# CHLAMYDIA INFECTION: POPULATION SPECIFIC RISK FACTORS FOR FEMALE UNIVERSITY STUDENTS

By

TAMI LYNN THOMAS

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This dissertation is dedicated to the students at the University of Florida and to my maternal grandfather, Thomas Edward Gentry.

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# CHLAMYDIA INFECTION: POPULATION SPECIFIC RISK FACTORS FOR FEMALE UNIVERSITY STUDENTS

By

Tami Lynn Thomas

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Chair: Sharleen Simpson
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Genital chlamydia infection is increasing on a national level resulting in millions in health care costs. Chlamydia related morbidity includes pelvic inflammatory disease, chlamydia prostatitis for men, and in some cases infertility. Despite decades of primary and secondary prevention measures, including the distribution of free condoms, health education programs, and inexpensive treatment, nationally and locally genital chlamydia infection rates have risen in young women.

The purpose of this research was to document rates of genital chlamydia infection in male and female university students who access health care services at a university student health care center and describe possible population specific risk factors for female university students. First, reported cases of genital chlamydia were tracked and demographics calculated with the cooperation of the laboratory manager at the research site. Incidence rates were higher than national rates, 5.8% versus 3.8%. Those infected were more likely to be female, living in apartments off campus, 20 years old, and white.

Then, female university students who accessed services at the student health care center were recruited using an institutional review board approved flyer to complete an anonymous questionnaire to gather data on high risk drinking behaviors, sexual risk taking, gynecologic complaints, condom use, and condom use self-efficacy. This sample of female students was predominantly junior and senior class level. They reported high-risk drinking and sexual risk-taking behaviors at rates greater than 67%. The mean number of sexual partners for those students completing the questionnaire was 1.6 in the past year. The number of sexual partners may also predict the likelihood of a gynecologic complaint, greater sexual activity, and subsequent sexually transmitted infection. Further analysis demonstrated no relationships between high-risk drinking, sexual risk taking, and condom use self efficacy scale scores.

This research demonstrates the need for prevention efforts through comprehensive sexuality education and reproductive health services on a university campus. Further research is planned to examine the impact of the transition to a university campus life, including sociocultural factors such as peer group subcultures, gender based power issues, high-risk drinking, and sexual risk taking.

# CHAPTER 1
# BACKGROUND AND SIGNIFICANCE

Chlamydia is an obligate bacteria that enters the vagina during sexual contact causing millions of infections annually for women under age 25 (Kelly, 2003; Centers for Disease Control and Prevention, 2004). Untreated infections invade the female endocervical epithelium and fallopian tubes with subsequent health care costs exceeding $3 billion per year (Aral, 2002; Holmes, 1994; Stamm, 2004). Vague symptoms including burning upon urination, pelvic pain and vaginal bleeding may be present, but asymptomatic infection is common (Weir, 2004). Mild symptoms, or lack thereof, leave these young women at risk for chlamydia related morbidity, most specifically, pelvic inflammatory disease (PID). Chlamydia PID can lead to infertility (Stamm, 2004). Unfortunately, inexpensive and effective treatment is often delayed because of vague or absent symptoms (Hu, Hook & Goldie, 2004).

## Chlamydia Infection Rates and Risks to Young Women

The Centers for Disease Control and Prevention (CDC) reports increasing rates of chlamydia nationally in women aged 16 to 24 from 1999 to 2003 (Centers for Disease Control and Prevention, 2004; Tables 1-1 and 1-2).

Table 1-1. Chlamydia, reported cases and rates per 100,000 females ages 16-19 in the United States

| Females ages 16-19 years | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|
| Cases | 277,376 | 231,167 | 249,269 | 257,428 | 266,175 |
| Rates | 2,329.2 | 2,352.5 | 2,531.3 | 2,599.0 | 2,687.3 |

(CDC, 2004)

Table 1-2. Chlamydia, reported cases and rates per 100,000 females ages 20-24 in the United States

| Females ages 20-24 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|
| Cases | 185,058 | 199,257 | 226,992 | 238,406 | 252,936 |
| Rates | 2,033.9 | 2,129.1 | 2,357.0 | 2,417.1 | 2,564.4 |

(CDC, 2004).

These data indicate a steady rise in the rates of chlamydia in this age group, an increase from 185,058 for women ages 20 to 24 in 1999 to 252, 963 in 2003. These increases occur in the presence of primary and secondary prevention measures including education, condom distribution, and effective treatment. The CDC postulates that increasing rates of chlamydia may be a result of primary and secondary prevention failures (U. S. Department of Health and Human Services, 2000).

In Florida, the reported cases and rates per 100,000 for women have increased from 1999 to 2003 (CDC, 2004; Table 1-3). Women in Florida are not screened for chlamydia as a standard of care in many primary healthcare settings. Cases have increased from 25,957 in 1999 to 34,581 in 2003. The infection rates continue to climb, despite health education efforts and inexpensive effective treatment. Table 1-4 represents screening rates for women in Florida and substantiates the concern that secondary prevention measures may have failed or at least that screening must increase.

Table 1-3. Number of cases and incidence rates of chlamydia per 100,000 in women ages 17–24 in Florida

| State reporting—Florida<br>Year | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|
| Rate per 100,000 population | 321.5 | 335.4 | 365.9 | 396.9 | 404.8 |
| Cases | 25957 | 27562 | 30647 | 33902 | 34581 |

(Centers for Disease Control and Prevention, 2004).

Table 1-4. Chlamydia positivity in women 15–44 by testing site in Florida

| Testing Site | Number of clinics | Number tested | Percent found positive |
|---|---|---|---|
| Family planning | 28 | 16131 | 4.1% |
| STD clinics | 25 | 4220 | 10.3 |
| Prenatal clinics | 13 | 3494 | 5.2 |
| Other | N/A | N/A | N/A |

(CDC, 2004)

Current screening of women in Florida may not be adequate. The data reflect that chlamydia was diagnosed in asymptomatic patients regardless of setting with the highest rate of positivity occurring in STD clinics. These sites do not include any population specific institutions such as student health care services on any campus in Florida. This fact is the rationale supporting this two-fold research purpose and the research questions.

The American College Health Association 2004 Annual Pap Tests and STI Survey represents findings with lower than expected rates of chlamydia in young women and higher than expected rates in young men (American College Health Association [ACHA], 2005; Table 1-5). The authors of the American College Health Association data caution that these results may not be accurate, as providers reported only the number of asymptomatic cases if known, and cited results as being imprecise (ACHA, 2005). The current rates of chlamydia infection rates for students who access the University of Florida Student Health Care Center are unknown as of January 2006. These data make the argument that chlamydia screening for young women on college campuses is not only desired but imperative.

Table 1-5. Results from the American College Health Association survey of providers– Rates of chlamydia (CZ) in men, women, those presenting with symptoms (positives), and those presenting without (asymptomatic positives)

| | Total | Positive | % positive | Asymptomatic positive | % of positive asymptomatic |
|---|---|---|---|---|---|
| Undifferentiated CZ | 108602 | 4289 | 3.95 | 604 | 14.1 % |
| Females with CZ | 72565 | 2649 | 3.65 | 387 | 14.6% |
| Males with CZ | 13948 | 1110 | 7.96 | 131 | 11.8% |

(ACHA, 2005)

## Epidemiology of Chlamydia

The epidemiology of chlamydia is dependent on several factors. As described by Donovan (2004, p. 545) they are the following:

- Sexual mixing patterns moderated by protective behaviors
- The transmission and pathogenicity of chlamydia
- Demographics
- Reporting practices of healthcare providers
- Implications of personal judgment
- Normative behavior
- Social conditions
- Decisions to seek treatment

There is no current routine screening for chlamydia for students who access health care services at the University of Florida Student Health Care Center. Chlamydia screening is offered, but testing for chlamydia and other sexually transmitted infections is expensive, more than $100 per test. Because increasing rates of chlamydia infection in this age group persist on the state and national level, rates for female students accessing the University of Florida Student Health Care Center should be evaluated. In fact, the epidemiology of chlamydia warrants regular screening of this population. Because of these statistics, even in an environment of limited resources and controlled costs, budget allocations for chlamydia screening must be considered. Sexual activity along with other risk behaviors—such as binge drinking, underage drinking, sexual activity while using alcohol, and sexual contact without the use of barrier methods—contributes to the spread of this infection and suggests that these behaviors or risk factors be examined and their relationships explored (Donovan, 2004; Ross, 2002; Von Sadovsky, Keller, & McKinney, 2002).

