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DEMOGRAPHIC FACTORS ASSOCIATED WITH CONDOM USE IN 18-24 YEAR OLDS FOR TWO STATES, 1998 AND 2000/2001

by
KIMBERLY R. GLENN
B.S., JAMES MADISON UNIVERSITY

A Thesis Submitted to the Graduate Faculty
of Georgia State University in Partial Fulfillment
of the
Requirements for the Degree
MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA

APPROVAL PAGE

THE FACTORS ASSOCIATED WITH CONDOM USE IN 18-24 YEAR OLDS FOR TWO STATES, 1998 AND 2000/2001

by

KIMBERLY R. GLENN

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DEDICATION PAGE

The following thesis document is dedicated to all of my family who did not have the opportunity to obtain a formal education, but who paved the way for my success. Your strength and pride reside within me.

ACKNOWLEDGEMENTS

Nothing in my life, including the completion of this thesis, would have been possible without God, the Divine Spirit and Savior. I would like to thank my parents, sister, niece, best friend and sorors for all of their support and love. Last, but not least, I would like to acknowledge my dedicated thesis committee, Ike S Okosun, MS, MPH, PhD, FRIPH, FRSH, Valerie Hepburn, PhD, MPA, and Karen Gieseker, PhD, MS for their help and trust throughout this thesis. Additionally, I would like to thank my fellow Institute of Public Health graduate students for supporting and believing in me.

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DEMOGRAPHIC ASSOCIATED WITH CONDOM USE IN 18-24 YEAR OLDS IN TWO STATES, 1998 AND 2000/2001

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ABSTRACT

Background: Despite knowledge about the transmission of HIV and other sexually transmitted diseases (STDs), young adults continue to participate in sexual risk behaviors such as unprotected sexual intercourse. This study examines factors that influence condom use in adults aged 18-24 years in the United States.
Methods: Using secondary data from the 1998, 2000, and 2001 Behavioral Risk Factor Surveillance System (BRFSS), univariate and multivariate analyses were conducted to assess the factors influencing condom use stratified by gender and study year. A p-value of <0.05 and 95% confidence intervals were used to determine statistical significance throughout all analysis performed.
Results: Univariate analysis found that increased age and being male were associated with increased odds of condom use. Multivariate analysis stratified by study year found that in 1998 increased age and unemployment was associated with increased odds of condom use. In 2000/2001, increased age was the only factor associated with increased odds of condom use. Being female was associated with decreased odds of condom use in that study year. When stratified by gender, only increased age was associated with increased condom use.
Conclusions: The study results suggest that the factors influencing condom use vary between gender and year. Since different factors impact condom use for each gender, the interventions designed to increase condom use must be centered on those factors. Since age was one of the consistent factors positively associated with condom use, interventions must begin earlier to affect the decision-making processes of young adults.

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Chapter I

INTRODUCTION

In 1999, nearly one million Americans were infected with HIV, of which 35% were infected through heterosexual transmission. Estimates from CDC indicate that 5 million cases of other sexually transmitted diseases occur annually (CDC, 1999). Although abstinence is the best method of protection against sexually transmitted diseases (STDs), HIV infection and unwanted pregnancy, many investigators advocate for condom use as one of the best methods for protection. Condoms are highly effective against HIV and most STDs, as well as unintended pregnancies. Studies show that the prevalence of STDs and HIV transmission is lower in populations that consistently use condoms compared to those that do not. Despite the general knowledge about the risks associated with unprotected sexual intercourse and the mass availability of condoms in the United States, many Americans do not use condoms on consistent basis.

Young adults, minorities, and females represent populations that are inconsistent in the use of condoms. Indeed, evidence of this risky sexual behavior may be associated with increasing rates of STD and HIV infections. Originally perceived as a low-risk population for HIV infection based on previous studies performed over 15 years ago, nearly half of all new HIV infections occurred in individuals under 25 years of age (CDC, 1999, 2003; Hightow et al., 2005). Even though the incidence of HIV in young adults is high, a large proportion of young adults have never been tested for HIV. Thus indicating that the actual incidence of HIV infection in this group may be much higher than what is generally reported (Keller, 1993).

Although initiatives such as the United States' *Healthy People 2010* target safer sexual behaviors to reduce adolescents' and young adults' risk for unintended pregnancies, and sexually transmitted diseases (STDs), including HIV/AIDS, many in this population continue to engage in behaviors that place them at risk, such as unprotected sex (Chambers & Lynn, 2003). Young adults are especially at-risk of infection with HIV and other STDs because they often practice unprotected sex. It has been reported that these young adults often have the perception of normative behaviors, perception of invincibility, lack of tangible consequences, and the inability to make healthy decisions (Thompson, Kyle, Swan, Thomas, & Vrungos, 2002).

Sexual risk behavior research, and the interventions based on that research, struggle to comprehend the factors associated with condom use in the young adult population. Current and previous interventions are mainly gender-specific and focus on certain age groups. Other interventions attempt to use behavior change models like the Health Belief Model and the Transtheorectical Model of Behavior Change in order to eliminate barriers to healthy sexual behaviors, such as consistent condom use, and increase intrinsic motivation. Hence, understanding factors that are associated with condom use is critical in designing appropriate and successful intervention models.

Purpose of Study:

The purpose of this study was to examine the impact of varying factors on condom use in young adults aged 18-24 years for two states in the U.S. Previous studies have evaluated condom use in young adults mainly on the basis of gender and ethnicity or included other sexual risk behaviors in the analysis alongside condom use. This study will assess the impact of these potential risk factors on condom use in two study periods,

and among males and females in those study periods that influence condom use. In this study the following research questions will be answered: 1) Did rates of condom use increased between the 1998 and 2000/2001 study periods?, 2) Overall, was there a significant difference between condom use in males and females?, 3) Were the factors that influenced condom use in 1998 the same in the 2000/2001 study period?, 4) Were the factors that influenced condom use in males the same as those that influenced condom use in females?, 5) Were the factors that influenced condom use in males in 1998 the same factors that influenced condom use in males in 2000/2001?, and 6) Were the factors that influenced condom use in females in 1998 the same factors that influenced condom use in females in 2000/2001?

