Published in final edited form as:

J Adolesc. 2002 October ; 25(5): 495–508.

Evaluation of a comprehensive AIDS education curriculum in Hungary – the role of good educators¹

V. Anna Gyarmathy, Louise-Anne McNutt, Andrea Molnár, Dale L. Morse, Jack DeHovitz, Eszter Ujhelyi, and Szabolcs Számadó

Abstract

The aim of this research was to evaluate a school-based AIDS education programme in Eastern Europe. Four evaluation segments were undertaken: process and outcome evaluations of the training of AIDS educators and of the educational activities for students. While most AIDS education curricula focus on the content of the education, our findings demonstrate that other aspects — including the characteristics of those educators who appear to be most effective, the way in which education is affected by teachers' attitudes, and the cultural implications of transferring programmes from one country to another – also need to be considered, especially in international environments.

Introduction

Hungary has low but slowly growing levels of human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS). In a population of 10.2 million, a total of 297 Hungarian residents had developed AIDS and 729 had reported infections with HIV as of June 1998 (HIV/AIDS – Magyarország, 1998; Hungary and her inhabitants, 2000). Although the rates of HIV infection are low at this time, unsafe sexual practices may be common, especially among teenagers. Data on sexual behaviour in Hungary are not readily available, but other Eastern European countries have recently witnessed increases in the incidence of sexually transmitted diseases (STDs) and risky behaviours, and teenagers are especially at high risk of becoming infected (Hegyi *et al.*, 1997; Tichonova *et al.*, 1997; Mikl *et al.*, 1998). For example, three-quarters of heterosexual patients at an STD clinic in Prague, Czech Republic, had had unprotected sex, about 11% of heterosexual men had had sex with prostitutes, and the same percentage of women had engaged in prostitution. One per cent of the patients injected drugs. Adolescents exhibited higher rates of high-risk behaviours: they were ten times more likely than adults to inject drugs, twice as likely to work as prostitutes, and about twice as likely to be diagnosed with an STD (Mikl *et al.*, 1998). Since the late 1980s, Slovakia, too, has experienced an increase in sexual freedom, sexual promiscuity and prostitution (Hegyi *et al.*, 1997). Also, an increase of about 40-fold in the incidence of syphilis in Russia between 1988 and 1996 has been attributed to changes in sexual behavior and rapid increases in injecting drug use (Tichonova *et al.*, 1997). Clearly, AIDS prevention activities are urgently needed in Eastern Europe.

¹Sponsorship: The study was reviewed, approved, and funded by the Hungarian National AIDS Committee and conducted in collaboration with the Hungarian Ministry of Education. Further funding was provided by Budapest Bank for Budapest Foundation, Eravis Rt., GlaxoWellcome, MATAV–Hungarian Telecommunication Co., Eximbank, Durex, and Richter Gedeon Pharmaceuticals. V. Anna Gyarmathy was supported in part by Grant 1D43TW0091 and Grant 2D43TW00233 from the Fogarty International Center, National Institutes of Health.

© 2002 The Association for Professionals in Services for Adolescents.

Reprint requests and Correspondence should be addressed to V. Anna Gyarmathy, Center for Drug Use and HIV Research, National Development and Research Institutes, Inc., 71 W 23rd St, 8th floor, New York, NY 10010, U.S.A. (gyarmathy@ndri.org).

In Hungary, many high-level government officials recognize the need for AIDS education and prevention (Nemzeti AIDS Bizottság). In a country faced with many pressing health problems and scarce resources, however, government funding for AIDS education and prevention is limited. Unable to support a comprehensive nationwide campaign, the government sponsors smaller programmes instead. The National AIDS Committee (NAC), an organization run by the Ministry of Health Care (formerly the Ministry of Welfare), has been the main financial support of both governmental and non-governmental organizations.

Supplementing governmental efforts, over 20 non-profit and profit-oriented organizations in Hungary offer AIDS prevention programmes as part of their diverse agendas (Bressollette and Pioker, 1997). About half of these organizations deal exclusively with AIDS education. Most are run by gay groups or by health-care workers and target their programmes to gay men, high school students, prison inmates, prostitutes, and intravenous drug users. Apart from visiting institutions or social hangouts where members of the target groups can be found, these organizations may train educators, provide money for treatment of HIV infection and related diseases, offer financial support to other organizations in the country, produce educational materials, or conduct behavioural research projects. A lack of well-trained behavioural scientists and health educators is another constraint in providing comprehensive high-quality AIDS education in Hungary. First, educators are not well trained in disease prevention. Second, no adequate evaluation of AIDS education and prevention programmes has been performed. Currently, only one organization has attempted to evaluate its AIDS programme (Bressollette and Pioker, 1997). This project translated an AIDS education curriculum of the American Red Cross from English to Hungarian. The evaluators stated that the curriculum had been tested and found effective, but because there was no systematic data collection and analysis, the basis for this evaluation is unclear.

