

Health Promotion Practice

<http://hpp.sagepub.com/>

The Systematic Development of ROsafe: An Intervention to Promote STI Testing Among Vocational School Students

Mireille Wolfers, Onno de Zwart and Gerjo Kok
Health Promot Pract published online 29 March 2011
DOI: 10.1177/1524839910384343

The online version of this article can be found at:
<http://hpp.sagepub.com/content/early/2011/03/28/1524839910384343>

Published by:



<http://www.sagepublications.com>

On behalf of:

Society for Public Health Education



Additional services and information for *Health Promotion Practice* can be found at:

Email Alerts: <http://hpp.sagepub.com/cgi/alerts>

Subscriptions: <http://hpp.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

The Systematic Development of ROsafe: An Intervention to Promote STI Testing Among Vocational School Students

Mireille Wolfers, MSc¹
Onno de Zwart, PhD¹
Gerjo Kok, PhD²

This article describes the development of ROsafe, an intervention to promote sexually transmitted infection (STI) testing at vocational schools in the Netherlands. Using the planning model of intervention mapping (IM), an educational intervention was designed that consisted of two lessons, an Internet site, and sexual health services at the school sites. IM is a stepwise approach for theory- and evidence-based development and implementation of interventions. It includes six steps: needs assessment, specification of the objectives in matrices, selection of theoretical methods and practical strategies, program design, implementation planning, and evaluation. The processes and outcomes that are performed during Steps 1 to 4 of IM are presented, that is, literature review and qualitative and quantitative research in needs assessment, leading to the definition of the desired behavioral outcomes and objectives. The matrix of change objectives for STI-testing behavior is presented, and then the development of theory into program is described, using examples from the program. Finally, the planning for implementation and evaluation is discussed. The educational intervention used methods that were derived from the social cognitive theory, the elaboration likelihood model, the persuasive communication matrix, and theories about risk communication. Strategies included short movies, discussion, knowledge quiz, and an interactive behavioral self-test through the Internet.

Keywords: *adolescents and young adults; STI; prevention; intervention; STI testing; intervention mapping; vocational schools*

Health Promotion Practice

Month XXXX Vol. XX, No. XX, xx-xx

DOI: 10.1177/1524839910384343

© 2011 Society for Public Health Education

Concerns about a high prevalence of sexually transmitted infections (STIs) among heterosexual young people with a low educational level have directed the Municipal Public Health Services (MPHS) to pay attention to students at vocational schools in the Netherlands. Vocational schools provide the lowest levels of vocational education in the Netherlands, and approximately 50% of Dutch students attend this type of school. Generally, the students in these schools are 16 to 24 years of age and many belong to minority ethnic groups. Until recently, not much attention was given to sexual health education at these schools, but the experiences of the MPHS suggested a need for sexual health education combined with sexual health services. The international literature also shows that low-educated young people, often belonging to minority ethnic groups, are vulnerable to HIV, STIs, and other sexual health problems (National Institutes of Health, National Institute of Allergy and Infectious Diseases, 2005; Tortolero et al., 2008) and that offering preventive services in school settings is feasible and effective in preventing STIs (Kirby, 2002; Kirby, Waszak, & Ziegler, 1991; McCall & McKay, 2004; Peak & McKinney, 1996; Richardson-Todd, 2006). Because such services have not been offered yet in the Netherlands, we designed a plan for sexual education and preventive sexual health

¹Municipal Public Health Service, Rotterdam Area, Netherlands

²Maastricht University, Netherlands

Authors' Note: *This study was conducted within the Huisman Research Centre for Infectious Diseases and Public Health and the Centre for Effective Public Health in Greater Rotterdam. The study was funded by ZonMw, The Netherlands Organisation for Health Research and Development. Please address correspondence to Mireille Wolfers, MSc, GGD Rotterdam-Rijnmond, Department of Infectious Diseases Control, P.O. Box 70032, Rotterdam, 3000 LP, Netherlands; e-mail: m.wolfers@ggd.rotterdam.nl*

services at the school sites (“ROsafe”). In developing the educational intervention, we used theory and evidence following the intervention mapping (IM) protocol (Bartholomew, Parcel, Kok, & Gottlieb, 2006).

