THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF BIOBEHAVIORAL HEALTH

EVALUATION OF A PEER-LED SEXUAL HEALTH INTERVENTION
ADMINISTERED TO COLLEGE STUDENTS

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Summer 2010

A thesis
submitted in partial fulfillment
of the requirements
for baccalaureate degrees
in Biobehavioral Health and Psychology
with honors in Biobehavioral Health

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Abstract

Reports from the U.S. Centers for Disease Control and Prevention as well as epidemiological studies suggest that HIV and other sexually transmitted infections (STIs) disproportionately affect adolescents and young adults in the United States. Consequently, many efforts are being made to empower these populations through school-based sexual health initiatives. The aim of this study was to examine previously collected data in order to determine if a single, brief, peer-led sexual health intervention increased participants’ sexual health knowledge and intentions to practice safer sexual behaviors. Participants consisted of a self-selected sample of 201 college students enrolled at a large university in Pennsylvania. Pre-intervention questionnaires assessing sexual health knowledge and sexual behaviors/safer sexual practices were administered to all participants immediately prior to the sexual health intervention. Participants then participated in an hour-long sexual health intervention facilitated by trained members of the HIV/AIDS Risk Reduction Advisory Council (HARRAC), a peer education program on campus. Immediately following the intervention, all participants completed a post-intervention questionnaire assessing sexual health knowledge as well as behavioral intentions for the next 30 days. The results indicated that the intervention significantly increased the participants’ sexual health knowledge. The intervention also significantly influenced the participants’ intentions to practice safer sexual behaviors (i.e., use a condom or dental dam); however, a majority of the participants still reported that they were unlikely or somewhat likely to use protection when engaging in oral sex at post-intervention. Moreover, the intervention significantly influenced participants to consider being tested for HIV. However, once again, a majority of the participants still reported that they were not considering being tested at post-intervention. Furthermore, no significant differences in intentions to engage in safer sexual behaviors were found between participants with high scores
and participants with low scores on the sexual health knowledge component of the post-intervention questionnaire.
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Acknowledgments

Special thanks to Dr. David Vandenbergh for his valuable insight during the research process, Dr. Patricia Koch for her vast knowledge in regards to sexual health, Dr. Michele Stine for her help with the data analysis, and Dr. Lori Francis for her suggestions toward my final paper. I would also like to thank Suzanne Zeman and Brittney Barbieri for HARRAC’s cooperation with my project as well as the Office of Health Promotion and Wellness for the use of their data. My project would not have been a success without all of their help!
Introduction

HIV/AIDS and other sexually transmitted infections (STIs) are a serious public health concern in the United States. Approximately 19 million Americans report being infected with a sexually transmitted infection each year; however, the actual number of cases is believed to be much greater than the reported number of cases (Centers for Disease Control and Prevention, 2009c). Since HIV/STIs are primarily acquired through risky sexual behaviors, prevention methods can reduce the frequency of their transmission. Thus, it is important to educate the public about behaviors that put them at an increased risk for acquiring such infectious diseases as well as strategies for preventing their transmission. Preventative care is essential for reducing and ultimately eliminating the transmission of HIV/STIs. As a result, many efforts are being made to empower the public through sexual health initiatives so they can make safer decisions regarding their own sexual health and reduce their chances of becoming another HIV/STI statistic.

Background Information on HIV/AIDS and Other STIs

Human Immunodeficiency Virus (HIV) is a virus that attacks specific white blood cells, known as T cells, which are essential for helping the body fight disease. Acquired Immunodeficiency Disease Syndrome (AIDS) is the final stage of HIV. It is acquired once a majority of the body’s T cells are destroyed. As a result, the immune system becomes suppressed, leaving a person susceptible to opportunistic infections and malignant tumors. Currently, HIV affects over 33 million people worldwide. While 90% of the people infected with HIV live in the developing world (Global Health Council, 2010), the U.S. Centers for Disease Control and Prevention (CDC) estimates that over one million Americans are infected with HIV and over a half a million have died after developing AIDS. It usually takes about 10-
15 years for a person with HIV to develop AIDS. During this time, very few people show symptoms of the infectious disease. In fact, the CDC estimates that about 21% of people infected with HIV in the United States do not even know they have it. HIV is found in blood, semen, vaginal fluid, and/or breast milk of an infected person. Consequently, one may acquire HIV by having unprotected sex (anal, vaginal, or oral) with someone infected with HIV, sharing needles and syringes with someone infected with HIV, or being exposed to HIV before or during birth or through breastfeeding (Centers for Disease Control and Prevention, 2009b). In the United States, sexual contact has been the primary route for transmission of HIV—approximately 61% through male-to-male contact and 11% through heterosexual contact (AVERT, 2010). As of today, there is no cure for HIV. Although highly active antiretroviral therapy (HAART) can slow the progression from HIV to AIDS, these medications have several disadvantages. Adverse side effects and potential for drug resistance are two of the major negative consequences associated with these medications. Not to mention, these medications are extremely expensive and need to be taken on a daily basis for the rest of the infected individual’s life (Centers for Disease Control and Prevention, 2009b).