No co-ordinated AIDS education programme for schools exists in Hungary, and none is required by law or regulation. In addition, several barriers hinder school-based programmes. First, some school administrators do not perceive a need for AIDS education. Quoting the low prevalence of HIV infections in Hungary, they consider AIDS a problem only of “foreign countries”. Second, some secondary school administrators are convinced that their students are sexually abstinent, as they “come from good families”. Third, the full curriculum at Hungarian schools leaves little room for added modules, so additions must pass rugged scrutiny.

When AIDS education is presented in schools, it is primarily provided by guest lecturers from external organizations. If the headmaster (principal) of the school does decide that AIDS education is needed, or is willing to accommodate organizations providing AIDS prevention sessions, presentations are usually made during the “form master class”. This class, which is similar to the “home room” session in the United States, is dedicated once a week to the discussion of administrative and academic matters not covered in regular classes. As the academic load of Hungarian schools is very heavy, non-academic extracurricular activities, such as health education, are frequently limited to “form master classes”. In addition to hosting guest lecturers, some teachers may incorporate AIDS education into their classes (Simon and Morava, 1993), such as mathematics, foreign languages or biology, but these classes may be more likely to provide information about the disease than to help students gain skills for preventing it.

Providing effective AIDS education and prevention programmes to individuals embarking on sexual activity is an important step in preventing the spread of HIV and other STDs. A cost-effective strategy in countries just beginning the fight against AIDS is to adopt programmes with demonstrated effectiveness in other settings. The purpose of this study

was to determine the effectiveness of several AIDS prevention methods in modifying AIDS-related attitudes among secondary school students in Hungary.

We used certain elements of the Health Belief Model (Becker, 1974; Strecher and Rosenstock, 1997) to assess the effectiveness of the education project. We hypothesized that perceived severity of AIDS and perceived susceptibility to infection may have an important role in AIDS prevention, and that the devaluation of monogamy that has followed changes in sexual behaviour may be a perceived barrier to preventive behaviour. Furthermore, although knowledge about AIDS does not seem to be associated with preventive behaviour (Brown *et al.*, 1992; DiClemente *et al.*, 1996), lack of basic knowledge about AIDS and condom use may be a barrier to protective, contraceptive behaviour.

Materials and methods

The Study of Hungarian Adolescent Risk Behaviours was conducted among students enrolled in Hungarian secondary schools to assess their behaviours concerning several health risks, their attitudes about these risk factors, and their knowledge about AIDS and proper condom use (Gyarmathy *et al.*, 2002). Students in Hungary may study at any one of three types of school systems after 8 years of primary school education. Students in college preparatory high schools and trade high schools study for 4 years, and students in trade schools study for 3 years. At the end of their studies, high school students receive a high school degree, trade high school students receive both a high school degree and a trade certificate, and trade school students receive a trade certificate.

Participants

A total of 54 public high schools, trade high schools, and trade schools were randomly selected from the official list of Hungarian secondary schools in Budapest, of which 32 (59.3%) agreed to participate; 17 schools did not participate due to their heavy workload. Five schools expressed concern over the private nature of the questionnaire and withdrew after an initial agreement to participate (15.6% of initial potential participants).

At each school, the administration was contacted and permission was sought to conduct the intervention in at least one class in every grade (a “class set”), representing the whole age range of the students in that given school. Randomly selecting classes to participate would have been ideal, but this was not an option at most schools. Rather, on the basis of workload reports provided by the teachers, the headmasters selected which classes would participate. This may have resulted in an overrepresentation of “good students” in the study (or students with home room teachers who support research and AIDS education). A total of 139 classes participated in the study, 3506 students filled out the pretest, 2790 filled out the posttest, and 2596 filled out the 5-week delayed posttest.

Individual students’ pretests, posttests, and delayed posttests were linked using self-assigned identification codes — these anonymous identifiers were code words determined by the student with the purpose of providing an identity for the data without revealing the respondent’s actual identity. About 4% of students in every follow-up wave opted not providing any identification code. Judging from responses to pretest questions, students who could be followed through the posttest and delayed posttest were more likely to have “good student” characteristics than students who either did not participate in the posttest or did not provide consistent anonymous identifiers needed to link questionnaires. Typically, students who could be followed reported at baseline less alcohol or drug use, and more safe sex practices prior to the interventions (such as non-penetrative sex, lower frequency of intercourse, mutual initiation of intercourse). There was no significant difference ($p>0.05$) between students who were not followed up for administrative reasons (school or class

ceased to participate) and students who potentially could have been followed up (and were either followed up or not).

We used a partial-coverage quasi-experimental programme design for the intervention study (Rossi and Freeman, 1993). A partial coverage programme is not delivered to all members of the target population—a group, serving as a control group, receives no intervention at all. The term quasi-experiment describes designs that do not involve randomly assigned comparison or intervention groups—in our study. School administrators did not allow us to randomize the selection of participating classes. Many of the intervention methods were based on the published methods, results and recommendations of the evaluation of an AIDS education project among high school students in the United States (Smith and Katner, 1995).

