University of Massachusetts Amherst

Sexually Transmitted Infections among College Women Secondary to High Risk Behaviors Related to Lack of Behavioral Health Interventions

Item Type	Capstone Project
Authors	Brouillette, Jennifer M
DOI	https://doi.org/10.7275/4174054
Download date	2024-11-24 13:19:57
Item License	http://creativecommons.org/licenses/by-nc-nd/3.0/
Link to Item	https://hdl.handle.net/20.500.14394/37936

Capstone Project: Sexually Transmitted Infections among College Women Secondary to High Risk Behaviors Related to Lack of Behavioral Health Interventions

by

Jennifer Brouillette, DNP-C, BSN RN

Submitted to the Graduate School of the

University of Massachusetts Amherst in partial fulfillment

of the requirements for the degree of

DOCTOR OF NURSING PRACTICE

May 5, 2013

Approved as to style and content by:

Dr. Karen Plotkin: School of Nursing Committee Chair

Dr. Joan Roche: School of Nursing Committee Member

Kathleen Reid, NP-C, Outside Member

TABLE OF CONTENTS

ABSTRACT **3**

PROBLEM IDENTIFICATION: BACKGROUND & SIGNFICANCE **4-10**

Risk Factors in College Populations *5*
Sexual Health Education in College Populations *6*

REVIEW OF THE LITERATURE **10-27**

High Risk Sexual Behaviors Related to STIs *10*
Effectiveness of Educational Interventions *18*
Synthesis of Evidence *25*
Limitations *26*
Theoretical Framework *27*

PROJECT DESCRIPTION, IMPLEMENTATION, & MONITORING **30-46**

Setting, Community, & Gap Analysis *30*
Organizational Analysis & Project Resources, Constraints, Facilitators, & Barriers *34*
Figure 1. Logic Model: STI Educational Intervention for College Women *34*
Key Stakeholders *37*
Project Design & Methods *38*
Goals, Objectives, & Expected Outcomes *40*
Budget *42*
Figure 2. Projected Budget STI Educational Intervention for College Women *42*
IRB Approval & Ethical Considerations *43*
Implementation & Evaluation *44*
Timeframe *45*
Table 1. Timeframe *46*

PROJECT RESULTS & CONCLUSIONS **46-60**

Results: General STI Knowledge Survey *46*
Table 2. General STI Knowledge Survey Item Analysis *46*
Table 3. Item#5. ANOVA *47*
Table 4. General STI Knowledge Survey ANOVA *48*
Results: Perceived Risk Survey *49*
Table 5. Perceived Risk Survey Item Analysis *49*
Table 6. Item #1. ANOVA *49*
Table 7. Item #2. ANOVA *49*
Results: Condom Use Intent *50*
Discussion *51*
Impact Evaluation: Costs & Financial Benefits *52*
Strengths *54*
Limitations & Future Research *57*
Conclusion *60*

REFERENCES **62-74**

APPENDICES **75-91**

A. Research Matrix *75-82*
B. Chlamydia Cases by Gender & Chlamydia & Gonorrhea Cases in Women in MA *83*
C. STIs by Age in MA, 2010 ..... *84*
D. Brochure: Get the Low Down Before It Goes Down *85*
E. Handout: CDC Factsheet: 10 Ways STDs Impact Women Differently from Men *86*
F. Pre-Test: General STI Knowledge Survey & Perceived Risk of STI Survey *87-88*
G. Post-Test: General STI Knowledge Survey, Perceived Risk of STI Survey, & Condom Use *89-91*

Abstract

OBJECTIVES: The goal of this doctorate of nursing practice (DNP) capstone project was to bridge the research gap on the problem of increased risk of sexually transmitted infections (STIs) including immunodeficiency virus (HIV), human papillomavirus (HPV), chlamydia, gonorrhea, and genital herpes among college women, ages 18-25 years, related to high risk sexual behaviors. Although a review of the literature reports that this population is provided with educational opportunities, including prior schooling, electronic resources, and primary care providers, rates of STIs among this population remain high. The purpose of this research translation project is to disseminate the current evidence of the problem of increased risk of STIs among college women, to implement best practice interventions to increase college women's knowledge of STIs, rid misconceptions, and enhance knowledge of risk reduction behaviors in college health settings. METHODS: This DNP project was an evaluation performance improvement project with a one group pre-test and post-test. RESULTS: One-way ANOVA identified a significant statistical difference in total means scores in both tools, the General STI Knowledge Survey and Perceived Risk Survey, from pre-test to post-test (p=.00). The majority of participants reported intent to consistently use condoms post-intervention, with 94.5% (n=86) considering to use condoms for the next 6 months and 91.2% (n=83) planning within the next 30 days. CONCLUSIONS: The findings of this project are both statistically and clinically significant in demonstrating the role of STI knowledge and risk assessment in decision making in college women.

Keywords: sexually transmitted infections, women, risk factors, behavioral interventions

Problem Identification: Background and Significance

Although there have been many efforts to reduce sexually transmitted infections (STIs), rates continue to be high in the United States. Globally, STI control, as measured by incidence and prevalence, has fluctuated over the years since the emergence of these communicable diseases (Steen, Teodora, Kamali, & Ndowa, 2009). The Centers for Disease Control and Prevention (CDC) (2011a) and World Health Organization (WHO) (2011) support efforts that speak to the magnitude of this problem. College women, ages 18-25 years, in particular have been identified as a high risk group for STIs (Ingersoll, Ceperich, Nettleman, & Johnson, 2008). Annually $15.9 billion is spent on direct medical costs associated with STIs, with this age group, accounting for nearly half of the 19 million new cases of STIs in the United States (CDC, 2010b; Johnson-Mallard et al., 2007).

Healthy People 2020 and Healthy Campus 2020, on both a state and national level, recommend increased risk reduction behaviors and enhanced awareness of these diseases which are preventable in nature (ACHA, 2012; USDHHS, 2010). Based on the latest data from the American College Health Association-National College Health Assessment II (ACHA-NCHA II), only about half (51%) of all sexually active college students reported consistent condom use during vaginal intercourse within the past 30 days (ACHA, 2011). While men have reported a greater number of sexual partners, surveys have revealed that they use condoms more frequently than women (Gullette, Rooker, & Kennedy, 2009).

Although it is recommended that all women ages 25 years and younger be routinely screened for chlamydia, less than half of sexually active women are screened annually (Braun & Provost, 2010; CDC, 2010a). Since the majority of women with chlamydia and gonorrhea are

asymptomatic, it is important that routine testing along with preventive behaviors take place (CDC, 2010a).

Previous research efforts document a lack of knowledge in both the short and long-term implications of STIs among women (Dillard & Spear, 2010; Johnson-Mallard et al., 2007). Untreated STIs hold a number of negative health consequences for women. There is increased likelihood of infertility and in the event of pregnancy there is the potential for harmful effects on the unborn child including ocular infections, malfunction of the central nervous system, defects including blindness, deafness, skin and bone deformities, and the possibility of death (CDC, 2011b; WHO, 2011). The presence of other STI infections also raises the risk of HIV infection. In addition, continual exposure to high risk strains of HPV place women at increased risk for cervical cancer (CDC, 2010a; Steen et al., 2009).

Risk Factors in College Populations

Sexual behaviors/interactions have been recognized as influential factors in acquiring STIs. Individual behaviors have been shown to be influenced by societal norms, and persuaded by others' behaviors, contributing to the epidemiology of the diseases (Kooyman, Pierce & Zavadil, 2011).Young women may rely on intimacy with others as a means for coping with stress of college (Lightfoot & Milburn, 2009). Early intercourse, numerous sexual partners, lack of condom use, and substance abuse has been identified as behavioral risk factors for the occurrence of STIs (Ingersoll et al., 2008; Turchik, Garske, Probst, & Irvin, 2010; Walcott, Chenneville, & Tarquini, 2011).

Binge drinking as defined by the National Institute on Alcohol Use & Abuse (NIAAA) (2012) is when a blood alcohol level reaches 0.08g/dL within two hours, typically about four

drinks in women. This remains a major concern on college campuses where nearly half of college students meet this criterion (USDHHS, 2007). Due to more frequent alcohol use and increased number of sexual partners, women attending college are at increased risk of being infected with an STI than their counterparts whom do not attend college (Adefuye, Abiona, Balogun, and Lukobo-Durrell, 2009; Lindley et al., 2008). Heavy alcohol consumption causes women to be more susceptible to unintended and unprotected sexual intercourse. Moreover, it holds the potential to interfere with academic performance and poses the danger of sexual assault or violence (Griffin, Umstattd, & Usdan, 2011; Ingersoll et al., 2008).

Striving to fit in with social norms, in quest of enjoyment, psychosocial concerns related to adaption to new environment, and means to cope with stress are some of the motives cited for increased alcohol consumption among this population. While 'living in the moment' college women may not be considering the potential harms associated with binge-term and long-term complications that can arise (Ingersoll et al., 2008; Kelly-Weeder, 2008; NIAAA, 2012). In sum, among college populations, the more risky sexual health behaviors exhibited the more negative sexual health outcomes, including STIs and pregnancy (Buhi et al., 2010; Ingersoll et al., 2008; Walcott et al., 2011).

Sexual Health Education in College Populations

While college students are surrounded by an educational environment, there is evidence of inconsistencies in prior and current preferences for retrieval of STI knowledge across individuals (Fogel, Fajiram, & Mogel, 2012; Walcott, Chenneville, & Tarquini, 2011). Although the internet offers a wealth of information and is a readily available, private resource to students, there is concern as to the validity of the sources and disparities among use. As revealed by Fogel

et al. (2012), African American college women are more likely than white women to seek sexual health information on the internet, with overall use of the internet for this topic among college students ranging from 24.9 to 70.6% (Buhi, Daley, Fuhrmann, & Smith, 2009). Additionally, other pertinent issues encountered by students include frustration with searching and incorrect interpretation in relation to health literacy (Buhi, Marhefka, & Hoban, 2010). Lastly, since there is not a standard for editorial control, there is concern with regards to the quality and reliability of the medical information being provided. Searches may yield websites that are lacking quality along with others that offer data that is inaccurate and mistrusting (Buhi et al., 2010; Wang, Walther, Pingree, & Hawkins, 2008).

In addition, using the internet, questions may go unanswered; whereas in face to face encounters, including educational interventions, areas of clarification or concern can be addressed at the time of acquiring the knowledge. There is significant variation in usage of the internet and uncertainty as to validity of the sources; therefore it is not a dependable method to effectively provide college women with sexual health knowledge (Fogel et al., 2012; Buhi et al., 2010; Wang et al., 2008).

Throughout the years there has been debate and discussion as to principles related to, and effectiveness of, abstinence only and comprehensive sexual health education. Walcott et al. (2011) report that, systematic reviews suggest that in comparison to comprehensive health education programs, abstinence only programs are not more effective in delaying intercourse (Trenholm et al., 2008; Underhill, Montgomery, & Operario, 2007). Meanwhile, interventions that incorporated both abstinence and reduction of risk factors including number of partners and condom use, have exhibited positive behavior modifications (Underhill et al., 2007).

Moreover, there has been noted ambiguity as to the defining of "abstinence," with college students perceptions varying. Interviews have unveiled uncertainty as what this term entails, questioning whether or not oral or anal sex, masturbation, and genital contact falls into this classification (Bersamin et al., 2007). Education efforts geared solely on abstinence may cause confusion as to the associated risks of certain behaviors and may not be applicable to this population without an accurate, distinct understanding of the concept. Although abstinence only education is grounded on sound, respectable objectives, in many cases it is not realistic, leaving young adults unprepared for STI prevention and less informed about potential harmful effects of STIs on health outcomes (Walcott et al., 2011).

Although there is sufficient evidence that demonstrates effectiveness of structural and social marketing interventions(CDC, 2010b; Steen et al., 2009), there is also significant substantiation in the literature that such measures do not offer knowledge that is necessary to prepare individuals for safe practice (Walcott et al., 2011; Weeks et al., 2010). Condom distribution programs can be seen as being cost-effective, however when not correctly applied the potential costs associated with the risk are far higher (CDC, 2010b). Barriers encountered by females with such an approach alone include lack of support and knowledge deficit as to how to properly use the device (Weeks et al., 2010). In turn, efficacy may be reduced as effective use of condoms requires proper, consistent use. In conclusion, the educational component is essential to adequately equip college women for real-life encounters (Walcott et al., 2011; Weeks et al., 2010).

Lastly, even though it is strongly advised by the United States Preventive Services Task Force (USPSTF) (2008), primary care providers offer varying degrees of reproductive health counseling during visits. Although three-quarters of reproductive age women seek annual health

care in the United States, it is estimated that only half of these individuals receive contraceptive counseling (Akers et al., 2010). Akers et al. (2010) report multiple confounding factors, including time constraints, lack of desire, provider waiting for patient to start the discussion, feeling of discomfort related to sensitive content, inadequate training, and insufficient resources. Consequently, primary care providers do not consistently carry out a thorough sexual risk assessment on women and offer sexual health counseling on STIs and contraception options (Akers et al., 2010).

Patients identify several barriers including religious beliefs, inconsistent sexual activity, personal desire to become pregnant, and other influences on preferred methods of contraception (Akers et al., 2010). Without universal standards, certain topics may be omitted. Contraception needs may be addressed, while the providers fail to discuss STI prevention measures (Montaño, Phillips, Kasprzyk, & Greek, 2008; Peterson, Albright, Garret, & Curtis, 2007). With all these confounding factors, women attending college have been exposed to differing degrees of sexual health education, some without a thorough risk assessment, highlighting further the need for interventions to take place at the college level.

The implementations of behavioral interventions such as health education, general STI education, peer health education programs, and testing drives have demonstrated increased rates of STI screenings, enhanced decision making skills, and increased HPV vaccination (Braun & Provost, 2010; Dillard & Spear, 2010; Johnson-Mallard et al., 2007). Even drawing attention to simple measures, such as condom use, can help to minimize the rates of STIs (Steen et al., 2009). There is a need for campus-based behavioral interventions that speak directly to the at risk population, college women (Akers et al., 2010; Johnson-Mallard et al., 2007; Peterson et al., 2007).

Review of the Literature

In collecting the evidence, a search of the literature on risks and behavioral interventions in this topic was carried out primarily using Academic Search Premier, CINAHL and Pub Med databases. The search terms that yielded relevant literature for this review are the following: *sexually transmitted infections (STIs), sexually transmitted diseases (STDs), sex, sex partners, alcohol, college, women, college women, human papillomavirus (HPV), human immunodeficiency virus (HIV), chlamydia, behavior interventions,* and *risk factors*. These terms were used as inclusion criteria, whereas those that did not include the target population of college-aged individuals, addressed other topics and treatment, and those conducted outside of the United States were excluded. Other criteria for inclusion in each database were English language, full-text articles, and studies published within the last six years, 2007 to present. The initial search yielded 30 studies that met inclusion criteria; however the 19 studies that concentrated on STI risk factors and behavioral interventions were incorporated into this literature review (see Appendix A).

High Risk Sexual Behaviors Related to STIs

Several studies were explorative in nature and suggested that early intercourse, numerous sexual partners, lack of condom use, and substance abuse were behavioral risk factors for the occurrence of STIs (Ingersoll et al., 2008; Lindley et al., 2008; Turchik et al., 2010). Furthermore, using a descriptive design in analyzing results from a web-based study, Dillard & Spear (2010)'s findings highlighted the idea that misconceptions and lack of awareness related to STIs served as barriers to women taking part in prevention measures, such as HPV vaccination. Demonstrating lack of knowledge of spread and transmission of this prevalent STI, a survey of HPV-related facts revealed that of the 396 undergraduate women aged 18-24 years attending

Pennsylvania State University nearly 35% (n=139) responded that they did not think men could contract HPV. Regression analysis also revealed that health care provider encouragement was a significant predictor of HPV knowledge (β=.20, p<.001) (Dillard & Spear, 2010).

In evaluating the evidence based upon Johns Hopkins' (2012) appraisal, as a non-experimental, descriptive study this research is rated as IIIB, with good quality evidence. Despite the threat to validity of having poor response rate of 22%, there was control to limit other biases with random sampling. In addition, Dillard and Spear (2010) found consistent results and presented a comprehensive literature review supported by current evidence based research (The Johns Hopkins Hospital, 2012).

Recent research efforts sought to disclose the underpinnings for which women increase the number of sexual partners while attending college. In order to further understand casual sexual relationships among college women Stupiansky et al. (2009) examined sexual compulsivity in relation to sexual behaviors. Analysis of data from an internet-based cross-sectional survey completed by 170 women with a mean age of 21 years attending Indiana University in Bloomington identified that sexual compulsivity, a repeated, uncontrollable sexual desire, was linked to STI risk. This behavior contributed to a higher number of prior lifetime sexual partners and continued to influence future sexual intentions and behaviors. College women characterized as higher in sexual compulsivity were four times more likely to have engaged in vaginal intercourse within the past 30 days (OR=4.64) as well as expressed intent to have sexual interactions during a future school-based event (OR=4.58) with a non-relationship partner than those who did not possess as many compulsive qualities (Stupiansky et al., 2009).

Based upon Johns Hopkins' (2012) appraisal, as a non-experimental, descriptive and relational study Stupiansky et al.'s (2009) research is considered a level IIIB, with good quality

evidence. In spite of concerns related to the sample including volunteer and response bias, the researchers provided a thorough literature review with supporting evidence and reported findings that were consistent with other research on sexual compulsivity (The Johns Hopkins Hospital, 2012).

Taking on a feminist developmental perspective, Kooyman et al. (2011) carried out a review of the literature looking at casual sex and identity development of female college students. Findings of this study suggested that casual sexual encounters among college women had a negative impact on identity development. They proposed that changes in societal views on accepted gender norms swayed women to take on more masculine behaviors. In addition to this, based upon the underpinnings of Erikson's (1968) stages of development, college-aged women are faced with battle of indentifying with oneself in the intimacy versus isolation phase while attempting to fulfill social norms of the college environment. Kooyman et al. (2011) reported that perceptions of peers' sexual behaviors and the need to coincide with other values led to an increase in sexual encounters and unprotected sex.

A major factor classifying this research as lower quality, rather than good, is that Kooyman et al.'s (2011) search strategy was poorly defined. The researchers did not provide the reader with their methods of retrieval of information including the number of articles incorporated into their review of the literature and search engines utilized. The study's limitations were also not discussed. On the other hand, the findings of the study offer a reasonable study design that could be carried out across other college settings. With this in mind, using Johns Hopkins' (2012) appraisal this literature review is graded as VC (The Johns Hopkins Hospital, 2012).