Study Hypotheses:

Hypothesis #1: Condom use increased in 2000/2001 compared to 1998.

Null Hypothesis #1: There is no difference in condom use between 1998 and 2000/2001.

Hypothesis #2: Condom users were more likely to be male than female.

Null Hypothesis #2: Males and females are equally as likely to use condoms.

Hypothesis #3: Different factors impact condom use in 1998 than in 2000/2001.

Null Hypothesis #3: There is no difference between the factors that impact condom use in 1998 and those that impact condom use in 2000/2001.

Hypothesis #4: The factors that influence condom use in males are different than those that influence condom use in females.

Null Hypothesis #4: The factors that influence condom use in males are the same as those that influence condom use in females.

Hypothesis #5: Males in 1998 were influenced by different factors for condom use than males in 2000/2001.

Null Hypothesis #5: Males in 1998 were influenced by the same factors for condom use as males in 2000/2001.

Hypothesis #6: Females in 1998 were influenced by different factors for condom use than females in 2000/2001.

Null Hypothesis #6: Females in 1998 were influenced by the same factors for condom use as females in 2000/2001.

CHAPTER II

REVIEW OF LITERATURE

Factors ranging from perception to self-esteem to accessibility have impacts on condom use for young adults. While many factors exist, much of the literature reflects significant influence from demographic aspects. The literature reviewed for this study focused on demographic factors, including issues surrounding their impact on condom use in at risk youths and young adults.

AGE

In 2003, over half of all new HIV infections occurred in individuals under the age of 25 (CDC, 2003). Historically, college students have not been perceived as at risk for HIV infection based on previous studies performed over 15 years ago (Hightow et al., 2005). While substantial progress has been made in preventing, diagnosing, and treating certain STDs in recent years, CDC estimates that 19 million new infections occur each year, almost half of them among young people ages 15 to 24. In addition to the physical and psychological consequences of STDs, these diseases also exact a tremendous economic toll. Direct medical costs associated with STDs in the United States are estimated at up to $14.1 billion annually (CDC, 2006). Condom use, as shown in previous research, is a widely advocated method for prevention of STD transmission (Anderson, Wilson, Doll, Jones, & Barker, 1999). Condom use by young adults could significantly inhibit the spread of HIV and other STDs. Condom use based on age has been consistently found to be higher among younger adults compared to older adults.

However, research on the finding of the 1997 Behavioral Risk Factor Surveillance System (BRFSS) showed that the younger age groups had the highest prevalence of HIV high-risk factors and perceived themselves at high to medium risk for HIV compared to older age groups (Holtzman, Bland, Lansky, & Mack, 2001). The same study found that as age increased, the prevalence of condom use decreased. The 1998 Youth Risk Behavior Surveillance survey found that males in grade 9 were significantly more likely than male students in grade 12 to report condom use. This translates into younger students using condoms at higher rates, which is consistent with other research studies (Grunbaum et al., 1999).

Partner age has also been shown to affect condom use. The older the partner and the older the participant, the lower the relative frequency of condom use. Our results also indicate that many younger African-American females are in relationships with older males. Risky behavior may increase for young women engaging in intimate relations with older partners, because they may lack effective sexual negotiation skills or possess insufficient power or both within the sexual relationship (Bralock & Koniak-Griffin, 2007).

Recent condom use, although of great significance, is not the only predictor of future condom use. Adolescents who use condoms at their sexual debut used condoms later on in older adolescents at substantially higher rates than did adolescents who did not use condoms at their debut, even after seven years. Related to the increased condom use, those who used condoms at their sexual debut were less likely to test positive for Chlamydia or gonorrhea (Shafii, Stovel, & Holmes, 2007).

The decision-making process matures for young adults as they age (Thompson, Kyle, Swan, Thomas, & Vrungos, 2002) and can also be affected by the level of educational attainment (Fisher, Misovich, Kimble, Fisher, & Malloy, 1996). Fisher et al. acknowledged that those who had some college education were more likely to be motivated toward healthy sexual behaviors (1996). Understanding the decision-making process over the span of young adulthood could provide evidence for earlier interventions that encourage development of positive decision-making.

Studies suggest that adolescents and young adults may not be capable of competent decision-making due to perceptions of invulnerability to consequences (Rolison & Scherman, 2003) and perceptions of normality (Martens et al., 2006). Older adolescents (i.e. college students) tend to judge themselves as being at less-than-average risk and as having control over negative events. The perception of risk, benefit, and consequence was important in the decision-making process for this population. Rolison & Scherman defined risk perception as "an individual's assessment of the probability of loss associated with a given action (or inaction)" (2003). College students perceived an inverse correlation between perceived risks and actual risk-taking, and a positive correlation between perceived benefits and actual risk-taking (Lavery, Siegel, Cousins, & Rubovits, 1993). Parson, Halkitis, Bimbi & Borowski asserted that this population was more likely to have experienced the benefits of risk behaviors such as unprotected sex personally, and not the costs. Following that belief, college students engaged in risk-taking behaviors and primarily based the decision to do so on past experienced benefits.

GENDER

Rates of condom use have consistently been found to be lower in females in comparison to males. The 1997 BRFSS found that men were more likely than women (29.1% vs.22.8%) to report having used a condom at last intercourse. BRFSS surveys the adult population, but the same trends existed in the adolescent or school-aged population surveyed in the Youth Risk Behavior Surveillance survey (YRBS). In the 1998 YRBS, male students (54.6%) were significantly more likely than female students (36.1%) to report condom use at the time of last intercourse.

In this period of increasing HIV/AIDS prevalence and increasing awareness about sexually transmitted infections, condoms remain the most commonly used disease prevention method. Correct and consistent use of condoms can be highly effective against many STDs, including HIV (Yarber, Graham, Sanders, & Crosby, 2004). Additionally, condom use among males has been shown to have societal savings of $27 per condom for high-risk heterosexual males and more than $530 per condom for men who have sex with men (CDC, 1999). Fortunately, trends showed condom use increased over the past two decades (Anderson, Wilson, Doll, Jones, & Barker, 1999; Shafii, Stovel, & Holmes, 2007).

