higher (indicating more positive attitudes) compared with those in the comparison group. The scale scores showed statistical differences between the two groups at the time of post-test 1 ($p < .01$), post-test 2 ($p < .01$), and post-test 3 ($p < .05$). Also, the scores of the intervention group increased significantly ($p < .01$) from pre-test to each of the three post-tests, whereas scores of the comparison group did not show these increases. Nonetheless, between 17% and 22% of the intervention group expressed intolerance on the attitude scale items by grade 11 (age 16 years). As expected, females were more positive in their attitudes; however, the differences in attitudes across the two groups were greater among males. These gender patterns were maintained at all three post-tests.

Communication about Sex

The SHR program emphasized the importance of honest communication about sexual matters among partners. Compared with students who did not receive the program, more youth in the intervention group expressed positive intentions concerning talking with a partner about past sexual experiences (post-test 1 — Intervention 77%: Comparison 66%, post-test 2 — Intervention 72%: Comparison 66%, post-test 3 — Intervention 74%: Comparison 69%, $p < .01$) and intent to refuse sexual intercourse before being ready (post-test 1 — Intervention 77%: Comparison 71%, $p < .01$ and post-test 2 — Intervention 72%: Comparison 62%, $p < .05$). However, by Grade 11 (post-test 3) these differences had disappeared. Although there were greater changes in males' intentions, more females in both groups had favourable intentions. With regard to items concerning the intention to inform their partner of having an STD and to keep informed about ways persons can become HIV-infected, the vast majority of students in both groups reported strong intentions; consequently, the results left little room for positive change.

In the unit on abstinence, the SHR program encouraged participants to express affection to a boyfriend or girlfriend in ways other than by engaging in sexual intercourse until they felt ready. At pre-test,

proportionally more students in the comparison group (Intervention 62%: Comparison 66%, $p < .05$) were able to ask their partners to express affection without having sex. However, there were no significant differences between the two groups at each post-test. Thus, the intervention group caught up to, but did not surpass, the comparison group. By Grade 11 (post-test 3), as students matured, both males and females increased their intentions to be affectionate without sex, although far more females intended to do so (83% of both groups) than males (67% intervention and 69% comparison group).

Skills Development

Skill development was measured through the students' responses to case scenarios written by SHR developers. The scenarios provided structured choices about how a person could act and what they could say in given circumstances. Alternative responses showed degrees of assertiveness or non-assertiveness. Most of the scenarios did not appear to produce a full range of responses because students usually chose assertive responses, possibly demonstrating a social desirability bias. The findings from the two scenarios which seemed to be most effective in testing skills are summarized below.

Significant differences (Intervention 68%: Comparison 62%, $p < .01$) were found at post-test 3 for the first scenario regarding acting on an invitation to have sex; however, they were primarily due to female differences (Intervention 81%: Comparison 74%, $p < .01$). In the second scenario regarding verbalizing sexual decisions, at post-test 1 more of the males in the intervention group reported that they would respond assertively if they were pressured unwillingly into having sex. The differences between groups were not statistically significant at either post-tests 2 or 3 for females or males.

Condom Use Skills and Attitudes

The following condom skills were to be developed through participation of the SHR program: to be able to obtain condoms; to purchase them in a store without being embarrassed; and to be able to use them properly when the time came. At post-test 1 (Intervention 89%: Comparison 86%, $p < .05$) and post-test 2 (Intervention 92%: Comparison 87%, $p < .01$), more students in the intervention group compared to their counterparts believed that they would be able to get condoms. Both groups showed progressive improvement at each post-test in reporting being able to obtain condoms.

As expected, fewer students in the intervention group (Intervention 33%: Comparison 37%, $p < .05$) at post-test 1 reported they would be embarrassed to ask for condoms in a store, even though at pre-test the comparison group reported more comfort in this situation. However, there was significant positive change in this view over time by both groups.

It is interesting to note that, at all three post-tests (Intervention 90%: Comparison 82%, $p < .01$; Intervention 90%: Comparison 84%, $p < .01$; Intervention 92%: Comparison 87%, $p < .01$), the intervention group felt more confident that they could actually use a condom properly. These differences were mostly attributable to the responses of females, although more male students in the intervention group at post-test one (Intervention 94%: Comparison 89%, $p < .01$) felt confident that they could use a condom correctly.