Other common sexually transmitted infections (STIs) of concern in the United States include human papillomavirus (HPV), herpes, chlamydia, and gonorrhea. HPV is the most common STI overall. The CDC estimates that nearly 20 million Americans are currently infected with HPV and another 6 million become newly infected each year. In fact, HPV is so common that 50% of all sexually active individuals will become infected with the virus during their lifetime. There are various strains of HPV. Low-risk strains cause genital warts, while high-risk strains cause abnormal cervical cells, which may lead to cervical cancer (Centers for Disease Control and Prevention, 2009a). Fortunately, there are two vaccines, Gardasil and
Cervarix, which prevent certain strains of HPV. Both vaccines protect a person against two strains of HPV that cause the most cases of cervical cancer. Gardasil also protects a person against two strains of HPV that cause the most cases of genital warts. Gardasil has been approved for both females and males between the ages of 9 and 26. Cervarix has only been approved for females between the ages of 10 and 26 (MedlinePlus, 2010). Once HPV has been acquired, however, there is no treatment for the virus itself. Treatment options are only available for HPV-related diseases (Centers for Disease Control and Prevention, 2009a).

Herpes is also extremely prevalent in the United States, affecting about 16.2% of the population. Although herpes is not life-threatening, the virus stays within the person’s body indefinitely. Symptoms include blisters, which result in painful sores and can last up to several weeks. Most of the time, however, infected individuals experience no or minimal symptoms. Contrary to the common belief, herpes can be spread even when symptoms are not present. There is no cure for herpes; however, antiviral medications can reduce the frequency and severity of outbreaks (Centers for Disease Control and Prevention, 2010b).

Chlamydia and gonorrhea are the two most common bacterial STIs in the United States. In 2008 alone, over 1.2 million Americans were diagnosed with chlamydia (Centers for Disease Control and Prevention, 2010a). However, the CDC claims that “underreporting is substantial because most people with chlamydia are not aware of their infections and do not seek testing” (Centers for Disease Control and Prevention, 2010a, “How Common is Chlamydia,” para. 1). Gonorrhea is also believed to be relatively common—the CDC estimates that over 700,000 infections occur each year in the United States (Centers for Disease Control and Prevention, 2010c). If left untreated, these infections can lead to a variety of serious health complications, including pelvic inflammatory disease (PID), chronic pelvic pain, infertility, and ectopic
pregnancy in women and epididymitis and sterility in men. Fortunately, however, bacterial STIs can be treated with antibiotics. Thus, it is important that sexually active individuals be screened for these STIs so that infected individuals can be treated before they encounter any serious health complications (Centers for Disease Control and Prevention, 2010a).

With the exception of the HPV vaccines, condoms and dental dams when used correctly and consistently are the only current preventative measures for reducing the transmission of HIV/STIs. Therefore, it is essential to educate sexually active individuals about the importance of using these barrier methods so they can prevent themselves from becoming infected and experiencing the multitude of health complications associated with one (or more) of the STIs discussed above.

Adolescents and Young Adults at Risk for Acquiring HIV/STIs

While anyone engaging in risky sexual behavior is susceptible to HIV/STIs, CDC reports and epidemiological studies suggest that these infectious diseases tend to disproportionately affect the adolescent and young adult populations. Sexually active adolescents and young adults account for the highest prevalence of STIs in the United States. Approximately one in four sexually active individuals between the ages of 15 and 24 contracts a sexually transmitted infection each year. In fact, current estimates suggest that half of all sexually active youth will acquire a sexually transmitted infection before the age of 25 (Kaiser Family Foundation, 2006). One recent epidemiological study assessed the prevalence of five common STIs (HPV, herpes, chlamydia, gonorrhea, and trichomoniasis) in 838 female adolescents in the United States who were between the ages of 14 and 19. The results indicated that the prevalence for any of the five STIs was 24.1% among all participants and 37.7% among the sexually experienced participants.
HPV was the most common STI (18.3%) followed by chlamydia (3.9%) (Forhan, Gottlieb, Sternberg, Xu, Datta, McQuillan, Berman, & Markowitz, 2009).

The high prevalence rates in these populations may be due to the fact that these age groups are more likely to have unprotected sex as well as multiple sexual partners. Kanekar and Sharma (2008) assessed the frequency of condom use at a university in south central Kentucky and found that nearly half of all the participants reported never using condoms during vaginal intercourse. Even more striking, 95% of the participants reported that they never used condoms while engaging in oral sex. Moreover, Fromme, Corbin, and Kruse (2008) found an increase in the number of sexual partners during the transition from high school to college. Factors influencing this behavior include decreased adult supervision, greater personal freedom, and increased opportunity for sexual behavior. Other explanations for the high prevalence rates include lack of or inaccurate knowledge regarding prevention and treatment options and stigma surrounding STIs and condom use. Interestingly, Lewis, Miguez-Burbano, and Malow (2009) found that condom use remained low among college students despite being knowledgeable about HIV. The authors attributed this risky behavior to limited communication between partners about safer sex; and therefore, encouraged self-efficacy (in addition to HIV/STI-related knowledge) as a focus for interventions. Furthermore, alcohol use may also play a role in risky sexual behavior. Cooper (2002) found that alcohol consumption in college students was strongly related to the decision to have sex as well as indiscriminate forms of risky sex (i.e., having multiple or casual sexual partners). Ven and Beck (2009) also found that alcohol intoxication facilitated, explained, and justified sexual encounters and casual coupling in the college population. As a result, sexual health interventions addressing these psychosocial antecedents of risk behavior need to be targeted at the adolescent and young adult populations.
Influence of Peer Education

Peer education is defined as “the teaching or sharing of health information, attitudes, values, and behaviors by members of groups who are similar in ages or experiences” (White, Park, Israel, & Cordero, 2009). It is rooted in Bandura’s Social Learning Theory, which postulates that people learn new behaviors and attitudes through observational learning (Bandura, 1977). Thus, peer educators may influence social behaviors by modeling appropriate behavior, teaching social skills, and rehearsing possible roles and situations (Milburn, 1995). Sloane and Zimmer (1993) claim that “people are more likely to hear and personalize a message that may result in changing their attitudes and behaviors if they believe the message is similar to them in lifestyle and faces the same concerns and pressures” (p. 242). Thus, peer education is an increasingly popular method being used to promote sexual health, especially in the adolescent and young adult populations (van der Maas & Otte, 2008). One setting where this approach has been utilized is in schools systems. This paper focuses on the evaluation of peer-led interventions in school-based settings, which have been implemented to educate North American youth about important information in regards to sexual health.