Sexually transmitted diseases (STDs) are a common source of adolescent morbidity with serious sequelae especially among women (DiClemente et al., 2005). Females are consistently disproportionately represented in the incidence rate of STDs (Chambers & Lynn, 2003). Young women are at an elevated risk for acquiring STDs and HIV compared to young men behaviorally and biologically. Behaviorally, they are more likely to have sexual partners who are older or drug users. Biologically, they are more

susceptible to STDs and HIV due to cervical ectopy and have more frequent and often serious disease complications. For example, Chlamydia has significantly increased within the young adult population. In 2005, females aged 15 to 19 had the highest Chlamydia rate, followed by females aged 20 to 24, which emphasizes the impact unprotected sex and other risk factors have on young adults in the U.S. Similarly, gonorrhea rates were highest among 20 to 24 year olds, but impacted males in this age group disproportionately. African-American women were disproportionately represented in the number of young females infected with Chlamydia and gonorrhea (CDC, 2006).

In addition to HIV and STDs, unintended pregnancy is seen as a negative outcome for females in this age group. Unintended pregnancies are associated with emotional, physical, mental, and financial problems. The cost of raising one child is estimated at nearly $400,000 (Handley, 2004). Annually, the federal government alone spends about $9 billion on unintended pregnancies in the form of social programs, welfare, and other financial aid (Hoffman, 2006). The United States still has the highest rate of adolescent pregnancies in the industrialized world (Chambers & Lynn, 2003). In 2001 an estimated 3.1 million unintended pregnancies accounted for nearly half (49%) of all pregnancies in the United States. The rate of unintended pregnancy was highest among females aged 18-24 in the same study (twice that of the overall female population) (Finer & Henshaw, 2006).

Young females can be at a higher risk of STDs and unintended pregnancy due to an eagerness to be in and maintain a long-term relationship. Condom use was much lower among those within ongoing relationships versus those within casual relationships

(18.7% vs. 62.1%) (Anderson, Wilson, Doll, Jones, & Barker, 1999). Researchers correlated not using a condom with trust, being in a long-term relationship and the use of oral contraception (Anderson, Wilson, Doll, Jones, & Barker, 1999; Gullette & Lyons, 2006; Patel, Gutnik, Yoskowitz, O'Sullivan, & Kaufman, 2006). Oral contraception was often chosen by those in long-term relationships even when condom use may be needed (i.e. respondent or respondent's partner was at high-risk) (Mosher, Martinez, Chandra, Abma, & Willson, 2004).

Adolescent women are likely to switch from condoms to oral contraceptives within the context of a serious sexual relationship and over the course of their sexual careers. Only one in six adolescent women uses both condoms and other contraceptives. Risks for unintended pregnancy are greater with typical condom use over the course of one year (15%) than for typical oral contraceptive use (5%) (Chambers & Lynn, 2003). The majority of females in a previous study used contraceptives for either pregnancy prevention, or pregnancy and disease prevention rather than for disease prevention alone (Mosher, Martinez, Chandra, Abma, & Willson, 2004). For this reason, females may trade off disease prevention for pregnancy prevention. Most persons in an ongoing relationship perceive monogamy and trust; profoundly abating concern about existing or future infections.

Reliance on trust and monogamy is an issue in relation with infection, as seen in Patel et al.'s study, when the identification with monogamy is different between the sexes. Patel et al. examined patterns of condom use among a population of 81 students aged 18-24 years on the campus of Brooklyn College in New York. Of that population, 90% of women reported being in a monogamous relationship, whereas most men reported being

in non-monogamous or casual relationships (60%) (Patel, Gutnik, Yoskowitz, O'Sullivan, & Kaufman, 2006).

Condom use can be affected by partner influence and motivation toward condom use. Females are highly affected by partner opinion and their partner's motivation toward condom use (Chambers & Lynn, 2003). Yarber and associates detected an increased odds for breakage/slippage if the partner was not highly motivated to use condoms (OR = 1.87, 95% CI = 1.18-2.94, $P \leq 0.007$). Condom breakage/slippage considerably increases the probability of exposure to an STD (Yarber, Graham, Sanders, & Crosby, 2004). Smith (2003) believed partner influence affected motivation, frequency of use, and comfort with the negotiation of condom use. Gender differences were substantial in the area of partner influence because the male is seen as the one who has the power to control whether or not a condom is used. For the woman to have control over condom use, the woman must have what was described as "sexual power". Studies show women to define "sexual power" as the expectation that the male partner would not get angry, violent, or refuse to have sex if the woman requested condom use (Smith, 2003). Sexual power, perceived control over condom use, perceived influence over partners' condom use, and having a partner who did not resist condom use were all linked to higher levels of condom use.

Retention of power over condom use and sexual decision making has indications across racial groups as well. Low-income, minority women often did not express apprehension about raising the issue of condom use with a partner, although researchers believed the fear may possibly still exist (Fullilove, Fullilove, Haynes, & Gross, 1990). Studies focusing on minority women found that measures of resource power, such as

education and employment, were more accurate predictors of condom use than was power in their relationships. Another finding, incongruent to the study by Fullilove et al., asserts that African-American women encounter interpersonal and gender-related power issues that make the practice of consistent condom use a challenge (Bralock & Koniak-Griffin, 2007).

Non-condom use among African-American female students may be explained beyond lacking the ability to effectively negotiate correct condom use. While closely associated, the consistent gender ratio imbalance on college campuses (especially historically Black colleges and universities) may be important to condom use. Ferguson et al. suggested that African-American female students were susceptible to feelings of lower self-esteem and had a lower perceived control over negotiation situations than men due to a "supply and demand" model which existed on the campus. Shortages of available African-American men lead some women to accept not using condoms as a way to satiate the male partner and, eventually, secure a relationship with him. Negotiations, from the perspective of the females, were based on an emotional exchange. Agreeing to non-condom use was given in exchange for an emotional attachment to the male partner (Ferguson, Quinn, Eng, & Sandelowski, 2006).