### Sexual Activity

Sexual activity is a group of behaviors that includes penile vaginal intercourse, mutual masturbation, petting, oral sex, anal sex, penile vaginal intercourse, and sexual

experimentation with objects and diverse forms of lubrication (Ross, 2002). Sexual risk taking is a subset of these behaviors that put an individual at risk for infection or abuse. The most common form of sexual risk taking is penile vaginal intercourse without the use of a condom (Grady & Gillam, 2003). Adverse outcomes of sexual risk taking include unwanted pregnancy and increased rates of sexually transmitted diseases (Cooper, 2004). Not surprisingly, sexual risk taking is also associated with high-risk drinking in research studies that explore college student behavior (LaBrie, Schiffman, & Earlywine, 2002; Liccardone, 2003).

**High-Risk Drinking**

High-risk drinking is defined as underage drinking and binge drinking. Binge drinking is defined by researchers as five or more drinks at one occasion (Dejong & Langford, 2002). Researchers report the adverse outcomes for high-risk drinking as increased rates of sexually transmitted diseases, sexual assault, battery, property damage, and even loss of life (Santelli, Lowry, Brener, & Robin, 2000; Sipkin, Grady, Bissett, & Gillam, 2003). Sexual risk taking and high-risk drinking seem to have a temporal effect, which means that when sexual risk taking and high-risk drinking occur transmission rates increase for chlamydia and other sexually transmitted diseases (Chronister & McWhirter, 2003; Foxman et al., 2000; Kirby, 2002). Research studies also indicate that sexual risk taking and high-risk drinking are some of the most prevalent exploratory behaviors practiced by female students (Wechsler et al., 2002).

**Transition to Campus Culture**

The adjustment to college offers challenges referred to in research literature as developmental transitions (Farrow & Arnold, 2003). These developmental transitions are frequently characterized by population specific behaviors. They include the desire to

have intimate emotional and sexual relationships, underage alcohol use, binge drinking, sexual risk taking, and inclusion in social functions (Farrow & Arnold, 2003; Liccardone, 2003). Chlamydia infection rates must be explored in the context of these developmental transitioning behaviors as they are products of personal decision making that include behaviors and decisions to seek treatment.

**Epidemiologic Methodology**

Epidemiologic methodology incorporates population specific information and addresses the causality and association of disease. Epidemiologic causality includes associated risks and relationships between a disease and the causes of the disease. Epidemiologic causality is a complex interaction of infectious or noninfectious agents, environmental and host factors that implies a direct relationship among an agent, an environmental or host factor, and a disease (Evans, 1978). Features of disease causality were described by Evans in 1978; they are the following:

- The rate of prevalence is higher in the exposed population than in a nonexposed population.
- Exposure to the infectious agent is more common in those diagnosed than those without the illness.
- Incidence rates should be higher in those exposed than those not exposed.
- Exposure to the suspected infectious agent should precede signs and symptoms.
- Specific signs and symptoms should exist.
- Experimental reproduction of the disease should exist. In other words, the disease can be replicated in laboratory setting.
- Eliminating the infectious agent should decrease the incidence of the illness, and prevention or modification of signs and symptoms should decrease or eliminate the presence of the illness (Evans, p. 254, 1978).

In contrast, a statistical association between a specific disease and a possible risk factor does not imply a causal relationship (Last, 2001). Statistical associations can be direct, indirect, or spurious (Gordis, 2000). Statistical analysis incorporated with epidemiologic method can determine direct, indirect or spurious associations. This analysis is essential in defining the interaction among host, pathogen, and environment. The classic epidemiological triangle graphically represents this interaction among host, pathogen, and environment, explaining the etiology and epidemiology of both infectious and chronic disease (Mausner & Krammer, 1985; Figure 1-1).

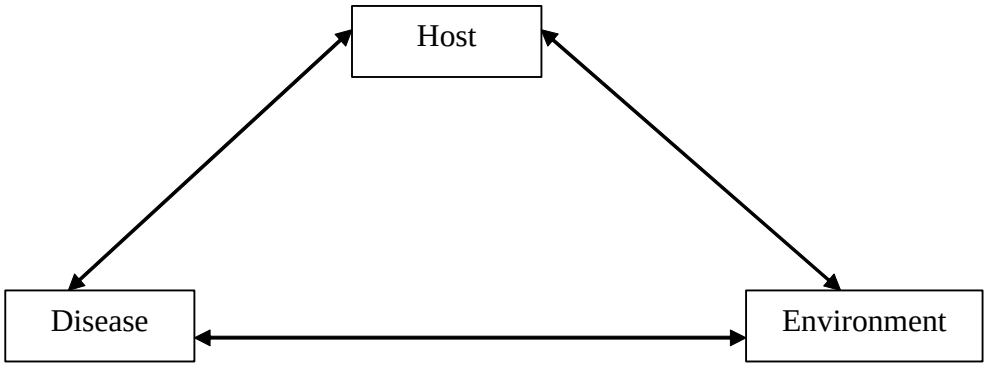


Figure 1-1. The epidemiologic triangle

But epidemiologic causality as an indicator of disease prevalence is different from statistical and biological causality because it begins with the determination of the number of disease cases in a certain population (Rothman, 1976). For example, in the venue of public health and clinical practice, the choice of a treatment is based on physical assessment, available treatment and the known causality of the infection or disease (Rothman, Greenland, & Walker, 1980). Determining the causality or associated risk factors for acquiring chlamydia in the specific population of female university students requires review of current infection rates of chlamydia for these students. The epidemiology of chlamydia on a university campus includes disease causality and identification of associated risk factors.

Genital chlamydia infection is directly caused by transmission during sexual contact. Population specific associated risk factors such as condom use, high-risk drinking, and sexual risk taking may have a direct, indirect, or spurious association with chlamydia infection rates. Analyses to determine whether population associated risk factors were associated with chlamydia infection or seeking care for a gynecologic complaint are an essential part of this research.

## Theoretical Framework

A theoretical framework provides an explanation and clarity for the research and its findings. The choice of theory is based on literature review and amplifies the purpose, questions and rationale for the research.

### Choice of Theory

Social Cognitive Theory (SCT) postulates that health-protective behavior results from a process of cognitive appraisal with an integration of information about disease, the outcomes of health behavior decision making, and the interaction of the environment, also described as social influences (Bandura, 1986; Figure 1-2). Social Cognitive Theory constructs are also congruent with nursing theory because they address environment, behavior, and personal aspects of behavior change in a dynamic reciprocal relational interchange. I have constructed a graphic representation of Social Cognitive Theory (Bandura, 1986), which is similar to the Epidemiologic Triangle, using a triangular model and including environment as a major construct (Figure 1-2).

The result of this integrated process is self-efficacy or an estimate of how well a person will cope with a situation that moderates behavior (Bandura, 1990). Self-efficacy is a measurable construct with predictive power, parsimony, and reliability (Wulfert & Wan, 1995). The construct proved to be so useful its own unique theory developed. This

theory provides a framework to explain the importance of a young woman's choice of sexual behaviors (Few, 1997; Leganger, Kraft, & Roysamb, 2000; Sherwin, 1992).