A review of the literature by Griffin et al. (2010) that included 18 research articles from 2007-2008 that focused on alcohol use and sexual behaviors supported the link between alcohol consumption and negative sexual health outcomes among women. The alcohol myopia theory (AMT), in which cognitive abilities to distinguish and make decisions in regards behaviors are reduced when under the influence of alcohol, served as the underpinning for this research. Actions made based on 'impelling cues' those that are instantly appealing take precedence over 'inhibiting cues,' reminders to adhere to personal norms. In view of this, Griffin et al. (2010) reported that after consumption of alcohol college women's yearn for a partnership prevailed over signals of negative sexual outcomes. In similar instances, women with lower levels of social self-esteem responded in a more open, willing manner to sexual advances by men as well as verbalized intentions to have unprotected sex (Griffin et al., 2010).

Based upon Johns Hopkins' (2012) appraisal, Griffin et al.'s (2010) literature review is rated as VB, with good quality evidence. The search strategy carried out by the researchers is well defined and a sufficient amount of well-designed studies (18 articles) are incorporated and analyzed to draw conclusions (The Johns Hopkins Hospital, 2012). Meanwhile, although the majority of the studies included were conducted in more recent years, few of them may be considered outdated (6 studies carried out in or before 2006; 1 in 1986); therefore may not represent present societal views.

Adefuye et al.'s (2009) cross sectional study of 390 women with a mean age of 24 years from a commuter university in Midwest, United States reinforced the relationship between alcohol and risky sexual behaviors. Data analysis identified that women having at least one alcoholic beverage within the past 30 days were twice as likely to not use a condom than those who abstained from alcohol (OR=1.81, p=.04). Analysis of the participants' responses to the

questionnaire also found that the use of marijuana was associated with inconsistent condom use (p=.02). Age was another correlating factor across females as demonstrated by the report of increased sex partners in younger students, with females ages 30 years and older significantly less likely to have sexual encounters with more than one male partner (OR=0.09, p=.03) (Adefuye et al., 2009).

In evaluating the evidence based on Johns Hopkins' (2012) appraisal, Adefuye et al.'s (2009) non-experimental, descriptive study is IIIA, with high quality scientific evidence. Consistent results and recommendations based on an extensive literature review are offered by the researchers. While there is concern related to undercoverage, social desirability, and recall bias, Adefuye et al. (2009) used random sampling and offer definitive conclusions that can be applied across college populations (The Johns Hopkins Hospital, 2012).

Moreover, Ingersoll et al.'s (2008) exploration of alcohol consumption and sexual activity among 2012 women aged 18-24 years attending a Southeastern Urban university unveiled that a considerable amount, nearly 23% (n=457) of this college population consumed an average of eight or more alcoholic beverages per week. Similar to Adefuye et al.'s (2009) and Griffin et al.'s (2010) findings, surveys disclosed a significant relationship among risky drinking and sexual activity. Results identified that 73% of the 1472(n=1075) sexually active women were risky drinkers in comparison to the 62% of the 350(n=217) not classified as risky drinkers whom abstained from sexually activity (p<.0001). A linear association was also demonstrated with greater number of alcoholic beverages and binge drinking in relation to ineffective condom use, with 44% of participants reporting both factors (OR=1.7, p<.005) (Ingersoll et al., 2008).

Ingersoll et al.'s (2008) non-experimental, descriptive and relational study is IIIA, with high quality scientific evidence using John Hopkins' (2012) evidence appraisal. Although a convenience sample was obtained and there is concern for response bias related to voluntary surveys, the large scale sample and consistent findings supported by scientific evidence strengthen the quality of this research (The Johns Hopkins Hospital, 2012).

Turchik et al.'s (2010) examined 310 undergraduate students aged 18-23 years attending a Midwestern University in Ohio and explored substance abuse with sexual risk taking in the female students. On another level, the study connected personality traits to sexual behavior decision-making. The use of surveys by the researchers found that increased sexual risk taking was exhibited by impulsive women with lower sexual inhibition and higher sexual excitation. Sensation-seeking was also identified as a key variable across women influencing sex-related decisions. Lower social desirability (t=-2.18, p<.05), reduced sexual inhibition (t=-1.95, p<.05), higher sexual excitation (t=3.15, p<.01), greater weekly drinking (t=3.11, p<.01), and more drug use (t=2.23, p<.05) each were significant predictors of increased sexual risk behaviors (Turchik et al., 2010).

Referring to Johns Hopkins' (2012) appraisal, Turchik et al.'s (2010) non-experimental, relational study is IIIA, with high quality scientific evidence. Not only are the findings of this study consistent with other scientific evidence on this topic, but the researchers also took measures to minimize participant response error by controlling for social desirability and threat of disclosure. In addition, to ensure statistical significance, data analysis revealed a lack of multicollinearity. Meanwhile, 93.2% of the participants (289 of 310) were Caucasian, raising the potential for undercoverage bias; however Turchik et al.'s (2010) significant findings can be applied to this population (The Johns Hopkins Hospital, 2012).

Independent research efforts by Buhi et al. (2010) and Lindley et al. (2009) using a large national sample of women aged 18-24 years, n=44,165 and n=25,389 respectively, from the 2006 and 2007 American College Health Association- National College Health Assessment (ACHA-NCHA) linked race/ethnicity to high risk sexual behaviors. In comparison to their counterparts blacks and Asians were less inclined to obtain routine gynecological exams, accounted for higher rates of STIs, had greater number of sex partners, and less likely to use oral contraceptive pills. Highlighting this, a higher percentage of black women reported using no form of contraception at last vaginal sex than white women (5.7% vs. 2.4%, $p<.001$) (Buhi et al., 2010). In addition, females who engaged in sexual activity with only females within the past year were 52% less likely to have a routine gynecological exam than those who took part in heterosexual relations ($p<.001$). Of further concern it was also revealed that older sexually active females (21-24 years) were almost twice as likely to have a routine gynecological exam as younger women (18-20 years) (OR=1.97, $p<.001$) (Lindley et al., 2009).

With comparable findings and presentation of the evidence, both Buhi et al.'s (2012) and Lindley et al.'s (2009) non-experimental studies are IIIB, with good quality scientific evidence according to Johns Hopkins' (2012) appraisal. Each findings are based upon a large national data set and are consistent with findings of previous national studies on STIs; however self-report bias and relatively low response rates with a mean of 35% in Lindley et al.'s (2007) study pose a small threat to overall quality of the findings (The Johns Hopkins Hospital, 2012).

Supplementing the link between race/ethnicity and STIs, Hou (2009) explored and compared STI related behaviors across 240 black students at Historically Black Colleges and Universities (HBCU) and 401 white students at Traditionally White Institutions (TWI) aged 18-24 years. Online surveys that incorporated HIV knowledge, HIV-related attitudes and beliefs,

HIV-testing behaviors, and sexual behaviors found that HBCU students exhibited greater sexual risk behaviors, had higher perceived risk of HIV, and were more likely to be tested for HIV than TWI white students. Speaking to this, HBCU students portrayed a greater degree of perceived peer norms toward vaginal and anal sex ($p<.05$), initiated vaginal sex at younger age (16.3 vs. 17.5 years, $p<.001$), were 1.7 times more likely to engage in vaginal sex ($p<.05$), and had 4.4 times greater likelihood to have had an STI ($p< .0025$) than TWI students. Of great concern, across both groups of students males were more likely to report condom use than females. In part as a result of this, females were more likely than males to have been diagnosed with an STI in the past (OR=.45, $.0025<p<.05$) (Hou, 2009).

In rating the evidence based on Johns Hopkins' (2012) appraisal, Hou's (2009) non-experimental, descriptive and comparative study is IIIB, with good quality scientific evidence based on a fairly comprehensive literature review. There is room for threat of disclosure and social desirability bias with the use of a survey. In spite of this the findings are consistent with national data from the ACHA-NCHA and definitive conclusions are drawn associating race to STIs (The Johns Hopkins Hospital, 2012).

As the literature above highlights, among the college population there are behaviors that influence decision making and actions in relation to STIs. Lack of knowledge (Dillard & Spear, 2010), personal characteristics such as possession of sexual compulsivity and desire to fit in (Kooyman et al., 2011; Stupiansky et al., 2009), and increased alcohol consumption (Adefuye et al., 2009; Griffin et al., 2010; Ingersoll et al., 2008) each have been associated with negative sexual health outcomes. This knowledge has helped to identify further areas that need to be addressed and means to intervene among the college population to limit the occurrence of STIs.

Effectiveness of Educational Interventions

Peterson et al. (2007) carried out a counseling intervention, The Women's Reproductive Assessment Program (WRAP), across 764 women aged 16 to 44 years residing in North Carolina, which centered on regular use of contraceptives, addressed barriers to contraceptive use, and explored self-efficacy in taking on risk-reduction behaviors. Using motivational interviewing the health educators placed emphasis on empathy and reflective listening to encourage the women to acknowledge their potentially negative behaviors and foster self-efficacy to modify these behaviors. Components of the counseling were recognizing and examining inconsistencies among STI risk and condom use and suggestions to control situations and minimize risks. Results demonstrated a significant improvement in the consistent self-reported use of contraceptives two months after enrollment (59% baseline vs. 72%) (Peterson et al., 2007).

Based upon Johns Hopkins' (2012) appraisal, as a randomized control trial Peterson et al.'s (2007) findings are rated as level IA, with high quality evidence in which definitive conclusions were drawn and supported by an extensive literature review that contains reference to scientific evidence. Although data was collected by self-reports, the use of a randomized control design and in consideration of high participant retention rates (85% at 2 months, 91% at 8 months, and 87% at 12 month follow up) the quality of evidence is strengthened (The Johns Hopkins Hospital, 2012).

Consistent with the above findings, Moore, Smith, and Folsom (2012)'s brief intervention, F.O.R.Eplay (Facts, Open Communication, Responsibility, and Enjoyment), supported the association between knowledge, self-efficacy, and decision-making. The program

provided general knowledge about STIs and measures to prevent transmission while placing emphasis on self-efficacy across a sample of 302 students aged 19-24 years attending the University of Missouri, Kansas City. Data analysis identified enhanced sexual health knowledge (t=-14.3, p<.001) and improved self efficacy (t=-5.386, p<.001) among the participants. Each student took part in one of three interventions; a video with class discussion and a visual illustration of proper condom application, a PowerPoint lecture with condom usage illustration, or review of sexual health websites. Evaluations written by the participants suggest that there was a preference for inclusion of real-life situations, discussion, and supplemental pictures when learning about sexual health in the college setting (Moore et al., 2012).

Moore et al.'s (2012) experimental study is rated as IA, referring to Johns Hopkins' (2012) appraisal with high quality evidence. Despite the fact that the research was conducted at one setting, the researchers controlled for other biases by using random sampling to assign participants to the intervention group and the sample size was sufficient. Moore et al.'s (2012) findings are consistent with other research on behavioral health interventions offering insight for effectiveness of brief (<50 minute) interventions (The Johns Hopkins Hospital, 2012).

Kanekar & Sharma (2010) completed a systematic review of 11 research studies from 1990-2010 that focused on behavioral interventions among college students found that a common framework of taking on an information-motivation-behavioral (IMB) approach was an effective means to reach out to this population. With the IMB, education has been based upon theories of health behavior change in which there is a relationship between knowledge, attitudes, and perception, in relation to change. With use in the past, the validity of the IMB has been strengthened over the years; therefore it can be applied across diverse populations and in cross-cultural settings, including college campuses (Kanekar & Sharma, 2010).

In rating the evidence based on Johns Hopkins' (2012) appraisal, Kanekar and Sharma's (2009) systematic review is IVA, with high quality scientific evidence in which a well-designed, reproducible search strategy was used. The results of the included studies are consistent, allowing for definitive conclusions to be drawn. In addition, to demonstrate the strength of the variable, effect size was calculated for each study. It is important to note, however, that not all of the interventions were grounded upon theory, highlighting need for further exploration of these variables in relation to theory (The Johns Hopkins Hospital, 2012).

Interventions that have incorporated perceptions, values, beliefs, and attitudes in regards to sexual health proposed that these personal attributes need to be spoken to in order to sustain behavior modification. In a descriptive and relational study, Walcott et al. (2011) investigated the characteristics and modes of sexual health education in middle and high school across 1,878 undergraduate students aged 18-25 years from two Southern Universities (one each in Florida and North Carolina). The researchers assessed the participants' present STI knowledge, attitudes toward STI prevention, and behaviors. Relationships among the constructs of self-report of condom use, attitudes and intentions towards sexual health, main components of effective STI interventions, and prior school-based sexual health education were also explored. Analysis of the data revealed that prior sexual health information was infrequently taught; most often incorporated into part of a class among a sizeable amount nearly 71% (n=1,333) of college students (Walcott et al., 2011).

Additionally, greater HIV related knowledge was demonstrated by those who previously received comprehensive as opposed to abstinence only education (t= -2.56, p=.01). Of great significance was the finding that more consistent condom use was reported in those who received education on means to cope with peer pressure and taught communication and negotiation skills

(t= 2.24, p=.03) as well as in those who perceived their sexual health education as useful (t=2.08, p=.04). Lastly, the possession of greater norms, positive attitudes, and intentions in regards to safe sex was associated with consistent condom usage (Walcott et al., 2011).

Walcott et al.'s (2011) non-experimental, descriptive and relational study is rated as IIIA using Johns Hopkins' (2012) appraisal with high quality supporting scientific evidence in which definitive conclusions were drawn. In addition to minimizing sampling error with a sufficient sample size, adequate internal consistency was demonstrated. Although there is room for threat of disclosure and social desirability bias with the use of a survey, Walcott et al. (2011) took measure to control for response bias (The Johns Hopkins Hospital, 2012).

Testing the hypothesis that intentions and perceived control over behavior are predictors of sexual behavior, Lewis, Kaysen, Rees, and Woods (2010) examined the relationship across 623 sexually active students, with a mean age of 21 years, attending the University of Washington. Condom use at global and local events and approaches to condom-related protective behaviors were explored. On a global level, surveys indicated that a remarkable amount, 33.5% of students (n=209) did not use a condom within the past three months when taking part in sexual behaviors. Increased condom use was reported among college students who more frequently used condom-related protective behaviors (p<.001 for both global and event levels). Active planning, such as buying, carrying, and discussing condom uses with partner(s), along with mental planning were associated with increased condom use at global and event levels (Lewis et al., 2010).

Evaluating the evidence based on Johns Hopkins' (2012) appraisal, Lewis et al.'s (2010) non-experimental, relational study is IIIA, with high quality scientific evidence in which definitive conclusions were drawn. While there is concern for social desirability and threat of

disclosure bias related to data collection using a survey, other aspects of the study including random sampling and sufficient sample size strengthen the recommendations that are consistent with other scientific evidence (The Johns Hopkins Hospital, 2012).

Lyles et al.'s (2007) systematic review of 18 studies from 2000-2004 that focused on behavioral interventions targeted to the individual or small group associated possession of decision-making skills to STI risk. The authors found that interventions which incorporated technical, personal, or interpersonal skill building activities demonstrated a decrease in the occurrence of unprotected sex, amount of sexual partners, and injection drug use and needle-sharing. These interventions included stress reduction, development of communication skills such as decision-making, problem solving, goal setting for minimizing risks, recognition and reactions to risky sex triggers, social/group support, and the promotion of abstinence. Similar behavior modifications were found across the studies including a reduction in the number of sexual partners (n=3), increased use of condoms (n=8), and decrease in needle-sharing or injection drug use (n=3). A significant ($p<.05$, for at least one outcome measure for each study) decrease in the rates of newly acquired STIs was also noted within a year of four of the interventions (Lyles et al., 2007).

Lyles et al.'s (2007) systematic review is rated as IVA, with high quality scientific evidence based on John's Hopkins' (2012) appraisal. A well-defined reproducible search strategy was conducted with the inclusion of research that met outlined strength of evidence criteria to be identified as best evidence. Although not limited to college-aged participants, Lyles et al. (2007) summarized evidence from a sufficient number of high quality studies (The Johns Hopkins Hospital, 2012).

In conducting a brief (30 minute) intervention Johnson-Mallard et al. (2007) used a two-group randomized control pre-test and post-test design to assess the value of educational programs on the knowledge and perceived risk of STIs among 104 women aged 18-48 years attending 2 universities (location not disclosed). The intervention included discussion, the presentation of Power Point slides with images of contraceptive methods, and a brochure for supplemental information. Based upon recommendations for effective STI interventions by the CDC, education focused on general STI knowledge including consequences of untreated STIs and anal sex, risk reduction behaviors, importance of partner selection and monogamy, and contraception options. Of significant concern, 15.3% (n=16) of the participants reported having two sexual partners and 13.4% (n=14) indicated 4 or more sexual partners within the last year. In addition, a considerable amount of the women, 91% (n=95) encountered problems in requesting their sex partner to use a condom. In the end, post-test surveys indicated a significant increase in both STI related knowledge ($p<.001$) and perceived risk of STIs ($p<.001$) in the intervention group (Johnson-Mallard et al., 2007).

Johnson-Mallard et al.'s (2012) experimental study is rated as IB, with good quality evidence based upon Johns Hopkins' (2012) appraisal. The smaller sample size introduces room for sampling error; however, random sampling was used to assign the participants to the control and experimental groups. The background and significance of the problem of STIs is presented in a fairly comprehensive manner with supporting scientific evidence (The Johns Hopkins Hospital, 2012).

In efforts to address concerns related to inconsistent routine STI screening among college women and the lack of school-based STD programs, Braun & Provost (2010) devised Educational Partnerships to Increase Chlamydia Screening (EPICS). This intervention funded by

the CDC, provided STI testing and raised awareness across 9 health care agencies and 19 educational institutions. Strategies included classroom-based education, involvement in campus social events and activities, peer health education, and testing-drives. To foster consistency of screening, protocols for screening were revised to ensure all new sexually active females received chlamydia testing and regular communication across program sites was encouraged. Results revealed that, of the 3,396 female participants, aged15-25 years, the majority (85%, n=2,887) had not received routine reproductive care within the past 12 months. Of great significance, STI testing on campus and the employment of outreach strategies led to a notable increase in rates of screening across females aged 25 years and younger, with 89.1% screening coverage, more than double of that achieved by other managed care settings (Braun & Provost, 2010).

Braun and Provost's (2010) experimental, cross-sectional study is rated as level IIA, based upon Johns Hopkins' (2012) appraisal with high quality evidence. Definitive conclusions that are consistent with other school-based interventions are drawn by the researchers. In addition, the recommendations are supported by an extensive literature review with reference to scientific evidence (The Johns Hopkins Hospital, 2012).