The decision making model for first-time condom use by adolescents with a new sexual partner is often a series of choices that is heavily influenced by the partner. In this model, the woman must desire to use condoms, then initiate discussions with her partner about condom use, and then actually use condoms. The last step may be the most difficult for the female, as the male partner is responsible for the actual use of the condom, which differentiates this decision process from that to use oral contraceptives.

In addition to partner influence and relationships, perception is essential to the decision-making process. Studies suggested that sex and safer sex decision making is different than other cognitive abilities. The process can be complex and cannot be easily explained by a single model. Several factors that influenced abstinence and contraceptive decision making processes included a) level of cognitive development, b) sexual knowledge, c) social and parental influences, d) perceptions of benefits of condom use, and e) gender difference (Chambers & Lynn, 2003).

A positive decisional outcome in terms of condom use would be reliant on both parties feeling satisfied with the decision to use condoms and entering the sexual situation with suitable overall self-esteem and self-confidence. This finding could prove to be daunting when considering the issue with body image encountered frequently in the adolescent and young adult population. Individuals with high body mass index (BMI), negative body image, and unhealthy weight control behaviors may be more likely to engage in sexual intercourse without contraception than others (Eisenberg, Neumark-Sztainer, & Lust, 2005), thus exposing themselves to STDs and the possibility of an unplanned pregnancy.

RACE/ETHNICITY

African-Americans make up almost half of all AIDS cases reported in the United States and yet are estimated to be only 12% of the total population. From 1999 to 2003, the estimated number of AIDS cases decreased among Whites yet increased among Blacks (Bralock & Koniak-Griffin, 2007). Apparently, since African-Americans are at an increased risk of becoming infected with HIV/AIDS, condom use in this population could significantly decrease exposure.

Most previous research asserted that Blacks, or African-Americans, were more likely than any other racial/ethnic group to report having used a condom at last intercourse (Grunbaum et al., 1999; Holtzman, Bland, Lansky, & Mack, 2001). The racial groups, such as Whites and Hispanics, that used oral contraceptive utilized condoms less (Grunbaum et al., 1999). The increased use of oral contraceptives among White and Hispanic adolescents can have much to do with access to healthcare and the ability to afford oral contraceptives.

Although this group's usage rates are higher, African-Americans were disproportionately represented among those who experienced condom breakage or slippage (Yarber, Graham, Sanders, & Crosby, 2004). African-American males were found in one study to be more likely to have an angry or adverse reaction to the use of condoms with their partner (Johnson et al., 1994). Negative reactions from partner about condom use can discourage the condom use initiation and communication about condom use.

Similarly, another study recognized that more White respondents reported never experiencing unwanted non-condom use due to partner influence than Latino and African-American respondents. However in African-Americans, males reported having sex without a condom due to partner influence more than females (Smith, 2003). The trend for African-American and Latino respondents to experience greater unwanted non-condom use than Whites is significant because these ethnic groups are disproportionately represented among HIV/AIDS cases (Smith, 2003).

SOCIOECONOMIC STATUS

Condom use, and ironically the incidence of HIV and other STDs, tends to be higher among those who are younger, African-American, lower-income and from metropolitan areas (Anderson, Wilson, Doll, Jones, & Barker, 1999; Patel, Gutnik, Yoskowitz, O'Sullivan, & Kaufman, 2006). Socioeconomic inequalities promote exposure risk for females especially. Women who have few economic options (i.e. low-income, unemployed) are far more vulnerable to engaging in transactional sex to pay for food, education-related costs, and other necessities. They are also vulnerable to coercive or forced sex and often have issues with condom negotiation (Bralock & Koniak-Griffin, 2007).

Education and annual income have served as an appropriate proxy for socioeconomic status. Educational attainment correlates to the ability to qualify for higher paying employment and annual income serves to assess the ability to afford and access services. These proxies have been associated with condom use due to the previously mentioned power and negotiation issues (Chatterjee, Hosain, & Williams, 2006). It would seem probable that those who have attained higher levels of education would be more likely to have higher rates of condom use. However, adolescents and young adults tend to engage in unprotected sex despite substantial knowledge regarding the negative consequences associated with their behaviors (Parsons, Halkitis, Bimbi, & Borkowski, 2000). The study by Chatterjee, Hosain, and Williams found that compared to those who had less than a high school education, participants who had completed high school were more likely to consistently use condoms (2006). On the other hand, those who had attained more than a high school diploma were 52% less likely to use condoms

consistently. Those who had an annual income over $20,000 were more likely to use condoms consistently (Chatterjee, Hosain, & Williams, 2006). Therefore, educational level may not be positively associated with condom use but annual income is positively correlated. This may not necessarily mean that education past high school causes less condom use, but it may signal that something transpires after high school either culturally or psychologically that discourages condom use for young adults.

The demographic factors highlighted in this literature review became the concentration of this research study. Focusing on age, race/ethnicity, gender, and socioeconomic status to examine the dynamics for condom use offers the opportunity to start from the basic, often inflexible, traits of an individual and make inferences about their behavior pattern from that point.

CHAPTER III

METHODS AND PROCEDURES

Source of Data:

This study used data from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS, administered and supported by CDC's Behavioral Surveillance Branch, is state-based, random-digit-dialed telephone survey of the civilian, non-institutionalized U.S. population aged ≥ 18 years (BRFSS, 1998; BRFSS, 2000) The objective of the BRFSS is to collect uniform, state-specific data on preventive health practices and risk behaviors that are linked to chronic diseases, injuries, and preventable infectious diseases in the adult population (BRFSS, 1998). These behaviors are presented in the form of modules within the interview. Sexual risk behavior questions appeared among the optional modules in the 1997 survey and included questions on the number of sex partners, condom using during most recent intercourse, and other HIV risk behaviors (MMWR, April 13, 2001).