Brief Literature Review Regarding Peer-Led Sexual Health Interventions

School-based health initiatives have been the primary route for targeting adolescents and young adults about the importance of sexual health. Many of these interventions focused on changing a number of factors, such as HIV/AIDS knowledge, attitudes, motivations, behavioral intentions, and behaviors. One study assessed 200 first-year students at Florida Atlantic University to determine if an AIDS Peer Education Program (APEP) influenced the students to reduce their risky sexual behaviors. The authors sent a questionnaire, measuring attitudes toward HIV and HIV-related behaviors, to incoming first-year students prior to the school year with the
assumption that some of the participants would be exposed to the AIDS Peer Education Program (APEP) at some point throughout the upcoming school year. Upon completion of the academic school year, a follow-up survey was then administered to the same 200 students that completed the baseline survey. Data was assessed from only the 24 individuals who completed both the baseline and follow-up surveys. Of the 24 participants, 11 of them attended an APEP event during the school year, and therefore, served as the intervention group. The control group consisted of the other 13 participants that did not participate in an APEP event. Richie and Getty (1994) found that the participants who attended an APEP event during their first year were more likely than the control participants to report that they had an HIV antibody test within the past year and used condoms more frequently by the end of the school year. The intervention group also reported more intentions to change their risky behavior in comparison to the control group (Richie & Getty, 1994).

Similarly, another study assessed the impact of a peer education program on junior and senior students’ sexual behavior in six Canadian high schools. A total of 306 senior students and 698 junior students completed both the pre- and post-intervention questionnaires. Of the 306 senior students, 147 were in the experimental group, while the other 159 served as the control group. Of the 698 junior students, 369 were in the experimental group, while the other 328 served as the control group. The experimental group received the Protection Express Program, a peer education program focusing on sexual health led by senior students. The control group was exposed to their school’s usual sexual health education curriculum. A self-report questionnaire was administered at baseline and nine months following the programs completion. Two sexual behaviors were measured; postponing sexual intercourse and condom use. The results indicated that junior and senior respondents in the experimental and control groups did not differ in
regards to postponing sexual intercourse. However, senior respondents in the experimental group were more likely than senior respondents in the control group to use condoms consistently. No differences were found between junior respondents in both the experimental and control groups in regards to condom use (Caron, Godin, Otis, & Lambert, 2004).

Moreover, Mahat, Scolveno, Leon, and Frenkel (2008) examined a peer education program to determine its effectiveness at changing adolescents’ HIV/AIDS knowledge, risk behavior intentions, and confidence to engage in safer sex. Participants included 97 ninth-grade students in an urban high school. Of the 97 adolescents, 58 of them participated in the peer education program, while the other 39 received traditional HIV/AIDS education offered by the school. Participants in both the intervention and control groups completed questionnaires at baseline and five months after the program’s completion. Results of the study suggested that the intervention group demonstrated greater knowledge than the control group after participating in the peer education program. Additionally, in comparison to the control group, the students who received the intervention were more likely to have sex with only one partner, planned to use condoms, and planned to get their partner to use condoms. No significant difference was found between the intervention and control groups for confidence to engage in safer sex at both pre- and post-intervention. Interestingly, however, females reported having more confidence than males at both pre- and post-intervention regardless of group.

Furthermore, Fisher, Fisher, Bryan, and Misovich (2002) compared the effectiveness of three HIV prevention interventions; a classroom-based intervention, a peer-based intervention, and a combined intervention. Participants consisted of 1,577 students (37% male and 63% female) that attended four different inner city schools in Connecticut. One high school participated in the classroom-based intervention, one participated in the peer-based intervention,
and one participated in the combined intervention. The fourth school served as the comparison group. The classroom-based intervention was delivered by the schools’ regular high school teachers during five successive class sessions. Activities focused on providing students with factual information about HIV, increasing HIV prevention motivation, and developing HIV prevention behavioral skills. The peer-based intervention was led by peer natural opinion leaders (NOLs). The NOLs communicated HIV prevention information, negative attitudes, and behavioral skills with approximately five same-sex friends and their acquaintances over a three week period. The combined intervention incorporated both the classroom- and peer-based intervention components simultaneously. Students in the comparison school received their school’s standard HIV/AIDS curriculum. Questionnaires assessing HIV prevention information, motivation, and behavioral skills were distributed to all participants. Pre-tests were distributed one month prior to the intervention, while post-tests were distributed one month after intervention completion. Additionally, follow-up assessments measuring condom use were collected three months and one year following intervention completion. Fisher et al. (2002) found differences between participants who were sexually inexperienced and participants who were sexually experienced for all three intervention groups. For sexually inexperienced individuals, participation in the classroom-based and combined interventions significantly increased their level of HIV prevention knowledge in comparison to the control participants. However, the peer-led intervention did not have a significant effect on HIV prevention knowledge for the sexually inexperienced students. For sexually experienced individuals, participation in any of the three interventions (classroom-based, peer-based, or combined) significantly increased their HIV prevention knowledge in comparison to control participants. Moreover, for sexually inexperienced individuals, participation in the classroom-based
intervention resulted in improved HIV prevention attitudes and intentions relative to control participants. An improvement in HIV prevention attitudes was also experienced by those who participated in the peer intervention in comparison to control participants. For sexually experienced individuals, participation in the combined intervention improved their HIV prevention attitudes, norms, and intentions relative to controls. Furthermore, sexually inexperienced individuals in the classroom and combined interventions experienced improvements in behavioral skills in comparison to controls. Only the combined intervention had similar positive effects on behavioral skills for the sexually experienced individuals relative to the control participants.