Lin et al. (2008) systematically reviewed 21 random control trials from 1988-2007 that evaluated behavioral counseling interventions in relation to STIs. The main intent of this review was to critically appraise STI prevention efforts. The theoretical underpinning was based on the notion that behaviors were swayed by one's knowledge, attitudes, and self-efficacy, which were modifiable in nature. Although limited insight was provided on the effects of lower scale (single-session less than 30 minutes) behavioral interventions, this systematic review confirmed the

efficacy of behavioral health counseling interventions in reducing STI incidence among at-risk adult and adolescents (Lin et al., 2008).

According to Johns Hopkins' (2012) appraisal, Lin et al.'s (2008) systematic review is rated as IVB, with good quality evidence. A comprehensive search strategy with inclusion of a sufficient amount (n=21) of well-defined studies was conducted by the researchers. Lin et al. (2008) appraised and synthesized research that was representative of the target population and those that did not have a control group were excluded. While there was noted heterogeneity in participants, interventions, and outcomes measures, definitive conclusions based on good quality evidence were drawn on STI incidence and behavioral health counseling interventions (The Johns Hopkins Hospital, 2012).

Synthesis of Evidence

The research evidence reviewed emphasizes that among college populations, high risk sexual health behaviors are associated with negative sexual health outcomes. In particular, younger age (Adefuye et al., 2009; Lindley et al., 2009), minority ethnicity(Braun & Provost, 2010; Buhi et al., 2012; Hou, 2009; Lindley et al., 2009), multiple sex partners (Buhi et al., 2012; Johnson-Mallard et al., 2007; Stupiansky et al., 2009), lack of reproductive health screening (Lindley et al., 2009), and inconsistent use of contraception (Ingersoll et al., 2008; Walcott et al., 2011) are contributing factors to STIs in college women. Moreover, in the presence of substance abuse, sexual situations can lead to unintended outcomes (Adefuye et al., 2009; Griffin et al., 2010; Kooyman et al., 2011; Turchik et al., 2010). Values, beliefs, attitudes, perceptions, intentions, self-identify, and communication skills are essential components that are each

important to address when speaking to sexual health behaviors in women (Kooyman et al., 2011; Lewis et al., 2010; Stupiansky et al., 2009; Walcott et al., 2011).

Interventions reviewed suggest adoption of an educational intervention strategy that incorporates general knowledge of the STIs, their prevalence, recommended preventative care, STI reduction behaviors, raised awareness of services offered on campus, and addresses personal attributes (Braun & Provost, 2010; Dillard & Spear, 2010; Johnson-Mallard et al., 2007; Kanekar & Sharma, 2010; Lin et al., 2008; Lyles et al., 2007; Moore et al., 2012; Peterson et al., 2007). Although not all of included studies are directly applicable, each of the researchers' findings offers means to promote healthy behaviors and address the pronounced sexual knowledge-behavior deficit among this population (Kanekar & Sharma, 2009). As this review summarizes, there is sufficient good and high quality evidence with consistent findings that highlight the problem of STIs among women and support targeted interventions in the college setting. The use of motivational interviewing and exploration of self-efficacy are suggested tactics to reach out to this population (Kanekar & Sharma, 2010; Lin et al., 2008; Peterson et al., 2007). Several brief educational sessions that are devised according to the target populations needs have identified enhanced outcomes among this population and offers means in the future to influence the behaviors of these women (Johnson-Mallard et al., 2007; Lyles et al., 2007; Moore et al., 2012).

Limitations in the Evidence

Although the majority of the researchers' data collection centered on the use of a survey tool, there is a concern for social desirability and threat of disclosure bias with self-report. In appraising these studies, it is also worth noting those certain populations, such as blacks, those

attending a two year college, and lesbians were underrepresented, which introduces undercoverage bias. Adding to the complexity in carrying out STI-related research, there has been noted differences in the accuracy of diagnoses and definitions of key concepts, such as race sexual orientation, gynecological exam, and abstinence, creating room for misclassification and misinterpretation of variables by participants.

In addition, variations may have occurred across interventions due to discrepancies in training and background knowledge of educators. It is also worth noting that not all of the literature was exclusive to women and the college setting, although the greater part of the data shared focused on this homogenous population. Low response rates, smaller sample size, and use of convenience samples in some studies raises potential for sampling error, limiting generalizability to other college health settings.

Theoretical Framework

The theoretical underpinnings for implementation of a behavioral health intervention across women in a college health setting corresponds to the constructs and relationships of Prochaska, DiClementi, and Norcross' (1992) Stages of Change Theory. As the review of the literature suggests, individual risk perception is a motivating factor across college students. In many instances there is the concern for an underestimated personal risk to acquiring an STI, in turn leading to lack of preventive measures (Adefuye et al., 2009). Rather than viewing the change as an abrupt definitive event, it is more realistic to view the intended behavior changes as a process that transpires over a period of time. In order to take on healthy behaviors and rid precarious actions, one must process and experience stages as beliefs and attitudes are modified. In the majority of instances, college women make decisions based upon their own interpretation

of knowledge and desire to change. Looking at change as a process, she moves through a circle of stages, including *precontemplation*, *contemplation*, *preparation for action*, *action*, and *maintenance* (Horowitz, 2003; Prochaska, DiClementi, & Norcross, 1992).

As suggested by Horowitz (2003), the encompassing concepts of 'decisional balance' and 'self-efficacy' are further incorporated as a part of this transtheoretical model. The prospective benefits and drawbacks of taking on the suggested behaviors are reflected upon as she concentrates on decisional balance. Supportive notions consist of self-protection and partner protection from disease, decreased likelihood of pregnancy, sense of responsibility, and in the majority of instances on college campuses condoms are readily available. In contrary to other forms of change, it needs to be understood that the adoption of such behaviors related to STI prevention are not entirely in her hands. Other outside factors, including her partner's characteristics and decisions may pose a challenge. Added prospective negative aspects considered are inconvenience, the notion the sensation will be altered, concerns related to partner(s)' thoughts, and partner(s)' potential view of mistrust or promiscuity. On another level, self-efficacy involves the possession of beliefs of certainty that she can manage the situations and adhere to them without retreating to high-risk behaviors, regardless of situational or environmental influences (Horowitz, 2003).

Speaking to the *precontemplation* stage, in which there is a knowledge deficit in regards to the problem, there is a need for education that touches upon general knowledge of STIs, their astounding prevalence, an assessment of perceived risk of STIs, potential complications, and preventative measures. The retrieval and identification of these new relevant thoughts and facts on use the STI preventive measures inspire interest in the topic. As she enters this phase initially she may not necessarily have intent to change. Concentration is centered on raising awareness

and highlighting the effects of this problem on college population and the impact on the relationships she shares within this community. Disapproving emotions are transpired as she considers herself being faced with the negative outcomes of unprotected sex (Horowitz, 2003).

Once processed, she enters into *contemplation* where she accepts responsibility for her actions and is interested in modifying her behaviors. As part of this she re-evaluates personal views and feelings and envisions herself in situations. In order to address this, motivational interviewing is incorporated by the educator to set goals and further promote an exploration of self-efficacy (Horowitz, 2003; NCI, 2005; Prochaska, DiClementi, & Norcross, 1992).

During the next 30-day period in which there is a readiness to change and she believes the objectives are achievable, she is *preparing for action*. A specific action plan is devised and shared with those in social network including friends and partner(s); for instance, verbalized intent of consistent use contraceptives within 2 months, or sooner. *Action* is when she is applying the knowledge and reducing high risk STI behaviors. To touch upon this, it is essential that interventions underscore the importance of social support, such as encouraging friends to take on similar behaviors, and suggested means to adhere to behaviors and avoid high-risk situations. Furthermore, the *maintenance* stage, which may not be acquired until after 6 months of action, focuses on nourishing the reduction in STI behaviors. In attending to this aspect, supplemental information such as with a brochure is essential for reinforcement along with promotion of self-efficacy (Horowitz, 2003; NCI, 2005; Prochaska, DiClementi, & Norcross, 1992).

In order to uphold progression, she takes on initiative to rid other negative behaviors, such as alcohol consumption, and endorses positive thoughts in regards to preventive measures.

Providing rewards for partaking in preventive behaviors, transforming ones environment to avert reminders of high risk behaviors, and empowering others are other measures to encourage maintenance. Since not linear in nature, she may enter and regress at any stage in the process, meanwhile the overarching goal is to allow the translation of knowledge to mold STI related health behaviors (Horowitz, 2003; NCI, 2005; White & Dudley-Brown, 2012).

Project Description, Implementation, & Monitoring

Setting, Community, & Gap Analysis

The location for this intervention was at a college health setting in Western Massachusetts (MA). The project was conducted in a private, co-ed college made up of nearly 3,700 students with an approximated gender distribution of 41.1 percent female and 58.9 percent male (U.S. News and World Report, 2012). Although a more rural area, Springfield, MA may be considered a suburban setting. Women attending the college ages 17-25 years were incorporated into the project as the target population.

As offered by the CDC (2011c) & Hogben & Leichliter (2008) pertinent information about values, beliefs, lifestyles, living conditions, and access to care within a given community can affect individual outcomes. In examining population-based parameters, due to cultural, behavioral, biological, and social factors, adolescents and young adults are at increased risk of STIs (CDC, 2011c; CDC, 2010c; Hogben & Leichliter, 2008; Ingersoll et al., 2008; MDPH, 2010).

Looking at the community from an external perspective, the state of MA has seen a rise in cases of both chlamydia and gonorrhea (CDC, 2011c; MDPH, 2010). Illuminating this concern over the past ten years total number of reported chlamydia infection cases in MA has

increased by 110% with 10,121 in 2001 and 21,236 in 2010. On top of this, among the 50 continental states, MA ranked 16th with 3.3 cases of primary and secondary syphilis per 100,000 persons (CDC 2010b; CDC, 2011c). In particular in 2010, women residing in MA were 2.5 more likely to have chlamydia than men (380.5 vs. 154.8 cases per 100,000) (CDC, 2011c) (see Appendix B for graphs on STIs by gender in MA). Altogether, with latest data from 2010, incidence rates of chlamydia, gonorrhea, and syphilis have risen in MA with highest concentrations in urban areas such as Springfield (CDC; 2011c; MDPH, 2010).

On a local level, in comparison to other statewide urban areas including Boston, Lowell, Worcester, and Cambridge, Springfield holds the highest rate of chlamydia, with 1,221.7 cases per population and rates of gonorrhea remain concentrated within this area (MDPH, 2010). With an estimated population of 153,155 Springfield is the largest community within the region (U.S. Department of Commerce, 2011). In view of the region, the socio-demographic indicators that offer a glimpse of health status differ across the larger cities in Western MA, including Springfield which is noted to be composed of a younger population, larger amount of Hispanics, and lower socioeconomic status (U.S. Department of Commerce, 2011). In terms of health care access, 12.3% of those residing in Western MA are without health care insurance, which exceeds the state rate of 8.9% of the population. In both subgroups, a greater number of Hispanics and blacks are faced with access obstacles in comparison to whites. Median household income of Springfield at $18,483 falls below the state average of $65,981 along with having more than double the number of people living below the poverty level (27.0% vs. 10.7%) (MDPH, 2010; U.S Department of Commerce, 2011).

In addition, educational level is also lower than the state average, with 26.6% of those residing in Springfield attaining less than a high school education, in comparison to the state

level of 15.2% (MDPH, 2007). Examination of local variation and subgroups within the region further draws attention to areas of worse indicators than state levels with higher rates of HIV/AIDS and greater incidences of chlamydia and gonorrhea in Springfield (MDPH, 2010; U.S. Department of Commerce, 2011).

Although regional analysis of data gives a glimpse at the needs of the greater area, these may not be generalized to all sub-populations within the community. The students attending the private college in which the intervention was held do not accurately represent the local and state populations. The majority of students attending were from Massachusetts, Connecticut, New York, New Jersey, and the other New England states, with 57 percent are from out of state areas. Additionally, only an approximately 14 percent were of racial/ethnic minority (Mass Department of Higher Education, 2013).

Further examination of sub-populations, specifically college women, offers additional insight as to individualized concerns of members residing in the community. Supporting the need for improved college campus health promotion efforts, the research results of ACHA-NCHA underscores common perceptions, risk behaviors, and associated lifestyle behaviors of the college population. Most recently the ACHA-NCHA II from spring 2012, highlighted the concern for lack of education revealing that of the 57,722 female respondents, 47% (n=27,353) reported that they had not received information on STI prevention from their college/university. At the same time there was an expressed interest by female college students with 41% (n=23,231) of 57,118 respondents indicating they would like the opportunity to learn STI prevention education (ACHA, 2012).

Actual reported behaviors and habits taken on by college females also reflect the gap in education in the college setting. Of the 40,377 sexually active females 17% (n=9870) never used

a condom or protective barrier during vaginal intercourse in the last 30 days. Also of significance, of sexually active females in college only 18% (n=10,399) reported always using a condom or protective barrier during vaginal intercourse in the last 30 days and 28% (n=23,175) had more than one sex partner in the last 12 months. Drawing attention to the influence of other confounding factors, 18.4% of females reported unprotected sex in the last 12 months when drinking alcohol (ACHA, 2012).

As discussed above, in consideration of internal characteristics of the population, it is necessary to speak to the prevalent behaviors in the college setting. Each of which have been cited as key risk behaviors to STIs, including unprotected vaginal intercourse, multiple sex partners (Buhi et al., 2012; Johnson-Mallard et al., 2007; Stupiansky et al., 2009), alcohol consumption (Adefuye et al., 2009;Ingersoll et al, 2008; Kooyman et al., 2011) in addition to feelings of independence and identity development (Kooyman et al., 2011; Lewis et al., 2010; Walcott et al., 2011) and changing in living conditions (Hogben & Leichliter, 2008; Kraut-Becher et al, 2008) the college population is seen at increased risk of STIs.

Review of internal data from the college demonstrated that there had been a decrease in the amount of screening for gonorrhea and chlamydia in women attending health services on campus, which the director of health services in part attributed to changes in ACOG's (2012) recommendations for pap screening dating back to 2009. At this setting, STI screening is routinely done when pap smears are performed and since ACOG (2012) no longer recommends screening in women younger than 21years old, there has been reduced screening among this age group. Per the director of health services, in 2012 there were 53 pap smears and routine STI testing performed on women over 21 years of age, in comparison to 386 carried out in 2009. As suggested by the director of health services and as research supports, oftentimes among this

population there is lack of perception that one may acquire an STI and since most often asymptomatic in nature women rarely seek routine STI testing on campus (Kanekar & Sharma, 2010; Kooyman et al., 2011; Walcott et al, 2011).

Altogether, the greater prevalence among the college population, those aged 18-25 years, is seen as an indicator of barriers to preventive services, including finances, transportation, and personal concerns (i.e. feelings of discomfort) (CDC, 2011c; Steen et al., 2009) (see Appendix C for graph of STIs by age in MA). As outlined above, the characteristics and elements of the community from an individual, local, regional, and statewide perspective support the need for evidence based intervention by health care providers. Attending to this concern, culturally appropriate strategies and means to transfer knowledge were devised to outreach to this vulnerable community.

Organizational Analysis & Project Resources, Constraints, Facilitators, & Barriers

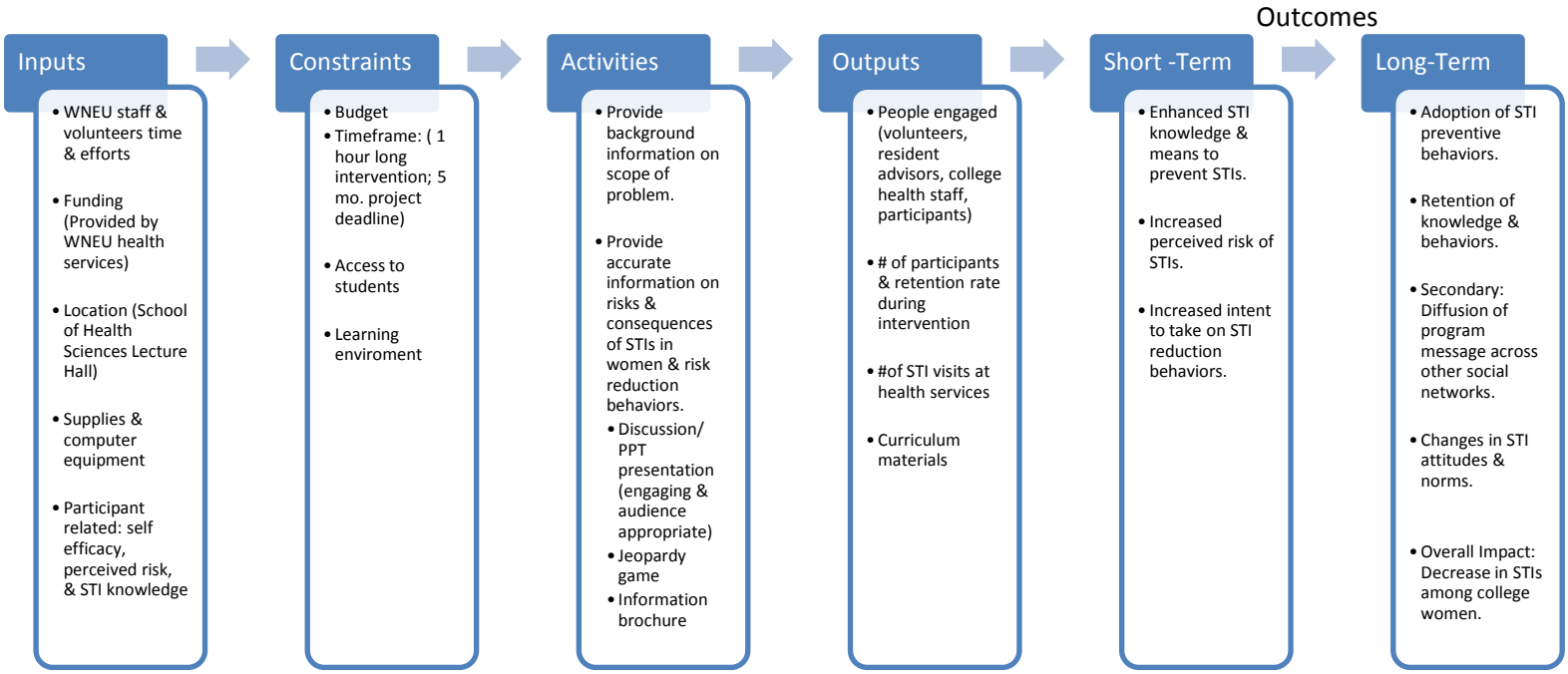


Figure 1. Logic Model: STI Educational Intervention for College Women

Adapted from: Johnson-Mallard et al., 2005; Zaccagnini &White, 2011

Anticipated resources included the DNP candidate's time and efforts spent planning, implementation, and evaluating the outcomes of the project. Collaborative efforts, including the director of health services and campus health educator's commitment and finances associated with the project were also taken into consideration. The director of health services planned to allow for this educational program to be covered by their allotted yearly budget. Other resources included information and knowledge acquired and written information being provided to the participants.