Research Questions:

This study will examine the factors that influence condom use in 18-24 year olds in 1998 and 2000/2001. In this study, education, employment, income, gender, and ethnicity were all investigated as factors that impact condom use. The research questions are as follows:

1) Did rates of condom use increased between the 1998 and 2000/2001 study periods?

2) Overall, was there a significant difference between condom use in males and females?

3) Were the factors that influenced condom use in 1998 the same in the 2000/2001 study period?

4) Were the factors that influenced condom use in males the same as those that influenced condom use in females?

5) Were the factors that influenced condom use in males in 1998 the same factors that influenced condom use in males in 2000/2001?

6) Were the factors that influenced condom use in females in 1998 the same factors that influenced condom use in females in 2000/2001?

Eligibility Criteria:

The delimitations for this study included age and state. This study only included adults in the United States aged 18 to 24 years old who were interviewed in either Ohio or New Jersey. The 1998 Behavioral Risk Factor Surveillance Survey (BRFSS) included respondents from seven states: Maine, Minnesota, New Jersey, New Mexico, Ohio, Tennessee, and Vermont. The 2000 BRFSS included respondents from Florida, Montana and Ohio and the 2001 BRFSS included respondents from only Delaware and New Jersey. To maintain the comparability of the samples, respondents from New Jersey and Ohio were selected from the 1998, 2000, and 2001 samples. For the purpose of analysis, the 2000 and 2001 samples were combined to create a sample comparable to 1998.

Variables Used in the Study:

In this study, the dependent variable is condom use during last intercourse. The independent variables were educational level, age, gender, race/ethnicity, household income and employment status. To determine condom use, in the BRFSS interviews respondents were asked, "Was a condom used the last time you had sexual intercourse?" Educational level was evaluated by the question, "What is the highest grade or year of school you completed?" Respondents were asked, "Are you currently employed for wages, self-employed, out of work, a homemaker, student, retired, unable to work?", to determine employment status. This question could attract the response of either response or student for those who are students employed for wages. Respondents' household income was assessed as a categorical variable by asking, "Is your annual household income from all sources less than $25,000; less than $20,000; less than $15,000; less than $10,000; less than $35,000; less than $50,000; less than $75,000; $75,000 or more?" Age and race/ethnicity were self-reported responses.

For the purposes of this analysis, the education, employment, race/ethnicity and household income variables were recoded. The education variable was recoded into three responses: less than high school, high school graduate, or greater than high school. The employment status variable was recoded into three variables: employed, unemployed, and student. Race/ethnicity was considered for only three groups: White, Black and Hispanic. Household income was divided into responses which indicated an annual household income under $20,000 and over $20,000. All responses that were excluded due to the recoding methods were not utilized in the analysis.

Assumptions

The following assumptions were made: (a) the interviewers' reported respondents' answers accurately and completely; (b) the respondents' self-reports were honest, accurate, and complete; (c) the accessed data was complete and accurate.

Operational Definitions:

(1) Respondent. The adult from whom information was requested and gathered.

(2) Condom use. Employment of condoms during the last act of sexual intercourse by the respondent or the respondent's sexual partner.

(3) Less than High School Education. The attainment of education during any year from kindergarten to eleventh grade; completed any grade level up to, but not including, twelfth grade.

(4) High School Education. Completed all grades up to and including the twelfth grade, and obtained a certificate of graduation.

(5) College Education. Completed high school and was enrolled as a student in a college or university. Also includes those who have graduated from college.

Statistical Analyses:

The statistical programs available in SPSS v. 15 were used to truncate, organize and analyze the data collected from the BRFSS data files.

Characteristics of the study population were compared by year. The difference between the mean reported age of respondents in 1998 and 2000/2001 was evaluated using an independent t-test for equality of means. Categorical variables such as gender, race/ethnicity, educational level, household income, and employment status were

compared between study periods as well. Differences in categorical variables between 1998 and 2000/2001 were assessed using the Pearson chi-square test.

Univariate and multivariate logistic regression analyses were performed to estimate the factors that are associated with condom use. In the models, condom use (code as 1 for users and 2 for non users) was the dependent variable. The independent variables were educational level, employment status, household income, race/ethnicity, age, and gender. In the multivariate analysis, gender-and-year-specific analyses were performed. This served to assess factors that influenced condom use within the years, among the genders, and among the genders within the years. A p-value of <0.05 and 95% confidence intervals were used to determine statistical significance throughout all analysis performed.

CHAPTER IV

RESULTS

The basic characteristics of eligible participants in 1998 and 2000/2001 are shown in Table 1. Overall, 386 and 890 subjects were eligible for the study in 1998 and 200/2001, respectively.

In 1998, 54.1% of eligible subjects were females and 45.9% were males. Most of the respondents were White (74.1%). An unexpectedly large number of respondents reported having less than a college education (51.3%). The majority of participants reported an annual household income of over $20,000 (76.6%). Slightly more than a quarter of the respondents reported being a student as their employment status, while greater than half reported being employed.

In 2000/2001, there were more females (53.0%) than males (47%). Most of the respondents were White (58.7%), had a greater than high school educational level (53.9%), and were employed (66.0%). The populations of study in 1998 and 2000/2001 were not significantly different from each other in terms of age, gender composition, household income, and employment status. The two study populations were however, different from each other in terms of racial/ethnic distributions ($p < 0.001$).