Intervention

The intervention comprised two parts: training for educators and educational activities for the participating students.

Training for educators—Schools willing to participate in the study were asked to send a teacher to an AIDS education training programme if possible. As a result, 20 teachers from 20 schools volunteered to take part in a training session aimed at improving their knowledge about AIDS and providing them with the AIDS education methodology and skills appropriate for teaching secondary school students. Furthermore, two professional health educators taught at schools that participated in the study but did not have available teachers.

Teacher characteristics of participating educators were thus diverse. Educators who were recruited from the secondary schools tended to be elderly and have no or very limited health education background. Furthermore, they were used to teaching in a traditional, lecture-like setting. The two professional health educators were in their 20s at the time of the study and had had several years of health education experience in various types of interactive settings.

The *curriculum of the educator-training programme* was based on the curriculum of the two AIDS courses offered at Eötvös Loránd University at the time of the study (Gyarmathy 1996a, b). Guest speakers gave lectures about HIV and AIDS, and the teachers in training partook in workshops on methods and the curriculum and practiced teaching in peer groups. After successful completion of the training session, teachers were assigned to give intervention classes in their own school and in schools that did not send teachers to the training session.

The participating schools were randomly assigned to either an *education pattern* or to the control group. Each teacher was expected to teach a class set and each class set was assigned to one of 12 education interventions. All classes were conducted between December 1996 and May 1997.

Educational activities for participating students—The education interventions for high school students targeted general information about AIDS, the seriousness of AIDS, negotiation skills for dating couples and prevention strategies. The 12 interventions were composed of various combinations of five activities: (1) lecture; (2) question and answer session; (3) role playing session; (4) a slideshow and (5) a video. To assure equivalent content in each intervention, instructors received detailed lesson plans for the educational sessions.

The *lecture* was 45 min long and covered definitions of AIDS and HIV, the prevalence of HIV and AIDS in Hungary and worldwide, the symptoms of HIV infection and AIDS, the routes of infection and prevention strategies. Instructors were asked to put special emphasis

on the value of low numbers of sexual partners, monogamy, virginity and the use of condoms as preventive measures. At the end of class, students received free condoms and the instructor demonstrated proper condom use by placing a condom on the index finger and the middle finger of a student.

The *question and answer session* was 45 min long and covered the same information as the lecture. Instead of lecturing, however, instructors solicited questions from students, distributed information about AIDS and HIV and demonstrated the proper use of condoms in a rather informal atmosphere.

The *role playing session* was scheduled to take up a 45-min class period. The protocol was developed by researchers and participating instructors. Topics included whether abstinence is appropriate when a couple is not sure whether they are ready for sex; what a young person might say when asked to go home with someone he or she has just met at a bar or a disco; what the students thought about marriage, virginity, and monogamy and beliefs and practical issues related to condom use.

The *slideshow* (compiled by Nefelejcs Foundation), about 5 min in duration, consisted of nine slides showing symptoms of AIDS.

The *videotape* was half an hour long and portrayed the experiences of a person with AIDS and his family. The video was developed by the Hungarian AIDS Foundation.

Programme evaluation

Four evaluation segments were undertaken: the process evaluation of the educator training, the outcome evaluation of the educator training, the process evaluation of the educational intervention for students, and the outcome evaluation of the intervention for students (Rossi and Freeman, 1993).

Training for educators—As part of the process evaluation of instructor training, instructor-trainees were required to sign an attendance log at every training session. While participation was of course not mandatory, signing up was an indication of the feasibility of the training programme for working teachers. Furthermore, short tests were administered during the programme to check whether trainees had gained the *knowledge* and *skills* presented in the training session. Help sessions were provided when necessary.

The outcome of the educator training was assessed at the final stage of the educator-training course. Knowledge and skills were assessed by a comprehensive final exam.

Educational activities for participating students—As part of the process evaluation of the educational activities for students, the *educators' knowledge of the programme's agenda* and *compliance with the design* were assessed through constant communication with the research staff. Educators were asked on several occasions about what methods they would follow and how they would present the materials to make sure that their perception of the protocol matched the protocol they were supposed to follow.

The outcome evaluation of the educational activities for students involved data collection using structured, self-administered questionnaires and the analysis of the collected baseline and follow-up data. Students filled out self-administered questionnaires 1 week prior to the education intervention (pretest), then immediately after the education intervention (posttest), and 5 weeks later (delayed posttest). Although the questionnaires were anonymous, students were asked to use the same self-assigned identification code word throughout the study so that their questionnaires could be linked.