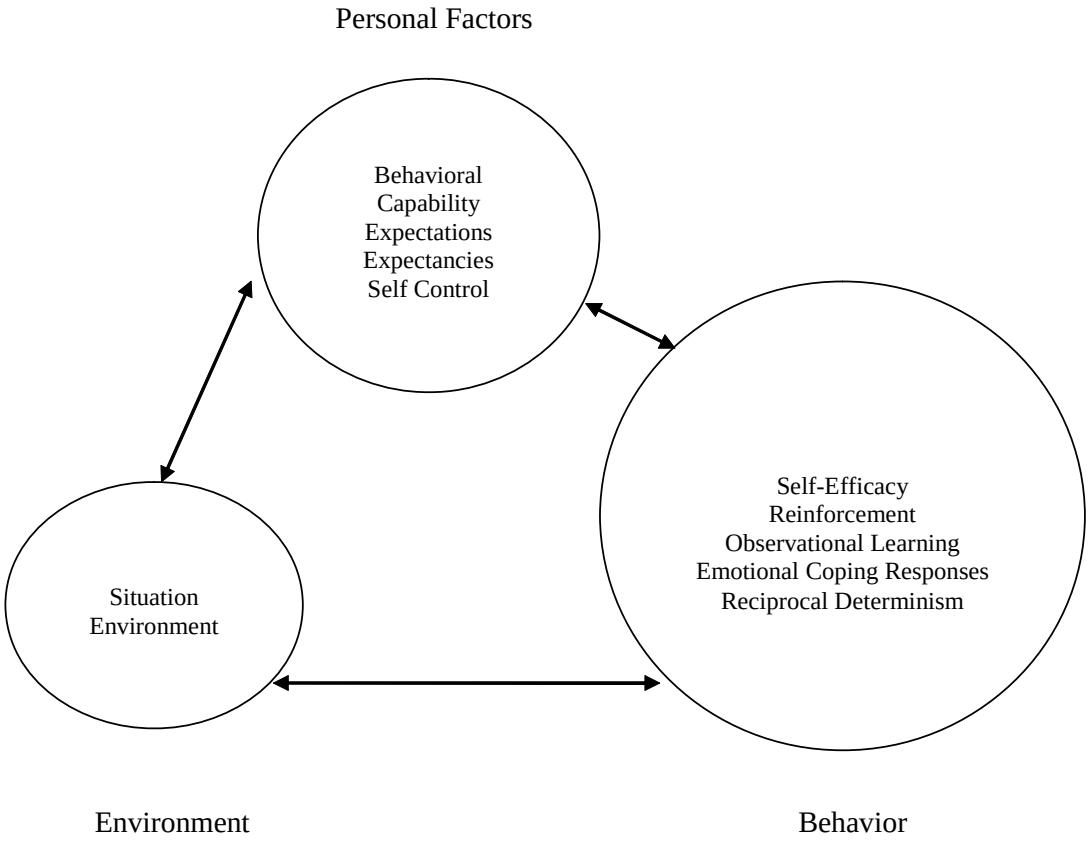


Figure 1-2. A model of social cognitive theory (Bandura, 1986) depicting construct groups in circles and the interactive relationship among the groups with bidirectional arrows

Leganger and colleagues (2000) also reported that self-efficacy predicts behavior change because of its influence on individual decisions. Therefore, if a female college student exercises self-efficacy, she will determine for herself what her choices are about use of condoms or the amount of alcohol she consumes. Research findings suggest that a female college student's choices for sexual health may depend on three key factors: self-efficacy, condom use, and perceived social support (Chronister & McWhirter, 2003). Self-efficacy Theory or SET, is the logical choice for this research because of its predictive value for behavior change and behavior maintenance (Bandura, 1977b, 1990).

More specifically, self-efficacy theory provides a research framework to examine incidence rates of chlamydia and the relationships among condom use, sexual risk taking and high-risk drinking in female university students by providing a theoretical basis to explore the behaviors of these students in relation to infection rates of chlamydia.

**Purpose**

The purpose of this research was to determine current infection rates of chlamydia in the student population that accesses services at the University of Florida Student Health Care Center and to determine relationships among condom use self-efficacy scores in female students, high-risk drinking, sexual risk taking, and the current incidence rates of chlamydia infection.

**Research Questions**

- What is the relationship among condom use self-efficacy scale scores and sexual risk taking behavior and high-risk drinking among the female college students who access services at a university student health care center?
- What are the differences in the number of sexual partners and the amount of high-risk drinking between those who did and did not engage in high-risk sexual activity?
- What are the combined effects of condom use self-efficacy scale scores, number of sexual partners, high-risk drinking and sexual risk taking behaviors on those with a gynecological complaint?

## Summary

This first chapter provides background information on chlamydia rates, the significance of this problem, and a choice of a theoretical framework. The impacts of condom use and population specific risk factors—including high-risk drinking, sexual risk taking, and a students' decision to seek treatment for a gynecologic complaint—are factors in reducing transmission rates of genital chlamydia infection (Barth, Cool, Downs, Switzer, & Fischhoff, 2002). Epidemiologic method provides a foundation to

examine population specific risk factors to determine causality and transmission of chlamydia infection. The importance of an integrated research study using epidemiologic method and theory is explained with the purpose and research questions identified.

# CHAPTER 2
# LITERATURE REVIEW

Current literature proffers three research perspectives relative to chlamydia infection and its relationship with condom use, sexual risk taking, high-risk drinking and college students. These perspectives are pathobiologic, sociocultural and behavioral. The following paragraphs provide a review of current perspectives, a summary of current research literature and the rationale for the theory choice with proposed model as the framework for this research.

## Pathobiological Perspectives

Chlamydia infection is typically studied from a pathobiological viewpoint. This perspective describes a pathogen and host interaction as the key to prevalence and incidence rates (Stamm, 2001). Research describes transmission emphasizing the vulnerability of the vagina as a host for infection (Collier et al., 1995; Dryden, Wilkinson, Redman, & Miller, 1994; Elkins & Cox, 1974; Hooton et al., 2000; Osterberg, Aspevall, Grillner, & Persson, 1996). Halting the spread of chlamydia infection by prescribing sexual abstinence exclusively is unrealistic as abstinence is a personal behavioral choice. Students choose to be sexually active for many reasons and condom use may be sporadic. According to researchers at the Centers for Disease Control and Prevention (CDC, 2004) using condoms without fail is the only behavior besides abstinence that can control chlamydia transmission. A student's personal sexual choices affect consistent condom use. These choices are in turn influenced by sociocultural and behavioral factors and may become risk factors for women ages 16 to 24.

Chlamydia infection research identifies age of the individual as the most important risk factor for acquiring chlamydia infection (United States Preventive Services Task Force [USPTF], 2002, CDC, 2004). Other associated risks were marital status, race, number of sexual partners, cervical ectopy, history of infection with a sexually transmitted disease and inconsistent use of condoms (CDC, 2004; USPTF, 2002). New data from the Centers for Disease Control and Prevention, in the first national representative study looking at prevalence rates in women ages 14 to 39, indicate that almost 1 out of every 20 women were reported to have chlamydia (CDC, 2005).

In 2004, the Centers for Disease Control reported the cost of chlamydia infection and related morbidities at 374.6 million dollars annually in the United States with an annual incidence rate of 1.5 million cases (Weir, 2004). There has been a steady increase in infection rates since 1984 complicated by a 70% asymptomatic case rate (CDC, 2004; USPTF, 2002). The Division of Sexually Transmitted Diseases at the Centers for Disease Control and Prevention describes several challenges to the identification and treatment of this disease. One challenge is the limitation of having only case reports to monitor trends in chlamydia, inconsistency in case reporting laws, and a lack of routine screening. Unfortunately in Florida, infection rates remain high because chlamydia screening is not routine at most female annual gynecological exams. This puts women under the age of twenty at a considerable risk (CDC, 2004). Hu and associates (2004) concluded that the persistent rise in chlamydia rates is a direct response to failures in primary and secondary prevention efforts in the public health arena. The United States Preventative Task Force reports that infection rates seem to decline when large-scale screening and treatment is implemented (USPTF, 2002).

Since primary prevention efforts focus on education, and secondary efforts focus on screening and treatment, the cost of screening and treatment has been the topic of research and case studies. The cost of treatment for a primary infection is an important consideration in an environment of cost containment and rising prescription costs. Recent clinical practice literature indicates that treatment of chlamydia infection with doxycycline or azithromicin is effective (Adimora, 2002). Doxycycline treatment is currently $10.10 per regimen at the University of Florida Student Health Care Center (UF SHCC) and azithromicin follows closely behind at a cost of $38.00 per regimen. Effective treatment is not cost prohibitive at the UF SHCC for most students.

The strength of current pathobiological research is its specific acknowledgment of vagueness or lack of symptoms with this infection and the recognition of the sociocultural implications (Brener & Gowda, 2001). Pathobiologic research literature is limited in that it has not addressed this specific population, female university students, who may or may not seek medical treatment for a vague gynecologic complaint. Whether the failure is in primary prevention efforts that involve education or secondary efforts that include costly screening and treatment, female college students remain at considerable risk for acquiring this infection. Female college or university students embrace an attitude of invulnerability, a desire for belonging, and intimate relationships (Arnett, 2004).

## Sociocultural Perspectives

Sociocultural perspectives must include population-associated risks including gender, age, ethnicity, residence, sexual risk taking, high-risk drinking, and their respective relationships with each other. Sexual risk taking is a subset of these behaviors that put an individual at risk for infection or abuse. The most common form of sexual risk

taking is penile vaginal intercourse without the use of a condom (Grady & Gillam, 2003). High-risk drinking is defined as under-age drinking and binge drinking. Binge drinking is defined by researchers as five or more drinks at one occasion (Dejong & Langford, 2002). This specific research literature examines the social pressures of peer groups such as sorority pledging, dating events and athletics that directly influence sexual risk taking and high-risk drinking (Wechsler et al., 2002). Additional research literature describes the interpersonal and behavioral implications from sexual risk taking activity on a college campuses; supporting consideration of the sociocultural environment as a predictor of high-risk activities (Gurman & Borzekowski, 2004). Inconsistent condom use is a persistent trend in sexual behaviors for college and university students accompanied by alcohol use (Bay-Cheng, 2003). Additional research notes that inconsistent condom use is highly correlated with high-risk drinking (Albarracin, Kumkale, & Jouhnson, 2004).