Table 1. Characteristics of the 1998 and 2000/2001 Study Populations

VARIABLES	1998 (n = 386)	2000/2001 (n = 890)	*p*-value
Age (years) Mean ± SD	21.0 ± 2.1	21.3 ± 2.1	0.06
	% (n)	**% (n)**	**% (n)**
Gender			
-Male	45.9 (117)	47.0 (418)	0.76
-Female	54.1 (209)	53.0 (472)	
Race/Ethnicity			
- White	74.0 (267)	58.7 (508)	< 0.001
- Black	16.3 (59)	15.3 (132)	
- Hispanic	9.7 (35)	26.0 (225)	
Education Level			
- Less than High School	11.7 (45)	13.2 (117)	0.11
- High School Education	37.0 (142)	32.9 (292)	
- Greater than High School Education	51.3 (197)	53.9 (479)	
Household Income			
-Less than $20,000	23.4 (64)	22.6 (156)	0.79
-More than $20,000	76.6 (210)	77.4 (535)	
Employment			
- Employed	64.1 (243)	66.0 (576)	0.21
- Unemployed	9.5 (36)	15.3 (102)	
- Student	26.4 (379)	26.0 (195)	

The difference in condom use between the two study periods was found not significant ($\chi^2 = 0.22$, $p = 0.641$). However, there was a statistical difference between condom use in males and females ($P < 0.001$). When stratified by study year, that difference is evident again. While the difference in the rates of condom use between the genders was significantly different for each year, there was no statistical significance in condom use for each gender between the study years.

The results of the univariate analyses of the association between each of the examined independent variables and condom use are shown in Table 2. The magnitude of association between independent and dependent variables were quantified using odds ratios from the logistic regression models. As shown, increases in age and being a male were associated with increased odds of condom use in 1998 and 2000/2001. In 1998, unemployment was also associated with increased odds of condom use. Educational level, household income, race/ethnicity, and being a student were not statistically associated with condom use in 1998 and 2000/2001.

To determine if the associations in the univariate models were independent of other covariates, multivariate logistic regression analyses stratified by gender and year of study were performed (Tables 3-6). As shown in Table 3, increasing age and unemployment were associated with increased odds of condom use in 1998, adjusting for other independent variables. A similar increasing odd of condom use due to increasing age was evident in 2000/2001. In 2000/2001, being a female was associated with decreased odds of condom use, adjusting for age, race, education, household income and employment.

In gender-specific multivariate analysis (Table 4), age was the only variable associated with condom use in males. There were no variables significantly associated with condom use in females. We further repeated gender-specific analysis stratified by study periods of 1998 and 2000/2001 (Tables 5-6). For males in 1998, increasing age was associated with increased odds of condom use, adjusting for race, education, employment and household income. Unemployment was independently associated with increased odds of condom use in females, adjusting for age, race, employment, education and household income. In the 2000/2001 study period, no studied variables were significantly associated with condom use in males or females.

Table 2. The results of a Univariate Analysis of the Factors Associated with Condom Use

VARIABLES	1998 OR (95% CI)	2000/2001 OR (95% CI)
Age	1.28 (1.13 – 1.44)†	1.19 (1.08 – 1.30)†
Gender		
-Male	2.36 (1.46 – 3.83)†	2.10 (1.47 – 3.02)†
-Female	Reference	Reference
Race/Ethnicity		
- Black	0.82 (0.44 – 1.55)	0.71 (0.43 – 1.16)
- Hispanic	1.01 (0.44 – 2.33)	0.76 (0.49 – 1.18)
- White	Reference	Reference
Education Level		
- Greater than High School Education	0.93 (0.44 – 2.0)	0.91 (0.51 – 1.62)
- High School Education	1.02 (0.61 – 1.69)	1.14 (0.63 – 2.07)
- Less than High School	Reference	Reference
Household Income		
-More than $20,000	1.10 (0.57 – 2.1)	1.15 (0.73 – 1.83)
-Less than $20,000	Reference	Reference
Employment		
- Unemployed	3.58 (1.47 – 8.71)†	1.00 (0.59 – 1.69)
- Student	0.38 (0.20 – 0.72)	0.66 (0.41 – 1.07)
- Employed	Reference	Reference

† Statistically significant at the $p < 0.05$ level.

Table 3. Results of the Multivariate Logistic Modeling for Condom Use 1998 and 2000/2001

VARIABLES	1998 OR (95% CI)	2000/2001 OR (95% CI)
Age	1.50 (1.15 – 1.95)†	1.15 (1.03 – 1.28)†
Gender		
-Female	0.93 (0.32 – 2.73)	0.46 (0.30 – 0.71)†
-Male	Reference	Reference
Race/Ethnicity		
-Black	0.45 (0.12 – 1.72)	0.69 (0.38 – 1.24)
-Hispanic	1.09 (0.21 – 5.66)	0.90 (0.53 – 1.52)
-White	Reference	Reference
Education Level		
- Greater than High School Education	0.57 (0.16 – 2.10)	0.67 (0.32 – 1.41)
- High School Education	1.24 (0.67 – 2.36)	1.20 (0.57 – 2.52)
- Less than High School	Reference	Reference
Household Income		
-More than $20,000	1.61 (0.43 – 6.03)	1.25 (0.75 – 2.07)
-Less than $20,000	Reference	Reference
Employment		
- Unemployed	8.56 (1.50 – 48.77)†	0.69 (0.37 – 1.29)
- Student	2.15 (0.39 – 11.87)	0.65 (0.35 – 1.22)
- Employed	Reference	Reference

† Statistically significant at the $p < 0.05$ level.

Table 4. Results of Multivariate Logistic Modeling of Factors Influencing Condom Use by Gender

VARIABLES	Male OR (95% CI)	Female OR (95% CI)
Age	1.22 (1.05 – 1.42) †	1.12 (0.98 – 1.28)
Race		
Black	0.61 (0.26 – 1.44)	0.74 (0.39 – 1.44)
Hispanic	0.95 (0.47 – 1.92)	0.84 (0.41 – 1.69)
White	Reference	Reference
Educational Level		
Greater than High School	0.95 (0.31 – 2.89)	0.68 (0.25 – 1.82)
High School	1.22 (0.34 – 4.34)	1.36 (0.49 – 3.75)
Less than High School	Reference	Reference
Employment		
Unemployed	0.80 (0.23 – 2.82)	1.21 (0.64 -2.30)
Student	1.08 (0.47 – 2.51)	0.54 (0.24 -1.19)
Employed	Reference	Reference
Household Income		
More than $20,000	0.98 (0.48 – 2.0)	1.60 (0.88 – 2.91)
Less than $20,000	Reference	Reference

† Statistically significant at the $p < 0.05$ level.