The pretest contained questions aimed at assessing general social and behavioural factors, attitudes and knowledge. It required one class period to complete (45 min). Demographic, general social and behavioural factors included age, gender, presence of depression, suicidal thoughts, smoking habits (frequency and opinion) drinking habits (frequency and opinion) and illicit drugs (frequency and type). Questions assessing current sexual behaviour included type and frequency of sexual intercourse, number of lifetime partners, monogamy (practice and opinion), having sex under the influence of alcohol or drugs, frequency of condom use and length of current and past relationships. Several questions elicited attitude factors. The knowledge test assessed knowledge about basic epidemiological information, symptoms of AIDS, modes of spread of HIV and ways to prevent HIV infection, including proper condom use.

The posttest, composed of the knowledge test only, took 10 min to fill out. The delayed posttest, which included a subset of questions from the pretest assessing behaviours and attitudes in the past 5 weeks in addition to the knowledge test, used up half a class period (about 25 min). A control group filled out the same pretest, posttest and delayed posttest but received no AIDS education.

The questionnaires were field tested to ensure they would be linguistically appropriate for both high school students with a broad vocabulary and trade school students with a potentially more limited vocabulary. They were also submitted to experts at the Department of Epidemiology at the National Institute of Public Health (now named the National Institute of Epidemiology) for content validation. Given the short time between the pretest and the posttest (5 weeks), we constructed two alternative forms of the test assessing the students' knowledge about AIDS. The two forms were created from four preliminary versions by field-testing them for reliability among students of different ages and from different school types. The final versions of the knowledge test contained nine items with altogether 42 True/False/Don't know subquestions.

For an evaluation of the short-term effect of the different education interventions, we monitored reported changes in attitudes such as *perceived severity* of AIDS ("Is AIDS a dangerous disease?" and "Can AIDS be prevented?") and *perceived susceptibility* to AIDS ("What do you think your chances are to get infected with the agent that causes AIDS?" and "Are you afraid of AIDS?") (Becker, 1974; Strecher and Rosenstock, 1997). In addition, we assessed changes in the perceived value of monogamy, as the devaluation of monogamy may be a *perceived barrier* to preventive behaviour ("Is monogamy important?"). Lack of knowledge about AIDS and condoms may also be a barrier to preventive behaviour. Perceived severity of AIDS and perceived susceptibility to AIDS were scored on a five-point scale (1 = strongly disagree, 5 = strongly agree), whereas opinion about monogamy was assessed on a three point scale (it is important and they are faithful; it is important but they are not faithful; it is not important). Knowledge about AIDS was assessed by statements that students had to judge by marking True, False or I don't know. We set up categories of "high" vs. "low" knowledge by comparing each participant's score with the median score for all students. Because budget constraints limited time available for follow-up, we were not able to assess the longer-term behavioural effect of the intervention.

The study was reviewed and ethically approved by the Hungarian National AIDS Committee and conducted in collaboration with the Hungarian Ministry of Education.

Statistical analysis

Data for the outcome evaluation of the education for students were entered using EpiInfo version 6.0, and statistical analyses were performed with SAS® (SAS Institute Inc. Cary, NC, U.S.A.), release 6.12.

To assess the representativeness of participating schools, we compared characteristics (e.g. geographic locations and types of schools) of the participating schools with characteristics of the non-participating schools using Fisher's exact test. No other school data were available. Comparisons of participating and non-participating schools yielded no significant differences concerning their geographic locations ($p = 0.346$) or the secondary school type ($p = 0.226$).

Individual students' pretests posttests, and delayed posttests were linked by school, class, year of birth, gender and the compressed self-assigned identification code. Compression of spaces, commas, colons, semicolons, quotes and hyphens and correction of typing errors resulted in altered identification codes containing only letters and numbers. Of the 3506 students who filled out the pretest, 3326 (94.9%) used unique identification codes, 2309 (69.4%) could be linked with the posttest and 1934 (55.1%) could be linked with the delayed posttest. Overall, 1559 (44.4%) students could be linked to all three questionnaires. Of all the students at baseline who were not followed up, 668 (40.6%) were lost for administrative reasons (school or class ceased to participate) and 979 (59.4%) were lost for personal reasons of the student. To assess differences between students that could be followed and those that could not, we performed bivariate analysis on factors collected on the baseline questionnaire (pretest).

Logistic regression analysis was utilized to assess the relationship between educational interventions and postintervention knowledge and attitudes. A regression model was created for each knowledge and attitude factor of interest. Independent factors incorporated in the models included the intervention groups and factors needed for adjustment in the analyses, including pretest scores on the factor, gender, type of school, age, current sexual activity, penetration ever and petting ever. Interaction terms were included in the regression analysis, and backward stepwise regression methods were used to evaluate interaction terms in the fully adjusted models. Using these methods, we found some interaction terms to be statistically significant. Descriptive analysis used to investigate these terms determined that students taught by specific teachers (professional health educators) appeared to perform better than students taught by other teachers (volunteer secondary school teachers). Additionally, more than the specific education method, quantity of education appeared to be associated with postintervention knowledge and attitudes. With the addition of variables for specific teachers and quantity of education, backward stepwise regression techniques were utilized again to assess the factors associated with post-intervention knowledge and attitudes. In the final model, we combined the 12 types of interventions and created three variables based on the time spent on education and controlled for the teacher effect by including variables for the teachers that taught in more than one school and more than one type of class. We reviewed the maximum likelihood estimates comparing the full model with models reduced by sets of variables.