With regard to intention to use condoms with sexual partners, there were no significant differences between the groups. Intentions were already positive at pre-test on the part of a large majority of students in both groups (Intervention 90%: Comparison 91%, $p < .01$). These very positive responses created a ceiling effect with little room for positive change. Although a decrease was noted from pre-test to post-test 3 for both groups in the proportions intending to use condoms with their sexual partners, more females in the comparison group (Intervention 87%: Comparison 91%, $p < .05$) and more males in the intervention group (Intervention 84%: Comparison 78%, $p < .05$) planned to use condoms. Intentions to actually ask partners about condom use before having sexual intercourse were less impressive. Significant differences between the two groups were only evident at post-test 2 (Intervention 84%: Comparison 80%, $p < .05$), in favour of the intervention group.

Condom Use Behaviours

The SHR program developers anticipated that one of the major outcomes of the unit on safer sex would be that young people who made the decision to become sexually active would also decide to protect themselves and their partner with condoms. However, when asked how often they used condoms in the last two months, the proportions who responded “always” did not differ significantly across the two groups at any of the post-tests. In fact, the percentages of students answering “always” in both groups diminished from 57% in the intervention group and 55% in the comparison group at post-test 1 to 41% in both groups at post-test 3.

An additional analysis determined that many more of those who had sex with only one partner, compared with those with multiple partners, had always used a condom at both post-test 1 and post-test 2. Thus, the students who were at higher risk because they had more partners were also more likely to take the additional risk of avoiding condoms.

At post-test 2 (Grade 10), significantly fewer students in both groups who were sexually active at pre-test used a condom "the last time they had sex" (Intervention 48%: Comparison 54%, $p < .01$) compared to those who had become sexually active in the past year (Intervention 74%: Comparison 72%, $p < .01$). This finding indicates that 15-year-olds were much more likely to use condoms if they had only recently become sexually active.

At pre-test, the main reasons that students gave for not using a condom were that: students did not have one with them; they believed that their partner was safe; and the female was using a contraceptive pill (Table 2). By post-test 3, greater proportions of students in both groups gave the last two reasons, indicating that

Table 2
Reasons a Condom Was Not Used When Student Last Had Sexual Intercourse
(% females and males in both groups at pre-test and post-test 3)

Reasons	Pre-test				Post-test 3			
	Intervention		Comparison		Intervention		Comparison	
	F	M	F	M	F	M	F	M
Did <i>not</i> have a condom	36	73	37	52	27	46	25	45
Had too much to drink	7	—	5	9	3	10	4	13
Did <i>not</i> know how to use / did <i>not</i> trust a condom	4	5	5	—	2	1	2	—
Safe time of month	5	—	3	—	4	1	5	2
Have a faithful (safe) partner	19	5	13	15	28	18	24	16
<i>Not</i> able to ask partner to use one / did <i>not</i> want to show distrust of partner	10	—	13	—	1	—	2	—
I am (my partner is) on the Pill	14	9	13	12	30	13	29	18
Other*	5	9	11	12	6	11	10	6

* Other responses included "I was raped," "didn't expect it to happen," "didn't want to," "feels better on the penis without one," and "didn't feel it was needed."

responsible reasons for non-use of condoms had increased. Interestingly, fewer females in both groups at post-test 3 stated that they were unable to ask their partner to use a condom. Evidently, female assertiveness had increased in both groups.

Motivational Supports

An important component of the SHR's conceptual model was motivational support. Findings are presented here on the influence of peers and of parents on youth behaviour.

Peer Influence

The motivational supports component was integrated into the program through the use of youth peer leaders. The goal of incorporating these peers into the SHR program was to change the group norms which encouraged sexual risk behaviours. Peer leaders helped with small-group activities and cooperative learning where students were encouraged to interact with one another through discussions in small groups. Also, the content of some SHR activities stressed the influence of peers.

A seven-item scale ($\alpha = .71$) was formed to examine peer norms. One example of a scale item was "My friends and I help each other avoid taking unnecessary risks." When the scale scores of the two study groups were compared, the SHR program had little effect on changing peer norms which could have negative influences. However, it was found that students who seemed to be influenced by peer norms of positive health attitudes and behaviours were less likely to be sexually active than those whose peer norms promoted more negative attitudes and risky behaviours. This finding suggests the importance of the peer support aspect to the conceptual model and to achieving the SHR program's main objectives, although overall, peer norms were difficult to change using the SHR intervention.