Condom use is a personal choice of sexual behavior influenced by associated sociocultural factors. These factors include gender-based power relationships and peer group expectations. Male-female power relationships are part of gender expectations and sociocultural influences that determine condom use and influence disease transmission (Gomez & Van Oss Martin, 1996). The sociocultural environment of the university campus may influence a female student's choice to seek treatment for symptoms of a sexually transmitted disease. An understanding of these sociocultural factors may also assist in the examination of population associated risk factors and in the development of effective interventions to decrease chlamydia infection rates.

Specific research on college students examined condom use, high-risk drinking and sexual risk taking determined that behavioral interventions were the most effective method of decreasing rates of sexually transmitted infections (Hirozawa, 2001). Health

education programs on university and college campuses focus on educating students as an intervention and a primary prevention measure against numerous illnesses (Collins, Duport, & Nagle, 2003 ). Developing effective interventions to promote healthy behaviors spawned research studies that identified person-environment interaction as an integral concept in this endeavor (Martinelli, 1999). The interaction between person and environment is essential to consider when researching this specific population: students who interact in the sociocultural environment of a college or university campus. High-risk drinking and sexual risk taking occur simultaneously as routine student behavior (Cooper, 2004). Research literature notes that risk behaviors appear in this new sociocultural environment, campus living, as students make the transition from home to campus life (Renn & Arnold, 2003).

Researchers describe the transition from home to attending a university or college as a challenge for most young women (Farrow & Arnold, 2003). The culture of a college campus is replete with gender and power issues. Examples include formation of male/female relationships and academic pressures imposed by professors. These situations in themselves are not harmful, but making decisions on unfamiliar topics and navigating the consequences and potentially negative situations is a challenge for young female students. Making decisions about sexual risk taking and increasing sexual activity is common for women in this age group (Smith, 2003). Individual concerns about physical symptoms in response to actively engaging in intimate sexual activity are influenced by social expectations and perception of socio cultural or campus culture issues (Berry, 2004). The desire to establish intimate relationships with the approval of and adherence to peer group expectations has a considerable influence on the female student. Students must exercise independent choices possibly for the first time in their

lives. Real or perceived power influences are critical to their perceptions and choices. Power relationships are part of gender and sociocultural expectations affecting condom use and disease transmission because they involve females and males (Gomez & Van Oss Martin, 1996).

The negative outcome of ignoring a vague symptom or gynecologic complaint may be a by product of a sociocultural expectation. The sociocultural expectation that a female who believes her partner is faithful, declines condom use, and will not seek early treatment for a gynecologic complaint. In many instances there is a struggle between condom use and the desire of the female student to be part of a couple, which may mean sex without condom. Sexual activity is affected by power in interpersonal relationships during the negotiation of condom use (Few, 1997).

Studies on sexually transmitted diseases describe a moment, when a young woman decides how, when, and with whom she shares sexual activity. This moment is shaped by her sociocultural environment (Berry, 2004; Kenney, 2000). There is a connection among person, behavior choice, and outcome that is a repeated trend in these studies. For example if the expectation is to have a boyfriend, an important part of social acceptance on campus, this may imply that sex is an expected. Having sex without a condom is a demonstration of the student's trust in her partner (Davidson-Harden, Fisher, & Davidson, 2000). This connection is evidenced by a linear relationship among person, behavior choice, and outcome. The student makes a choice, has self-efficacy or lack of self efficacy, uses a condom or declines to use a condom, and the result is a specific health outcome.

Research that addresses the sociocultural perspectives of male female interaction addresses the fact that not using a condom leaves the female vulnerable to infection. The

persistence of a partner saying, “Everything is okay” may lead to the perception that there is low risk or no risk (Smith, 2003). In effect, the female student wants to believe there is no risk because she wants to trust that her lover would not deceive her just to have sex (Davidson-Harden et al., 2000). The perception of risk and infection are not significant correlates. Feeling that she is not at risk does not protect the individual from infection (Kalichman et al., 2002). The student’s realization that she is vulnerable to infection is significant because it affects the perception of presenting symptoms and the decision to seek medical treatment (Oprendek & Malcarne, 1997).

The influence of social power upon condom use is significant, as reported in research on acquired immune deficiency syndrome (AIDS); whether peers use condoms can affect individual condom use (Albarracin et al., 2004). Personal concerns about vaginal irritation or burning upon urination are often competing against the desire to deny previous sexual activity. The presence of a gynecological complaint or a vague symptom may be dismissed and medical treatment delayed.

Sexual activity and the decision to use condoms are part of the sociocultural dynamic of transitioning from living at home to campus life, becoming sexually active, and taking sexual risks. Possessing a condom and using it correctly are two distinctly different situations. Many times a condom is carried and not used due to gender expectations, what young men expect from their female partners, and what young women may feel their partners expect from them. These expectations are also alluded to as power issues or social pressures (Arnett, 2004).

The strengths of sociocultural research literature is a recognition of the integration and impact of sociocultural influences, peer pressure to be in relationships, participation in high-risk drinking, and sexual risk taking. The limitation to this research literature is that, although the information is well documented, no research has evaluated a

comparison of these behaviors with chlamydia infection or a gynecologic complaint in this specific population.

## Behavioral Perspectives

Pitts and colleagues (Pitts, McMaster, Mangwiro, & Woolliscroft, 1999) demonstrated that individual behavior and the sociocultural environment determine whether treatment is sought. Behavioral research supports this finding and suggests that studies framed by Social Cognitive Theory (SCT; Bandura, 1977b), using the construct of self-efficacy, are valuable predictors for behaviors that influence sexual health (Tremblay & Frigon, 2004; Tulloch, McCaul, Miltenberger, & Smyth, 2004).

Chlamydia infection and correlated population specific risk behaviors for college students have not been published in current research literature, but condom use by young adults has. Condom use is hypothesized to predict sexually transmitted infection rates and must be examined as population specific risk factor for disease transmission (Hirozawa, 2001). Research using health belief models, reasoned action, and social cognitive frameworks indicate that condom use is best explored in relation to sexual negotiation (Wulfert & Wan, 1995). Since the sexual negotiating process is affected by drinking, drinking behaviors must be explored in relation to condom use.

Study data in college student populations describe a relationship between age at first drunkenness, and unplanned and unprotected sex (Hingson, Herren, Winter, & Wechsler, 2003). The earlier drinking starts, the more likely unplanned and unprotected sex will occur. Research confirms that patterns of high-risk drinking start prior to transitioning to campus life and may actually escalate when students begin their studies (Von Sadovsky et al., 2002). Studies also support the premise that high-risk drinking has

many poor outcomes, including increased sexually transmitted infection rates, bodily injury, and even death (Staton et al., 1999).

This sobering information further illustrates the influence of campus culture, peer groups and sociocultural expectancies on rates of participation in high-risk drinking. Perceived expectations of alcohol use or alcohol expectancies, in other words the social expectations to drink or peer pressure to drink, are significant influences on students and their decisions to participate in high-risk drinking. High-risk drinking, which is defined as drinking five or more drinks on an occasion, is linked to sexual risk taking, inconsistent condom use, and the absence of barrier methods to prevent the sexually transmitted infections (LaBrie et al., 2002).

Overall, behavior and condom use research support the need for further study on attitudes about the initiation of condom use (Davidson-Harden et al., 2000). Students' attitudes about the information they receive is crucial. Nurse researchers report that even in the context of a life-threatening illness, the students' acceptance of information is paramount to the subsequent follow through or practice of health promoting activities (Collins et al., 2003). Because infection rates are increasing in the presence of primary prevention, a study to examine frequency of condom use by students is essential. College students repeatedly put themselves at risk by practicing unhealthy behavior such as sexual risk taking and high-risk drinking (Rozmus, Evans, Wysochansky, & Mixon, 2005). Other examples are smoking, using illegal drugs, underage drinking, binge drinking, having sex with unknown partners, and having sex while under the influence of alcohol or drugs (Von Ah, Ebert, Ngamvitroj, Park, & Duck-Hee, 2004). The strength of this perspective in the literature review is that it provides a basis of research that supports the selection of research questions. But the limitation to this specific group of literature is

the dearth of research focused on specific behaviors and gynecologic complaints or diagnosis of sexually transmitted infection and subsequent disease transmission.