Results

Process and outcome evaluation of instructor training course

Instructor-trainees demonstrated excellent attendance throughout the entire duration of the training course (>90%). They also showed great enthusiasm in class preparation and class participation. The only two trainees who failed the final exam were provided further help sessions and were administered a make-up final exam, which both passed.

Process evaluation of educational activities for students

Many of the teachers expressed discomfort with the instructional method that was assigned to them. These teachers were allowed to trade assignments with other teachers under the

supervision and with the approval of the study organizers. Still, we received feedback that some teachers used different methods in the classroom. For example, certain teachers felt uncomfortable about role-playing, so they used the protocol of the role-playing session in a discussion format without informing investigators. In addition, without previous consultation and with the best intentions, two teachers performed a complex array of AIDS-prevention activities instead of their assigned method, as they thought a comprehensive prevention week would yield better results than a single class. These classes were dropped from the analysis as the intervention used was not defined. One teacher was fired in the middle of the semester.

In some schools, we encountered technical difficulties. For example, slide projectors or video players were either not available, or broken, or required slides or tapes different from the size supplied. In place of the slide show, some teachers passed around photos from a textbook (Dömök, 1996), many of which were the same as those in the slide show. When the video could not be shown, they substituted a reading of a book chapter written by a person with HIV about his life.

Outcome evaluation of the of the educational activities for students

Knowledge about AIDS and condom use—Many students did not know basic facts about AIDS prior to the interventions. About 75% of students were confused about what caused AIDS (they either did not know or stated that AIDS was caused by a one-celled organism, not a virus) and only 24% knew the magnitude of HIV infections worldwide and in Hungary. Students were more knowledgeable about symptoms that affect appearance than other symptoms. For example, 46.4% of students knew that symptoms of AIDS included “losing weight” and 53.9% knew that AIDS could cause “spots all over the body”, but only 13.4% knew that having AIDS increased a person’s risk of tuberculosis infection. Overall, 72.9% of students were knowledgeable about proper condom use, with no significant differences between sexually active and inactive students.

Overall, knowledge about both AIDS and condom use improved on the delayed posttest. Five weeks after the intervention, most students (91.6%) knew that HIV infection caused AIDS and 34.1% knew that tuberculosis risk increased with HIV infection, but only 15% knew the magnitude of the AIDS epidemic in Hungary and the world. The percentage of students knowledgeable about proper condom use increased to 89.2%.

Logistic regression analyses found that quantity of education and teacher effects were related to increases in knowledge (Table 1). However, specific education methods (e.g. lecture, role play) were not associated with increased knowledge (data not shown). Students who received more hours of AIDS education appeared to have become more knowledgeable about AIDS and AIDS prevention. Additionally, specific teachers were associated with increased knowledge. Teachers A and B were professional health educators and can be characterized as very knowledgeable, trained educators, young, female, and engaging, not known to students. Teachers C (male) and D (female) were elderly secondary school teachers who taught both in their own schools and in other schools.

Attitudes toward AIDS—Students scored high on questions assessing attitudes about AIDS in the pretest, leaving little room for improvement. At baseline, about 80% of students perceived AIDS to be a very dangerous disease that they were afraid of, and about 90% of students correctly perceived that they had little risk of infection (given the current low prevalence of HIV infection in Hungary). Responses on the delayed posttest indicated that the teachers influenced students’ attitudes about the danger of AIDS, their fear of AIDS, and the perceived risk of HIV infection more than any specific educational method or

combination of methods. Perception of AIDS preventability was not affected by education interventions or by teachers.

Attitudes toward monogamy—Students expressed a high appreciation of monogamy on the pretest, which increased only slightly following the intervention. More than half the students answered that monogamy was important and they were indeed monogamous; only 16.6% thought that monogamy was not important at all. Whereas the first opinion remained more or less unchanged by the education programmes, the latter percentage decreased to 14.3% after the intervention. Multivariate analysis revealed little contribution of teaching methods or teachers to changes in attitude. Student characteristics at baseline were important predictors of both knowledge and attitudes.

Discussion

We studied AIDS education methods among 3505 students in public secondary schools in Hungary. The education methods were based on published reports of educational approaches found to be successful in the United States, where research and development budgets far exceed the resources in Hungary and many developing Eastern European countries (Smith and Katner 1995). We identified quantity and quality of teaching as factors associated with improved knowledge and attitudes.