Table 5. Results of Multivariate Logistic Modeling of Factors Influencing Condom Use in 1998 by Gender

VARIABLES	Male OR (95% CI)	Female OR (95% CI)
Age	1.89 (1.19 – 2.99) †	1.39 (0.92 – 2.10)
Race		
Black	0.90 (0.12 -6.61)	0.22 (0.02 -210)
Hispanic	3.95 (0.36 – 43.10)	0.48 (0.04 – 5.87)
White	Reference	Reference
Educational Level		
Greater than High School	0.25 (0.02 – 2.83)	0.88 (0.14 – 5.78)
High School	1.23 (0.57 – 6.45)	1.01 (0.34 – 3.52)
Less than High School	Reference	Reference
Employment		
Unemployed	--*	8.27 (1.30 – 52.63) †
Student	2.97 (0.22 – 40.49)	1.79 (0.16 – 20.19)
Employed	Reference	Reference
Household Income		
More than $20,000	1.55 (0.17 – 13.80)	1.45 (0.23 – 9.30)
Less than $20,000	Reference	Reference

* Value too small to report.
† Statistically significant at the $p < 0.05$ level.

Table 6. Results of Multivariate Logistic Modeling for Factors Influencing Condom Use in 2000/2001 by Gender

VARIABLES	Male OR (95% CI)	Female OR (95% CI)
Age	1.15 (0.96 – 1.38)	1.12 (0.96 – 1.30)
Race		
Black	0.45 (0.15 – 1.32)	0.87 (0.42 – 1.82)
Hispanic	1.02 (0.47 – 2.21)	0.89 (0.42 – 1.90)
White	Reference	Reference
Educational Level		
Greater than High School	0.79 (0.25 – 2.50)	0.63 (0.23 – 1.74)
High School	1.10 (0.35 – 3.42)	1.42 (0.51 -3.94)
Less than High School	Reference	Reference
Employment		
Unemployed	0.36 (0.07 – 1.83)	0.75 (0.36 -1.54)
Student	1.03 (0.41 – 2.57)	0.45 (0.19 – 1.05)
Employed	Reference	Reference
Household Income		
More than $20,000	1.02 (0.47 – 2.23)	1.53 (0.78 – 3.03)
Less than $20,000	Reference	Reference

CHAPTER V

DISCUSSION AND CONCLUSIONS

Designing effective interventions to prevent young adults from participating in adverse behaviors, such as unprotected sex, requires that the intervention be based on sound empirical information about factors that are associated with condom use. Condom use is generally accepted as an effective method for the prevention HIV and STD transmission. While some studies have considered demographic factors that are associated with several sexual risk behaviors, only very few have investigated factors that provide the most probable influence in young adults. This study was designed to investigate factors that impact condom use in young adults 18-24 years using data from BRFSS. The use of BRFSS for this study represents the best available data since the sampling scheme was nationally representative in scope. The training program and quality control measures instituted in BRFSS gave added credence to the data. Understanding factors associated with condom use in young adults is critical in designing appropriate interventions needed in alleviating prevalence of HIV/AIDS in these at-risk groups.

The main hypothesis was that condom use will be higher in 2000/2001 than 1998 in both American male and female young adults. It was also hypothesized that the factors influencing condom use in 1998 would be different from those that influenced condom use in 2000/2001. Additionally, this study theorized that factors that are associated with condom use will vary between men and women. The first hypothesis

presumes that contemporary information about sexual risk behaviors would be enough to increase condom use in young adults.

The results of this investigation indicated no statistically significant difference in condom use in the study populations in 1998 and 2000/2001. This finding is inconsistent with the study by Thompson et al (2002). Thompson et al. (2002) stated that condom use increased between 1995 and 2002. The related finding in this study does not support that assertion. However, the result of the chi-square test found that males have a significantly higher rate of condom use compared to females. This finding is consistent with the literature and may be attributed to the males' control over the use of condoms. Females also have showed difficulties in the negotiation and initiation of condom use (Smith, 2003). Furthermore, females increased their use of oral contraception during 1995 to 2002 and may have abandoned condom use as a form of contraception (Thompson, Kyle, Swan, Thomas, & Vrungos, 2002). For each study year, the disparity in condom use among the genders exists but the disparity does not change, thus creating the lack of a statistical difference in condom use between the years. These results indicate that interventions targeting condom use in females may not have been as effective for this population.

In 1998, age and employment were factors influencing condom use, while in 2000/2001, both age and gender were associated with condom use. Employment has been included as a measure of socioeconomic status and can be associated with condom use (O'Donnell, O'Donnell, & Stueve, 2001). The study also found that increased age appeared in the models as a factor associated with condom use for both genders overall. In 1998, increased age was associated with condom use in males and unemployment was

associated with condom use in females. In 2000/2001, there were no factors shown to have an association with condom use. The null hypothesis asserted that there would be no difference in the factors that were associated with condom use for each gender between the two study periods.

Race/ethnicity and household income were not important factors in condom use in both males and females. This may be due to the change in the percentage of Blacks and Hispanics in each year's study population. In 2000/2001, the percentage of Hispanics increased three-fold while the percentage of Blacks decreased slightly. Although the results were not significant, Blacks and Hispanics were consistently less likely to be condom users. The lack of significant association of Black race with increased condom use is inconsistent with previous studies. The reasons for this anomaly may be attributable to sample size. The 2001 Youth Risk Behavior Surveillance (YRBS) found that Black adolescents were using condoms at higher rates than their White and Hispanic counterparts. In fact, none of the multivariate analysis showed race/ethnicity to have a statistically significant association with condom use. This, again, is at variance with previous studies because relationships are frequently found between race/ethnicity and condom use. The population size may be larger in those studies compared to this one. Additionally, the number of variables in the multivariate analysis completed by previous studies may have been less than those in this study.