## Theoretical Application and Rationale

### Self-Efficacy Theory

The construct of self-efficacy derived from social cognitive theory (Bandura, 1997b) is well tested and has such reliability for predicting health behavior that it has its own theoretical model. The theory of self-efficacy has framed studies that examined psychological aspects of academic achievement (Maddux & Stanley, 1986; Multon, Brown, & Lent, 1991), clinical areas such as depression (Davis & Yates, 1982), social skills (Moe & Zeiss, 1982), assertiveness (Lee, 1983, 1984), pain control (Manning & Wright, 1983), and health behaviors (O'Leary, 1985; Pender, Murdaugh, & Parsons, 2002). This research foundation provides a suitable framework for chlamydia infection research involving behavioral and sociocultural factors.

Self-efficacy involves the development of social, cognitive, and behavioral capabilities that must be organized and targeted into a course of action (Bandura, 1977b). Female university students are adapting to campus life and desire to be successful and competent. Competent functioning in life requires a synthesis of skills in cognitive, social, and behavioral areas. The female university student is adapting and forming behaviors for her life with expectations of positive outcomes. For example, if she studies, she makes excellent grades that will result in a rewarding career. Self-efficacy theory involves three main constructs: person, behavior, and outcome as affected by efficacy expectations and outcome expectations (Bandura, 1977a). The following paragraphs describe these key constructs and the relational statements.

**Key Constructs**

Self-efficacy theory is a linear model with the construct of person as the starting point (right-hand side of the model in Figure 2-1). Person is defined as a human being who wishes to accomplish a behavior change. The construct of behavior is defined as actions that will affect the final construct of the outcome or the individual's decision to perform, expend effort and persist to achieve the requisite behavior. The outcome, is the successful completion of the required behavior or the desired behavior change (Bandura, 1977b, 1997).

Efficacy expectations are a group of concepts that impact personal behavior and are influenced by performance attainment, vicarious experience, verbal persuasion, and physiologic arousal. Whereas outcome expectations are concepts that focus on personal beliefs, that desired behavior change will be achieved (Bandura, 1977a, 1990).

**Relational Statements**

The relationships among the three major constructs of self-efficacy theory are unidirectional and linear. Person directly affects behavior, thus behavior directly impacts outcome. Efficacy expectations and outcome expectations have no direct linear relationship among the major constructs, but are shown as influencing both behavior and outcome (the broken lines in Figure 2-1; Bandura 1997; Fitzgerald, 1991). This model, epidemiologic methodology and review of the current state of research in chlamydia frame the two-fold purpose and questions developed for this research.

**Rationale**

The use of self-efficacy theory as a framework for this research is logical because of its predictive value in health behavior change and maintenance. It can assist in

describing the relationships among individuals, their specific behaviors, and a desired outcome. Therefore, the person, the female student entering the university setting, experiencing transitions and interacting with the environmental, develops expectancies. These expectancies include whether she can influence her own condom use, drinking patterns, and sexual behavior.

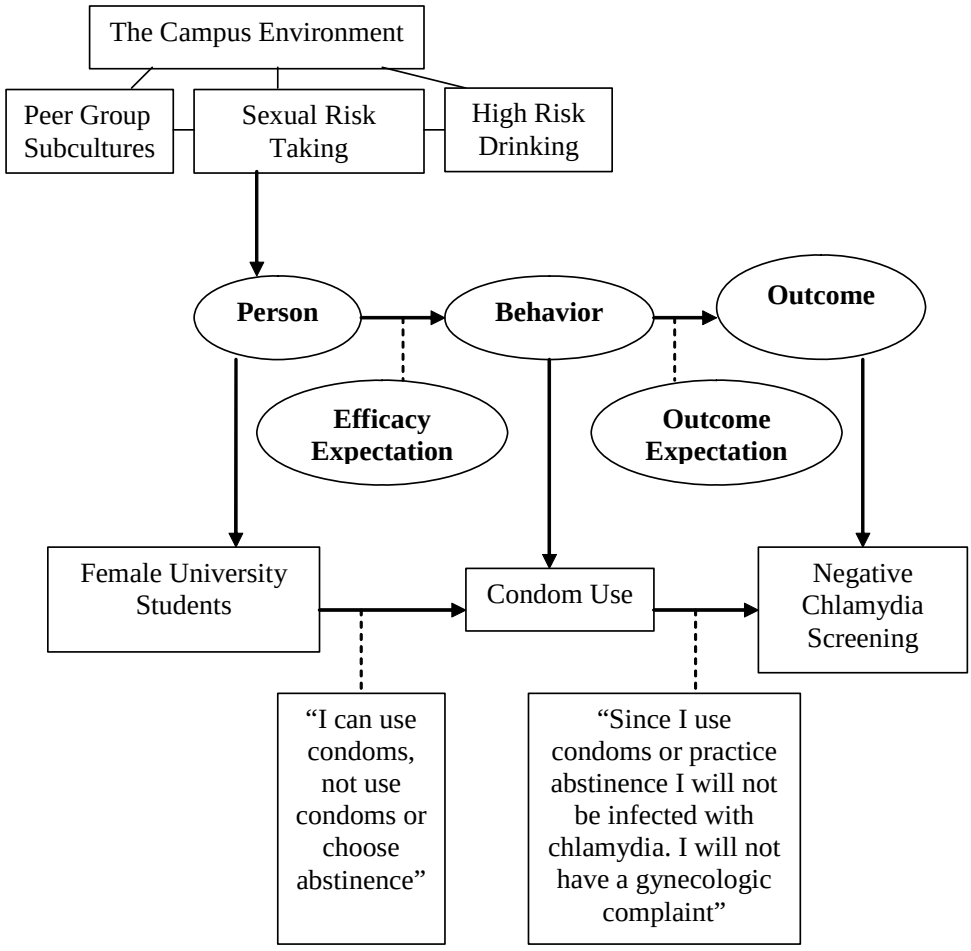


Figure 2-1. Proposed Campus Chlamydia Model adapted from Bandura's (1997) self-efficacy theory

The chosen behavior will then directly affect the outcome. A choice to not use condoms, participate in binge drinking, and sexual risk taking may predict chlamydia positivity or the decision to seek treatment for a gynecological complaint. Since chlamydia has subtle symptoms the individual may not seek treatment and may then

suffer pelvic inflammatory disease and/or infertility. The proposed Campus Chlamydia Model is adapted from self-efficacy theory. The person (female university student) may or may not use condoms and the desired outcome is a negative chlamydia screen (Figure 2-1).

**Substructed Constructs and Relationships**

The substructed theoretical framework begins with female university students. There is a direct relationship to behavior, specifically condom use without fail or abstinence. The behavior is influenced by efficacy expectations, denoted by a broken line. When using condoms consistently or practicing abstinence, the student achieves the outcome behavior, a negative chlamydia screen. Outcome expectations are that if she practices consistent condom use or abstinence; she avoids a chlamydia positive screen, paying for treatment morbidity of subsequent pelvic inflammatory disease and possible sterility.

Failure to use condoms and the failure to demonstrate self-efficacy puts the student at greater risk for infection. The absence of condom use leads to infection, and condom use is the only measure other than abstinence that prevents transmission (Pinkerton, Abramson, & Turk, 1998). To measure condom use self-efficacy, the Condom Use Self-Efficacy Scale was developed (Brafford & Beck, 1991). This tool, which yields a condom use self-efficacy score, will be used to measure the student's self-efficacy in using a condom. Carrying a condom and using a condom with self-efficacy are two different situations for the female university student. The proposed Campus Chlamydia Model will provide a framework to examine the impact of sociocultural factors such as class standing and residency along with behavioral factors like condom use self efficacy, condom use, and high-risk drinking on chlamydia infection rates.

Statistical analysis and findings may support or refute the model and will be discussed in Chapter 5.

## Summary

This literature review addresses pathobiological, environmental, and behavioral aspects of the phenomenon of rising rates of chlamydia in young women who attend a college or university. It describes the theory of self-efficacy, introduces the proposed Campus Chlamydia Model to describe the phenomenon of increasing chlamydia infection, and provides a framework for research.

# CHAPTER 3
# RESEARCH IMPLEMENTATION

This chapter describes the research study and its implementation. The two-fold purpose of this research was to determine current incidence rates of chlamydia in the student population that accesses services at the University of Florida Student Health Care Center and to determine relationships among condom use self-efficacy scores in female students, high risk drinking, sexual risk taking, and the current incidence rates of chlamydia infection.

## Research Design

A descriptive cross-sectional study method was chosen because this approach gathers information from one population at a given point in time using a convenience sample (Hulley et al., 2001). Results from a chlamydia questionnaire completed by female students were analyzed and then current chlamydia infection rates as reported by laboratory records were evaluated.