We were interested in comparing AIDS education methods, but our process evaluation of the educational interventions identified factors other than the curriculum and method that affected the education programme. One such aspect was the technical ability to follow the planned protocol. Oftentimes, the lack of slide projectors or video players forced educators to use alternative methods. Another aspect was the educators' compliance with the education curriculum. According to the study protocol, we randomly assigned schools to either an education pattern or to the control group. As each school sent one teacher to the training course, ultimately each teacher was assigned to an education pattern and was expected to administer one of 12 educational interventions to a class set. Since teaching discomfort may confound study results (Boscarino and DiClemente, 1996), before starting the intervention, teachers who expressed discomfort with the assigned method were allowed to trade assignments with other teachers under the supervision and with the approval of the study organizers. Before class, we contacted the teachers to make sure that they would be teaching according to the method assigned and follow the protocol. Teachers were also able to contact the principal investigator at any time at work or at home in case they had any problems or questions. After class, teachers were again asked if they had used the education method that they were supposed to use. Still, we received feedback that some teachers used different methods. We excluded from the analysis the classes of two teachers who performed a complex array of AIDS prevention activities instead of their assigned methods.

In controlled experiments in the United States, role-playing was shown to be the best educational method to improve AIDS-related attitudes and ultimately behaviours. These controlled experiments used a trained staff of health educators. We hoped to use the train-the-trainer method with the goal of saving money and supplying local AIDS educators to the participating schools. We found that it was difficult to supervise and coordinate the volunteering teachers. There may be several reasons for this, including cultural implications. First, given the low prevalence of HIV in Hungary, some participating teachers may have felt that the study was a good opportunity to expose their students to AIDS education, but they did not feel the urgency of an AIDS education research study. Second, some cultural issues may have caused miscommunication. During the communist era, people in all sorts of occupations received instructions from "above", and nobody asked their opinion. To avoid conflict, many got used to ignoring instructions that they did not feel like following and

telling their supervisors that everything was going as planned. Although we gave the participating teachers many opportunities for feedback, and we did have constant communication with all teachers, some may have chosen not to discuss changes to avoid friction. Others may have felt that once again they were receiving instructions from “above”, and they ignored these “instructions” altogether. The difficulties in coordinating train-the-trainer education and planning multimedia activities suggest that under certain circumstances, AIDS education and prevention programmes may be more efficient if outside lecturers are used who provide an even quality of education and can bring their own multimedia tools.

While “train-the-trainer” type programmes may be beneficial in some subject areas, it appears that AIDS education for secondary school students requires special skills if it is to be successful. Previous studies have also identified teacher effect as an important factor for success in AIDS and other educational settings (Kutnick and Jules, 1993; Murdoch Eaton and Levene, 1997). Peer educators seem to have a special advantage in this area: they are not only more popular but also more successful than traditional teachers (Ozer *et al.*, 1997; Stephenson *et al.*, 1998). The teachers who appeared most successful in our study were very knowledgeable about health and AIDS prevention, but they were also young, engaging individuals. In addition, our most successful educators were “outsiders” to the students. Because we had not considered this result in the study design, we cannot unravel the teacher characteristics that may be most effective.

One important limitation of our study was the variations that may have been introduced for each method. For example, when video players were not available, an alternative approach (reading a chapter) was substituted in some cases; for the evaluation, however, these classes were categorized as video classes. Information is not available on the specific approach utilized in each class, so we cannot adjust for these alterations. This type of noise may have obscured the effect of the educational methods, but it does highlight the lack of technical resources often of concern in developing countries. Another limitation of the study is the low response rate. School principals decided if the school would participate or not. We suspect that the choice to participate was dependent on administration characteristics rather than student characteristics; selection, therefore, is not likely to be correlated with student attributes. Possible selection bias could have arisen from dissimilar participation rates among different types of school, college preparatory schools vs. vocational training, but we found no differences in response rates by school type. A third limitation is that some of the classes were lost to follow-up, again owing to the decision of the school administration. We did not find any significant differences in baseline characteristics of students who were lost to follow-up for administrative reasons and those who were not. In classes that participated for the whole study, students that remained had “good student” characteristics, including lower levels of alcohol use and sexual activity. We controlled for these differences in the multivariate analysis.

This study has several implications for further research on AIDS prevention programmes, including the question of “good teachers” and education strategies in developing countries. Our study suggests that in certain settings, selecting qualified professional educators for AIDS education programmes may be the key to a successful AIDS education programme. We also identified a difficult problem in developing an AIDS education programme—the touchy issue of recruiting volunteers and being selective about who is accepted. Thus, there is a pressing need for studies that focus on identifying teacher characteristics associated with good outcomes, including knowledge of AIDS, age and personality of the teacher. Studies based in the United States may be good starting points for developing programmes in Eastern Europe, but the programmes must then be fine-tuned to be effective in a different culture.