Parent Influence

A second method of incorporating a motivational support component into the program was through having students dialogue at home with their parents about sexual matters. It was anticipated that parent involvement in the SHR program would have the effect of improving communication between parent and student, thus creat-

ing a better opportunity to maintain parental influences on health behaviours. Six parent-youth activities, which were to be done in collaboration, were designed to improve the communication between parent and son or daughter and to foster the development of healthy attitudes toward safe sexual practices. Unfortunately, procedures employed by teachers for gaining the parents' cooperation to participate fully in the program's activities were unsuccessful and only one-third of the parents did at least one of the SHR activities with their child. Consequently, data from the minority of parents who participated are not presented here as they may reflect a biased sub-sample. This shortcoming illustrates the problem in expecting teachers and parents to take on new and perhaps challenging roles in curriculum areas not traditionally seen as the prime responsibility of schools.

Sexual Behaviours

The number of sexually active students in both groups increased significantly from pre-test through each of the last two post-tests, as would be expected for this age group. At pre-test, 15% of the intervention group (15% females; 16% males) and 21% of the comparison group (17% females; 26% males) reported having vaginal intercourse at least once. By post-test 3, the rates were 44% of the

Table 3
Associations with Having Vaginal Sex

Independent Variables	Standardized beta		
	Females	Males	Total
Cannabis use	.21	.11	.17
Alcohol use	.16	.22	.17
Mother's education (lower)	.10	—	.07
Skipping classes	.09	.12	.09
No church attendance	.07	.09	.08
Lower average mark	—	.11	.08
HIV/AIDS/STD knowledge (lower)	—	.09	—
Higher self-esteem	—	—	.09
Parent relationships (poorer)	—	—	.08
Multiple <i>R</i>	.38	.46	.42
<i>R</i> Square	.14	.21	.17

intervention group (46% females; 42% males) and 50% of the comparison group (49% females; 51% males). These differences between the sexual behaviours of the two groups were significant ($p < .01$) at each test point but did not clearly indicate the effectiveness of SHR in promoting abstention. The increase in sexual activity was similar for both females and males across the two groups, although the differences between the intervention and control groups in the proportions who were sexually active were greater for males at all four tests.

Multiple Risk

Students who had sexual intercourse took risks in other areas as well. A multiple regression analysis on the dependent variable vaginal sex yielded a multiple R value of .46 for males and .38 for females (Table 3). Self-report variables that were moderately correlated with having vaginal sex were drinking alcohol, cannabis use, skipping classes, and achieving lower grades at school.

DISCUSSION

Overall, the differences between the intervention and comparison group students show a positive, but marginal, effect of the SHR program. It must be remembered that even these small positive effects may have been artifacts of evaluating the groups with instruments designed to reflect the SHR curriculum content. Other standardized instruments of youth behaviour, if such existed, may have shown even smaller effects. Furthermore, the intervention group students may have exhibited a social desirability bias in their responses as they knew they were receiving a new curriculum. Finally, since implementation of the SHR program was not monitored, it is difficult to say how completely the program elements were delivered and whether a Type III error has occurred in the analysis. This is a real possibility in the assessments of many health education curricula that are implemented on a broad basis, and we can only have a modest degree of certainty that these findings can be generalized to other Canadian education settings.

HIV/AIDS/STD Knowledge, Skills, and Behaviour

Sexual activity in both groups increased at about the same rate as in the general population (King et al., 1988). Therefore, the SHR

program did not seem to be effective in decreasing the proportion of youth reporting to have sexual intercourse.