IM is a stepwise approach for the theory- and evidence-based development and implementation of interventions, comprising six steps, each leading to a product that guides the next step. The first step begins with conducting a needs assessment and ends with defining the most distant objectives in the IM model: the desired health and behavioral outcomes. In the second step, the objectives are further specified and the most important and changeable behavioral determinants selected. Objectives and determinants are then used to formulate change objectives, specific actions that should lead to the desired behavior. Step 3 is the selection of useful theory- and evidence-based behavioral change methods and strategies that are applicable to the change objectives. The intervention program is then designed in Step 4; the methods and strategies are translated into intervention materials. In Steps 5 and 6, detailed plans for the adoption, implementation, and evaluation of the program are produced. The purpose of this article is to present the development of a theory- and evidence-based intervention for vocational schools to promote STI testing.

► INTERVENTION MAPPING

Step 1: Needs Assessment

The first step in the systematic IM approach involves conducting a needs assessment to determine the exact health problem on which the intervention should be focused and identification of the behavioral risk factors that contribute to the problem. The most distant objectives in the IM model, desired health and behavioral outcomes, are defined at the end of the needs assessment. First, available epidemiologic figures on STIs, as well as literature on the sexual risk behavior of vocational school students, were reviewed to determine whether there is a need for an intervention to promote STI testing among this target group. Second, the literature was reviewed to identify theoretical determinants that can be used for predicting and explaining STI testing. Consequently, additional qualitative and quantitative research were performed on STI-testing behavior among vocational school students.

Literature review. First, studies on the epidemiology of STIs and sexual risk behavior among adolescents and young adults were reviewed. We were especially interested in the findings for low- and intermediate-educated students because of the educational background of the

target group. This review revealed that in the Netherlands as well as internationally, young people have the highest prevalence of STIs. Surveillance systems in various industrialized countries report that Chlamydia is most frequently reported to cause STIs, and the highest prevalence of Chlamydia infection is observed among female adolescents (Koedijk et al., 2009; World Health Organisation, 2001). Surveillance figures published yearly by the National Centre for Infectious Disease Control in the Netherlands show that 10.6% of Chlamydia tests among heterosexuals were positive in 2008. The main burden of Chlamydia infection is carried by the young heterosexual population, with 52% of the infections in 2008 occurring in those under 25 years of age. For women, the highest number of positive Chlamydia tests (17%) was among 15- to 19-year-olds, and for heterosexual men the highest rates (14.5%) were among 15- to 25-year-olds. Young people of South American/Caribbean descent (from Surinam or the Netherlands Antilles, Aruba) had the highest Chlamydia infection rates, 18.4% for men and 15.1% for women. The first national screening study of Chlamydia in the Netherlands in 2005 revealed that heterosexual young people with a low to intermediate education level who live in an urban area are younger than age 20 years, and those of Surinamese or Antillean descent are at the highest risk. The overall prevalence was 2.0%, with 3.2% in urban areas, and the highest prevalence of 12.1% was observed among women of Surinamese or Antillean origin (Van Bergen et al., 2005).

A national study of sexual behavior until 25 years of age showed that those with a low education level had more risky sexual behavior; sexual activity started at an earlier age; and they reported more sexual partners and had less knowledge about STIs and reproductive and contraceptive issues (Graaf, Meijer, Poelman, & Vanwesenbeeck, 2005). Furthermore, 10% of boys, 14% of low-educated girls, and 7% of highly educated girls with experience in sexual intercourse had ever been tested for an STI.

Second, the literature on behavioral determinants of testing for STI and HIV was reviewed. Studies using a comprehensive theoretical framework on STI testing among adolescents and young adults were scarce, so except for a few studies that used the health belief model we analyzed studies with single or multiple psychological constructs and studies on the use of sexual health care services. Variables identified to correlate with STI testing among adolescents and young adults were risk perception (severity and worries; Crosby et al., 2001; Hou & Wisenbaker, 2005), moods and emotions (shame), stigma attached to testing (Cunningham, Tschann, Gurvey, Fortenberry, & Ellen, 2002; Kalichman & Simbayi, 2003), knowledge, past testing behavior, accessibility and

availability of test services (Hou & Wisenbakker, 2005; Peralta, Deeds, Hipszler, & Ghalib, 2007), and demographic variables.