As discussed above, much of the literature suggests that peer-led sexual health interventions are most effective at increasing HIV/AIDS-related knowledge. In addition, there is some evidence that peer-led sexual health interventions can also impact the attitudes, behavioral intentions to practice safer sex, and condom-use behaviors. Due to the variety of different approaches used to educate students, however, these gains cannot be widely assumed for every sexual health intervention. Thus, the current study aimed to determine the effectiveness of single, brief, peer-led sexual health intervention that is available to any student or student group upon their request at a large university in Pennsylvania.

Hypotheses

It was hypothesized that the participants’ sexual health knowledge would increase after participating in the sexual health intervention. In other words, participants would score significantly higher on the sexual health knowledge component of the post-intervention questionnaire in comparison to their score on the pre-intervention questionnaire. In addition, it was predicted that participants who reported that they or their partner(s) never or rarely used
protection (i.e., a condom or dental dam) when engaging in sexual acts on the pre-intervention questionnaire would report a greater likelihood for using protection at post-intervention (behavioral intentions to use condoms and/or dental dams). Moreover, significantly more participants would report that they are considering being tested for HIV after participating in the sexual health intervention (behavioral intention to get tested). Furthermore, it was hypothesized that the participants who had greater sexual health knowledge would report that they are more likely to engage in safer sexual practices at post-intervention than participants with less knowledge.

Methods

Participants

Participants consisted of a self-selected sample of 201 college students enrolled at a large university in Pennsylvania. Of the 201 participants, 136 were female, 31 were male, and one preferred not to answer. The other 33 individuals provided no response. A majority of the participants reported that were single (106 individuals) or engaged/ in a committed dating relationship (60 individuals). When asked about sexual partners in the last 12 months, a majority of the participants (127 individuals) reported having all male partners. Thirty participants reported having all female partners and three participants reported having mostly male but some female partners as well.

Measures

The pre- and post-intervention questionnaires assessed the participants’ background information, sexual health knowledge, sexual behaviors/safer sexual practices, and behavioral intentions. The questionnaires were developed (and revised in January 2010) by the Office of
Health Promotion and Wellness, which is associated with the university’s health services. Refer to Appendix B-1 and B-2.

**Background information.** Participants were asked their gender, relationship status, and the sex of their sexual partners in the last 12 months.

**Sexual health knowledge.** Eleven true/false items were used to assess general knowledge of HIV/AIDS and other STIs (e.g., HIV can be transmitted through blood, semen, vaginal secretions and breast milk) as well as safer sexual practices (e.g., You should use oil-based lubricants such as petroleum jelly to prevent the condom from tearing or breaking down during sex). Responses were dichotomized to values of 1 for correct answers and 0 for incorrect answers and then summed to derive a total score (0 to 11). Higher scores equated to greater knowledge on this particular measure. Sexual health knowledge was assessed at both pre- and post-intervention.

**Sexual behaviors/safer sexual practices.** Participants were asked if they had ever engaged in oral, vaginal, or anal sex. If the participants responded “yes” to any of these questions, they were asked how often they or their partner(s) used a condom or dental dam during the act. Each sexual behavior/safer sexual practice was examined separately. Items were measured on a scale from 1 (Never) to 5 (Always). These sexual behaviors and safer sexual practices were assessed only at pre-intervention.

**Behavioral intentions.** Two yes/no questions assessed the participants’ intentions regarding future HIV/STI testing. These questions were asked at both pre- and post-intervention. In addition, participants were asked how likely they or their partner(s) were to use a condom or dental dam during the next 30 days when engaging in oral, vaginal, or anal sex. Each sexual
behavior was examined separately. Items were measured on a scale from 1 (Unlikely) to 5 (Very likely). These questions were only asked at post-intervention.