### Power Analysis and Sample Size Estimations

Clinicians often treat a gynecologic complaint rather than test for a sexually transmitted infection because of cost to the student. It is much cheaper in many instances to treat with a prescription than to pay the cost of testing and treatment. The use of the binomial dependent variable, gynecologic complaint, accounts for this practice. This dummy variable expresses either the absence or presence of a gynecologic complaint described as yeast infection, bacterial vaginosis, chlamydia, gonorrhea, herpes, or HPV.

Health care providers may see on average 10 to 20 patients on a given day. The sample size required to detect statistical significance based on responses from the chlamydia questionnaire pilot was achieved. Three hundred twenty-five questionnaires were collected. Only those that had legible responses and were complete were used for analysis, a total of 285.

The predicted sample size of this descriptive study relied on a reasonable confidence because no hypothesis testing occurred (Hulley et al., 2001). Assuming that 30% of the female students coming to a university clinic have a gynecological complaint, approximately 81 subjects were required if the estimate is to fall within 10 percentage points of the true proportion with 95% confidence. On the other hand, based on a formulation of 80% power, a medium critical effect size of 0.30, and a significance level of 0.05 for a two-tailed test, a sample of 106 subjects was deemed sufficient to address the relationship between categorical variables. For testing the difference in outcome variables, given the median effect size and 80% power, 62 subjects per group were sufficient. Finally, to determine the correlation between the outcome variables, given a medium effect size and 80% power, 82 subjects were required to address the relationship questions. The Gpower computer software (Erdfelder, Faul, & Buchner, 1996) was used to calculate the required sample size.

**Setting and Subject Recruitment**

The University of Florida Student Health Care Center is fully staffed with personnel to meet the health care needs of those students requiring women's health examinations, counseling on birth control methods, sexually transmitted disease testing, and walk-in appointments as needed. It has also been the site of previous research. The

Student Health Care Center at the University of Florida and its satellite clinics serve the health care needs of approximately 27,000 female students annually.

The main campus and satellite clinics provide similar services with private areas to complete health history information and confer with the health care providers about confidential concerns. Approved flyers invited the students to participate in this study and an explanation of the study's purpose and instructions were attached to the front of chlamydia questionnaire.

**Instruments**

**Chlamydia questionnaire.** The student volunteer subject was given a cover letter explaining the purpose of the study a self-report chlamydia questionnaire. A questionnaire including demographic information, questions on sexual behavior, high-risk drinking, treatment for sexually transmitted diseases, and the Condom Use Self-Efficacy Scale (Appendix A) was used to gather research data. This combined questionnaire scale includes the 28 items developed and validated by researchers at the University of Maryland named the Condom Use Self-Efficacy Scale (Brafford & Beck, 1991). This instrument was used to collect data on condom use, high-risk drinking behaviors, and sexual risk taking. Items were either fill-in-the-blank or multiple responses with answers to cirlce.

**Condom Use Self-Efficacy Scale.** The Condom Use Self-Efficacy Scale (CUSES) is based on self-efficacy theory (Bandura, 1997b) and was used to study cognitive and behavioral predictors of sexually transmitted diseases in adolescent and young adults (Sieving et al., 1997). It was developed from behavioral theory and has been tested for reliability and validity. It has a proven Cronbach's alpha of 0.91 and test-retest correlation equaling 0.81 (Brafford & Beck, 1991). The CUSES research

completed at universities in the Midwest verified its reliability demonstrating a Cronbach's alpha of .94 for the scale and a reliable application to college student research (Peterson & Gabany, 2001). Each item on the scale requires the student to circle an item on a 5-point response format ranging from "strongly disagree" (scored as 1) to "strongly agree" (scored as 5) in this research. The scoring is reversed on items 8, 9, 10, 15, 16, 17, and 18. The scores for each item are then summed yielding a total score ranging from 0-140, with higher scores indicating greater condom use self-efficacy. Table 3-1 provides a sample of the questions included.

In studies focused on the development of the condom use self efficacy scale by Brafford & Beck (1991), a high CUSES score emerged as predictor of change in sexual risk behavior, an indicator for specific health education topics such as application of condoms and additional research to support these findings (Satha, Hanna, & Rodcumdee, 2005; Sieving et al., 1997). In particular, Peterson & Gabany ( 2001) found that students at their midwestern university who reported using condoms consistently during the last 30 days scored statistically significantly higher on the CUSES.

Table 3-1. Examples of questions used in the Condom Use Self-Efficacy Scale

| | Strongly disagree | Disagree | Undecided | Agree | Strongly agree |
|---|---|---|---|---|---|
| I feel confident that I could remember to carry a condom with me should I need one | | | | | |
| I feel confident in my ability to discuss condom usage with any partner I might have. | | | | | |

These results are meaningful because condom use requires some technical skill and may require negotiating with a resistant partner on some occasions. The scale integrates condom use negotiation, confidence about applying condoms, and using condoms while drinking or using marijuana (Brafford & Beck, 1991; Peterson & Gabany,

2001). The purpose of using the CUSES was to evaluate reported condom use self-efficacy in those students who completed the questionnaire. Research evaluating and utilizing this tool noted that convenience sampling and self-report were listed as limitations to the tool; despite this report, the tool has demonstrated reliability (Brafford & Beck, 1991; Cecil & Pinkerton, 1998; Peterson & Gabany, 2001). Condom use self-efficacy is integral to this research because condom use is identified as the key preventative measure to stop the spread of chlamydia (USPTF, 2002).

**Data Analysis of Laboratory Review**

Chlamydia infection rates were determined from reported findings from the Student Health Care Center's laboratory manager. The laboratory manager signed a confidentiality agreement prior to research implementation. Then, after review of positive chlamydia test results, provided deidentified data that assisted in determining gender, residence, and reinfection for students accessing health care services at the University of Florida Student Health Care Center. Positive laboratory tests with deidentified data confirming Chlamydia infection were collected from laboratory findings. These raw data were transferred to a log on a password protected computer file. This file was then transferred to a statistical analysis data sheet for future analysis (Appendices B and C).

Rates calculated from 2005 indicated that laboratory results of sexually transmitted disease data reveal a 7% incidence rate of chlamydia infection in females. These rates are consistent with increasing trends and are almost twice as high as rates reported by the American College Health Association (ACHA, 2005). They were compared to the case rates reported by the Alachua County Health Department, the Florida Department of Health, and national prevalence rates for women ages 18 to 24 to

determine whether rates for female students accessing health care services at the University of Florida Student Health Care Center were consistent with current rising rates reported locally, statewide, and nationally.

## Data Collection Methods

Completed anonymous questionnaires from volunteer subjects were used to gather data and as a strategy to ensure accurate self-report for sexual activity, condom use, and high risk drinking. These questionnaires were collected at the University of Florida Student Health Care Center clinic on the main campus. A letter of explanation was attached to the front of the questionnaire that explained the purpose of the study, and provided contact information and instructions for completing the questionnaire. Students completed the questionnaires and placed them in an envelope. These envelopes were collected on a daily basis by the principal investigator. Questionnaires were collected until the number of subjects required for statistical analysis was met. The time period for raw data collection was approximately 3 weeks.

The questionnaire information was entered on a statistical program variable data sheet to facilitate analysis at a later date. The computer used was password protected and data were locked in a filing cabinet behind a locked door to ensure confidentiality.

## Analysis of Questionnaire Data

Descriptive statistics were used to obtain the summary measures for all data, including a description of the sample characteristics. Descriptive statistics included means, medians, range, and standard deviations for continuous variables. Categorical variables were statistically represented in frequency distributions, percentage distributions, and graphical illustrations. A $p$-value of less than 0.05 was considered statistically significant.

For the evaluations of the research questions, Wilcoxon rank sum test was used when two groups were compared. Spearman correlation analysis was used to determine the correlation between the variables. Analysis of frequency was utilized to determine the relationship between categorical variables. Finally, logistic regression analysis was used to explore potential differences in predictor variables between those with and without a gynecological complaint.

## Ethical Considerations

University students are a readily accessible health population and are considered vulnerable because of economic and power relationship issues between professors and students. Therefore, no research implementation of any kind was done until the study protocol was reviewed and approved by the Institutional Review Board at the University of Florida and the medical director of the University of Florida Student Health Care Center.

Recruitment was completed with special concern for the students' vulnerability and accessibility. Health care was provided to students regardless of their participation in the study and no medical treatment was denied at anytime if they refused to participate. All responses were anonymous and confidential, and the review of chlamydia case reporting was done without identifiers. Health Insurance Portability and Accountability Act (HIPAA) guidelines were observed.