Qualitative research. As part of the needs assessment, semistructured interviews were conducted with 38 vocational students from Rotterdam aged 16 to 24 years (average 18.8 years) and of various ethnic backgrounds. The interviews asked about unsafe sex, STIs, and STI testing. Results showed that STI testing was a subject that hardly interested the students, although practically all students, except four, were sexually active and had experience with sexual intercourse with more than one partner. A lack of knowledge about STIs and STI testing concerned the transmission, symptoms, and consequences of STIs as well as the testing activity itself. For example, misconceptions existed about STIs being transmitted by kissing and that washing the genitals and hands and using oral contraceptives can prevent transmission. Most respondents were unaware that STIs can be transmitted by oral and anal sex. An important misunderstanding was the idea that STIs always occur with symptoms, and that this is a reason for testing. The knowledge on where, how, and when to test was incomplete. The students hardly discussed the topic but considered the subjective norms of parents as most important, followed by the norms of friends and partner. The pros of testing often had to do with peace of mind and a symbolic meaning for the relationship, as well as obtaining treatment for physical complaints. Easy accessibility to test facilities was considered an advantage. Stigma and shame were attached to testing. Also, fear of the test itself and the test results were reported and mentioned as a reason for not testing. Students did not consider themselves at risk for STIs, and perceptions of risk were related to familiarity with the partner, matters of trust and intimacy, and appearances.

Survey on behavioral determinants. The next step in the needs assessment was a cross-sectional behavioral survey on STI testing among 778 students from vocational schools in the Rotterdam area, and analyses were performed on 501 students with sexual experience. Using Fishbein's integrative model (Fishbein, 2008; Montañó & Kasprzyk, 2002), we studied correlates of the intention to test for STIs. In the development of the questionnaire, we used the outcomes of our qualitative study and the literature review to measure all expected relevant background variables in addition to the most proximal determinants of behavioral intention, which are attitude, perceived norms, and self-efficacy. This survey is described in more detail elsewhere (Wolfers, Kok, Mackenbach, & de Zwart, 2010). Briefly, intentions to test were low despite high-risk sexual behavior. Univariate, significant predictors of the

intention to test were attitude; self-efficacy; perceived norms of partners, friends, and parents, including perceived descriptive norms of partners and friends; perceived susceptibility; shame; pros; and characteristics of test site accessibility. In a multivariable analysis, the most important predictor of the intention to participate in STI testing was attitude ($r = .49, p < .01; \beta = .35, p < .001$). Other predicting variables were the subjective norms of friends and parents ($r = .38, p < .01; \beta = .18, p < .001$), modeling behavior of friends ($r = .26, p < .01; \beta = .10, p < .01$), perceived susceptibility ($r = .33, p < .01; \beta = .15, p < .001$), and characteristics of accessibility to test facilities ($r = .22, p < .01; \beta = .11, p < .001$).

Translation of needs assessment data into desired outcomes. A linkage group with stakeholders from the vocational schools, the MPHS, university department of public health, and the national expertise center on HIV-AIDS and STIs was formed at the start of the project and had been involved in the development of the questionnaire for the survey. The group also discussed the exact target behavior. For the present project, the major behavior outcome for the intervention was defined as taking an STI test after unsafe intercourse and before having unprotected intercourse within a steady relationship. We defined unsafe sex as anal or vaginal intercourse without a condom with someone other than a main partner in a situation in which both partners tested negative for STIs. Other behavior outcomes were in regards to safe sex: the use of condoms and contraceptives.

Step 2: Matrix of Change Objectives

In the second step of IM, the objectives were specified further. First, the behavioral outcome had to be delineated into specific actions that lead to the desired behavior, the so-called performance objectives (POs), what the target group members need to do as a result of the program. Six different sub-behaviors were specified to achieve the program outcome (Table 1).

Next, the most important and changeable behavioral determinants of these performances were identified and selected. The results of the research in Step 1, as well as scientific knowledge about behavioral determinants and behavioral change, informed these decisions. An important goal of the educational intervention was decided to be raising awareness for STI testing by means of enhancing students' risk perception and establishing a positive attitude toward STIs testing. In addition, the social norms of friends and self-efficacy were decided to be important determinants to address in the intervention. Knowledge was considered a prerequisite for changing attitudes, becoming aware of risks, and enhancing self-efficacy.