**Procedures**

Participants were recruited via word of mouth and campus advertisements throughout the 2010 spring semester. Each participant attended an hour-long sexual health intervention, better known as a “Safer Sex Party.” The name “Safer Sex Party” was derived to encourage student participation in the sexual health interventions. It is important to note that these “parties” are strictly educational. The “Safer Sex Parties” are facilitated by trained members of the HIV/AIDS Risk Reduction Advisory Council (HARRAC), which is an outreach group of peer educators associated with the university’s Office of Health Promotion and Wellness. These students are trained by health educators employed at University Health Services. Their training consists of two semester-long classes; one class explores health topics relevant to the college population, while the other teaches the students how to educate and influence the decisions of their peers in regards to health behaviors. HARRAC’s goals during the Safer Sex Parties are to educate students about the behaviors that put them at risk for HIV/STIs, to teach preventative strategies through demonstrations, and to practice strategies for communicating with partners about using preventative methods. During the parties, participants are encouraged to engage in several interactive games that are designed to help demonstrate important concepts. These games include the risk behavior activity, condom race, and communicating with your partner. The purpose of the risk behavior activity is to evaluate the risks of different sexual activities. Cards describing a specific sexual activity are distributed to the participants, who are then asked to place the cards under the appropriate risk category (no risk to high risk). The purpose of the condom race is to show the difficulties of using protection while in the dark and under the
influence of alcohol. Three different volunteers race to put a male condom on a banana correctly. One volunteer is blindfolded in order to simulate putting on a condom in the dark. Another volunteer wears beer goggles to simulate putting on a condom while drunk. The third volunteer has no visual impediments. The purpose of communicating with your partner is to help the participants’ to develop ways for talking with their sexual partner(s) about using condoms and/or dental dams consistently when engaging in sexual acts. Participants are handed cards describing different scenarios (e.g., Your partner says, “It doesn’t feel good with a condom”) and then are asked to come up with solutions to the scenarios (e.g., “I’ll feel more relaxed, and if I’m more relaxed, I can make it feel better”).

This study included a total of 12 parties, which were held throughout the 2010 spring semester. Each intervention had anywhere from 20 to 50 participants present. HARRAC members took turns facilitating the parties. A total of 12 different peer educators (all were female) facilitated the parties. At least two peer educators facilitated each party. The parties took place in on-campus classrooms and dormitories. As mentioned above, the interventions lasted approximately 60 minutes each.

Immediately prior to participating in the intervention, all participants were administered the pre-intervention questionnaire, which assessed their sexual health knowledge and sexual behaviors/safer sexual practices. Then, immediately after participating in the intervention, the participants were administered the post-intervention questionnaire. The post-intervention questionnaire once again assessed the participants’ sexual health knowledge as well as their behavioral intentions within the next 30 days. These questionnaires were entirely anonymous; no identifiable information was collected. Consequently, participants were instructed to create a
four-digit identification number so their responses could be matched on the pre- and post-intervention questionnaires.

**Statistical Analyses**

Analyses were conducted using PASW Statistics 17. A paired-samples $t$-test was used to determine the mean difference in total scores on the sexual health knowledge component of the pre- and post-intervention questionnaires. Additionally, a $\chi^2$ test was used to determine if participants who reported that they never or rarely used protection when engaging in sexual acts on the pre-intervention questionnaire were further inclined to report that they were more likely to use protection after participating in the intervention. Moreover, a $\chi^2$ test was used to determine if there was a difference in the number of participants who reported that they were considering being tested for HIV on the pre-intervention questionnaire versus the post-intervention questionnaire. Furthermore, a univariate analysis of variance (ANOVA) was used to determine any differences in intention to engage in safer sexual behaviors between participants with high scores and participants with low scores on the sexual health knowledge component of the post-intervention questionnaire. All tests were based on a .05 significance level.

**Results**

A paired-samples $t$-test revealed a statistically significant difference between all of the participants’ total scores on the sexual health knowledge component of the pre- and post-intervention questionnaires, $t (124) = -10.473, p = 0.000$. On average, participants answered 1.2 questions more accurately on the post-test than they did on the pre-test. Refer to Table 1 for the frequencies of correct/incorrect responses on the sexual health knowledge component of the pre- and post-tests.
Table 1. Frequencies of Correct/Incorrect Responses on the Sexual Health Knowledge Component of the Pre- and Post-Tests

<table>
<thead>
<tr>
<th>True/False Sexual Health Knowledge Questions</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Answered Correctly</td>
<td>Answered Incorrectly</td>
</tr>
<tr>
<td>1) HIV attacks a person's immune system, leaving it unable to fight off certain kinds of infection.</td>
<td>178 (88.6%)</td>
<td>4 (2.0%)</td>
</tr>
<tr>
<td>2) You should choose oil-based lubricants such as petroleum jelly to prevent the condom from tearing or breaking down during sex.</td>
<td>109 (54.2%)</td>
<td>69 (34.3%)</td>
</tr>
<tr>
<td>3) HIV can be transmitted through blood, semen, vaginal secretions and breast milk.</td>
<td>181 (90.0%)</td>
<td>2 (1.0%)</td>
</tr>
<tr>
<td>4) Condoms, when used properly, can help prevent the spread of STIs.</td>
<td>164 (81.6%)</td>
<td>20 (10%)</td>
</tr>
<tr>
<td>5) In 90% of cases, the body's immune system clears the HPV infection within 2 years.</td>
<td>67 (33.3%)</td>
<td>115 (57.2%)</td>
</tr>
<tr>
<td>6) People can have and transmit an STI and not know it because they do not have symptoms.</td>
<td>174 (86.6%)</td>
<td>2 (1.0%)</td>
</tr>
<tr>
<td>7) You cannot become infected with HIV if you are in a monogamous relationship and on birth control pills.</td>
<td>171 (85.1%)</td>
<td>13 (6.5%)</td>
</tr>
<tr>
<td>8) Bacterial STIs can often be cured by antibiotics.</td>
<td>150 (74.6%)</td>
<td>30 (14.9%)</td>
</tr>
<tr>
<td>9) Chlamydia is the most commonly reported bacterial STIs in the US.</td>
<td>140 (69.7%)</td>
<td>39 (19.4%)</td>
</tr>
<tr>
<td>10) 1 in 4 women has genital herpes.</td>
<td>136 (67.7%)</td>
<td>44 (21.9%)</td>
</tr>
<tr>
<td>11) According to the law, you or your partner cannot give consent if you have been drinking.</td>
<td>145 (72.1%)</td>
<td>37 (18.4%)</td>
</tr>
</tbody>
</table>