Potential barriers and constraints to implementation existed on both individual and environmental level. While the social environment is not promoting abstinence and the societal norms of the college environment, women in this setting may be receiving mixed messages (Buhi et al., 2008; Kooyman et al., 2011). An identified constraint was access to students as recruitment efforts were focused in the residential settings. As projected, barriers to condom use included cost and lack of interest (Lewis et al., 2010; Stupiansky et al., 2009); however through promotion efforts condoms can be obtained at low cost and are readily available for distribution.

Time commitment, both for participants and those involved in the intervention was seen a possible hindrance, however those involved were informed of the benefits of the program with intent they would see it as worthwhile. The health educator involved was offered additional knowledge on the topic of STIs and her time was compensated by her hourly wage per the director of health services. On the same note, a potential outcome of the educational program was increased awareness of health services on campus; thereby increased utilization of services by students.

Although cost was seen as a concern, students were reminded that STI screening services on campus are essentially free of charge to them. Since the possession of insurance became mandatory for students, private insurances are most often billed for services. In the past if students expressed concern about STI services being itemized on a bill for others (i.e. parents) to see, at the discretion of the clinician, health services consumed the costs, which are an estimated $35.00 per each chlamydia and gonorrhea screen. With some lee-way in the health services budget there has been room to allow for this and from the perspective of the health service director, as a department they would rather consume the costs, rather than deter testing, in consideration of the potential long-term financial and health burdens of untreated STIs.

Meanwhile, facilitating factors for implementation included the DNP candidate's collaborative relationship with the director of health services at the college and the involvement and support of the campus health educator. Each member had the opportunity to be involved in both informal and formal meetings discussing the project. The director of health services also expressed a readiness to change in effectively meeting the educational needs of the students in the college setting. In addition, actions and interventions to prevent STIs and acknowledge early recognition in treatment of STIs was and continues to be supported on a local, state and federal level (CDC, 2011; USDHHS, 2010; WHO, 2011).

To overcome these potential roadblocks, in addition to the above, several strategies were employed. Free condoms were provided at the intervention. To limit concern related to access, students were encouraged to promote others to come to the intervention. Empowering advertisement was used to portray the notion to the women that the perceived benefits, including enhanced reproductive health, outweighed their potential hindrances such as time constraints.

The intent was that this exchange made them feel as though it is worth attending (NCI, 2005; Salabarría-Peña, Apt, Walsh, 2007).

In order to increase the appeal to the college women, the intervention was carried out on a mid-week day to limit interference with other social obligations. It was also held in the evening hours since the majority of classes are during the daytime. With the support of health services budget, door prizes and giveaways were offered and a pizza and salad dinner was provided. Students were also offered "bear points," which is a point-based program that allows for greater future housing preferences. In the end, the resources, facilitators, and perceived benefits of the students and those involved in the intervention, allowed for successful recruitment to take place.

Key Stakeholders

In order to carry out the process, other key stakeholders were engaged in this project, which included implementers, decision makers, participants, and partners (Salabarría-Peña, Apt, Walsh, 2007). People directly involved with putting the STI intervention into operation consisted of college health staff, including administrative personnel, volunteers, health educator, and director of health services. Throughout the process of planning and implementing the director of health services and health educator contributed, including suggestions as to appropriate methods to reach this target population of college women and advising on appropriateness/feasibility of educational content and survey questions. Resident Advisors (RAs), those who are responsible for student housing activities, aided in the recruitment of women. Participants, college women ages 18-25 years, the RAs, and other community members, are those being shaped by the intervention. Partners included those who supported the program,

including academic organizations (UMASS, Amherst and WNEU) as well as school representatives and other local and professional organizations that serve this population. Other employees at health services including two NPs and the operations manager whom this DNP candidate has formed working relations with supported this program's efforts.

Project Design & Methods

In order to evaluate the benefits of an educational program, the DNP candidate implemented a performance improvement project with a one group pre-test and post-test method. The educational program was devised in accordance with recommendations set forth by the CDC (2010) and U.S. Preventive Task Force (USPTF) (2008) in order to explore female college students' views and knowledge of STIs, perceived risk and associated risk factors of STIs, and potential barriers to prevention measures.

The behavioral health intervention corresponded to the constructs and relationships of Prochaska, DiClementi, and Norcross' (1992) Stages of Change Theory in which college women make decisions based upon their own interpretation of knowledge and desire to change. The education was comprised of face-to-face group discussion, with both lecture and interactive format, approximately one hour in length. The beginning thirty minute segment consisted of a Power Point presentation that highlighted the significance of the problem among the college population and offered general STI knowledge and facts. It was designed for appeal to the population with bright colors, animations, and visual images. The discussion was initiated with the definition of *sex* and *sexual health* along with clarification of terms. The education focused on the most prevalent STIs at this setting including chlamydia, gonorrhea, pediculosis pubis, and

herpes simplex. The lecturer made mention of HIV/AIDs to ensure that although not common on campus, college women are not immune to this condition.

The remainder portion of the Power Point presentation centered on high risk behaviors in relation to STI risk (i.e. unprotected sex, multiple sex partners, excess alcohol consumption and use of other substances that alter judgment). A key note pointed out was that in any event, regardless of the presence of substances, 'no means no.' The women were provoked to examine their own risk perception and rid the notion, "it won't happen to me." Reasons for unprotected sex and the benefits of protected sex were stressed to the audience. Lastly, students were reminded and encouraged to utilize on campus health services for counseling and to obtain contraception and STI testing.

The remaining thirty minutes of the program involved an interactive group jeopardy game, which contained 35 questions divided among the following five categories: facts, symptoms, spreading it, prevention, and myths. Questions were true/false and multiple choice format. Team members were encouraged to discuss the questions and formulate a group answer. In order to further nourish the objectives, a brochure was devised and a CDC (2011) handout was distributed (see Appendices D & E) for reinforcement and the promotion of self-efficacy.

In order to gather pertinent information, three survey tools were combined to examine variables associated with knowledge, behaviors, and sexual risk. The pre-test contained the General Sexually Transmitted (STI) Knowledge Survey and Perceived Risk of Sexually Transmitted Infection (STI) Behavior Survey (see Appendix F). The post-test contained both surveys from the pre-test with the addition of questions on condom use intent (see Appendix G). As recommended by Salabarría-Peña, Apt, & Walsh (2007) the questions were reliable, valid,

easily understood, and there was not a time limit assigned for completion. The pre-test was completed at baseline prior to the educational intervention and the post-test was conducted immediately after the intervention.

Goals, Objectives, & Expected Outcomes

Goals

Agency

- Increase awareness of STIs on college campus.
- Increase knowledge of STI services available at campus health services.

Population

- Prevent acquisition of STIs among college women.
- Prevent transmission of STIs among college women.

Objectives

Agency

- During planning and post-intervention there will be raised of awareness of problem of STIs among community leaders and college health professionals.

Population

- During intervention, there will be an exploration of college women's' perceptions, attitudes, and beliefs towards STIs.
- College women will demonstrate increased STI-related knowledge immediately post-intervention. Beliefs and misconceptions will be clarified.
- College women will report an increase in intent to take on STI reduction behaviors immediately post intervention.

Expected Outcomes

Agency

- Immediately post-intervention college health professionals will verbalize the importance of a thorough STI risk assessment during encounters with college women.
- Each college health professional involved will identify risk factors and at risk populations post-intervention.
- Immediately post-intervention, college health professionals will gain a better understanding of methods to effectively enhance STI knowledge among the college population.

Population: Change demonstrated by increase in correct responses from pre-test to post-test, comparing group means.

- College female respondents will experience an increase in correct responses by ≥25% on general STI knowledge (i.e. facts, prevention, transmission) immediately post intervention.
- College females will experience a ≥25% increase in concern related to being infected with an STI immediately post-intervention (i.e. increased report of *very* and *moderately*).
- College females will experience a ≥25% increase in perceived risk of STIs immediately post intervention (i.e. increased report of *very likely*, *somewhat*, and *likely*).
- There will be a ≥25% increase in a positive (yes) response in college women considering to consistently use condoms for the next 6 months.
- There will be a ≥25% increase in positive (yes) response in college women planning to use condoms every time within the next 30 days.

In sum, outcome indicators for the program included identifying the percentage of college women, ages 18-25 years with inaccurate knowledge related to STIs, risky sexual behaviors, and perceived risk of STIs and comparing this post-intervention. Furthermore, general knowledge was assessed which included the percentage of college women, ages 18-25 years, whom accurately and inaccurately identify facts, transmission, and risk factors for STIs and a measure of intent to use condoms was captured. Short-term behavior outcomes measures that were obtained included an assessment of the following: condom use in the last 30 days and duration of consistent condom use. Data was analyzed using SPSS computer software. In order to compare the findings among the pre-intervention and post-intervention surveys and reveal potential associations among the variables one-way analysis of variance (ANOVA) was used. Altogether, it was projected to note at least a 25% improvement in STI knowledge, perceived STI risk, and risk reduction behaviors.

Budget

As part of project management, a preliminary budget of both direct and indirect costs and intended benefits, as outlined below was devised.

Personnel	Other Details	Unit	Cost ($)	Total	**Benefits/ Gains**
DNP Candidate	3 education credits	168 hours	$2,200.00	(*Not Included)	*Enhanced community, college personnel, and student awareness of the problem of STIs. *Enhanced general knowledge and means to
Team Member 1 (College Health NP)	consult time	2 hours	$45.00/hour	$90.00	
Team Member 2(College Health NP)		2 hours	$45.00/hour	$90.00	
NP Benefits	2 NPS	approx. 6%	0.06 x$180.00	$10.80	
Educational Advisor				(*Not Included)	
Other: Support Staff/Consultants		2 hours	$20.00/hour	$40.00	
Actual Event	Other Details	Unit	Cost ($)	Total	

Advertising/Invitation/ Signs	printing & paper	150	$50.00	$50.00	prevent STIs among community members, college health staff, and college women.
Surveys(2)	printing & paper	200	$50.00	$50.00	
Event Space			$0		
Utilities/Computer Use			$50.00	$50.00	
Audio/visual Aids: Screen			$0	Typically provided by venue	*Enhanced partner communication.
Power strip		1	$0		
Extension Cord		1	$0		
Microphone		1	$0		*Reduction in costs associated with STI related visits.
Supplies/Writing Utensils/Folders		100	$25.00	$25.00	
Brochures		150	$1.00	$150	
Other: Event Food & Beverages	~100 attendees		$2.00/ person	$200.00	*Costs of testing less than finances associated with diagnosed & untreated STIs.
Vehicle Expenses/Travel		~0.55/ Mile	$25.00	$25.00	*Costs averted/ savings associated with prevention of STI sequalae.
Total Expenses				**$780.80**	

Figure 2. Projected Budget STI Educational Intervention for College Women

As the DNP candidate, I worked free of service as I earned educational credits. In addition, I worked with two college health NPs employed at health services whose hourly wage and earned benefits were figured into their actual work time. The costs were assumed by the department since it was being incorporated as a portion of student health education. The majority of the actual costs of the event, including paper materials, supplies, use of technology, event space, travel, food, and giveaways were covered by health services allocated funds for student education. Differing from other institutions, students are not charged per visit for evaluation services, rather a health service fee is incorporated into their tuition bill. Additional

services which may be needed in the event of untreated STIs, including certain diagnostics, treatments, and referrals require additional fees.

IRB Approval & Ethical Considerations

This evaluation design performance improvement project was devised to analyze existing evidence and generate further knowledge about the effects of STI related education on sexual behaviors and outcomes. As part of this living individuals were involved, however IRB exempt criteria was met in consideration that the behavioral health intervention was conducted in an educational setting and survey procedures were utilized (DHHS, 2004; NIH, 1979).

The project was carried out with integrity bearing in mind the importance of protecting confidentiality in consideration that human subjects were involved. In order to keep data private, to limit the risk of violation of confidentiality, participants were not asked to identify themselves. Respect for persons was attained by using autonomous surveys to make certain respondents were protected as they remained unidentifiable. In addition, results were reported in aggregate form. Transfer of knowledge and evaluation of outcomes are being portrayed in an honest, accurate, and objective fashion. Each participant was treated equally and individual needs were acknowledged. By being a part of this intervention the participants may have benefited from the knowledge gain to promote more positive sexual health outcomes.

Implementation & Evaluation

In hopes of attaining a convenience sample of approximately 100 women, ages 18-25 years, whom attend the university this DNP candidate planned to enlist at least120 participants. During late January to mid February, students were recruited with intent to carry out the intervention in mid February 2013. The Resident Advisors (RAs) of the dormitories notified the

students and encouraged them to bring others. Colorful poster advertisements were hung in the dormitories and other various areas on campus to entice participants.

Since not mandatory in nature, participants voluntarily agreed to take part in the intervention. By participating they were asked to complete the pre-test and follow-up post-test that examined variables associated with her knowledge, behaviors, and sexual risk. The ability to speak, read, and write English served as inclusion criteria. Demographic variables including age, race, school year, and relationship status were obtained at sign-in upon entry. The program took place in a lecture hall adequately equipped for the intended number of participants in the College of Health Sciences and Pharmacy, the building where health services is located.

Evaluation of the program focused on unveiling the effects of the intervention on the participants and demonstration to key stakeholders the efficacy of the program. Specifically it is noted if there was a positive effect on general knowledge and sexual behaviors among the target audience, college women, and determination if the program generated knowledge of significance. Throughout the planning and implementation qualitative methods of observation, note-taking, and monitoring were carried out to gather data. Topics evaluated include accessibility of program, degree of reaching target population, increased knowledge and awareness in regards to STIs, strengths and limitations program, and applicability to other populations.

Timeframe

In efforts to comply with the timeframe set forth by the academic university, the scope of the project has been designed in a realistic and achievable manner (Zaccagnini & White, 2011). With this in mind, tasks along with short and long term objectives were carried out over a nine month period, as documented in Table 1.

Table 1. Timeframe

Time	Tasks
September 2012-present	Literature review completed, program theory formulated, DNP committee formed, target group identified, budget developed, stakeholder agreement in process.
December 2012	Attended meetings with key stakeholders. Devised, modified, and obtained permission to use tools.
January 2013	Obtain approval of capstone project proposal. Recruit participants with help of resident advisors and health educator, finalize ppt presentation, confirm lecture hall for intervention
February 2013	Continue advertising program. Review/modify /update program education materials, administer pre-intervention surveys, and implement education program.
February-May 2013	Analyze data and evaluate outcomes.
April- May 2013	Documentation and dissemination of findings.

Table 1.

Project Results & Conclusions

The demographic data supports the achievement of the target audience of college women, ages 18-25 years. The final sample of 106 participants, ranged in age from 17-21 years, with the majority being 18 years of age (n=70) and mean of 18.44 years. The sample was comprised primarily of women of Caucasian ethnicity (93.4%), followed by Hispanic (2.8%), African American (1.9%), Asian (0.9%), and other (0.9%) respectively. The majority of women was freshman (88.7%) and reported relationship status as being single (87.7%).

Results: General STI Knowledge Survey

Table 2.
General STI Knowledge Survey Item Analysis

Item #	Pre-Test (n=101)	Post-Test (n=91)	Group Change in Scores (Post-Test - Pre-Test)

1	80.2% (n=81)	90.1% (n=82)	9.9%
2	75.2% (n=76)	96.7% (n=88)	21.5%
3	68.3% (n=69)	89.0% (n=81)	20.7%
4	85.1% (n=86)	97.8% (n=89)	12.7%
5	42.6% (n=43)	71.4% (n=65)	28.8%*
6	84.2 % (n=85)	91.2% (n=83)	7.0%
7	77.2% (n=78)	94.5% (n=86)	17.3%

Note. Total Survey Score (0-7). Mean pre-test=5.17, post-test=6.31.
*Most significant change in scores noted in item #5
Table 2.

Table 3.
**Item#5. General STI Knowledge Survey ANOVA*

	df	*F*	*Mean Square*	*p*
Between Groups	1	13.442	3.401	*.000
Within Groups	190		.253	

*Note. Item #5= Having a STI (such as chlamydia) makes a person more vulnerable to being infected with HIV or AIDs. ** Significant at the $p<0.05$ level.

Table 3.

Table 4.
General STI Knowledge Survey ANOVA

	Df	*F*	*Mean Square*	*p*
Between Groups	1	48.090	62.143	.000*
Within Groups	190		1.292	

Note. Total survey scores (0-7). Comparing means from pre-test to post-test. *Significant at the $p<0.05$ level.

Table 4.

A pre-test was completed by 101 participants in order to assess baseline general knowledge, facts, and misconceptions in regards to STIs. A post-test, immediately post-intervention, was completed by 91 of these participants. Each of the 7 items individually was analyzed to determine significance of change and each survey was scored (0-7) to obtain total mean scores.

When carrying out item analysis it is observed that there is an increase in the percentage of correct responses for each item. The most significant change is noted in item #5, which is a true response to the following: Having an STI (such as chlamydia) makes a person more vulnerable to being infected with HIV or AIDs. There was a statistically significant difference between groups for this item as determined by one-way ANOVA (F (1,190) = 13.44, p = .00).

In looking at the descriptives, the mean total scores from pre-test (mean=5.17) to post-test (mean=6.31) reflects a significant difference (difference in means= 1.14). There was a statistically significant difference between groups as determined by one-way ANOVA (F (1,190) = 48.09, p = .00). Since $p<.05$, we can accept the hypothesis that there is a statistical difference in the total mean scores between the pre-test and post-test groups. The Robust Tests of Equality of Means, with an adjusted F ratio as significant ($p<.00$) also supports that the group means are significantly different than one another.

Results: Perceived Risk Survey

Table 5.

Perceived Risk Survey Item Analysis

Pre-Test (n=101)	Post-Test (n=91)	Group Change in Total Scores (Post-Test – Pre-Test)
Q1. Sum= 207	Sum= 228	21
Q2. Sum=200	Sum=246	46
Total Sum(Q1+Q2)= 407	Total Sum (Q1+ Q2)=474	67
Q1. Mean= 2.05	Mean=2.51	0.46
Q2. Mean=1.98	Mean=2.70	0.72
Total Mean (Q1+Q2)=2.01	Total Mean (Q1+Q2)=2.70	0.69

Note. Total Survey Score (0-9). Higher score indicates greater perceived risk.
Table 5.

Table 6.
**Item #1. Perceived Risk Survey ANOVA*

	Df	*F*	*Mean Square*	*p*
Between Groups	1	11.710	9.953	**.001
Within Groups	190		.850	

**Note*. Item #1= How would you rate how worried you are about getting a STI? Total survey scores (0-4). **Significant at the $p<0.05$ level.