## Summary

This chapter explained the research study design, including data collection, power analysis and sample size estimation, recruitment, instruments, and ethical considerations to implement the research.

# CHAPTER 4
# FINDINGS

## Introduction

### Research Purpose

The purpose of this research was to determine current infection rates of chlamydia in the student population that accesses services at the University of Florida Student Health Care Center and to determine relationships among condom use self-efficacy scores in female students, high-risk drinking, sexual risk taking, and the current incidence rates of chlamydia infection.

### Research Questions

- What is the relationship among condom use self-efficacy responses and sexual risk-taking behavior and high-risk drinking among the female college students who access services at a university student health care center?
- What are the differences in the number of sexual partners and the amount of high-risk drinking between those who did and did not engage in high-risk sexual activity?
- What are the combined effects of condom use self-efficacy scale scores, number of sexual partners, high-risk drinking, and sexual risk taking behaviors on those with a gynecological complaint?

In this chapter, infection rates of chlamydia for those students who access services at the University of Florida Student Health Care Center (UF SHCC) are described, the sample characteristics of those female students who completed the chlamydia questionnaire are described, and the research questions are addressed.

## Infection Rates

Infection rates for students who access the UF SHCC were calculated from deidentified data provided by the laboratory manager. The incidence of chlamydia infection for these students for the calendar year 2005 and rates for January 2006 are provided in Table 4-1. This table represents an increasing trend in infection rates based on the number of students tested and the time of year. A breakdown of percentages between males and females was unavailable prior to July 2005. Rates among males and females are variable, and this may be a result of increased screening done by healthcare providers due to the availability of urine screening tests at a reduced cost.

Table 4-1. Chlamydia infection data for students who access services at the University of Florida Student Health Care Center

| Month/Year | Total students tested/N | Percentage positive total/(N) | Percentage positive female/(N) | Percentage positive male/(N) |
|---|---|---|---|---|
| January 2006 | 235 | 5.1 (12) | 1.3 (3) | 3.8 (9) |
| December 2005 | 208 | 7.8 (16) | 5.2 (11) | 2.4 (5) |
| November 2005 | 235 | 6.4 (15) | 3.0 (8) | 2.9 (7) |
| October 2005 | 290 | 6.5 (18) | 3.7 (11) | 2.8 (7) |
| September 2005 | 389 | 5.4 (21) | 2.6 (10) | 2.8 (11) |
| August 2005 | 152 | 5.2 (8) | 2.0 (3) | 3.2 (5) |
| July 2005 | 149 | 7.4 (11) | 2.7 (4) | 4.7 (7) |
| June 2005 | 120 | 3.3 (4) | * | * |
| May 2005 | 154 | 3.2 (5) | * | * |
| April 2005 | 245 | 4.5 (11) | * | * |
| March 2005 | 263 | 6.1 (16) | * | * |
| February 2005 | 238 | 9.2 (22) | * | * |
| January 2005 | 285 | 7.0 (20) | * | * |

* Missing data—Unavailable

Table 4-2 illustrates the demographic characteristics of students testing positive and notes the mean age as 20, with females testing positive 70% versus males at 30%. The ethnicity of those testing positive were white at 25%, Black at 21.4%, Hispanic at 12.9%, and Asian at 4.3%. No repeat infections were noted. The majority of the students

who tested positive gave an apartment address as their residence with dormitories the next frequent and a fraternity or sorority house as the lowest reported place of residence. The average demographic characteristics of those who tested positive for chlamydia infection were 20 years of age, female, white, and residing in an apartment off campus. This demographic information and the case rates were not available previously.

Table 4-2. Demographic characteristics for students testing positive for chlamydia infection

| Demographic | Frequency/Percent |
|---|---|
| Age (20) | 18.0% |
| Gender | |
| Female | (56) 70.0% |
| Male | (31) 30.0% |
| Ethnicity* | |
| White | (20) 25.0% |
| Black | (16) 21.4% |
| Hispanic | (9) 12.9% |
| Asian | (3) 4.3% |
| Residence* | |
| Off-campus apartment | (56) 75.7% |
| On-campus dormitory | (11) 14.3% |
| On-campus sorority/fraternity house | (1) 1.4% |
| Off-campus home | (6) 8.5% |

* Missing data

**Chlamydia Incidence Rates for 2004**

This rate was reported as 3.8% by the American College Health Association and is considered the national average (ACHA, 2005). Responding student health care centers had enrollment size ranging from 836 to 51,827, with a mean size of 15,049 (ACHA, 2005). Unfortunately, in 2004 no data were collected or evaluated for genital chlamydia infection in students who accessed services at the UF SHCC.

**Incidence Rates for 2005**

The incidence rate of chlamydia infection for students who accessed health care services at UF SHCC was calculated using the total number of new cases diagnosed divided by the total number of persons at risk. The denominator, persons at risk, were those individuals identified by healthcare providers who were at risk for chlamydia infection. These rates were calculated at 5.8% for 2005 for the UF SHCC. The rates for the American College Health Association have not been published for 2005; these rates might also increase.

**Incidence Rates for 2006**

Chlamydia infection rates for students who access services at the UF SHCC thus far in 2006 yield a rate of 5.1%. Infection rates from the first few months of 2006 do not necessarily reflect the average infection rate of chlamydia for the entire year. Subsequent analysis of these rates will be completed when data from all months are available.

**Comparisons of National and State Data**

In comparison to the national data provided by the American College Health Association, the infection rates for students who access services at the UF SHCC are 1.5 times the national average of 3.9%. This is consistent with the infection rates reported by the Alachua County Health Department (Florida Department of Health, 2006). The comparisons are noted in Table 4-3.

Table 4-3 provides a comparison between reported chlamydia infection in students who access health care at a college or university student health care center in the United States and the reported infections of chlamydia at the UF SHCC. These rates are comparable because of the methodology used to analyze percentages. To arrive at the rates, those testing positive were divided by the total students tested (P. Davis-Smith,

personal communication, April 5, 2006). In contrast, statistics from the Alachua county health department are reported by case only. Reporting of chlamydia is required by law in Florida (Florida Department of Health, 2006). The number of cases of chlamydia infection in Alachua county has more than doubled in 9 years, from 480 in 1995 to 1134 in 2004 (Florida Department of Health, 2006).

Table 4-3. Chlamydia infection rates as reported by the ACHA and the University of Florida Student Health Care Center

| Reporting agency | Year | Percent of chlamydia infections reported/(N) | Percentage of females/(N) | Percentage of males/(N) |
|---|---|---|---|---|
| American College Health Association* | 2004 | 3.9 | 3.6 | 7.9 |
| University of Florida Student Health Care Center | 2005 | 5.8 (158) | 3.2 (87) | 2.6 (71) |

*Reported in percents only.

## Questionnaire Analysis

### Sample Characteristics

The questionnaire was offered to female students who accessed care at the UF SHCC for any reason. During a 3-week period, 328 questionnaires were collected. Questionnaires that were complete and legible were used for analysis. The sample consisted of 285 questionnaires. Demographic characteristics also were derived from this questionnaire; details of these characteristics are illustrated in Table 4-4. The ages ranged from 18 to 31 years with the mean age of 20.81 years (SD = 1.85, Median = 21 years). The majority of students (74%) were Caucasian, and resided off campus, 78.2%. Senior students made up the largest percentage of subjects, 27.02%.

### Variables

The variables selected for analysis were determined from a literature review of the epidemiology of genital chlamydia infection. Independent variables were age,

number of sexual partners, condom use self-efficacy scale (CUSES) scores, sexual risk taking, and high risk drinking. The dependent variable, gynecologic complaint, a dummy variable, reflected either the presence or absence of a diagnosis or treatment of chlamydia, gonorrhea, herpes, HPV, yeast infection, or bacterial vaginitis. This dependent variable was chosen because of the frequent practice by health care providers to treat students rather than testing for STI due to cost concerns. Frequently, treatment is cheaper than testing.

High-risk drinking was defined as five or more drinks on one occasion and determined by responses from subjects noting how many occasions in the past year they had five or more drinks and how many alcoholic drinks they consumed on each occasion. For the purposes of this research, sexual risk taking was defined as inconsistent or absence of condom use during sexual contact. This was calculated from responses to questions that asked how often the subject used condoms. Initial analysis of the independent variables included frequencies and other measures of central tendency. Table 4-4 displays the demographic characteristics of study participants in this descriptive research.