Conclusion

AIDS prevention activities, especially school-based education, are a priority in all parts of the world, including Eastern Europe. While most AIDS education curricula focus on the content of the education, other aspects—including the characteristics of those educators who appear to be most effective, the way in which education is affected by teachers' attitudes, and the cultural implications of transferring programmes from one country to another—also need to be considered, especially in international environments. Our findings demonstrate that in certain cultural settings, ordinary school teachers, even enthusiastic volunteers, may not be prepared to provide effective AIDS education. Furthermore, the work of professional health educators may be affected by technical difficulties, including the lack of video and projection equipment. While school-based AIDS education provided by school teachers may work in the United States, in other countries AIDS education may be more efficient with outsider educators. While we may not need to understand the reason for this phenomenon, understanding the characteristics of a good AIDS educator is a universal challenge.

Acknowledgments

Special thanks to all the participating schools, to the volunteering teachers and students, and to Kate Schmit for her excellent editorial guidance.

References

- Becker M. The Health Belief Model. *Health Educ Monographs* 1974;2 entire issue.
- Boscarino JA, DiClemente RJ. AIDS knowledge, teaching comfort, and support for AIDS education among school teachers: a statewide survey. *AIDS Education Prevention* 1996;8:267–277.
- Bressollette, C.; Pioker, Z. Hungarian AIDS Data Basis Project. Óvegylet Alapítvány; Budapest: 1997.
- Brown LK, DiClemente RJ, Park T. Predictors of condom use in sexually active adolescents. *Journal Adolescent Health* 1992;13:651–657.
- Csermely, G.; Somaini, B.; Racz, J. Consolidating Non-governmental Organizations in the AIDS Field in Hungary; Abstract no. Th.C.4762. *Int Conf AIDS*; 1996;
- DiClemente RJ, Lodico M, Grinstead OA, Harper G, Rickman RL, Evans PE, Coates TJ. African-American adolescents residing in high-risk urban environments do use condoms: correlates and predictors of condom use among adolescents in public housing developments. *Pediatrics* 1996;98:269–278. [PubMed: 8692629]
- Dömök, I. A HIV/AIDS járványtana. A járványügyi helyzet alakulása az elmúlt 15 évben külföldön és hazánkban. In: Gyarmathy, VA., editor. *AIDS — tények és előrejelzések a legújabb kutatások tükrében*. Nefelejcs Alapítvány; Budapest: 1996. p. 19-40.
- Gyarmathy VA. AIDS course for educators [in Hungarian]. *Educatio Sanitaria* 1996a;XXXVII(5): 234–255.
- Gyarmathy A. Special training of AIDS research at the Department of Genetics of the Eötvös Loránd University of Sciences: the experiences of the first year, 1995/96 [in Hungarian]. *Educatio Sanitaria* 1996b;XXXVII(4):173–189.
- Gyarmathy VA, Thomas RP, Mikl J, McNutt LA, Morse DL, DeHovitz J, Ujhelyi E, Számadó S. The study of Hungarian adolescent risk behaviors: sexual activity and condom use among students studying in secondary schools in Budapest, Hungary. *International Journal of STD AIDS* 2002;13(6):399–405. [PubMed: 12015014]
- Hegyí E, Hegyí V, Danilla T. Long-term trends of the incidence of syphilis and gonorrhoea in the Slovak Republic during 1947–1994, with special regard to young age groups. *Bratislavske Lekarske Listy* 1997;98:536–571.
- HIV/AIDS - Magyarország. *Epinfo* 1998;5:289–293.
- Hungary and her inhabitants. [Accessed February 2, 2000]. 2000 Available: <http://www.hungaryemb.org/HandHI.htm>