Table 6.

Table 7.
**Item #2. Perceived Risk Survey ANOVA*

	Df	*F*	*Mean Square*	*p*

Between Groups	1	17.682	25.030	**.000
Within Groups	190		1.416	

**Note*. Item #2= What do you think your chances are of getting a STI? Total survey scores (0-5).
**Significant at the $p<0.05$ level.

Table 7.

In looking at the descriptives for item #1 (How would you rate how worried you are about getting a STI?), the mean score from pre-test (mean=2.05) to post-test (mean=2.51) reflects a significant difference (difference in means= 0.46). There was a statistically significant difference between groups as determined by one-way ANOVA (F (1,190) = 11.71, p = .001). Since $p<.00$, we can accept the hypothesis that there is a statistical difference in the total mean scores between the pre-test and post-test groups. The Robust Tests of Equality of Means, which an adjusted F ratio as significant ($p<.00$) also supports that the group means are significantly different than one another.

Similar findings are also observed for item #2 (What do you think your chances are of getting a STI?), with a significant (difference in means=0.72) increase in mean score from pre-test (mean=1.98) to post-test (2.70). One-way ANOVA (F (1,190) = 17.68, p = .000) resulted in a statistically significant difference between the pre-test and post-test groups.

Results: Condom Use Intent

Underscoring the significance of the problem of risky sexual behaviors among college women, 11.0% (n=10) reported never using a condom during sex in the past 30 days, while 19.8% (n=18) reported almost never and 23.1% (n=21) sometimes used condoms. Only 35.2% (n=32) reported consistent condom use in the past 30 days. Fairly consistent with these findings, 58.2%(n=53) reported inconsistent condom use over the past 6 months, while 39.6% (n=36%) used a condom during sex every time for 6 months or greater. On the other hand 94.5% (n=86)

of participants report considering to start to use condoms every time for the next 6 months and 91.2% (n=83) are planning to start using condoms every time within the next 30 days.

Discussion

To assure confidentiality, individual responses to the survey tools are not compared from pre-test to post-test immediately after the intervention; rather group change is being examined. As devised to meet outcome measures, individual item analysis of the General STI Knowledge Survey reveals improvement in percentage of correct scores. Further examination using one-way ANOVA, identified a significant statistical difference in total mean scores (F (1,190) = 11.71, p = .001). The greatest change was observed in item #5, which supports the lack of perceived vulnerability of STIs among college women in relation to knowledge (CDC, 2010; Adefuye et al., 2009). In accordance with Prochaska, DiClementi, and Norcross' (1992) Stages of Change Theory, the adoption of healthy behaviors are taken on as beliefs and attitudes are modified. This intervention, which centered on awareness and significance of the problem among this community, allowed for generation of interest on this topic and the stimulation of personal emotions. Women were encouraged to explore their own views and feelings in relation to STI behaviors and potential negative outcomes of risky behaviors (Horowitz, 2003; Prochaska et al., 1992).

Also as projected, data analysis revealed statistically and clinically significant findings on the Perceived Risk of STI Behavior Survey. As a result of the intervention among participants it was identified that there was an increase in perception of worry and likelihood of getting an STI immediately after the educational intervention. These findings support the idea that the acquisition of general STI knowledge can influence college women's' views of perceived risk of

STIs. As she is contemplating the change, she is acknowledging her own responsibility for her actions and perceives her ability to modify these behaviors. Decisional balance and self-efficacy are considered and influenced through the processing of this knowledge (Horowitz, 2003; NCI, 2005; Prochaska et al., 1992).

The clinical significance of this project is further represented by the positive response in intent to change condom use behaviors. A remarkable portion, 94.5% (n=86) of participants report considering to start to use condoms every time for the next 6 months. In addition, 91.2% (n=83) are planning to start using condoms every time within the next 30 days. These findings place emphasis on individual risk perception as a motivating factor across college students. The driving force of a more accurate perception of personal risk to acquiring an STI leads the individual to take on STI preventive measures, in particular the adoption of condom use (Adefuye et al., 2009; Horowitz, 2003). With a specific plan and a readiness to change, these women are preparing for action (Horowitz, 2003; Prochaska et al., 1992). The few who did not express interest to use condoms may be attributed to the participants who are fixed in their present ways with no intent to change and those who are abstinent. Altogether, this project identified significant changes in group mean scores from pre-test to post-test suggesting a positive correlation among knowledge, perceived risk, and intention on STI behaviors.

Impact Evaluation: Costs & Financial Benefits

As with other projects in which there is time, efforts, and finances involved, it is important to discuss the costs and financial benefits in relation to effectiveness of the intervention (McEwan, 2012). The actual total costs assumed by this DNP candidate were on paper supplies for advertisement and distribution, which is estimated to be around $200.00. Since the health services department at the university has an allotted budget for student

education, costs did not have to be absorbed from other sources. The health services personnel spent time and efforts working on the program during their scheduled hours, therefore did not require additional hourly wages. With a projected budget of $780 originally proposed and actual program expenses estimated to be $300.00, the intervention cost much lower than anticipated.

As underscored by Smith, Cook, & Ness (2007) and Chesson, Collins, & Koski (2008) there are numerous economic benefits of STI prevention on an individual and community level. The estimated direct costs of STI screening in the clinic setting, including the clinician and test cost, is $49/test, while indirect costs including time value, transportation, and other factors, were estimated to be $62/test (Smith, et al., 2007). On the other hand, Chesson et al. (2008) projected that the average cost per diagnosed case of STIs in women and men is even higher, $171 for chlamydia, $206 for gonorrhea, and $572 for syphilis. With this in mind, on the community level it is advantageous to promote timely diagnosing in minimizing future financial burden.

Furthermore, the costs associated with untreated STIs are more troublesome. Chesson et al. (2008) offer the following equation for cost-savings associated with STI prevention: "$(C_w)(0.16)(0.925)(0.70)($1,995)$, where C_w is the number of infected women treated for chlamydia, 0.16 is the absolute reduction in the probability of pelvic inflammatory disease (PID) as a result of treatment, 0.925 is an adjustment factor to prevent double-counting of PID averted in women with both chlamydia and gonorrhea, 0.70 is an adjustment factor to account for the possibility of re-infection, and $1,995 is the average cost per case of PID (p.1)". Moreover, it is estimated that for each STI case treated, there is prevention of 0.5 case of that STI in the population by interfering with the transmission of that STI (Chesson et al., 2008).

Altogether, the benefits acquired by college women including enhanced awareness, knowledge, communication, and means to take on STI risk reduction behaviors far outweigh the project costs. As outlined (see Figure 2) the estimated program costs and costs avoided due to the educational program, offer an estimate of the profound potential for net cost savings. Not only will this help preserve financial concerns associated with STIs, but it will also help avoid emotional disturbances associated with STI related complications. With a credible association noted among the outcome measures for STI knowledge, perceived risk, and intent to use condoms, internal validity of this project is strengthened. In attending to external validity, findings can be generalized across other populations of college women (McEwan, 2012). Bearing in mind the program expenses were under budget and a more than expected effect took place, ideal cost effectiveness was achieved. Overall, the costs associated with this educational intervention program are trivial in view of the prospective gains offered to each participant.

Strengths

This project has several notable strengths that support the significance of the findings. The total survey completion rates of 101 pre-tests and 91 pre-tests reflect a considerably low attrition rate of 9.9% from sign-in, pre-test, presentation, and post test and a high retention rate of 90.1%. Other engagements, including academic and sports meetings and personal agendas, and psychosocial concerns are speculated for the drop out of a small number of participants. Given this significantly high retention rate and minimal drop-out rate, this intervention suggests a degree of acceptability and the possession of favorable attitudes across participants (Sidani & Braden, 2011).

Another advantage of this project in relation to the setting and duration of the intervention. Although Lin et al.'s (2008) systematic review concluded that behavioral health counseling intervention with multiple sessions reduce STI incidence, with little known on lower-intensity interventions it was recommended that further research be conducted. As a result of a one hour education session held in one location, expected outcomes were achieved in this project. Participants experienced a significant improvement in knowledge and perceived risk and reported intention to adopt STI reduction behaviors secondary to this brief intervention. The shorter time frame of one hour allowed for attention span to be maintained. In particular across college students a sense of boredom and knowledge acquisition have been shown to be affected by learning and teaching methods. Passive learning such as note-taking with lecturing may be seen as less boring than active learning strategies that stimulate individual arousal for example group work (Mann & Robinson, 2009; Wilson & Korn, 2007). With intent to capture the most from the timeframe, this intervention combined both techniques. In the end, the improvement in scores suggests both a sufficient degree of receptivity and high level of engagement of the participants.

An additional strong point was the effectiveness of the recruitment strategies utilized in this project. Enticing poster advertisements were designed to stimulate interest in attending the session. Creative wording was devised to see this as an enjoyable event. Titling of the program, "Get the Low Down Before It Goes Down" along with inviting phrases including "Girl Talk" and "Information Every College Woman Needs" were devised to suit the target populations' interest. The session was also intentionally planned the week of Valentine's Day since it is can be considered by some as an intimate occasion and/or arouse a mix of emotions. Of great magnitude, RAs were the primary source of recruitment for the participants. High levels of

interest in the program were expressed by the RAs who lived alongside the students in the dormitory. Frequent communication including reminders of the program helped to capture the audience. The above discussed tactics proved effective in this setting and may be reproducible across other college health settings.

Further strengthening the quality of this project's evidence, the findings are consistent what that of other studies. Using a comparable sample size (n=104) and shorter time frame, Johnson-Mallard et al. (2007) identified a significant increase in STI related knowledge ($p<.001$) and perceived risk ($p<.001$) after a thirty minute STI educational intervention. Strategies including encouragement of individuals to acknowledge negative behaviors and promotion of self-efficacy are also recommended tactics to effectively reach out to the college population (Moore et al., 2012; Peterson et al., 2007).

The results of this project also parallel that of national data. As reported in the American College Health Association-National College Health Assessment II, merely half (51%) practiced consistent condom use during vaginal intercourse within the past thirty days (ACHA-NCHA II) (ACHA, 2011). Similar to these results, this project found that 58.2% (n=53) reported inconsistent condom use over the past six months. With inconsistent condom use noted across a national sample of college students, Buhi et al. (2010) recommended the need for condom use promotion efforts across this population. Specifically among this population, whites were less likely to use condoms than blacks (Buhi et al., 2010). These findings emphasize the need for STI reduction behaviors in consideration that whites made up the majority (93.4%) of this project's sample.

Altogether, the significance of this project's findings in a one hour single session and it's consistency with other literature on this topic offer college health professionals insight to designing effective brief sexual health education interventions. Reaching out to those who work closely alongside this population, such as RAs, is a suggested means to achieve a target population particularly freshman women. Incorporation of a combination of learning styles may help to keep college students connected and foster learning on the problem of STIs.

Limitations & Future Research

The original intent of this DNP candidate as part of gathering demographic data at sign-in was to have each participant provide email addresses as a method of delivery for a two month post-intervention survey that contained each of the four items from the post-test on intent to use condoms. Bearing in mind that email addresses often reveal personal information, in order to ensure privacy and confidentiality this portion was left optional. A limitation to this is lack of response from all participants to this section, as this DNP candidate experienced. In the college environment, students' decisions may be swayed as they are exposed to the pressure to remainder of participants opted to not provide email contact as a consequence of the first participants choosing not to provide email contact information. Often applied when addressing other pertinent issues including alcohol consumption among college students, interventions aimed at social norm misconceptions offers an approach to modifying individual behaviors (Reilly & Wood, 2008). Further insight as to reasoning in which participants did not offer contact email address would be of great value in strengthening follow up data.

In addition to this, there is the notion that humans want to see their own benefit to following up, looking at potential personal gains. Similar to the underpinnings in which

incentives draw individuals to participate, literature has also shown the influence of incentives on follow-up surveys. In particular among the college population, web-surveys are a convenient, efficient means to assess pertinent topics of interest and obtain feedback however achieving high response rates can be difficult (Laguilles, Williams, & Saunders, 2011; McCree-Hale, De La Cruz, & Montgomery, 2010). In the research arena, response rates remain a topic of interest as they are linked to response error and bias. According to Grove's et al.'s (2000) leverage-salience theory (LST) individuals allocate certain values to portions of the survey which drives the decision to contribute. The degree to which the survey request draws attention to each of these aspects (i.e. sense of confidentiality, topic of survey, length, and if incentive available) also persuades willingness to participate (Grove et al., 2000; Laguilles et al., 2011).

Further supporting the ideas related to personal appeal, Laguilles et al.'s (2011) examination across four web-based surveys found that lottery incentives had a positive effect on response-rates, when compared to counterparts who did not receive this offer through the invite. Along the same lines, McCree-Hale et al.'s (2010) research among college students associated pre-paid downloadable songs from Apple iTunes as a useful incentive to increase participants' response to a web-based survey one month after a sexual health workshop. Data analysis further revealed that doubling the songs offered from two to four significantly enhanced college students' response rates ($p<.001$) (McCree-Hale et al., 2010). On the whole, it is suggested that college students hold a preference to participate in surveys when there is a sense of personal appeal and desirability.

Another limitation to this project is related to the homogeneity of the sample. In consideration that 93.4% of the 106 participants (n=99) whom attended were Caucasian there is concern for a relative lack of ethnic and racial heterogeneity. While this sample did accurately

represent the target population of freshman women at a principally white campus, additional research across more diverse populations may allow for further generalizabilty across other college populations.

As with other studies that use surveys as primary tools for data collection, an additional limitation is concern for self-report bias. There is a threat of social desirability as the participants may want to present themselves in a more acceptable manner. To limit this concern, it was made well known and reiterated that autonomy, confidentiality, and privacy were maintained. High response rates and a low number of no responses to items (pre-test=10 items; post-test 10 items omitted) suggest there was a minimal degree of ambiguity of interpretation of questions. Participants were also given opportunity for clarification if necessary. The survey items which were adapted and modified with permission from authors have been used in prior research allowing for threats to validity to be minimized.

Bearing the above in mind, it is recommended that future efforts are focused on examining and determining college students' preference and motivation to follow up post educational intervention. Carrying out interviews and directly inquiring individuals in a more personal setting may offer insight. In order to make the most of response to surveys among this population, creative strategies should be taken on by researchers (Laguilles et al., 2011). Perhaps a smaller more individualized session would allow for an enhanced sense of accountability. Although there are ethical concerns to consider, it would be useful to gain a more thorough understanding of the influence of autonomy on post-intervention survey response rates. Exploration among a more heterogeneous population would allow for further expansion of applicability to other populations.

Conclusions

STIs among college women are a multi-factorial problem that warrants attention by health care providers. Looking at the environmental aspects only offers a glimpse as to the underpinnings of this concerning issue. On an individual level, behaviors are strong predictors of STI risk (Adefuye et al., 2009; Stupiansky et al., 2009; Turchik et al., 2010). Although taking on an abstinence-only method, the internet, social and structural marketing interventions, and primary care providers hold potential to offer sexual health insight to college women, such approaches do not offer consistency in translation and retrieval of knowledge and are not specifically tailored to meet the needs of this population (Akers et al., 2010; Buhi et al., 2009; Peterson et al., 2007; Walcott et al., 2011).

Interventions such as education on signs and symptoms of infections (Johnson-Mallard et al., 2007;Kanekar & Sharma, 2010; Moore et al., 2012), discussion of sexual interactions with partners (Lewis et al., 2010), overview of contraception (Johnson-Mallard et al., 2007; Peterson et al., 2007), addressing personal and interpersonal skills (Lin et al., 2008;Lyles et al; 2007, Moore et al., 2012; Peterson et al., 2007; Walcott et al., 2011), and raised awareness of health services offered on campus (Braun & Provost, 2010) each individually offer promising means to protecting and promoting positive female reproductive health.

The findings of this intervention are both statistically and clinically significant in demonstrating the role of STI knowledge and risk assessment in decision making in college women. It is suggested that knowledge deficit can lead to difficulty in interpretation and decision making. As this evaluation performance improvement project demonstrates, providing college women with the knowledge that their individual decisions and behaviors influence their

personal health allows them to grasp the concept that they are capable and responsible for making such changes. Presenting college women with STI education can lead to a significant improvement in general STI knowledge and information, rid misconceptions, and offers a more accurate perception of STI risk. This program placed emphasis on the substantial health gains, which some may see this in itself as influential in adopting preventive behaviors. On the whole, it is essential that the education program is supported by its own environment.

Although knowledge may be seen as necessary, but not sufficient to illicit change across this population it can be seen as a tool to promote healthy lifestyle behaviors. By participating in this intervention, these women were provided with the power to take action and offered suggested means to maintain STI reduction behaviors in real-life situations. As this project revealed, each of the tools *knowledge* and *intent* are necessary for change, meanwhile when combined offer stronger predictors of behavior change across the college population.

In conclusion, current evidence supports the notion that best practice to effectively address the problem of STIs in college women includes targeted behavioral interventions that integrate a theoretical underpinning, such as Prochaska et al.'s (1992) Stages of Change Theory, along with comprehensive sexual health education. Not only does this project offer substantial benefits on an individual and community level, but it also offers the potential for profound cost savings in the future. In exceeding expected outcomes, this research translation project addressed the gap in knowledge on this concerning topic and allowed for adaptability as pilot data for future research. Advance practice nurses and other college health professionals are in the prime position to effective reach out to this vulnerable population.