TABLE 1
Matrix of Change Objectives for STI-Testing Behavior

Performance Objectives for Students	Social Influence (Perceived Norms and Social Support)				Risk Perception	Self-efficacy
	Attitude	Behavioral Beliefs	Knowledge	Social Influence (Perceived Norms and Social Support)		
1. Assess personal sexual behavior, and compare this with the standard of safe sex for young people	A1.1. Students express a positive attitude toward STI testing for adolescents and young adults	B3.1. Students acknowledge that by testing, you show that you and your partner are serious.	K1.1. Students can explain which sexual techniques cause risk for STI, and which are safe for STI.	S3.1. Students realize that peers also think that it is sensible that young people get tested for STI.	R1.1. Students acknowledge that an STI test is necessary after unsafe sex. R1.2. Students acknowledge that an STI test is necessary before having unprotected sex with a steady partner.	
2. Decide whether there is a personal risk for acquiring an STI and decide if an STI test is necessary	A3.1. Students acknowledge it is wise that he or she and his or her partner first take an STI test before having sex without a condom within a steady relationship. A3.2. Students accept that it is necessary to take an STI test after unsafe sex. A3.3. Students acknowledge the advantages of STI testing. A3.4. Students acknowledge that the advantages outweigh the disadvantages of STI testing.	B3.2. Students acknowledge that taking an STI test does not mean you do not trust your partner. B3.3. Students acknowledge that an STI test is a good moment to have safe sex afterwards. B3.4. Students acknowledge that by taking an STI test (and get treatment if necessary) you prevent transmission to others. B3.5. Students acknowledge that by taking an STI test you can start timely treatment if you are infected. B3.6. Students acknowledge that by taking an STI test you take responsibility for your own and your partner's health.	K3.1. Students can explain that STI can occur without symptoms. K3.2. Students can explain that by washing you cannot prevent STI. K3.3. Students can explain that you cannot tell by someone's appearances if he has an STI. K3.4. Students can explain that oral contraceptives cannot prevent STI. K3.5. Students can explain that STI can cause fertility in women. K3.6. Students can explain that you can catch an STI by having unprotected sex only.	S3.1. Students realize that peers also think that it is sensible that young people get tested for STI. S3.2. Students realize that peers agree that you should take an STI test after unsafe sex and have sex within a new steady relationship. K4.1. Students can explain where you can get an STI test, know where to find opening hours, and know what the procedure is.	R2.1. Students acknowledge that they had unsafe sex (vaginal or anal intercourse without a condom). R2.2. Students acknowledge that they risk an STI because they had unsafe sex. R2.3. Students acknowledge they need to take an STI test because they had unsafe sex. R3.1. Students express that they want to know whether they are infected with an STI. R3.2. Students acknowledge that you can catch an STI within a steady relationship if you do not use condoms because unprotected sex with a steady partner is unsafe if both are unaware of their STI/serostatus. R3.3. Students acknowledge that a virgin risks an STI if she has sex with a man who has sexual experience.	
3. Make an appointment for an STI test		B4.1. Students acknowledge that only by taking an STI test you can really find out if you are infected with an STI.				SE4.1. Students express confidence that they can make a plan to take an STI test. SE4.2. Students express confidence that they dare to go to take an STI test.

(continued)

TABLE 1 (continued)

<i>Performance Objectives for Students</i>	<i>Attitude</i>	<i>Behavioral Beliefs</i>	<i>Knowledge</i>	<i>Social Influence (Perceived Norms and Social Support)</i>	<i>Risk Perception</i>	<i>Self-efficacy</i>
4. Go to a test site where STI tests are performed	A5.1. Students express a positive attitude toward the test site of their choice.		K5.1. Students can explain how an STI test is performed and that most of the times physical examination is not necessary.	S5.1. If in need for support, students ask a good friend for support when going to take an STI test. S5.2. Students discuss the idea of testing with someone they trust.		SE5.1. Students express confidence that they will carry out their plan to take an STI test; get tested and receive the results.
5. Receive the results of the STI test.	A6.1. Students acknowledge the advantages of knowing the results of the STI test. A7.1. Students express a positive attitude toward STI testing in future, if they have been at risk again.	B6.1. Students accept that hearing the result of an STI test is not something you have to be very frightened for.				
6. Take an STI test again, after risk behavior in the future.			K7.1. Students acknowledge that an STI test is again needed after repeated risk in the future	S7.1. Other students also acknowledge that an STI test is again needed after repeated risk in the future.		