*Questions 2, 5, 8, 9, 10, and 11 were more likely to be answered correctly at post-intervention.
A $\chi^2$ test revealed that participants who reported that they *never* or *rarely* used protection when engaging in sexual acts on the pre-intervention questionnaire were significantly more inclined to report that they were more likely (*not sure, likely,* and *very likely*) to use protection after participating in the intervention, $\chi^2 (25) = 64.053, p = 0.000$. More than one-fifth (22.6%) of the participants who *never* used protection when engaging in sexual acts pre-intervention reported *not sure* (14.3%), *likely* (1.2%), and *very likely* (7.1%) when asked at post-intervention how likely they were to use protection within the next 30 days. Approximately 4 out of 10 (41.6%) participants who *rarely* used protection when engaging in sexual acts pre-intervention reported *not sure* (25%), *likely* (8.3%), and *very likely* (8.3%) when asked at post-intervention how likely they were to use protection within the next 30 days. Refer to Table 2-1 for frequencies of safer sexual practices at pre-intervention and Table 2-2 for frequencies of intention to practice safer sexual behaviors at post-intervention.

A $\chi^2$ test revealed a statistically significant difference in the number of participants that reported considering being tested for HIV on the pre- and post-intervention questionnaires, $\chi^2 (1) = 38.459, p = 0.000$. Nearly a quarter (23.4%) of the participants who reported that they were not considering being tested for HIV on the pre-intervention questionnaire reconsidered the idea after participating in the intervention. Refer to Table 3 for the frequencies of intention to get tested for HIV at pre- and post-intervention.

A univariate ANOVA revealed that there were no significant differences in intention to engage in safer sexual behaviors between participants with high scores and participants with low scores on the sexual health knowledge component of the post-intervention questionnaire, oral sex: $F (5, 149) = 1.953, p = 0.089$; vaginal sex: $F (5, 149) = 1.092, p = 0.368$; anal sex: $F (5, 147) = 0.732, p = 0.601$. 
### Table 2-1. Frequencies of Safer Sexual Practices at Pre-Intervention

<table>
<thead>
<tr>
<th>Safer Sexual Practices</th>
<th>Frequency at Pre-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
</tr>
<tr>
<td>Oral Sex</td>
<td>105 (52.2%)</td>
</tr>
<tr>
<td>Vaginal Sex</td>
<td>9 (4.5%)</td>
</tr>
<tr>
<td>Anal Sex</td>
<td>13 (6.5%)</td>
</tr>
</tbody>
</table>

### Table 2-2. Frequencies of Intentions to Practice Safer Sexual Behaviors at Post-Intervention

<table>
<thead>
<tr>
<th>Behavioral Intentions</th>
<th>Frequency at Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unlikely</td>
</tr>
<tr>
<td>Oral Sex</td>
<td>68 (33.8%)</td>
</tr>
<tr>
<td>Vaginal Sex</td>
<td>14 (7.0%)</td>
</tr>
<tr>
<td>Anal Sex</td>
<td>8 (4.0%)</td>
</tr>
</tbody>
</table>

### Table 3. Frequencies of Intention to Get Tested for HIV at Pre- and Post-Intervention

<table>
<thead>
<tr>
<th>Behavioral Intention</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Are you considering being tested for HIV?</td>
<td>25 (12.4%)</td>
<td>154 (76.6%)</td>
</tr>
</tbody>
</table>
Discussion

The goal of this study was to determine if a single, brief, peer-led sexual health intervention increased participants’ sexual health knowledge and intentions to practice safer sexual behaviors immediately following the intervention. The results of this study are in support of the first three hypotheses previously stated. First, the participants’ sexual health knowledge significantly increased after participating in the intervention, suggesting that even a single, brief, peer-led sexual health intervention can increase a person’s knowledge. These results are consistent with the several other studies discussed in the introduction that found increases in sexual health knowledge following peer-led interventions. Thus, this study adds to the body of literature in support of peer education as an adequate approach for teaching students about HIV/STI and safer sex information. Second, the intervention significantly influenced students who never or rarely used protection pre-intervention to consider using protection when engaging in future sexual acts. Third, the intervention also significantly influenced participants to consider being tested for HIV. While these effects were significant, the majority of the participants still reported that they were unlikely or somewhat likely to use protection when engaging in future sexual acts (oral sex in particular) at post-intervention (See Table 2-2). Additionally, a majority (56.7%) of the participants still reported that they were not considering being tested for HIV at post-intervention (See Table 3). These results suggest that while a single, brief, peer-led sexual health intervention may increase knowledge, behavioral intentions may take longer to change. The Transtheoretical Model of Behavior Change suggests that awareness is the first step towards influencing a person to change their unhealthy behavior(s). However, a person must understand their risk and explore the pros and cons of changing their behavior before they actually intend to change their behavior (Prochaska, Johnson, & Lee, 2009). This theory would also explain why
there were no significant differences in intention to practice safer sexual behaviors between participants with high scores and participants with low scores on the sexual health knowledge component of the post-intervention questionnaire. Since the post-test was administered immediately following the completion of the intervention, participants did not have sufficient time to contemplate changing their behavior(s) despite their increase in knowledge.