References

Adefuye, A.S., Abiona, T.C., Balogun, J.A., & Lukobo-Durrell, M. (2009). HIV sexual risk behaviors and perception of risk among college students: Implications for planning interventions. *BMC Public Health*, 9(1), 281. doi: 10.1186/1471-2458-9-281

Akers, A.Y., Gold, M.A., Borrero, S., Santucci, A., & Schwarz, E.B. (2012). Providers' perspectives on challenges to contraceptive counseling in primary care settings. *Womens' Health Journal*, 19(6), 1163–1170. doi: 10.1089/jwh.2009.1735

American College Health Association. (ACHA). (2012). *National College Health Assessment II (NCHA-II*). http://www.acha-ncha.org/docs/ACHA-NCHA II_ReferenceGroup_ExecutiveSummary_Spring2012.pdf

American College Health Association. (ACHA). (2012). *Student objectives: Sexually transmitted diseases and HIV*. Retrieved from: http://www.acha.org/HealthyCampus/student-obj.cfm

American College Health Association. (ACHA). (2011). *National College Health Assessment II (NCHA-II*). Retrieved from: http://www.achancha.org/docs/ACHA-NCHA II_ReferenceGroup_ExecutiveSummary_Fall2011.pdf http

The American Congress of Obstetricians and Gynecologists (ACOG). (2012). New cervical cancer screening recommendations from the U.S. Preventive Services Task Force and the American Cancer Society/American Society for Colposcopy and Cervical Pathology/American Society for Clinical Pathology. Retrieved from: http://www.acog.org/About%20ACOG/Announcements/New%20Cervical%20Cancer%20Screening%20Recommendations.aspx

Bersamin, M.M., Fisher, D.A., Walker, S., Hill, D.L., & Grube, J.W. (2007). Defining virginity and abstinence: Adolescents' interpretations of sexual behaviors. *Journal of Adolescent Health*, 41(2), 182–188. doi: 10.1016/j.jadohealth.2007.03.011

Braun, R.A. & Provost, J.M. (2010). Bridging the gap: using school-based health services to improve chlamydia screening among young women. *American Journal of Public Health*, 100(9), 1624-1629. doi: 10.2105/AJPH.2009.186825

Buhi, E.R., Marhefka, S.L., & Hoban, M.T. (2010). The state of the union: sexual health disparities in a national sample of US college students. *Journal of American College Health*, 58(4), 337-346. Retrieved from: http://web.ebscohost.com.silk.library.umass.edu:2048/ehost/pdfviewer/pdfviewer?vid=&hid=112&sid=057ea76f-a557-4e67-94be-d4eaa39349a2%40sessionmgr110

Buhi, E.R., Daley, E.M., Fuhrmann, H.J., & Smith, S.A. (2009). An observational study of how young people search for online sexual health information. *Journal of American College Health*, 58(2), 101-111. Retrieved from: http://web.ebscohost.com.silk.library.umass.edu/ehost/pdfviewer/pdfviewer?vid=4&hid=7&sid=4e358fc2-1e37-4409-9c5b-355a1898f55e%40sessionmgr15

Centers for Disease Control and Prevention (CDC). (2011a). Family Health, College Health and Safety. Retrieved from *cdc.gov*: http://www.cdc.gov/family/college/

Centers for Disease Control and Prevention (CDC). (2011b). STDs & Infertility. Retrieved from *cdc.gov*: http://www.cdc.gov/std/infertility/default.htm

Centers for Disease Control and Prevention (CDC). (2011c). Sexually transmitted diseases surveillance 2010, STDs in adolescents & young adults. Retrieved from *cdc.gov*: http://www.cdc.gov/std/stats10/adol.htm

Centers for Disease Control and Prevention (CDC). (2010a). Cervical cancer screening for women who attend STD clinics or have a history of STDs. Retrieved from *cdc.gov*: http://www.cdc.gov/std/treatment/2010/ccscreening.htm

Centers for Disease Control and Prevention (CDC). (2010b). STD Trends in the United States:2010 National Data for Gonorrhea, Chlamydia, and Syphilis. Retrieved from *cdc.gov*: http://www.cdc.gov/std/stats10/trends.htm

Centers for Disease Control and Prevention (CDC). (2010c). Massachusetts-2010 Profile. Retrieved from *cdc.gov*: http://www.cdc.gov/nchhstp/stateprofiles/pdf/massachusetts_profile.pdf

Chesson, H.W., Collins, D., & Koski, K. (2008). Formulas for estimating the costs averted by sexually transmitted infection (STI) prevention programs in the United States. *Cost Effective Resource Allocation*, 6(10), 1-6. doi: 10.1186/1478-7547-6-10

Department of Health and Human Services (DHHS). (2004). Office for human research protections (OHRP) decision flow sheet. *Institutes of Health and Human Services*. Retrieved from: http://www.ihs.gov/Research/pdf/OHRPdecisionFlowWcitations.pdf

Dillard, J.P. & Spear, M. E. (November/December 2010). Knowledge of human papillomavirus and perceived barriers to vaccination in a sample of U.S. female college students. *Journal of American College Health*, 59(3), 186-190. doi: 10.1080/07448481.2010.493189

Erikson, E. H. (1968). *Identity: Youth and crisis*. New York, NY: Norton.

Fogel, J., Fajiram, S., & Morgan, P.D. (2010). Sexual health information seeking on the internet: Comparisons between white and African American college students. *Association of Black Nursing Faculty (ABNF) Journal*, 21 (4): 79-84. Retrieved from: http://web.ebscohost.com.silk.library.umass.edu/ehost/pdfviewer/pdfviewer?vid=6&hid=24&sid=1435d119-f0cb-4431-bf94-88aea9111138%40sessionmgr10

Griffin, J.A., Umstadd, R., & Usdan, S.L. (2010). Alcohol use and high-risk sexual behavior among collegiate women: A review of research on alcohol myopia theory. *Journal of American College Health*, 58(6). Retrieved from: http://web.ebscohost.com.silk.library.umass.edu/ehost/pdfviewer/pdfviewer?vid=3&hid=7&sid=4e358fc2-1e37-4409-9c5b-355a1898f55e%40sessionmgr15

Groves, R.M., Singer, E., & Corning, A. (2000) Leverage-saliency theory of survey participation-description and an illustration. *Public Opinion Quarterly*, 64(3), 299-308.

Groves, R.M., Presser, S., & Dipko, S. (2004). The role of topic interest in survey participation decisions. *Public Opinion Quarterly*, 68(1), 2-31.

Gullette, D.L., Rooker, J.L., & Kennedy, R.L. (2009). Factors associated with sexually transmitted infections in men and women. *Journal of Community Health Nursing*, 26, 121-130. doi: 10.1080/07370010903034425

Hogben, M. & Leichliter, J. (2008). Social determinants and sexually transmitted disease disparities. *Sexually Transmitted Diseases*, 35(12), S13-S18. doi: 10.1097/OLQ.0b013e31818d3cad

Horowitz, S.M. (2003). Applying the transtheoretical model to pregnancy and STD prevention: A review of the literature. *American Journal of Health Promotion*, 17 (5), 304-328. Retrieved from: http://web.ebscohost.com.silk.library.umass.edu/ehost/pdfviewer/pdfviewer?vid=8&hid=106&sid=09aaef23-ffd4-48c8-80f4-d48851a09175%40sessionmgr111

Ingersoll, K.S., Ceperich, S.D., Nettleman, M.D., & Johnson, B.A. (November 2008). Risk drinking and contraception effectiveness among college women. *Psychology & Health*, 23(8), 965-981. doi: 10.1080/08870440701596569

The Johns Hopkins Hospital/ The John Hopkins University. (2012). *JHNEBP research evidence appraisal*. Retrieved from: http://www.nursingworld.org/DocumentVault/NursingPractice/ResearchToolkit/JHNEBPResearch-EvidenceAppraisal.pdf

The Johns Hopkins Hospital/ The John Hopkins University. (2012). *JHNEBP non-research evidence appraisal*. Retrieved from: http://www.nursingworld.org/DocumentVault/NursingPractice/Research-Toolkit/JHNEBP-Non-Research-EvidenceAppraisal.pdf

Johnson-Mallard, V., Lengacher, C.A., Kromrey, J.D., Campbell, D.W., Jevitt, C.M., Daley, E., & Schmitt, K. (2007). Increasing knowledge of sexually transmitted infection risk. *Nurse Practitioner*, 32(2), 26-32. Retrieved from: http://web.ebscohost.com.silk.library.umass.edu/ehost/pdfviewer/pdfviewer?vid=3&hid12&sid=c5459fc0-c9f5-42ef-ab5d-08f91ad67e80%40sessionmgr11

Johnson-Mallard, V. (2005). The effects of an education/behavioral intervention on knowledge, perceived risk and self efficacy in women. University of South Florida Commons, Theses and Dissertations. Paper 2944. Retrieved from: http://scholarcommons.usf.edu/etd/2944

Kanekar, A. & Sharma, M. (2010). Interventions for safer sex behaviors among college students. *American Journal of Health Studies*, 25(3), 138-148. Retrieved from: 11p.http://web.ebscohost.com.silk.library.umass.edu/ehost/pdfviewer/pdfviewer?vid=7hid=106&sid=bafa92c9-f3f9-4eb5-9963-951dc20ed386%40sessionmgr112

Kelly-Weeder, S. (2008). Binge-drinking in college-aged women: Framing a gender-specific prevention strategy. *Journal of the American Academy of Nurse Practitioners*, 20(1), 577-584. doi: 10.1111/j.1745-7599.2008.00357.x

Kooyman, L., Pierce, G., & Zavadil, A. (2011). Hooking up and identity development of female college students. *Adultspan: Theory Research & Practice*, 10(1), 4-13. Retrieved from: http://web.ebscohost.com.silk.library.umass.edu/ehost/pdfviewer/pdfviewer?vid=3&hid=127&sid=4f85b648-22a9-4ea8-8991-ca89fdea2c19%40sessionmgr104

Kraut-Becher, J., Eisenberg, M., Voytek, C., Brown, T, Metzger, D.S., & Aral, S.O. (2008). Examining racial disparities in HIV: lessons from sexually transmitted infection research. *Journal of Acquired Immune Deficiency Syndrome*, 47(1), S20-S27. doi: 10.1097/QAI.0b013e3181605b95

Laguilles, J.S., Williams, E.A., & Saunders, D.B. (2011). Can lottery incentives boost web survey response rates? Findings from four experiments. *Research of Higher Education*,

52(1), 537-553. Springer Science & Business Media, LLC. doi: 10.1007/s11162-010 9203-2

Lewis, M.A., Kaysen, D.L., Rees, M., & Woods, B.A. (2010).The relationship between condom-related protective behavioral Strategies and condom use among college students: Global- and event-level evaluations. *Journal of Sex Research*, 47(5), 471-478. doi: 10.1080/00224490903132069.

Lightfoot, M.A. & Milburn, N.G. (2009). HIV prevention and African American youth: examination of individual-level behavior is not the only answer. *Culture, Health, & Sexuality*, 11(7), 731-742. doi: 10.1080/13691050903078824

Lin, J.S., Whitlock, E, O'Connor, E., & Bauer V. (2008). Behavioral counseling to prevent sexually transmitted infections: a systematic review for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*, 149 (7): 497-508. Retrieved from: http://web.ebscohost.com.silk.library.umass.edu/ehost/pdfviewer/pdfviewer?vid=20&hi=10&sid=f6fed3f3-48e0-4eb7-b15d-4665b38bf222%40sessionmgr13

Lindley, L.L., Barnett, C. L., Brandt, H.M., Hardin, J.W., & Burcin, M. (2008). STDs among sexually active female college students: Does sexual orientation make a difference? *Perspectives on Sexual & Reproductive Health*, 40(4), 212-217. doi: 10.1363/4021208

Lyles, C.M., Kay, L.S., Crepaz, N., Herbst, J.H., Passin, W.F., Kim, A.S., Rama, S.M., Thadiparthi, S., DeLuca, J.B., & Mullins, M.M. (2007). Best-evidence interventions: Findings from a systematic review of HIV behavioral interventions for U.S. populations

at high risk, 2000-2004. *American Journal of Public Health*, 97(1), 133-143. doi:10.2105/AJPH.2005.076182

Mann, S. & Robinson, A. (2009). Boredom in the lecture theatre: an investigation into the contributors, moderators and outcomes of boredom amongst university students. *British Educational Research Journal*, 35(2), 243-258. doi: 10.1080/01411920802042911.

Massachusetts Department of Higher Education (2013). Performance Report. Retrieved March 1st, 2013 from: *www.mass.edu*

Massachusetts Department of Public Health (MDPH). (2010). STD, HIV/AIDS and viral hepatitis surveillance summary – 2010. Retrieved from: http://www.mass.gov/eohhs/docs/dph/cdc/aids/std-surveillance-2010.pdf

Massachusetts Department of Public Health (MDPH). (2007). Regional health status indicators western Massachusetts. Retrieved from: http://www.mass.gov/eohhs/docs/dph/research-epi/western-report.pdf

McCree-Hale, R., De La Cruz, N.G., & Montgomery, A.E. (2010). Using downloadable songs from Apple iTunes as a novel incentive for college students participating in a web-based follow-up survey. *American Journal of Health Promotion*, 25(2), 119-121. doi:10.4278/ajhp.090128-ARB-39

McEwan, P.J. (2012). Cost effectiveness analysis of education and health interventions in developing countries. *Journal of Developmental Effectiveness*, 4(2), 189-213. Retrieved April 1st, 2013 from: http://academics.wellesley.edu/Economics/mcewan/PDF/cea.pdf

Montaño, D.E., Phillips, W.R., Kasprzyk, D. & Greek, A. (2008). STD/HIV prevention practices among primary care clinicians: risk assessment, prevention counseling, and testing (abstract). *Sexually Transmitted Diseases*, 35(2), 154-66. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/18007273

Moore, E.W., Smith, W.E., & Folsom, A.R.B. (2012). F.O.R.E.play: The utility of brief sexual health interventions among college students. *Journal of American College Health*, 60(2), 175-177. doi: 10.1080/07448481.2011.584336.

National Cancer Institute. (2005). Theory at a glance: A guide for health promotion practice. *U.S. Department of Health and Human Services.* Retrieved from: http://www.cancer.gov/cancertopics/cancerlibrary/theory.pdf

National Institutes of Health (NIH). (1979). The Belmont Report Ethical Principles and Guidelines for the protection of human subjects of research. *Department of Health, Education, and Welfare*. Retrieved from:http://ohsr.od.nih.gov/guidelines/belmont.html

National Institute on Alcohol Abuse and Alcoholism (NIAAA). (2012). Brochure: Alcohol, a woman's health issue. *U. S, Department of Health and Human Services*, National Institute of Health News. Retrieved from: http://pubs.niaaa.nih.gov/publications/brochurewomen/women.htm

Petersen, R., Albright, J., Garrett, J.M., & Curtis, K.M. (2007). Pregnancy and STD prevention counseling using an adaptation of motivational interviewing: A randomized controlled trial. *Perspectives on Sexual & Reproductive Health*, 39 (1): 21-28. Retrieved from:

http://web.ebscohost.com.silk.library.umass.edu/ehost/pdfviewer/pdfviewer?vid=27&hi=10&sid=f6fed3f3-48e0-4eb7-b15d-4665b38bf222%40sessionmgr13

Prochaska, J., DiClementi, C., & Norcross, J. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist*, 47(9), 1102-1114.

Reilly, D.W. & Wood, M.D. (2008). A randomized test of a small-group interactive social norms intervention. *Journal of American College Health*, 57(1), 53-60. Retrieved March 20th, 2013 from Academic Search Premier Database: http://web.ebscohost.com.silk.library.umass.edu/ehost/pdfviewer/pdfviewer?vid=6&sid4fb23cd5-a093-4b03-8187-35df70e4ee88%40sessionmgr13&hid=25

Salabarría-Peña, Y, Apt, B.S., & Walsh, C.M. (2007). Practical Use of Program Evaluation among Sexually Transmitted Disease (STD) Programs, Atlanta (GA): *Centers for Disease Control and Prevention.* Retrieved from: http://www.cdc.gov/std/program/pupestd/Step4_0216.pdf

Sidani, S. & Brade, C.J. (2011). *Design, evaluation, and translation of nursing interventions*. John Wiley & Sons. Ames, Iowa.

Smith, K.J., Cook, R.L., & Ness, R.B. (2007). Cost comparisons between home- and clinic-based testing for sexually transmitted diseases in high-risk young women. *Infectious Diseases in Obstetrics and Gynecology*, 2007, article ID 62467, 1-5. Doi: 10.1155/2007/62467

Steen, R., Teodora, E.W., Kamali, A., & Ndowa, F. (2009). Control of sexually transmitted infections and prevention of HIV transmission: Mending a fractured paradigm. *Bulletin of the World Health Organization*, 87(1), 858-865. doi: 10.2471/BLT.08.059212

Stupiansky, N.W., Reece, M., Middlestadt, S.E., Finn, P., & Sherwood-Laughlin, C. (2009). The role of sexual compulsivity in casual sexual partnerships among college women. *Sexual Addiction & Compulsivity*, 16(3), 241-252. doi: 10.1080/10720160903202760.

Trenholm, C., Devaney, B., Fortson, K., Clark, M., Quay, L., & Wheeler, J. (2008). Impacts of abstinence education on teen sexual activity, risk of pregnancy, and risk of sexually transmitted diseases. *Journal of Policy Analysis and Management*, 27(1), 255-276. doi:10.1002/pam.20324

Turchik, J.A., Garske, J.P., Probst, D.R., & Irvin, C.R. (2010). Personality, sexuality, and substance use as predictors of sexual risk taking in college students. *Journal of Sex Research*, 47(5), 411-419. doi: 10.11080/00224490903161621

Underhill, K., Montgomery, P., & Operario, D. (2007). Sexual abstinence only programs to prevent HIV infection in high-income countries: Systematic review (abstract). *British Medical Journal*, 335(1), 1-12. Retrieved from: http://www-ncbi-nlm-nih-gov.silk.library.umass.edu/pubmed/17656503

U.S. Department of Commerce. (2011). State & county quick facts, Springfield, Massachusetts. *United States Census Bureau*. Retrieved from: http://quickfacts.census.gov/qfd/states/25/2567000.html

U.S. Department of Health & Human Services (USDHHS). (2010). Sexually transmitted diseases. Retrieved from *HealthyPeople.gov*.: http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=37

U.S. Department of Health & Human Services (USDHHS). (2007). HHS health beat: Half the students. Retrieved from *HHS.gov*: http://www.hhs.gov/news/healthbeat/2006/09/20060901a.html

United States Food and Drug Administration (U.S. FDA). (2010). Condoms and sexually transmitted diseases, brochure. *U.S. Department of Health & Human Services*. Retrieved from: http://www.fda.gov/ForConsumers/byAudience/ForPatientAdvocates/HIVandAIDSActivities/ucm126372.htm

U.S. News & World Report. (2012). *Colleges: Western New England University*. Retrieved from: http://colleges.usnews.rankingsandreviews.com/best-colleges/western-new englandcollege-2226

The United States President's Emergency Plan for AIDS Relief (PEPFAR). (2011). Guidance for the prevention of sexually transmitted HIV infections. Retrieved from: http://www.pepfar.gov/documents/organization/171303.pdf

United States Preventive Services Task Report (USPSTF). (2008). Behavioral counseling to prevent sexually transmitted infections, recommendation statement. Retrieved from: http://www.uspreventiveservicestaskforce.org/uspstf08/sti/stirs.htm

Walcott, C.M., Chenneville, T., & Tarquini, S. (2011). Relationship between recall of sex education and college students' sexual attitudes and behavior. *Psychology in the Schools*, 48(8), 828-842. doi:10.1002/pits.20592

Wang, Z., Walther, J.B., Pingree, S., & Hawkins, R.P. (2008). Health information, credibility, homophily, and influence via the internet: Web sites versus discussion groups. *Health Communications*, 23(1), 358-368. doi:10.1080/10410230802229738

Weeks, M.R., Li, J., Coman, E., Abbott, M., Sylla, L., Corbett, M., & Dickinson-Gomez, J. (2010). Multilevel social influences on female condom use and adoption among women in the urban United States. *AIDS Patient Care and STDs*, 24(5), 297-309. doi:10.1089/apc.2009.0312

White, K. & Dudley-Brown, S. (2012). *Translation of evidence into nursing and health care practice*. New York. Springer Publishing Company.