In this study education did not emerge as an important factor that is associated with condom use both the univariate or multivariate analyses. Educational levels were very similar between the study years. Educational levels were acknowledged in the literature to be associated with condom use. In this study, although it was not

statistically significant, condom use was more associated with a high school education level compared to an educational level of less than high school. As supported by some of the literature, it was also found that condom use was not positively associated with a greater than high school education compared to those who had reported an education level of less than high school. Again, the 2001 YRBS established that those in lesser grades were more likely to report using a condom at the time of last intercourse.

Conversely, age consistently emerged as a variable which was positively associated with condom use. This finding may indicate that as young adult age, they may be more likely to use condoms more than when they are younger. Previous research supports this assertion by reporting that decision-making processes mature with increasing age (Thompson, Kyle, Swan, Thomas, & Vrungos, 2002). This finding is instructive, yet encouraging, because it advises that young adults are positively changing their behaviors as they grow older. However, if serious and permanent consequences such as HIV infection occur due to unprotected sex during the earlier years of young adulthood, the behavior change may not be individually useful.

Limitations of the Study

The results of this study must be interpreted with caution. First, because of the strict eligibility criteria, the sample size was unusually low. The low number may be associated with the results of associations that were observed in this study. Secondly, data for these analyses were restricted to only two U.S. states. These states are by no means representative of the overall U.S. population. Hence, it would be difficult to generalize findings of this study to other regions. A dataset that is nationally

representative would provide a better opportunity to study the role of sexual risk behavior on condom use in American young adults.

Along the same lines, it would be ideal to have study data from comparable populations in the same years. Study populations from 2000 and 2001 were combined in order to create a comparable sample (e.g., respondents from the same states) for this study's analyses. Third, many potential factors that are associated with condom were not evaluated in this study. This study was limited because of the secondary nature of the data. Factors such as parental involvement, childhood poverty, and religious beliefs could significantly impact condom use. A study design with saturated models that includes the above variables would provide a useful understanding of factors that are associated with condom use in young adults.

As this study was limited to the previously interviewed subjects, more Hispanic subjects should be involved in the study of sexual risk behaviors in the college aged population. Within minority cultures on college campuses, the factors which influence participation in risk-taking behaviors should be closely evaluated, as well as the effect of the majority culture on the risk-taking behaviors of college students from minority backgrounds. Gender-focused research should study the rationale of male condom use and decisions not to comply with condom use.

Recommendations and Implications for Further Research

Research such as this is complicated by the lack of availability of data. Funding for consistent sampling of states for the BRFSS would be advisable to make research for this population easier. Although The National Health and Nutrition Examination Survey often perform a nationally representative survey, the resulting data for children and

youths are sometimes not readily available for public for use. Making data on sexual risk behaviors in young adults publicly available may increase the chances of research being performed in these at risk population, and enhancing valuable interventions.

The findings of this study point toward early intervention and education for adolescents. Interventions targeting condom use issues for young adults should be constructed and implemented as early as possible – even before adolescence is reached. Currently, if decision-making processes are maturing as adolescents and young adults' age, programs that help guide and inform adolescent decision making are advised.

Separate and culturally appropriate interventions which target Blacks, Hispanics and females should focus on self-esteem, condom negotiation, personal protection, and healthy decision making. Males must be encouraged to approach the topic of condom use with their female partners in order to increase condom use frequency and make communication about condom use an empowering decision for both participants (Ferguson, Quinn, Eng, & Sandelowski, 2006; Smith, 2003). Interventions should specifically empower females to make sound decisions on condom use and to become comfortable with taking on the responsibility of condom possession within sexual relationships.

The low rate of condom use among females is a public health issue because this may translate into increased exposure to HIV and other STDs. Regardless of any future changes in the trends of condom use, community HIV testing programs should be supported and testing opportunities need to exist on college campuses. Programs should be conducted in a confidential or anonymous environment where the student will feel protected from stigma associated with HIV testing. Pre- and post-testing counseling that

discusses condom use should be made available to young adults. Interventions and media campaigns should ideally promote communication between partners regarding HIV status and testing.

Further research should further investigate the correlates of condom use and the process of decision making that produces healthy sexual behaviors. Research should examine which educational and health promotion interventions to reduce risk-taking may be most effective with the young adult population. The next steps for studying the college population would be to understand the culture of college including the different stages of sexual relationships beyond the statuses of monogamous and casual. Additionally, research pertaining to the reasons college-students engage in multiple-partner sexual lifestyles is recommended. New research should also determine the effect of the Internet on the opportunity to have multiple sexual relationships or to participate in sexual risk behaviors. The role of the Internet and media (e.g., television) should be evaluated in the exposure to sexual risk behaviors. Studies such as this one reflect the importance of the college population in the development and advocacy of programs aimed at sexual risk behavior reduction. Qualitative research that allows for college students to categorize and describe the relationship types in which condom use may vary is necessary for suitable interventions to be developed.

Policy Indications

Although previous studies found that lack to knowledge about the availability and use of condoms was not a factor in the failure of young adults to use condoms, knowledge- and skill-based interventions should be incorporated in adolescents' learning environment earlier than college or post-high school. Usually, interventions and

campaigns that discuss condom use openly and provide participants with skills about condom use are instituted after high school. Comprehensive sexual education should include information about condom use and should confer the positive aspects about condom use to adolescents as early as middle school. Abstinence-only programs instituted in public school systems have been shown to only provide short term benefits, and no lasting positive effects (Hauser, 2002) while adolescents are experiencing their sexual debut at earlier ages (McIlhaney, 2000). Regardless of when they have their sexual debut, if adolescents are not being provided with the appropriate information as to how to protect themselves against sexually transmitted diseases and unintended pregnancy, they will be at a greater risk of incurring negative outcomes.

Comprehensive sexual education should be gender-and age-specific. As seen in this study, the factors influencing male condom use are not the same as those which influence female influence. Those factors need to be addressed in sexual education for each gender. Furthermore, each age group should have a separate curriculum related to healthy sexual behaviors and perceptions that would provide building blocks to the next level of the curriculum.

APPENDIX A

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