An IM matrix of change objectives was constructed, combining the POs with their most important and changeable determinants (Table 1). Change objectives are the most immediate targets of a program to be achieved and are stated in terms of what a person exactly needs to learn to enable performance of the specific health-promoting behavior.

Step 3: Theoretical Methods and Practical Strategies

In the third step, theoretical methods and practical strategies had to be selected and linked to the change objectives in the matrix. In IM, methods are seen as general concepts derived from behavioral theories, whereas strategies are specific practical applications of methods. A core process for this step is reviewing existing empirical evidence in the literature and reviewing theories of change (Bartholomew et al., 2006). The topic approach was not very helpful because the literature revealed no evidence-based interventions to promote HIV or STI testing until 2007. Therefore, we searched for interventions for reducing risky sexual behavior to prevent STIs and HIV. As recommended in IM, we also used the general theory approach for theories about general behavior change to achieve our change objectives. Next, we translated and summarized the resulting IM products into documents that could be used in the consultations with stakeholders and experts to obtain ideas about ideas and strategies. For this purpose, we organized brainstorm sessions with teachers, prevention workers, public health nurses, and experts in the field of STI/HIV prevention. Preliminary ideas were discussed in the linkage group, after which decisions on the use of methods and techniques were made by the developers.

We used methods derived from social cognitive theory, the elaboration likelihood model, the persuasive communication matrix, and theories about risk communication. For example, we used discussion about arguments to test risk situations for STIs (method) in combination with modeling (method) when we used short movies in a game in which students had to vote for possible outcomes and discuss their choice (strategy). With the matrix of change objectives as a blueprint, we were able to fill in the content and techniques of the various intervention components. Table 2 provides examples of our translation of the methods and strategies into intervention components to accomplish specific change objectives regarding the specific behavioral determinants.

Step 4: Program Development

In Step 4, we consulted teachers, public health nurses, health educators, and students for the development of

the program and materials. The program had to be flexible enough to be used in different types and levels of education, addressing the cultural diversity of the students and fulfilling the different needs of the students. The educational intervention was carried out by a health educator from the MPHS in two lessons of 100 min each, with the possibility of a home assignment. The educational intervention was followed by consulting hours at the schools, provided by the MPHS during subsequent weeks. Students could visit during the consultation hours free of charge, anonymously, and without an appointment.

Given these factors, we designed a mixture of intervention components that combined in-class methods with individual assignments. The most important practical techniques were short movies for modeling techniques and providing information on STI testing in a lifelike situation to overcome testing barriers. These movies were used in a game similar to that of a popular Dutch television show to induce discussions in the classroom. Movies on STI consults were shown to discuss and explain testing procedures. We also developed an Internet site in which various techniques were combined. The site was to be visited as a home assignment for students to assess their personal risk for STIs and to motivate them to take an STI test if they had been involved in high-risk behavior. The students were also advised on appropriate test locations: Did they want to have an anonymous STI test, did they prefer to go to their general practitioner, or did they need a service that was free of charge. Furthermore, by taking the quiz on the Internet site, students could test and improve their knowledge on safe sex and STIs.

Media students from a vocational school produced the movies, and students from a theater class at the vocational school participated as actors. The scripts were written together with the media students; thus, we anticipated that the movies would be culturally appropriate to the target group. The Internet site was built and designed by professionals. In the different steps of the development of the site, students were asked their opinion and the texts were pretested for comprehension by students with the lowest levels of education. A small group of interested teachers and health educators who were to deliver the intervention were also involved in this process.

The health educators had experience with groups of young people and were knowledgeable about the counseling and sexuality of young people. In close collaboration with the health educators, we created a scenario for the two lessons, including guidelines and prompting questions on how to elicit discussions in the classroom. This scenario was pretested by all participating health educators during test lessons, after which we made small adaptations and additions. Components promoting