Wilson, K. & Korn, J.H. (2007). Topical Articles: Attention during lectures: Beyond ten minutes. *Teaching of Psychology*, 34(2), 85-89. doi: 10.1080/00986280701291291.

World Health Organization (WHO). (2011). *Media centre, sexually transmitted infections.* Retrieved from: http://www.who.int/mediacentre/factsheets/fs110/en

Zaccagnini, M.E. & White, K.W. (2011). *The Doctor of Nursing Practice Essentials: A new model for advanced nursing practice.* Sudbury, MA: Jones and Bartlett Publishers.

Appendix A

*Based upon the Johns Hopkins Hospital/The John Hopkins University Research & Non-Research Evidence Appraisal (2012)

Citation	Sample and Location Research/Study Was Performed	Design	Outcomes/Results of the Intervention and/or Objectives of the Study	Strengths and Weaknesses	*Evidence Level	Class
Dillard & Spear (2010)	396 female undergraduate students aged 18-24 years at Penn State University	Non-Experimental Descriptive, web-based study	Objectives: To determine female college students' knowledge of HPV and barriers to vaccination. Results: 65% possessed accurate knowledge of HPV related facts. Media exposure and physician encouragement to be vaccinated enhanced awareness. Misconceptions of HPV remain a concern highlighting need for further education in college populations.	Strengths: Results consistent with other studies and contained thorough literature review. Stratified random sampling was used to minimize selection bias. Weaknesses: Relatively poor response rate of 22% therefore may not be generalized to other college health settings.	III	B
Griffin, Umstattd, & Usdan (2010)	18 articles from 2007-2008 retrieved from Academic Search Premier and PubMed databases examined	Literature review	Objective: The purpose of the literature review was to examine the Alcohol Myopia Theory (AMT) in relation to alcohol use and high-risk sexual behavior among collegiate women. Results: AMT perspectives can be used as the foundation for interventions among college women that speak to the high prevalence of negative sexual outcomes related to alcohol use.	Strengths: Search strategy well defined. Sufficient amount well designed studies included. Strengths and limitations discussed. Weaknesses: Studies included were not limited to women. Majority of studies were in more recent years, but 6 on/before 2006; therefore may not represent present societal views.	V	A
Braun & Provost (2010)	3396 females aged15-25 years across 9 Health care agencies and 19 educational institutions (15 high schools, 3community colleges, 1 university) in California	Experimental, Cross-Sectional: Educational Partnerships to Increase Chlamydia Screening (EPICS) program implemented	Objective: To determine racial/ethnic factors associated with chlamydial infection. To provide a chlamydia screening program in an educational-based setting specifically geared towards women. Results: School-based chlamydia programs have proven effective in diagnosing asymptomatic cases and reach out to women who do not have a usual setting to receive services. Some women prefer to use the school-based setting. Whites were less likely than other racial groups to test positive(Whites 2.4%, Black/African American 12.9%, Pacific Islander 8.6%, & Asian 7.6% positivity rate).	Strengths: Findings consistent with previous research. Using targeted clinical strategies can be applicable to other settings, even those outside school-based setting. Extensive literature review with supporting scientific evidence provided. Weaknesses: Baseline data was not collected prior to implementation of screening program, therefore could not determine if increased rates in school-based setting.	II	A

Citation	Sample and Location Research/Study Was Performed	Design	Outcomes/Results of the Intervention and/or Objectives of the Study	Strengths and Weaknesses	*Evidence Level	Class
Johnson-Mallard et al. (2007)	104 women aged 18-48 years attending 2 universities, with overall mean age of 21 years old	Experimental study design, and two-group randomized control pretest/posttest design	Objective: To determine the effect of educational programs on the knowledge and perceived risk of STIs among women. Results: 15.3% (n=16) of the participants had 2 sexual partners and 13.4% (n=14) had 4 or more sexual partners within the last year. 91% (n=95) reported problems in requesting their sex partner to use a condom. The educational/behavioral intervention resulted in significance for STI knowledge and perceived risk of STI, $p<.0001$.	Strengths: The sampling was randomized and a control group was utilized. Demographic data similar in 2 groups. Estimates of reliability provided. Weaknesses: Smaller sample size limits generalizabilty. With results, not statistically clear of instances in which condom use was used as primary source for birth control.	I	B
Lin et al. (2008)	21 English randomized control trial articles, from 1988-2007 that evaluated behavioral counseling interventions	Systematic Review	Objective: To further examine and critically appraise STI prevention efforts among adolescents and adults driven by evidence based behavioral counseling interventions. Results: STI incidence has been reduced among identified at risk adult and adolescent as a result of multiple sessions of behavioral health counseling interventions in STI clinics and primary care settings.	Strengths: Researchers synthesized articles that were representative of target population and those that did not have a true control group were excluded. Definitive conclusions drawn. Weaknesses: Limited insight is provided on the effects of lower scale (less than 30 minutes) behavioral interventions. Unable to meta-analyze particular components of interventions due to heterogeneity in populations, interventions, and outcome measures.	IV	B
Hou (2009)	401 white students at traditionally white institutions (TWI) and 240 black students at Historically Black Colleges and Universities (HBCU), aged 18-24 years	Non-Experimental Descriptive & Comparative, using online survey	Objectives: Explored and compared STI related behaviors across HBCU students and white students at TWIs. Results: HBCU students portrayed a greater degree of perceived peer norms toward vaginal and anal sex ($p<.05$), initiated vaginal sex at younger age (16.3 vs. 17.5 years, $p<.001$), and as well as were 1.71 times more likely to engage in vaginal sex than TWI students. Overall, females were more likely than males to have been diagnosed with STI.	Strengths: Findings consistent with national data from ACHA-NCHA. Similar age and gender distribution. Fairly comprehensive lit. review. Weaknesses: Survey used for data collection therefore concern for threat of disclosure and social desirability bias. Sample not exclusive to women, although majority females in each group.	III	B

Citation	Sample and Location Research/Study Was Performed	Design	Outcomes/Results of the Intervention and/or Objectives of the Study	Strengths and Weaknesses	*Evidence Level	Class
Peterson et al. (2007)	764 women ages 16-44 years residing in North Carolina	Randomized Control Trial, conducted across 3 primary care facilities Baseline self-administered questionnaires, with follow-up questionnaires at 2, 8, and 12 months after enrollment	Objective: To determine an effective counseling intervention to increase consistent use of sexual health prevention measures in women. Results: 59% of women who took part in the intervention group reported a high level of contraceptive use, which was enhanced two months later after the intervention 72%. Repeated counseling sessions may be needed to improve contraceptive decision-making and to reduce the risk of unintended pregnancy and STIs.	Strengths: Researchers used a randomized controlled design, the 12-month follow-up period further strengthen the findings. The study also maintained high participant retention rates, 85% at 2months, 91% at 8 month, and 87% at 12 month follow up. A theoretical framework based upon the behavior-change theory was incorporated into the design. Definitive conclusions drawn and results clearly depicted in tables. Weaknesses: There is some room for bias as data is gathered used self-reports from participants. Researchers also unable to stratify differences in pregnancy and chlamydia rates among the groups. May have been differences among counselors; therefore variances may have existed in interventions.	I	A
Lindley et al. (2009)	25,389 sexually active female college students aged 18-24 years, across 117 college institutions	Non-Experimental Comparative &Descriptive using the 2006 ACHA-NCHA	Objectives: To determine the degree of sexually active college students who obtained a routine gyn. exam within the past year. To assess the characteristics associated with students in relation to gyn. exams, including age, race/ethnicity, sexual orientation, health insurance, smoking history, and gender and number of sexual partners. Results: 75.6% of students obtained a routine gyn. exam within the past year. Students whom were younger (ages 18-20 years), Asian or Hispanic, lesbian, reported having sex only with women in the past year (each with $p<.001$), and those who did not have health insurance were significantly less likely to obtain a routine gyn. exam.	Strengths: Researchers utilized randomized sampling from both classroom and web-based survey. Results, using multivariate logistic regression, clearly portrayed and those of significance. Results consistent with other findings in relation to the percentage of students receiving a routine gyn. exam/year. Weaknesses: Relatively low response rate, 85% from classroom surveys, 23.2% from web-based surveys, with a mean rate of 35.0%. Since self-selection used concern for the reliability of responses. Ambiguity in the defining of the term gyn. exam.	III	B

Citation	Sample and Location Research/Study Was Performed	Design	Outcomes/Results of the Intervention and/or Objectives of the Study	Strengths and Weaknesses	*Evidence Level	Class
Walcott, Chenneville, & Tarquini (2011)	1,878 undergraduate students aged 18-25 years from 2 universities (Florida & North Carolina)	Non-Experimental, Descriptive & Relational	Objectives: To further investigate the characteristics and modes of sexual health education in middle and high school across undergraduate college students and the participants' present STI knowledge, attitudes toward STI prevention, and behaviors were examined. Relationships among the constructs of self-report of condom use, attitudes and intentions towards sexual health, main components of effective STI interventions, and prior school-based sexual health education were also explored. Results: Greater HIV related knowledge was demonstrated by those who previously received comprehensive as opposed to abstinence only education (t= -2.56, p=.01). More consistent condom use was reported in those who received education on means to cope with peer pressure and taught communication and negotiation skills (t= 2.24, p=.03) as well as in those who perceived their sexual health education as useful (t=2.08, p=.04). The possession of greater norms, positive attitudes, and intentions in regards to safe sex was associated with consistent condom usage.	Strengths: In order to control for response bias, inconsistent data and surveys that took over 10 minutes were excluded. Adequate internal consistency demonstrated. Results portrayed in tables and thoroughly described based upon projected hypotheses. Sufficient sample size used. Definitive conclusions made. Weaknesses: Sample not excluded to women, although represent 77% of the sample. Survey used to collect data therefore concern for social desirability and threat of disclosure bias. Recall bias may have resulted since participants asked about prior education. No control over other modes of non-school based sexual education.	III	A
Turchik, Garske, Probst, & Irvin (2010)	310 undergraduate students aged 18-23 years attending a Midwestern U.S. University (Ohio)	Non-Experimental, Relational	Objective: To explore the influence of personality, sexuality, and substance abuse on sexual risk in college students. Results: Increased sexual risk taking exhibited by impulsive women with lower sexual inhibition and higher sexual excitation. Lower social desirability (t=-2.18, p<.05), reduced sexual inhibition (t=-1.95, p<.05), higher sexual excitation (t=3.15, p<.01), greater weekly drinking (t=3.11, p<.01), and more drug use (t=2.23, p<.05) each were significant predictors of increased sexual risk behaviors.	Strengths: In order to minimize participant response error, researchers controlled for social desirability and threat of disclosure. Used broad, valid instruments for data collection. Data analysis revealed a 'lack of multicollinearity.' Results consistent with other research predictions. Weaknesses: Sample not exclusive to women. Lack of cultural diversity imposes threat to generalizabilty and concern for undercoverage bias.	III	A

Citation	Sample and Location Research/ Study was Performed	Design	Outcomes/Results of the Intervention and/or Objectives of the Study	Strengths and Weaknesses	*Evidence Level	Class
Adefuye, Abiona, Balogun, & Lukobo-Durrell (2009)	390 students with mean age 24 years attending a commuter university in the Midwest, U.S.	Non-Experimental, Descriptive	Objective: To explore college students' perception of HIV risk and sexual risk behaviors. Results: Women having at least one alcoholic beverage within the past 30 days were twice as likely to not use a condom than those who abstained from alcohol (OR=1.81, *p*=.04). Marijuana use was associated with inconsistent condom use (*p*=.02). Age was another correlating factor across females as demonstrated by the report of increased sex partners in younger students, with ages 30 years and older significantly less likely to have sexual encounters with more than one male partner (OR=.09, *p*=.03).	Strengths: Participants randomly chosen, limiting selection bias. Consistent findings and results clearly depicted in tables. Survey instruments devised based on previously tested, reliable tools. Weaknesses: Majority of sample African American and takes place in urban area increased undercoverage bias, limiting generalizabilty to this population. Social desirability bias a concern related to the survey. Recall bias may have occurred as participants were asked about their past. Small sample size increase room for sampling error.	III	A
Lyles et al.(2007)	18 articles from 2000-2004, retrieved from EMBASE, MEDLINE, PsycINFO, and SocioFile Databases that focused on behavioral interventions	Systematic Review	Objective: To highlight best-evidence interventions for HIV-risk reduction. Results: Increased condom use and reduction in behavioral risk factors, including number of sexual partners, injection drug use, and limiting episodes of unprotected intercourse are educational components that are effective in improving sexual health. Technical skill building (i.e. condom use), and enhancement of personal and interpersonal skills (i.e. communication, stress management) were prevalent tactics to effectively educate participants. Individual intervention efforts need to be tailored to meet the community's needs.	Strengths: Researchers underscore the notion that effective STI prevention programs are geared towards meeting the needs of the target population. Rigorous appraisal of studies carried out by researchers. Consistent results with adequate number of well designed studies included. Weaknesses: Only 8 of the interventions had women as the only participants. Interventions were not prioritized according to effectiveness and cost-effectiveness was not analyzed. Some of the studies included did not report clear hypotheses; therefore outcomes could not be associated with findings. Samples not limited to college-aged participants	IV	A

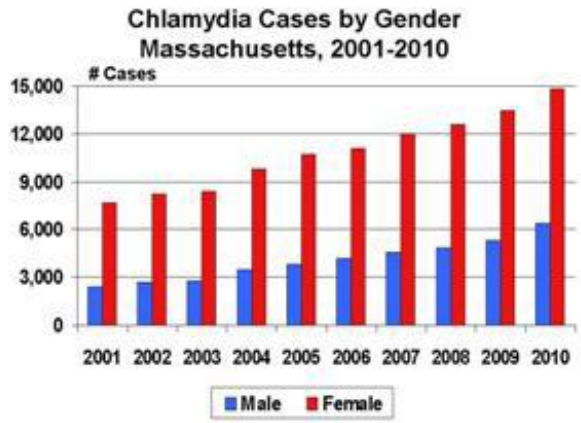
Citation	Sample and Location Research/ Study was Performed	Design	Outcomes/Results of the Intervention and/or Objectives of the Study	Strengths and Weaknesses	*Evidence Level	Class
Kanekar & Sharma (2010)	11 articles from 1990-2010 retrieved from CINAHL, MEDLINE, ERIC, Academic Search Premier, Scopus, Web of Science, and Social Sciences Citation Index Databases	Systematic Review	Objectives: To retrieve studies that address sexual behaviors and safer sex in college students. Results: 5 of the 11 studies (45%) centered on informational education and increasing motivational and behavioral skills in relation to risk reduction behaviors among college students.	Strengths: Well-defined, reproducible search strategy used. Effect size was calculated for each study. Prior research demonstrates an information-motivation-behavioral (IMB) skills approach as valid and can be applied across diverse populations and in cross-cultural settings. Weaknesses: Some of the studies included date back to 1990, therefore may not be relevant in today's society. Not all of the interventions contained were theory-based.	IV	A
Lewis et al. (2010)	623 students with mean age 21 years from the University of Washington	Non-Experimental, Relational	Objective: To determine the relationship among condom use at global and local events and approaches to condom-related protective behaviors. Results: Increased condom use reported among college students who more frequently used condom-related protective behaviors. Intentions and perceiving control over behavior are predictors of sexual behavior. Active (i.e. buying, carrying, and discussion condom use) and mental planning are associated with condom use at global and event levels.	Strengths: Speaks to target population of college students. Sufficient sample size used. Hypotheses are clearly outlined. Analyzed and compared global-level data. Sample randomly chosen from registrar's office to limit selection bias. Weaknesses: Sample not limited to women, 57.8% female participants. Self-report on surveys used for data collection raising risk of social desirability and threat of disclosure bias	III	A
Buhi et al. (2012)	44,165 single undergraduate college students, aged 18-24 years	Non-Experimental Secondary Analysis of Quantitative data, using the 2007 ACHA-NCHA	Objective: To explore sexual health disparities among Blacks and Whites across U.S. college students. Results: Whites less likely to use condoms and be tested for HIV than Blacks, meanwhile Blacks had greater number of sexual partners, reduced use of oral contraceptives, and greater rates of STIs and unintended pregnancies. Highlight the need for theory-driven, targeted sexual health interventions on campus.	Strengths: Results consistent with findings of previous national studies. Large national data set used as sample. Based on comprehensive literature review with scientific evidence. Weaknesses: Self-report bias a concern with use of survey. Target population not limited to women, however 64% females. With 94.7% white participants concern for homogeneous bias.	III	B

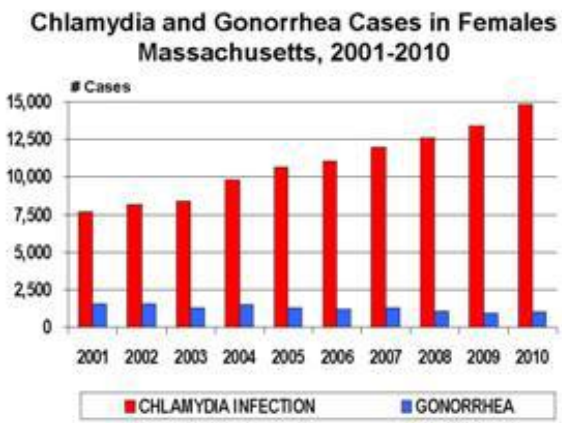
Citation	Sample and Location Research/Study Was Performed	Design	Outcomes/Results of the Intervention and/or Objectives of the Study	Strengths and Weaknesses	*Evidence Level	Class
Kooyman, Pierce, & Zavadil (2011)	Research focusing on feminism, psychological development, and STI prevention in college women	Literature Review	Objective: Examine correlation between identity development and casual sex in college women. Results: Literature suggests that casual sexual encounters among college women can negatively impact identity development. Changes on societal views on accepted gender norms cause women to take on more masculine behaviors. College-aged women are faced with battle of indentifying with oneself in the intimacy versus isolation phase while attempting to fulfill social norms of the college environment. Perceptions of peers' sexual behaviors and the need to coincide with other values, can lead to increased sexual encounters and unprotected sex.	Strengths: Offers theory-based understanding of college women's sexual behaviors. Research focused on primary target population of college women. Provides current recommendations for interventions that can be carried out across other college settings. Weaknesses: Methods of retrieval of information not available (number of articles, search engine utilized). Limitations not disclosed.	V	C
Moore, Smith, & Folsom (2012)	302 students aged 19-24 years attending University of Missouri-Kansas City	Experimental, F.O.R.E Play (Facts, Open Communication, Responsibility, Enjoyment) Intervention	Objective: Reveal college students preferences for modes of sexual education and seek out the most effective brief interventions among this population. Results: When educated on general knowledge about STIs and measures to prevent transmission while placing emphasis on self-efficacy enhanced sexual health knowledge was noted among college students, (t=-14.3, p<.001) and improved self efficacy (t=-5.386, p<.001). Preference for inclusion of real-life situations, discussion, and supplemental pictures when learning about sexual health.	Strengths: Random sampling used to assign participants to intervention group. Sufficient sample size. Offers insight for effectiveness of brief (<50 minute) interventions. Results consistent with other research on behavioral health interventions. Baseline information obtained prior to intervention. Extensive literature review with supporting evidence provided. Definitive conclusions drawn. Weaknesses: Study not exclusive to women. Time spent by each participant in web-site intervention not obtained, therefore cannot be related to information retained. Conducted at one location, limiting generalizabilty across all college settings.	I	A