Most Canadian secondary students have been exposed to and understand the basic facts about HIV/AIDS/STD transmission. However, knowledge of HIV/AIDS increased significantly in the intervention group over the comparison, which may have indicated the value of a more practical, skills-based curriculum. Similarly, attitudes and behavioural intentions improved after the program was implemented and in subsequent years. Finally, there were significant differences in assertiveness and condom skills between the intervention and comparison groups. Students often report an intention to abstain or to utilize safer sex practices. The SHR program activities related to condom skills were effective in enabling students to know how to obtain condoms, to decrease embarrassment about buying condoms, and to learn the steps of putting on a condom. However, students' reports on condom use in actual sexual situations showed much less use. Although young people indicate in Grade 9 that they intend to use condoms with their sexual partners, when they later become sexually active, they tend not to use them. On the basis of the evaluation data, 15 year olds did not sufficiently protect themselves and their partners with safe sexual practices. Their reported use of condoms did not increase over time despite the SHR emphasis on the critical importance of condoms as the only safe protection against STDs and HIV. Thus, the behavioural parts of the program need to be reinforced beyond the year in which the program is offered. Furthermore, this indicates that a better understanding is required of the initiation of sexual relationships and the norms and expectations which adolescents experience in this activity.

There is some indication that sexual risk behaviours are linked to other risk taking and experimentation. Although the data are not conclusive, it might be expected that youth who undertake multiple risk behaviours may be less influenced by a school-based educational program.

Peer Influences

High-risk sexual behaviour is not equivalent to other risk behaviours, such as substance use or smoking, because sexual activity involves two people being motivated by emotions and very powerful biological forces. Also, male and female norms and roles tend to differ, particularly regarding sexual issues, peer-group structures, and

values. Therefore, it is important to investigate and understand general gender role differences as well as sexuality norms.

While some studies have demonstrated the impact of peer association on the initiation and frequency of sexual intercourse among adolescents (DiBlasio & Benda, 1994; Jessor & Jessor, 1977; Kandel & Davies, 1991; Treboux & Busch-Rossnagel, 1990), significant gaps in knowledge remain as to the nature of these associations and the social mechanisms through which sexual exploration is learned. Furthermore, sexually active teenagers may be engaging in norm violation (of society's norms), rather than in collective conformity to alternate social controls (within the peer group). The SHR program had little demonstrable effect on changing peer norms. However, this may have been due to variation in peer-leader training or inconsistency in applying the peer-leader strategy. By examining the value of peer-group coherence in adolescent development and its impact on behaviours and norms, we may gain further insights into the role of the social environment in shaping adolescent sexuality.

Sex Education

Education authorities in Canada have recognized "Healthy Growth and Sexuality" as a major component of health education and have developed curricula that address the process of developing healthy sexual relationships, as well as the mechanics of protection from unwanted pregnancy, HIV, and STDs (Ontario Ministry of Education and Training, 1998). The SHR program is a relatively brief intervention and, as such, is less likely to have an impact than a longer-term curriculum that is well-integrated into multiple subject areas. However, with recent revisions to the school environment in many provinces, there may be fewer opportunities for teachers and resource persons to deliver health-education packages that are relevant to high risk behaviours. Furthermore, responsibility for curricula delivery in schools is inconsistent, with various roles being taken by physical education, counselling, and family studies departments. Biomedical and individualistic behavioural perspectives usually take precedence in instructional methods. Sociocultural, economic, and group dynamic perspectives on high-risk behaviours are seldom presented to students (CMEC, 1999). Finally, students with irregular attendance and students who drop out of school do not benefit from traditionally delivered curricula. These issues suggest that alternative delivery mechanisms and strategies need to be utilized for HIV/AIDS/STD education for high risk groups of youth.

CONCLUSIONS

The SHR initiative represents an important development in health-education programming in that it was accompanied by a long-term evaluation of outcomes. This research was premised on the assumption that parents and peers can play powerful roles in reinforcing health-risk avoidance behaviours. Educational programs to reduce high-risk behaviours that focus only on individual knowledge, attitudes, and behaviours are unlikely to be successful in a peer-group milieu that provides powerful incentives for conformity to group normative values. Programming that emphasizes activities that promote group understanding of norms and skills in changing norms are needed. Such programs, which recognize the power of group norms to undermine the individual's ability to practice preventive health behaviours and that address the social function underlying these collective behaviours, are necessary if intervention strategies are to be effective and sustainable. However, peer programs are also difficult to implement in the usual school environment of limited time and resources for "non-essential" curricula.

More research is required to examine the effect of peer influences in the larger context of behavioural change. This work should contribute to a more powerful framework to increase understanding about the sexual behaviours of youth and the factors influencing them. A study that concentrates on more qualitative information about motivators, values, and other factors that might influence sexual behaviours is necessary to help in the search for explanations and to guide the development of better educational programs aimed at decreasing high-risk behaviours.

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