TABLE 2

<i>Determinant</i>	<i>Change Objectives Targeted</i>	<i>Strategy</i>	<i>Method</i>	<i>Intervention Element</i>
Attitude Behavioral beliefs Risk perception Knowledge	A3.1. Students acknowledges it is wise that he or she and his or her partner first take an STI test before having sex without a condom within a steady relationship. B4.1. Students acknowledge that only by taking an STI test you can really learn if you are infected with an STI. B3.2. Students acknowledge that taking an STI test does not mean you do not trust your partner. R3.2. Students acknowledge that you can catch an STI within a steady relationship if you do not use condoms because unprotected sex with a steady partner is unsafe if both are unaware of their STI/serostatus K3.1. Students can explain that STI can occur without symptoms. K3.4. Students can explain that oral contraceptives cannot prevent STI. S5.1. If in need for support, students ask a good friend for support when going to take an STI test. S5.2. Students discuss the idea of testing with someone they trust. K5.1. Students can explain how an STI test is performed, and that most of the times physical examination is not necessary. B4.1. Students acknowledge that only by taking an STI test you can really learn if you are infected with an STI. K3.2. Students can explain that by washing you cannot prevent STI.	Watching a short movie modeling risk situations within a steady relationship Discussing subjects raised in movies after voting for alternative outcomes Giving information by health educator	Modeling: Showing the positive behaviors targeting behavioral beliefs Persuasive communication: Using new arguments, countering misunderstandings and fables Scenario-based information on risks Providing information	Movie: <i>Lovers</i> Boy and girl want to make love. He does not want to use a condom any longer. He says she is taking the pill as a reason not to use a condom; also, they have been together for some time. She thinks they should first take an STI test. Because you do not know what your ex-partners have done. He says nothing looks wrong, so he does not need a test. They argue somewhat, he does not agree straightaway. But in the end, he does. The movie stops, three options are shown of how the scene will end. Students vote, options are discussed in class.
Social influence Knowledge Behavioral beliefs	Movie: <i>Real Friends</i> Two girls, friends, talk about risks they have for STI. One of the girls is afraid she has an STI because she had sex without a condom with her ex-boyfriend who betrayed her. She does not dare to go for a test because of fear for physical examination. They argue somewhat, find out that they are both at risk but both do not dare to go for a test. But at the end, they decide to go together to support each other. One of the options to vote for as an answer the girl will use on her friend's question whether she ever took an STI test is she does not need to test because she only has sex without a condom if she knows a boy well.	Watching short movies made by students Discussing subjects raised in movies after voting for alternative outcomes Giving information by health educator about testing	Modeling: Showing the positive behaviors targeting behavioral beliefs Modeling how to mobilize social support to perform the target behavior Persuasive communication: Using new arguments, countering misunderstandings and fables	Movie: <i>Real Friends</i> Two girls, friends, talk about risks they have for STI. One of the girls is afraid she has an STI because she had sex without a condom with her ex-boyfriend who betrayed her. She does not dare to go for a test because of fear for physical examination. They argue somewhat, find out that they are both at risk but both do not dare to go for a test. But at the end, they decide to go together to support each other. One of the options to vote for as an answer the girl will use on her friend's question whether she ever took an STI test is she does not need to test because she only has sex without a condom if she knows a boy well.

(continued)

TABLE 2 (continued)

<i>Determinant</i>	<i>Change Objectives Targeted</i>	<i>Strategy</i>	<i>Method</i>	<i>Intervention Element</i>
Self-efficacy Knowledge Behavioral beliefs	SE4.2. Students express confidence that they dare to go to take an STI test. K5.1.1. Students can explain how an STI test is performed, and that most of the times physical examination is not necessary. B3.5. Students acknowledge that by taking an STI test you can start timely treatment if you are infected.	Watching lifelike movie about an STI consult, addressing commonly expressed fears and misunderstandings about STI testing among young people Receiving information from health educator	Providing information by health educator	Another option to vote for as an answer the girl will use on the friend's question whether she ever took an STI test is she does not need to test because she always washes well after sex, this prevents STI Movie <i>Intake</i> Intake at STI clinic. Boy comes for STI test. He is nervous, does not want to show his private parts, and does not want anyone to know about it. Finds out there is no physical examination, and his results can be sent by SMS
Risk perception	R1.1. Students acknowledge that an STI test is necessary after unsafe sex. R1.2. Students acknowledge that an STI test is necessary before having unprotected sex with a steady partner. R2.1. Students acknowledge that they had unsafe sex (vaginal or anal intercourse without a condom). R2.2. Students acknowledge that they risk an STI because they had unsafe sex. R2.3. Students acknowledge they need to take an STI test because they had unsafe sex. R3.1. Students express that they want to know whether they are infected with an STI. R3.2. Students acknowledge that you can catch an STI within a steady relationship if you do not use condoms because unprotected sex with a steady partner is unsafe if both are unaware of their STI/serostatus.	Providing information tailored on personal risk behavior at feedback of behavioral self-test Providing information in feedback on preferences about test facilities that the person has selected	Risk perception	Self-test Interactive behavioral self-test at the Internet site that has to be visited as a home assignment. Students have to recall their own experiences with unsafe sexual behavior. They get feedback on the risks on their own behavior. They can state their preferences on test accessibility and can choose a site of their preference and find information about it.