**Limitations**

Although this study has some promising results, there are also several limitations. First, there was no control group with which to compare the outcome. In order to make any inferences regarding the effectiveness of the sexual health intervention, a control group should be used to determine whether the supposed gains from the intervention are due to the intervention itself and not confounding variables. Second, the sample used was fairly biased. In addition to being self-selected, a majority of the participants were female, creating a non-representative sample. Third, the measures used to determine the effectiveness of the intervention were not tested for their reliability and validity; and therefore, they may not be adequate measures of the concepts being assessed. Fourth, the self-report measures that were used are subject to a social desirability response bias. Due to the sensitive nature of the questions that were asked in regards to sexual behavior/safer sexual practices and behavioral intentions, it is possible that the participants responded in a way that is socially desirable. Fifth, post-intervention assessments took place immediately following the completion of the intervention. Thus, it is unknown if the gains of the intervention will be long-term. Finally, inconsistencies throughout the sexual health interventions may have influenced the results of the study. For example, different peer educators administered the various interventions throughout the semester; and therefore, variables such as the skill and/or knowledge of the peer educators themselves may have influenced whether or not
each intervention was successful. All of these methodological problems need to be considered when interpreting the results of this study.

**Suggestions for Future Research**

Future research should focus on controlling for the multitude of variables discussed in the limitations above. Additionally, a reliable and valid measure needs to be developed for the constructs being assessed. Moreover, sexual health interventions should be developed based on theoretical models and tailored toward the needs of the target population. They should focus on behavioral skills and target behaviors that are most amenable to change. Interventions should also employ active learning methods since this approach tends to be more effective at capturing youths’ attention. Furthermore, long-term maintenance strategies should be incorporated into the interventions in order to make them more sustainable. This could be done by offering monthly newsletters and vouchers for free condoms and/or STI testing. Finally, more research should focus its attention on sexual health interventions that are implemented in secondary school settings. It is important to address sexual health issues with youth before they engage in sexual behavior, and secondary schools offer an advantageous setting because nearly all youth can be reached.

**Conclusion**

Overall, the results of this study provide support for much needed peer-led education programs focusing on sexual health in order to reduce the high prevalence rates of STIs seen throughout the adolescent and young adult populations. While a single, brief, peer-led sexual health intervention, such as the one described in this study, may be effective at increasing one’s knowledge, more research should be conducted to determine if this approach is adequate for influencing students to practice safer sexual behaviors.
References


Appendix A

IRB Approval Letter

Date: March 29, 2010
From: Joyel D. Moeller, IRB Administrator
To: Tiffany N. Tanzosh
Subject: Results of Review of Proposal - Expedited (IRB #33371)
Approval Expiration Date: March 4, 2011
“Evaluation of a Sexual Health Intervention Administered to College Students”

The Institutional Review Board (IRB) has reviewed and approved your proposal for use of human participants in your research. By accepting this decision, you agree to obtain prior approval from the IRB for any changes to your study. Unanticipated participant events that are encountered during the conduct of this research must be reported in a timely fashion.

Attached is/are the dated, IRB-approved informed consent(s) to be used when recruiting participants for this research. Participants must receive a copy of the approved informed consent form to keep for their records.

If signed consent is obtained, the principal investigator is expected to maintain the original signed consent forms along with the IRB research records for this research at least three (3) years after termination of IRB approval. For projects that involve protected health information (PHI) and are regulated by HIPAA, records are to be maintained for six (6) years. The principal investigator must determine and adhere to additional requirements established by the FDA and any outside sponsors.

If this study will extend beyond the above noted approval expiration date, the principal investigator must submit a completed Continuing Progress Report to the Office for Research Protections (ORP) to request renewed approval for this research.

On behalf of the IRB and the University, thank you for your efforts to conduct your research in compliance with the federal regulations that have been established for the protection of human participants.

Please Note: The ORP encourages you to subscribe to the ORP listserv for protocol and research-related information. Send a blank email to: ORP-ResearchFitness-subscribe-request@lists.psu.edu

JDM jdm
Attachment
cc: Patricia B. Koch
    David J. Vandenbergh

An Equal Opportunity University
Appendix B-1

Pre-Intervention Questionnaire

Last 4 digits of your cell #: ____________________________ Date: __________

Note: Your responses are confidential; your cell # is used to match your pre- and post-assessments.

Please circle the correct answer below:

1. T F The human immunodeficiency virus (HIV) attacks a person's immune system, leaving it unable to fight off certain kinds of infection.

2. T F You should choose oil-based lubricants such as petroleum jelly to prevent the condom from tearing or breaking down during sex.

3. T F HIV can be transmitted through blood, semen, vaginal secretions and breast milk.

4. T F Condoms, when used properly, can help prevent the spread of STI's.

5. T F In 90% of cases, the body's immune system clears the HPV infection within 2 years.

6. T F People can have and transmit an STI and not know it because they do not have symptoms.

7. T F You cannot become infected with HIV if you are in a monogamous relationship and on birth control pills.

8. T F Bacterial STIs can often be cured by antibiotics.

9. T F Chlamydia is the most commonly reported bacterial STI in the US.

10. T F 1 in 4 women has genital herpes.

11. T F According to the law, you or your partner cannot give consent if you have been drinking.

12. Have you been tested for STI's in the last year? □ Yes □ No

13. Have you been tested specifically for HIV in the last year? □ Yes □ No

14. Are you considering being tested for HIV? □ Yes □ No

15. Have you ever had oral sex?
   □ Yes  □ No  If YES, how often do you or your partner(s) use a condom or dental dam during oral sex?
   □ Never □ Rarely □ Sometimes □ Mostly □ Always