Citation	Sample and Location Research/Study Was Performed	Design	Outcomes/Results of the Intervention and/or Objectives of the Study	Strengths and Weaknesses	*Evidence Level	Class
Ingersoll, Ceperich, Nettleman, & Johnson (2008)	2,012 women ages 18-24 years attending Southeastern Urban University	Non-Experimental Descriptive & Relational	Objectives: To unveil rates of risk drinking, ineffective condom use, and ineffective contraception in women. Also, to determine the association among ineffective contraception and condom use and behaviors. Results: 73% (n=1472) of sexually active women risky drinkers in comparison to 62% (n=350) whom were both not risky drinkers and abstained from sexually activity (p<0.0001). A linear association was also demonstrated with greater number of alcoholic beverages and binge drinking in relation to ineffective condom use, with 44% of participants reporting both factors (OR=1.7).	Strengths: Results depicted clearly and organized. Self-reported data similar to that of other surveys across this population. Focused on only target population of college women. Sufficient sample size used. Weaknesses: Voluntary surveys completed by participants, therefore concern for response bias. Results may be an underestimate since classified binge-drinking as 5 drinks/occasion, not 4/occasion as proposed by others. Convenience sample used from one setting so may not be generalized to all college settings.	III	A
Stupiasky et al. (2009)	170 women with mean age 21 years attending Indiana University-Bloomington	Non-Experimental Descriptive & Relational	Objective: To determine relationship between sexual behaviors of college women and sexual compulsivity. Results: Sexual compulsivity contributes to a higher number of prior lifetime sexual partners and influences sexual intentions and behaviors. Women characterized as higher in sexual compulsivity were four times more likely to have engaged in vaginal intercourse within the past 30 days (OR=4.64) as well as express intent to have sexual interactions during a future school-based event (OR=4.58) with a non-relationship partner than those who did not possess as many compulsive qualities.	Strengths: Results clearly portrayed in charts and discussed in organized manner by variables. Findings consistent with other research on sexual compulsivity. Based on comprehensive literature review with supporting evidence. Weaknesses: Room for volunteer bias, since participants volunteered to participated and offered potential to win a cash gift card reward. Internet-survey used to collect data therefore concern for response bias. Population homogenous so findings may not be generalized to other college settings.	III	B

Appendix B

Chlamydia Cases by Gender & Chlamydia & Gonorrhea Cases in Women in MA, 2001-2010, MDPH (2010)

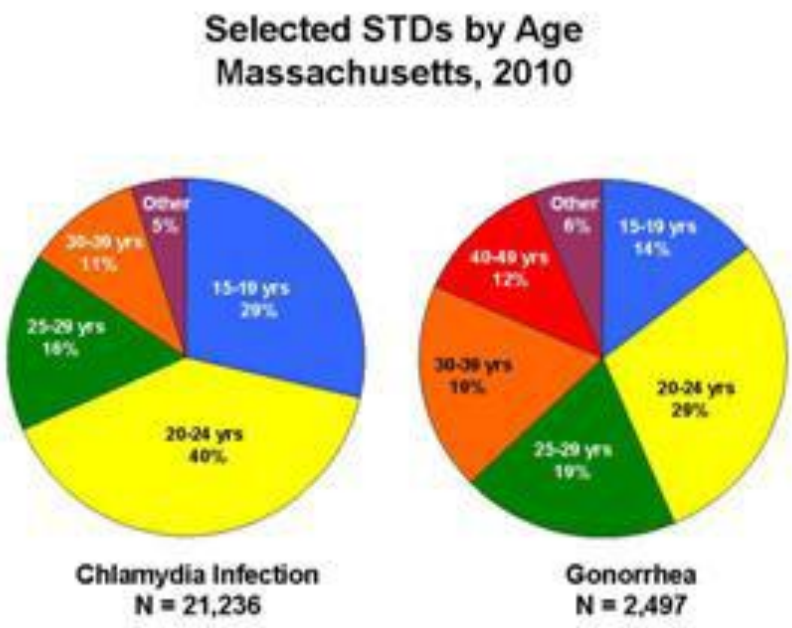




From MDPH: http://www.mass.gov/eohhs/docs/dph/cdc/aids/std-surveillance-2010.pdf

Appendix C

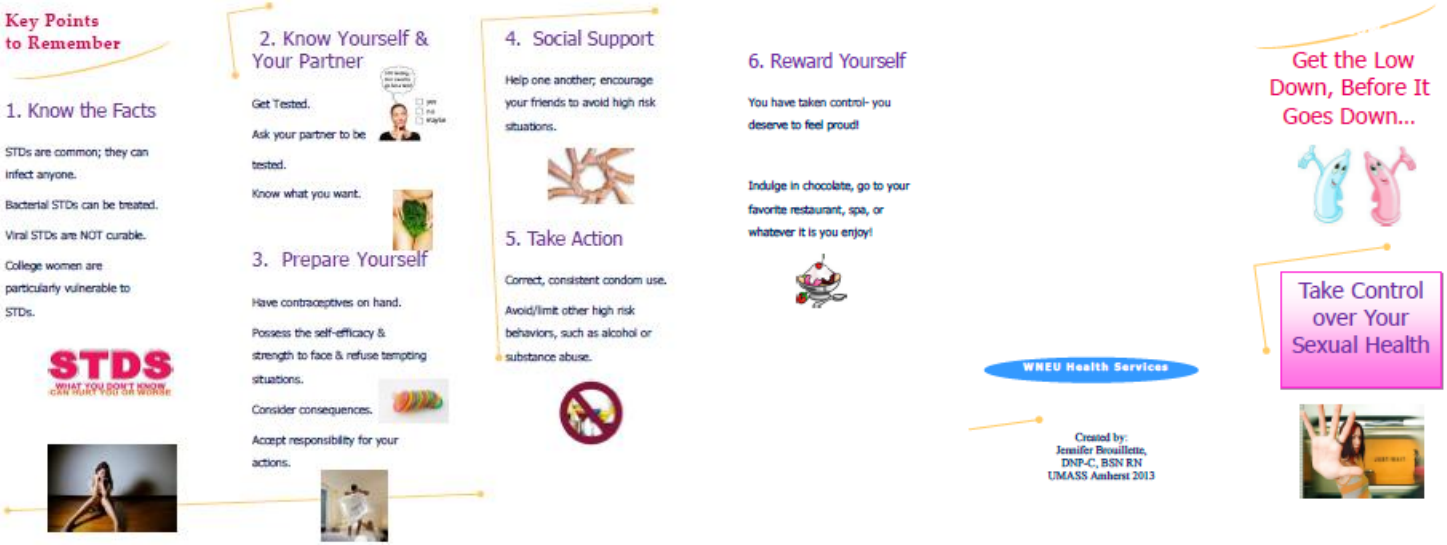
STDs by Age in MA, 2010 (MDPH, 2010)



From MDPH: http://www.mass.gov/eohhs/docs/dph/cdc/aids/std-surveillance-2010.pdf

Appendix D

Brochure: Get the Low Down, Before It Goes Down



Key Points to Remember

1. Know the Facts

STDs are common; they can infect anyone.

Bacterial STDs can be treated.

Viral STDs are NOT curable.

College women are particularly vulnerable to STDs.

STDS

WHAT YOU DON'T KNOW CAN HURT YOU OR WORSE

2. Know Yourself & Your Partner

Get Tested.

Ask your partner to be tested.

Know what you want.

3. Prepare Yourself

Have contraceptives on hand.

Possess the self-efficacy & strength to face & refuse tempting situations.

Consider consequences.

Accept responsibility for your actions.

4. Social Support

Help one another; encourage your friends to avoid high risk situations.

5. Take Action

Correct, consistent condom use.

Avoid/limit other high risk behaviors, such as alcohol or substance abuse.

6. Reward Yourself

You have taken control- you deserve to feel proud!

Indulge in chocolate, go to your favorite restaurant, spa, or whatever it is you enjoy!

WNEU Health Services

Created by:
Jennifer Brouillette,
DNP-C, BSN RN
UMASS Amherst 2013

Get the Low Down, Before It Goes Down...

Take Control over Your Sexual Health

Appendix E

Handout: CDC, STIs in Women (2011)

CDC FACT SHEET

10 Ways STDs Impact Women Differently from Men

Sexually transmitted diseases (STDs) remain a major public health challenge in the U.S., especially among women, who disproportionately bear the long-term consequences of STDs. For example, each year untreated STDs cause infertility in at least 24,000 women in the U.S., and untreated syphilis in pregnant women results in infant death in up to 40 percent of cases. Testing and treatment are keys to reducing disease and infertility associated with undiagnosed STDs.

Why are women so severely affected by STDs? Below are 10 ways STDs impact women differently from men.

1 A woman's anatomy can place her at a unique risk for STD infection, compared to a man.

- The lining of the vagina is thinner and more delicate than the skin on a penis, so it's easier for bacteria and viruses to penetrate
- The vagina is a good environment (moist) for bacteria to grow

2 Women are less likely to have symptoms of common STDs — such as chlamydia and gonorrhea — compared to men.

- If symptoms do occur, they can go away even though the infection may remain

3 Women are more likely to confuse symptoms of an STD for something else.

- Women often have normal discharge or think that burning/itching is related to a yeast infection
- Men usually notice symptoms like discharge because it is unusual

4 Women may not see symptoms as easily as men.

- Genital ulcers (like from herpes or syphilis) can occur in the vagina and may not be easily visible, while men may be more likely to notice sores on their penis

5 STDs can lead to serious health complications and affect a woman's future reproductive plans.

- Untreated STDs can lead to pelvic inflammatory disease, which can result in infertility and ectopic pregnancy
- Chlamydia (one of the most common STDs) results in few complications in men

6 Women who are pregnant can pass STDs to their babies.

- Genital herpes, syphilis and HIV can be passed to babies during pregnancy and at delivery
- The harmful effects of STDs in babies may include stillbirth (a baby that is born dead), low birth weight (less than five pounds), brain damage, blindness and deafness

7 Human papillomavirus (HPV) is the most common sexually transmitted infection in women, and is the main cause of cervical cancer.

- While HPV is also very common in men, most do not develop any serious health problems

The Good News

8 Women typically see their doctor more often than men. Women should use this time with their doctor as an opportunity to ask for STD testing, and not assume STD testing is part of their annual exam. While the Pap test screens for cervical cancer, it is not a good test for other types of cancer or STDs.

9 There is a vaccine to prevent HPV; and available treatments for other STDs can prevent serious health consequences, such as infertility, if diagnosed and treated early.

10 There are resources available for women to learn more about actions they can take to protect themselves and their partners from STDs, and where to receive testing and treatment.

- **Healthcare providers** — A doctor or physician can provide patient-specific information about STD prevention, protection and tests
- **1-800-CDC-INFO (232-4636)** — Operators can provide information about local STD testing sites and put callers in touch with trained professionals to answer questions about STDs
- **FindSTDTest.org** — This website provides users with locations for HIV and STD testing and STD vaccines around the United States
- **www.cdc.gov/std** — CDC's website includes comprehensive information about STDs, including fact sheets on STDs and Pregnancy (www.cdc.gov/std/pregnancy) and STDs and Infertility (www.cdc.gov/std/infertility)

APRIL 2011

Appendix F

Pre-Test: General STI Knowledge & Perceived Risk of STI Survey

(Choose one response: True or False)

1. To best of knowledge, all STIs are curable.
   1 –True O 2-False O

2. STIs can be without symptoms.
   1 –True O 2-False O

3. If left untreated, STIs can negatively affect a woman's reproductive health.
   1 –True O 2-False O

4. If you are pregnant there is no need to use condoms.
   1 –True O 2-False O

5. You don't have to use a condom for protection if you are in a relationship with just one person, even if that person had sex without a condom with other people before.
   1 –True O 2-False O

6. It's more important to use condoms in one-night stands and flings than in real relationships.
   1 –True O 2-False O

7. If you know a person's sexual history and lifestyle before you have sex with them, you do not need to use condoms.
   1 –True O 2-False O

8. Having a STI makes a person more vulnerable to being infected with HIV or AIDS.
   1 –True O 2-False O

9. STIs can be spread by sharing tableware, toilet, or bathtub.
   1 –True O 2-False O

10. Alcohol or other substances can influence decisions related to sex and use of contraceptives.
1 –True O 2-False O

Adapted with permission from:

Harvey, S.H. & Henderson, J.T. (2006). Correlates of condom use intentions and behaviors among a community-based sample of Latino men in Los Angeles. *Journal of Urban Health*, 83(4), 558–574. doi: 10.1007/s11524-006-9064-3.

The Henry J. Kaiser Family Foundation. (1996). *The Kaiser survey on public knowledge and attitudes about STDs other than AIDS*. Retrieved from: http://www.kff.org/youthhivstds/1206-stdtop.cfm

Perceived Risk of Sexually Transmitted Infection (STI) Behavior Survey

Please bubble the most appropriate response to the following questions:

1. How often do you worry about getting a sexually transmitted infection?
1 -Never O 2-RareIy O 3.Sometimes O 4-Most of the time O

2. How would you rate how worried you are about getting a sexually transmitted infection?
1 –Not at all O 2-Somewhat O 3-Moderately O 4-Very O

3. Thinking about getting a sexually transmitted infection makes me feel upset and frightened.
1-Strongly disagree O 2-Disagree O 3-Neither O 4-Agree O 5-Strongly Agree O

4. What do you think the chances are of a woman getting a sexually transmitted infection?
l-Very unlikely O 2-Somewhat unlikely O 3-Uncertain O 4-Somewhat likely O 5-Very likely O

5. What do you think your chances are of getting a sexually transmitted infection?
l-Very unlikely O 2-Somewhat unlikely O 3-Uncertain O 4-Somewhat likely O 5-Very likely O

Adapted with permission from: Johnson-Mallard, V. (2005). The effects of an education/behavioral intervention on knowledge, perceived risk, and self efficacy in women. *Theses and Dissertations.* Paper 2944. http://scholarcommons.usf.edu/etd/2944

Appendix G

Post-Test: General STI Knowledge & Perceived Risk of STI Survey & Condom Use Intent

(Choose one response: True or False)

1. To best of knowledge, all STIs are curable.
   1 –True O 2-False O

2. STIs can be without symptoms.
   1 –True O 2-False O

3. If left untreated, STIs can negatively affect a woman's reproductive health.
   1 –True O 2-False O

4. If you are pregnant there is no need to use condoms.
   1 –True O 2-False O

5. You don't have to use a condom for protection if you are in a relationship with just one person, even if that person had sex without a condom with other people before.
   1 –True O 2-False O

6. It's more important to use condoms in one-night stands and flings than in real relationships.
   1 –True O 2-False O

7. If you know a person's sexual history and lifestyle before you have sex with them, you do not need to use condoms.
   1 –True O 2-False O

8. Having a STI makes a person more vulnerable to being infected with HIV or AIDS.
   1 –True O 2-False O

9. STIs can be spread by sharing tableware, toilet, or bathtub.
   1 –True O 2-False O

10. Alcohol or other substances can influence decisions related to sex and use of contraceptives.
1 –True O 2-False O

Adapted with permission from:

Harvey, S.H. & Henderson, J.T. (2006). Correlates of condom use intentions and behaviors among a community-based sample of Latino men in Los Angeles. *Journal of Urban Health*, 83(4), 558–574. doi: 10.1007/s11524-006-9064-3.

The Henry J. Kaiser Family Foundation. (1996). *The Kaiser survey on public knowledge and attitudes about STDs other than AIDS*. Retrieved from: http://www.kff.org/youthhivstds/1206-stdtop.cfm

Perceived Risk of Sexually Transmitted Infection (STI) Behavior Survey

Please bubble the most appropriate response to the following questions:

1. How often do you worry about getting a sexually transmitted infection?
1 -Never O 2-RareIy O 3.Sometimes O 4-Most of the time O

2. How would you rate how worried you are about getting a sexually transmitted infection?
1 –Not at all O 2-Somewhat O 3-Moderately O 4-Very O

3. Thinking about getting a sexually transmitted infection makes me feel upset and frightened.
1-Strongly disagree O 2-Disagree O 3-Neither O 4-Agree O 5-Strongly Agree O

4. What do you think the chances are of a woman getting a sexually transmitted infection?
l-Very unlikely O 2-Somewhat unlikely O 3-Uncertain O 4-Somewhat likely O 5-Very likely O

5. What do you think your chances are of getting a sexually transmitted infection?
l-Very unlikely O 2-Somewhat unlikely O 3-Uncertain O 4-Somewhat likely O 5-Very likely O

Adapted with permission from:

Johnson-Mallard, V. (2005). The effects of an education/behavioral intervention on knowledge, perceived risk, and self efficacy in women. *Theses and Dissertations.* Paper 2944. http://scholarcommons.usf.edu/etd/2944

Condom Use Intent

1. When you had sex, how often did you use condoms in the past 30 days?

   NEVER ALMOST NEVER SOMETIMES ALMOST EVERY TIME EVERY TIME

2. For how long have you been using condoms every time?

   LESS THAN 6 MONTHS 6 MONTHS OR MORE

3. Are you considering starting to use condoms every time for the next 6 months?

   YES NO

4. Are you planning to start using condoms every time within the next 30 days?

   YES NO

Adapted with permission from:

Brown-Peterside P., Redding, C.A., Ren, L., & Koblin, B.A. (2000). Acceptability of a stage-matched expert system intervention to increase condom use among women at high risk of HIV infection in New York City. *AIDS Education and Prevention*, 12(2), 171-181. Retrieved from: http://www.uri.edu/research/cprc/Measures/HIVSafeSex03.htm