STI testing were embedded in other educational components about contraceptive use and the correct use of condoms, as well as an informative component on the general knowledge of sex organs and functionality and conception.

Step 5: Planning for Adoption and Implementation

In the development phase, anticipating future implementation of the program is important. Potential stakeholders—those who have an interest in the intervention and its outcomes—have to be identified and already involved in Step 1. Relevant decision makers and users for the adoption and implementation of this intervention were situated at the MPHS and the vocational schools. The linkage group formed in Step 1 was consulted in Steps 1 to 3. According to their expertise and degree of involvement, members were consulted individually during the different steps and they joined brainstorming sessions as described in Step 3. The members contributed to decisions on how to use the information from the needs assessment, the content of the intervention, the strategies used, and the execution of the evaluation. As part of the evaluation, teachers and managers of the schools, as well as the health educators, were interviewed on their experiences, intentions, barriers, and facilitators for future use of the program. These outcomes were used in planning the adoption and implementation of the program.

Step 6: Evaluation Plan

To evaluate the effects of the educational intervention, as well as the education combined with the consultations at the schools, a group randomized trial was performed with follow-up measurements after 1, 3, and 6 to 9 months. The effect evaluation outcomes were on STI testing and safe sex behavior and its determinants.

Process measures of the dose and fidelity of the intervention delivered were collected during the interventions by means of registrations, classroom observations, and a survey among teachers. A section with process questions on the dose and fidelity of the intervention was included in the post-test questionnaire that was part of the effect evaluation.

After the follow-up measurement, the control classes were also offered the educational intervention. Among the students in these classes, focus group discussions were organized to measure their appreciation of the intervention, the different components, and to determine the effectiveness of the parameters of the theoretical methods, for example, identifying with the role models in the movies. The results of the effect and the process evaluation will be reported elsewhere.

DISCUSSION

We described the development of an intervention to promote STI testing among vocational students by applying the IM protocol. IM is a model that guides the developmental process in distinct steps, systematically using theories on explaining and changing behavior and guides in how to apply theoretical methods to achieve program outcomes.

Strengths

The IM model was a very useful tool and was also very helpful in translating theory, behavioral determinants, and program objectives to intermediates and participants in the planning and brainstorming sessions who were not familiar with health education theories and IM. The outcomes of the first IM steps were a good starting point for eliciting practical and creative ideas for the intervention. The clear structure of program outcomes, performance objectives, determinants, and learning objectives helped the planners make choices for the target behavior, make a clear delineation, stay focused on this behavior, and choose the appropriate evaluation outcomes. In this study, the contribution of the target population, the vocational students, was very valuable. The students played a major role in developing crucial program materials. Also, the early involvement of the health educators and public health nurses who delivered the education in the planning and development process resulted in enthusiastic performances in the schools and commitment to the project.

Weaknesses

A weakness in the study is the modest role of the teachers at the vocational schools. Teacher involvement in all steps of the development process was difficult because of the pressure of their work and, maybe, a lack of priority for the subject. Only teachers from a limited number of schools who provided training in health care participated. More involvement of teachers in the development process may have led to different choices in planning the classroom activities.

Although we have not yet described the effects of the intervention, we have documented the content and methodological background of the intervention in the IM framework, which allows us to monitor and evaluate the intervention rather precisely. In addition to the results of an effect evaluation on the final program outcomes, we will be able to perform a thorough process evaluation on the different components of the program and measure the effects on the level of behavioral determinants. This evaluation will provide insight into the effect of the intervention, the entry points for improving the design, and execution of the program.

REFERENCES

- Bartholomew, L. K., Parcel, G. S., Kok, G., & Gottlieb, N. H. (2006). *Planning health promotion programs: An intervention mapping approach* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Crosby, R., DiClemente, R. J., Wingood, G. M., Sionéan, C., Harrington, K., Davies, S. L., . . . & Oh, M. K. (2001). Psychosocial correlates of adolescents' worry about STD versus HIV infection. *Sexually Transmitted Diseases, 28*, 208-213.
- Cunningham, S. D., Tschann, J., Gurvey, J. E., Fortenberry, J. D., & Ellen, J. M. (2002). Attitudes about sexual disclosure and perceptions of stigma and shame. *Sexually Transmitted Infections, 78*, 334-338.
- Fishbein, M. (2008). A reasoned action approach to health promotion. *Medical Decision Making, 28*, 834-844.
- Graaf, d., H., Meijer, S., Poelman, J., & Vanwesenbeeck, I. (2005). *Seks onder je 25e. Seksuele gezondheid van jongeren in Nederland anno 2005* [Sexual health of young people in the Netherlands in 2005]. Delft: Eburon.
- Hou, S. I., & Wisenbakker, J. (2005). Using a web-based survey to assess correlates of intention towards HIV testing among never-been-tested but sexually experienced college students. *AIDS Care, 17*, 329-334.
- Kalichman, S. C., & Simbayi, L. C. (2003). HIV testing attitudes, AIDS stigma, and voluntary HIV counselling and testing in a black township in Cape Town, South Africa. *Sexually Transmitted Infections, 79*, 442-447.
- Kirby, D. (2002). Effective approaches to reducing adolescent unprotected sex, pregnancy, and childbearing. *Journal of Sex Research, 39*, 51-57.
- Kirby, D., Waszak, C., & Ziegler, J. (1991). Six school-based clinics: their reproductive health services and impact on sexual behavior. *Family Planning Perspectives, 23*, 6-16.
- Koedijk, F. D. H., Vriend, H. J., Van Veen, M. G., Op de Coul, E. L., van den Broek, I. V. F., van Sighem, A. I., . . . van der Sande, M. A. B. (2009). *Sexually transmitted infections, including HIV, in the Netherlands in 2008* (No. 210261005/2009). Bilthoven, Netherlands: RIVM.
- McCall, D., & McKay, A. (2004). School-based and school-linked sexual health education and promotion in Canada. *Journal of Obstetrics and Gynaecology Canada, 26*, 596-605.
- Montaño, D. E., & Kasprzyk, D. (2002). The theory of reasoned action and the theory of planned behavior. In K. Glanz, B. K. Rimer, & F. M. Lewis (Eds.), *Health behavior and health education: Theory, research and practice* (pp. 67-98). San Francisco, CA: Jossey-Bass.
- National Institutes of Health, National Institute of Allergy and Infectious Diseases. (2005). HIV infection in adolescents and young adults in the U.S. fact sheet. Retrieved from <http://www.niaid.nih.gov/factsheets/hivadolescent.htm>
- Peak, G. L., & McKinney, D. L. (1996). Reproductive and sexual health at the school-based/school-linked health center: an analysis of services provided by 180 clinics. *Journal of Adolescent Health, 19*, 276-281.
- Peralta, L., Deeds, B. G., Hipszer, S., & Ghalib, K. (2007). Barriers and facilitators to adolescent HIV testing. *AIDS Patient Care and STDs, 21*, 400-408.
- Richardson-Todd, B. (2006). Sexual health services in school: A project in a multi-agency drop-in. *Journal of Family Health Care, 16*, 17-20.
- Tortolero, S. R., Markham, C. M., Addy, R. C., Baumler, E. R., Escobar-Chaves, S. L., Basen-Engquist, K. M., . . . Parcel, G. S. (2008). Safer choices 2: rationale, design issues, and baseline results in evaluating school-based health promotion for alternative school students. *Contemporary Clinical Trials, 29*, 70-82.
- Van Bergen, J., Götz, H. M., Richardus, J. H., Hoebe, C. J., Broer, J., Coenen, A. J.; PILOT CT Study Group. (2005). Prevalence of urogenital *Chlamydia trachomatis* increases significantly with level of urbanisation and suggests targeted screening approaches: Results from the first national population based study in the Netherlands. *Sexually Transmitted Infections, 81*, 17-23.
- Wolfers, M. E. G., Kok, G., Mackenbach, J., & de Zwart, O. (2010). *Correlates of STI testing among vocational school students in the Netherlands*. Manuscript submitted for publication.
- World Health Organisation. (2001). Global prevalence and incidence of selected curable STI. Overview and estimates (No. 2001.02/2001.10). Geneva, Switzerland: WHO.