16. Have you ever had vaginal intercourse?
   □ Yes  □ No  If YES, how often do you or your partner(s) use a condom or dental dam during vaginal intercourse?
   □ Never □ Rarely □ Sometimes □ Mostly □ Always

17. Have you ever had anal intercourse?
   □ Yes  □ No  If YES, how often do you or your partner(s) use a condom or dental dam during anal intercourse?
   □ Never □ Rarely □ Sometimes □ Mostly □ Always

18. In the last 12 months, your sexual partner(s) were:
   □ All male □ Mostly male, some female □ Equal numbers of male and female □ All female □ Mostly female, some male □ More male than female □ Mostly female than male
Appendix B-2

Post-Intervention Questionnaire

Last 4 digits of your cell #: ___________________________ Date: ___________________________

Note: Your responses are confidential; your cell # is used to match your pre- and post-assessments.

Please circle the correct answer below:

1. T F The human immunodeficiency virus (HIV) attacks a person’s immune system, leaving it unable to fight off certain kinds of infection.

2. T F You should choose oil-based lubricants such as petroleum jelly to prevent the condom from tearing or breaking down during sex.

3. T F HIV can be transmitted through blood, semen, vaginal secretions and breast milk.

4. T F Condoms, when used properly, can help prevent the spread of STI’s.

5. T F In 90% of cases, the body’s immune system clears the HPV infection within 2 years.

6. T F People can have and transmit an STI and not know it because they do not have symptoms.

7. T F You cannot become infected with HIV if you are in a monogamous relationship and on birth control pills.

8. T F Bacterial STI’s can often be cured by antibiotics.

9. T F Chlamydia is the most commonly reported bacterial STI in the US.

10. T F 1 in 4 women has genital herpes.

11. T F According to the law, you or your partner cannot give consent if you have been drinking.

12. Are you considering being tested for STI’s? □ Yes □ No

13. Are you considering being tested specifically for HIV? □ Yes □ No

14. In the next 30 days, how likely are you or your partner(s) to use a condom or dental dam during:

   Oral Sex: Unlikely □ Somewhat Likely □ Not Sure □ Likely □ Very Likely □
   Vaginal Intercourse: Unlikely □ Somewhat Likely □ Not Sure □ Likely □ Very Likely □
   Anal Intercourse: Unlikely □ Somewhat Likely □ Not Sure □ Likely □ Very Likely □

15. Your gender:

   □ Male
   □ Female
   □ Transgender
   □ Prefer not to answer

16. Your relationship status:

   □ Single
   □ Engaged / Committed dating relationship
   □ Married / Domestic partner
   □ Separated
   □ Divorced
   □ Widowed
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tnt5018@psu.edu  
(610) 216-0939

Current Address: 418 E. College Ave., Apt. 26  
State College, PA 16801  

Permanent Address: 4028 Friar’s View Drive  
Northampton, PA 18067

EDUCATION
The Pennsylvania State University, University Park, PA  
August 2010
- B.S. Biobehavioral Health
- B.S. Psychology, Biological and Evolutionary Science Option
- Honors Thesis: Evaluation of a Peer-led Sexual Health Intervention Administered to College Students
- Thesis Adviser: Patricia B. Koch, Ph.D.

HONORS
- Dean’s List Recognition  
  Fall 2006—Present
- The Schreyer Honors College  
  Fall 2008—Present
- Psi Chi National Psychology Honor Society  
  Fall 2008—Present
- The Honor Society of Phi Kappa Phi  
  Fall 2008—Present

RESEARCH EXPERIENCE
Prevention Research Center Alcohol and Skin Cancer Projects  
State College, PA  
Research Assistant, Primary Investigator: Rob Turrisi, Ph.D.  
January 2010—August 2010
- Conducted roadside interviews in collaboration with the Pacific Institute for Research and Evaluation (PIRE) as part of an alcohol-related research project
- Performed administrative duties, such as researching current literature and news articles, revising IRB applications and grant proposals, and entering raw data into Excel computer files

Early Growth and Development Study  
University Park, PA  
Research Assistant, Primary Investigator: Janae Neiderheiser, Ph.D.  
January 2008—August 2008
- Coded prenatal and delivery records for research purposes
- Edited video recordings of research participants
- Researched medical terms, tests, and laboratory results

ACTIVITIES
Global Medical Brigades  
August 2009—May 2010
- Participated in fundraising events to raise money for two student-run medical brigades in Honduras
- Traveled to rural areas outside Tegucigalpa, Honduras in March 2010 to set up temporary medical clinics in order to provide much-needed healthcare to hundreds of underprivileged Hondurans

HIV/AIDS Risk Reduction Advisory Council (HARRAC)  
January 2009—May 2010
- Educated students about current sexual health statistics, HIV/AIDS and other sexually transmitted infections (STIs), proper use of barrier methods (i.e., condoms and dental dams), and resources for HIV/STI testing
- Facilitated educational sexual health workshops to encourage students to engage in safer sexual behaviors

HealthWorks Peer Education Program, Peer Educator  
August 2008—May 2010
- Advocated for a healthy Penn State community through health education and promotion
- Created and implemented health-related initiatives focusing on nutrition, sexual health, physical activity, and stress management

Lehigh Valley Hospital-Muhlenberg, Ambulatory Surgical Unit Volunteer  
July 2009—December 2009
- Attended to post-operative patients’ needs
- Transported patients out of the hospital