- Kutnick P, Jules V. Pupils' perceptions of a good teacher: a developmental perspective from Trinidad and Tobago. *British Journal of Educational Psychology* 1993;63(Part 3):400–413. [PubMed: 8292545]
- Mikl J, Sudar Z, Smith P, Bruckova M, Jedlicka J, Kastankova V, Tryzna R, DeHovitz J. HIV infection and high risk behavior among patients attending an STD referral clinic in Prague, Czech Republic. *Sexually Transmitted Infections* 1998;74:128–130.
- Murdoch Eaton D, Levene M. Student feedback: Influencing the quality of teaching in a paediatric module. *Medical Education* 1997;31(3):190–193. [PubMed: 9231137]
- Nemzeti AIDS Bizottság. [Accessed March 24, 1999]. Available: <http://www.weblapok.hu/aids/nab.htm>
- Ozer E, Weinstein R, Maslach C, Siegel D. Adolescent AIDS prevention in context: the impact of peer educator qualities and classroom environments on intervention efficacy. *American Journal Communication Psychology* 1997;25(3):289–323.
- Rossi, PH.; Freeman, HE. Evaluation. A Systematic Approach. SAGE Publications; Newbury Park, CA: 1993. Quasi-experimental impact assessments; p. 297-330.
- Simon, T.; Morava, G. HIV/AIDS Education in the Lessons of Foreign Languages and Mathematics at some High-schools in Hungary; PO-D14-3819. *Int Conf AIDS*; 1993;
- Smith MU, Katner HP. Quasi-experimental evaluation of three AIDS prevention activities for maintaining knowledge, improving attitudes, and changing risk behaviors of high school seniors. *AIDS Education and Prevention* 1995;7:391–402. [PubMed: 8672392]
- Stephenson JM, Oakley A, Charleston S, Brodala A, Fenton K, Petruckevitch A, Johnson AM. Behavioural intervention trials for HIV/STD prevention in schools: Are they feasible? *Sexually Transmitted Infections* 1998;74(6):405–408. [PubMed: 10195048]
- Strecher, VJ.; Rosenstock, IM. The health belief model. In: Glanz, K.; Lewis, FM.; Rimer, BK., editors. *Health Behavior and Health Education—Research and Practice*. Jossey-Bass Publishers; San Francisco, CA: 1997. p. 41-59.
- Tichonova L, Borisenko K, Ward H, Meheus A, Gromyko A, Renton A. Epidemics of syphilis in the Russian Federation: trends, origins, and priorities for control. *Lancet* 1997;350:210–213. [PubMed: 9250199]

Table 1

Maximum likelihood estimates and associated p-values for the effect of teaching methods and teachers on outcome measures. Secondary school students, Budapest, Hungary, Fall 1996–Spring 1997

Outcome Measures ^c	Baseline prevalence	Effect of intervention ^a p-value ^d	Effect of teacher ^b p-value ^d	One hour of class time β ^e p-value ^d	Two hours of class time β ^e p-value ^d	Three hours of class time β ^e p-value ^d	Teacher A β ^e p-value ^d	Teacher B β ^e p-value ^d	Teacher C β ^e p-value ^d	Teacher D β ^e p-value ^d
Perception that AIDS is very dangerous	81.5%	0.487	<0.001	-0.26 0.42	0.00 0.975	0.28 0.171	1.37 0.001	-0.37 0.089	0.20 0.479	-0.76 0.092
Rated fear of AIDS: "neutral", "much", and "very much"	79.6%	0.810	0.019	0.19 0.54	-0.10 0.640	-0.14 0.487	0.82 0.015	-0.20 0.388	0.35 0.242	0.85 0.162
Assessment of HIV risk: "very much" and "much"	10.9%	0.195	0.016	0.49 0.08	-0.37 0.048	0.02 0.906	0.39 0.049	-0.47 0.025	0.16 0.525	0.64 0.193
High level of AIDS knowledge	54.9%	0.004	0.003	-0.01 0.97	0.34 0.158	0.62 0.011	-0.17 0.621	0.77 0.005	0.80 0.026	1.20 0.181
High level of condom use knowledge	72.9%	0.426	0.797	0.64 0.13	-0.08 0.789	0.00 1.00	-0.24 0.576	0.25 0.484	0.00 1.00	-0.23 0.748
Perception that AIDS cannot be prevented	3.1%	0.109	0.030	1.18 0.021	-0.15 0.597	-0.20 0.439	0.08 0.836	-0.88 0.008	0.29 0.256	-0.03 0.964
Perception that monogamy is important	83.4%	0.104	0.404	0.90 0.091	-0.81 0.039	0.53 0.136	0.67 0.199	-0.15 0.727	0.53 0.256	0.05 0.964

Note: Teacher A: young female PI, subbing when needed (one of the authors); Teacher B: young female collaborator, subbing when needed (one of the authors); Teacher C: elderly male, teaching in his own and in other secondary schools, and Teacher D: elderly female, teaching only in secondary schools other than her own.

^aTesting for the importance of the effect of the intervention: The different teaching methods tested were collapsed into three categories based on the amount of time spent on education (1 h of class time, 2 h of class time, 3 h of class time) after no differences were found in the effect of the individual teaching methods (lecture format, question and answer session, role play, video, slide show and combinations of these methods). We are comparing the logistic regression model including all the variables representing the time spent on education with the logistic regression model excluding any variable representing the education.

^bTesting for the importance of the teachers: Comparing the logistic regression model including all the variables representing the teachers (Teacher A, Teacher B, Teacher C, and Teacher D) with the logistic regression model excluding any variable representing the teachers.

^cAll models controlled for: gender, type of school, age (<17 years, 17+ years), alcohol use (never or rarely vs. other), current sexual activity (yes/no), penetration (ever, never), petting (ever, never), baseline score for the outcome variable, number of education interventions received (none, one, two, three).

^dMaximum likelihood estimate (MLE) p-values.

ϵ Increase in prevalence noted by positive coefficient.

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript