Web-Based Reproductive Health Education: Findings from TeenWeb Nairobi

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In Kenya, 70 percent of the population is under 20 years old. According to UNAIDS estimates, 1 in 10 Kenyans is HIV-positive, and 7 out of 10 HIV-positive individuals are 18 to 25 years old. Young women are at particularly high risk. UNAIDS estimates that in African countries with generalized epidemics, up to 80% of women aged 15-24 years old lack sufficient knowledge about HIV/AIDS, indicating the ongoing need for reproductive health education. This paper will report findings from TeenWeb, a school-based research-practice collaborative project that has both educational and methodological goals. This paper focuses on the project's Web-based reproductive health educational intervention directed at adolescents in five schools in Nairobi, Kenya. We address two primary questions in this paper:

1) Is access to web-based reproductive health information associated with an increase in reproductive health knowledge or with changes in attitudes about condom use among urban adolescents?

2) Do patterns of knowledge or attitude change vary according to the age, biological sex, or socioeconomic status of the respondent?

Methods

Study Design

We recruited five secondary schools in Nairobi, Kenya to serve either as "Web" or "Control" schools. For Web schools, we contracted with local companies to install Internet lease lines, install computer hardware and software, configure a LAN, and train students and teachers on the basics of computer operation and Web navigation. Students in all schools first completed a self-administered paper module (Module #1) tapping sociodemographic information and baseline knowledge and attitudes related to condoms, HIV testing, emergency contraception, and Kenyan abortion law. Following completion of Module 1, students in Web

schools began a series of 5 Web-based questionnaire modules that extended across two school years. Students completed one Web-based module approximately every 6 to 8 weeks, and in return, had access to the Web for at least 30 minutes after completing each module.

The project's Web portal links both to Web health sites and to age-appropriate content developed for African youth. Content changed to reflect the topics queried in the Web questionnaire modules. These topics included sexuality, contraception, abortion, and intimate partner violence. Although students were encouraged to access Web-based health information through "priming" via questionnaire content and "automatic forwarding" to the project's educational pages after completion of each module, they could access other Web content as well.

After the first paper module, students in **control** schools completed a 2nd (and final) paper module at the end of the study, at about the same time that Web-students were completing their final Web-based module. The final paper (Control) and Web modules repeated questions related to knowledge and attitudes about condoms, HIV testing, emergency contraception, and abortion legislation, in order to examine change over time in conjunction with Web access. Web students also re-took these same questions in Module 4, in order to examine any differences associated with the passage of time, etc. prior to exposure to the reproductive health information available on the project's Web page. Study design is illustrated in Figure 1.

Study Sample

In Phase 1of the project, module content was deemed non-sensitive by our ethics review board and written parental consent was waived. Our recruitment rate for study entry was more than 99%. More than 1500 students completed Module 1 (1034 in the Web condition, and 496 in the control condition). Beginning with Module 4 (Project Phase 2), sensitive content was introduced and written parental consent was required. We retained 91% of Web respondents at entry into Phase 2; respondent loss did not differ by biological sex. At study completion, we

retained 79% of students in Web schools and 77% in Control schools, yielding a final sample size for the present analysis of 1199 students. Thirty seven percent of the analysis sample is female; the mean age at study entry was 16.5 years.

Measures

Outcomes: Reproductive health attitudes and knowledge

Attitudes about condom use. Fourteen statements about condom use were presented and students were asked to indicate on a 5-point scale whether they agreed or disagreed with the statement (see list of statements in Table 1). We will conduct a factor analysis of these items using Module 1 data; resulting factors will serve as dependent measures. Based on preliminary analyses done to date, we expect three factors reflecting perceived problems in condom use (e.g., "condoms often break"), embarrassment issues (e.g., "buying condoms is embarrassing"), and perceptions about circumstances warranting condom use (e.g., "only people with many partners need to use condoms").

Knowledge about emergency contraception. Students were asked to identify what emergency contraception is, the number of hours after sex during which it is effective, and where it can be obtained in Nairobi. This information was included in the project's Web page. Correct answers to these items will be summed to yield a total score.

Knowledge about abortion. Students were asked to identify the circumstances under which abortion is legal in Kenya. A total score will be calculated by adding one point for a correct answer, and subtracting one point for an incorrect answer.

Predictors

Intervention condition. This is a dichotomous measure indicating whether or not students participated in the Web (1) or Control (0) condition. To ensure student privacy we did not track exposure of individual students to Web-based content (health or other).[1]

[1] However we did collect web-browsing logs for each project computer throughout the data collection period. Content analysis of these logs to help quantify actual exposure is planned for a separate analysis.

Age. Age of the respondent at study entry will be calculated as date of Module 1 completion minus date of birth.

Biological Sex. Sex is self-reported by the student.

Socioeconomic Status (SES). Socioeconomic status is a count of the following 15 commodities available in students' households: electricity, running water, flush toilet, refrigerator, gas or electric stove, metal or wooden bed, sofa, bicycle, car, dictionary, television, telephone, cell phone, stereo, and computer.

Analysis Plan

Data collection was completed in Nairobi on September 19, so analyses have not yet been conducted. For purposes of evaluating the intervention, TeenWeb represents a nonequivalent control group design, with students clustered within schools. (Because of logistical restraints imposed by availability of Internet lease lines, schools could not be randomly assigned to Web and Control conditions.) To address question 1, we will conduct an analysis of covariance (ANCOVA) on each of the three attitude/knowledge outcomes as measured in Module 6 (post-test). Attitude/knowledge measured in Module 1 will serve as a covariate; thus we are predicting change between the Module 1 measure and the Module 6 measure. Age, biological sex, SES, and intervention condition will also be entered as predictors. All predictors will be entered simultaneously, and variance adjustments made for school clusters. A significant main effect of condition will indicate differential improvement in knowledge and/or change in attitudes for Web versus Control students. For research question 2, we will add interaction terms between intervention condition and the following predictors: age, sex, and SES. Because respondents were not randomly assigned to groups, we will also examine the comparability of Web and Control groups on sociodemographic characteristics. The more comparable these groups are, the more our intervention approximates a true experimental design. Using the same general strategy described for question 1, we will also examine change in knowledge/attitudes between Module 1 and 4 for Web students. Findings will be discussed in

terms of the utility of Web-based reproductive health education in urban settings of varying infrastructure, and the interpretive limitations imposed by study design.

Figure 1. Data collection schedule for repeated knowledge and attitude questions

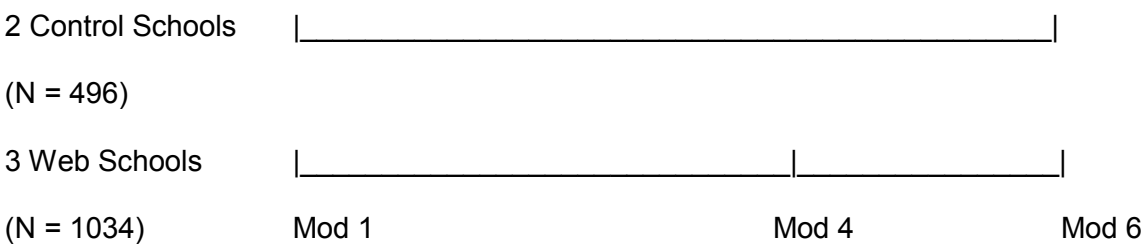

Table 1. Questions about condom use.

How much do you agree or disagree with the following statements?

a. Condoms are useful to prevent pregnancy
b. Condoms are useful to prevent infections like HIV
c. Condoms are difficult to use
d. Condoms often break
e. Condoms are too expensive to buy
f. When someone trusts their partner, they do not need to use a condom
g. Talking about condoms is embarrassing
h. Buying condoms is embarrassing
i. Using condoms is embarrassing
j. Condoms are used by responsible partners
k. It is fine to say NO to sex, if there is no condom
l. Only people with many partners need to use condoms
m. It is all right for a woman to ask her partner to wear a condom
n. The government should provide condoms for free to adolescents