**Discussion**

Table 4-5 provides descriptive statistics of three variables. The mean age for the sample size is 20 with a SD of + or – 1.8 years. Thirty-one percent of the student volunteer subjects reported they never participated in high-risk drinking in the past 12 months. Conversely, 68% of the student volunteer subjects reported they had participated in high-risk drinking (more than 5 drinks at a sitting). The highest reported frequency of consistent condom use was 29% of the time; 27% reported never using condoms. This indicates that students participate in high-risk sexual behavior by not using condoms every time during sex at least 71% of the time. Summary measures of the variables age,

number of sexual partners, high-risk drinking, number of occasions to drink in the past 2 weeks, the number of drinks on these occasions, the number of times students were drinking and having sex, and the CUSES scores are listed in Table 4-6.

Table 4-4. Demographic characteristics of study participants (n = 285)

| Variable | Frequency (N) | Percent |
|---|---|---|
| Ethnicity | | |
| Caucasian | 211 | 74.04 |
| Hispanic | 33 | 11.58 |
| African American | 23 | 8.06 |
| Asian | 9 | 3.16 |
| Other | 9 | 3.16 |
| Residence | | |
| On-campus dormitory | 53 | 18.60 |
| On-campus sorority/fraternity | 9 | 3.16 |
| Off-campus apartment | 208 | 72.98 |
| Off-campus—Living at home | 15 | 5.26 |
| Class standing | | |
| Freshman | 50 | 17.54 |
| Sophomore | 42 | 14.74 |
| Junior | 62 | 21.75 |
| Senior | 77 | 27.02 |
| Graduate Student | 54 | 18.95 |

Table 4-5. Frequency of condom use and high-risk drinking

| Variable | Frequency (%) |
|---|---|
| Frequency of condom use in the last 12 months | |
| Never | 77 (27.02) |
| 20% of the time | 42 (14.74) |
| 50% of the time | 42 (14.74) |
| 70% of the time | 41 (14.4) |
| Always | 83 (29.1) |
| Frequency of high risk drinking (5 or more drinks on one occasion) | |
| Zero | 90 (31.6) |
| 1 | 28 (8.5) |
| 2 | 20 (6.1) |
| 3 | 15 (4.6) |
| 4 | 4 (1.2) |
| 5-10 | 53 (25.8) |
| 11-20 | 38 (11.5) |

Table 4-6. Summary measures of variables age, number of partners, high risk drinking, drink occasions, drinking and having sex, and CUSES scores (N = 285)

| Variable | Mean | SD | Median | Minimum | Maximum |
|---|---|---|---|---|---|
| Age | 20.81 | 1.85 | 21 | 18 | 31 |
| Number of sexual partners | 1.64 | 1.64 | 1 | 0 | 10 |
| High-risk drinking | 12.82 | 25.65 | 3 | 0 | 180 |
| Number of drinking occasions | 2.20 | 7.33 | 1 | 0 | 120 |
| Drinks | 3.28 | 6.72 | 3 | 0 | 93 |
| Drinking and having sex | 6.45 | 13.90 | 1 | 0 | 100 |
| CUSES | 93.91 | 18.13 | 98 | 28 | 140 |

In the past 12 months, students reported they participated in high-risk drinking an average of 12.8 times. Which means they participated in high-risk drinking on average once a month. As indicated by the median value, more than 50% of the students practiced high-risk drinking three times in the past 12 months. In the past 2 weeks, they indicated that they chose to drink an average of 2.20 occasions and had an average of 3.28 drinks on these occasions. This indicates that high-risk drinking is common practice for those students who participated in the study.

Sexual risk taking was also common in this group. The students reported that in the past 12 months they consumed alcohol and simultaneously engaged in a sexual activity an average of 6.45 occasions and had an average of 1.64 partners in the past 12 months. These behaviors would warrant condom use. But, as reflected in Table 4-5, this is not common practice. The Condom Use Self-Efficacy Scale (CUSES) scores reflect an unexpected finding. The mean total score for condom use self-efficacy was 93.91, reflective of a moderate amount of self-efficacy, and the expectation was that scores would be much lower because condom use was low.

Frequency and percent of the presence of a gynecologic complaint, sexual activity and behaviors, comfort in discussing diagnosis of an STI with a partner, and diagnosis of

either an STI, yeast infection, or bacterial vaginitis are listed in Table 4-7. The results indicated that, 29.12% of the students in the sample had a gynecological complaint. When they were asked about condom use, 29.12% always used condoms. The majority of the students in the sample (69.82%) indicated that they were very comfortable asking their partners about seeking treatment for a sexually transmitted infection. Also, 51.58% indicated that they were very comfortable discussing their diagnosis of a sexually transmitted infection with their partners. In this sample of students, five were diagnosed and treated for chlamydia (1.75%), and 2.81% of the students have been treated more than once for chlamydia.

## Research Question Findings

### Research Question 1

What is the relationship among condom use self-efficacy responses, sexual risk-taking behavior, and high-risk drinking among the female college students who access services at a university student health care center?

To address Research Question 1, Wilcoxon rank sum test and Spearman correlation analysis were utilized. There were no significant differences in mean rank CUSES scores between those who engaged in high-risk behavior and those who did not. There was a significant difference in mean rank CUSES scores between those with and without a gynecological complaint ($p = 0.0291$). Analysis using Spearman correlation coefficient indicated that the correlation among CUSES scores, age, number of sexual partners, number of times practicing high-risk drinking, number of drinking occasions, number of drinks on each occasion, and number of times drinking and having sex were statistically nonsignificant.

Table 4-7. Frequency and percent of sexual activities, behavior, sexually transmitted infection (STI), and gynecologic complaint (N = 285)

| Variable | Frequency | Percent |
|---|---|---|
| Gynecological complaint | | |
| Yes | 83 | 29.12 |
| No | 202 | 70.88 |
| Condom Use | | |
| Never | 77 | 27.02 |
| 20% of the time | 42 | 14.74 |
| 50% of the time | 42 | 14.74 |
| 70% of the time | 41 | 14.39 |
| Always | 83 | 29.12 |
| Petting | | |
| Yes | 189 | 66.32 |
| No | 96 | 33.68 |
| Masturbating | | |
| Yes | 143 | 50.18 |
| No | 142 | 49.82 |
| Oral Sex | | |
| Yes | 209 | 73.34 |
| No | 76 | 26.66 |
| Intercourse | | |
| Yes | 137 | 48.07 |
| No | 148 | 51.93 |
| Anal Sex | | |
| Yes | 11 | 3.86 |
| No | 274 | 96.14 |
| Gender of partners | | |
| Male | 267 | 93.68 |
| Female | 10 | 3.51 |
| Both | 8 | 2.81 |
| Asking partner about seeking treatment | | |
| Uncomfortable | 22 | 7.72 |
| Somewhat comfortable | 18 | 6.32 |
| Moderately comfortable | 46 | 16.14 |
| Very comfortable | 199 | 69.82 |
| Comfort in discussing an STI with a partner | | |
| Uncomfortable | 45 | 15.79 |
| Somewhat comfortable | 42 | 14.74 |
| Moderately comfortable | 51 | 17.89 |
| Very comfortable | 147 | 51.58 |

Table 4-7. Continued.

| Variable | Frequency | Percent |
|---|---|---|
| Diagnosed and treated for | | |
| Chlamydia | 5 | 1.75 |
| Gonorrhea | 5 | 1.75 |
| Herpes | 7 | 2.46 |
| HPV | 12 | 4.21 |
| Yeast infection | 47 | 16.50 |
| Bacterial vaginosis | 11 | 3.86 |
| None | 198 | 69.47 |
| Treated more than once for | | |
| Chlamydia | 8 | 2.81 |
| Gonorrhea | 6 | 2.11 |
| Herpes | 3 | 1.05 |
| HPV | 5 | 1.75 |
| Yeast infection | 38 | 13.33 |
| Bacterial vaginosis | 7 | 2.46 |
| None | 218 | 76.49 |

Analysis of frequency (chi-square analysis) indicated that there were significant relationships between having a gynecological complaint and gender of partner (chi-square = 9.95, $p = 0.0069$). That is, among those with a gynecological complaint, 4.48% indicated they engaged in sexual activity with the same sex, whereas only 1.2% of those with no gynecological complaint indicated they had a same sex relationship. There was a significant difference between having a gynecological complaint and being diagnosed and treated ($p = 0.0001$). Among those with gynecological complaints, 2.41% were diagnosed with chlamydia versus 1.52% with no gynecological complaint (Figure 4-1). In addition, there was a significant difference between having a gynecological complaint and those students treated more than once for sexually a transmitted infection ($p = 0.0001$). Among those with a gynecological complaint, 6.02% were treated more than once for chlamydia versus 1.51% of those with no gynecological complaint (Figure 4-2).

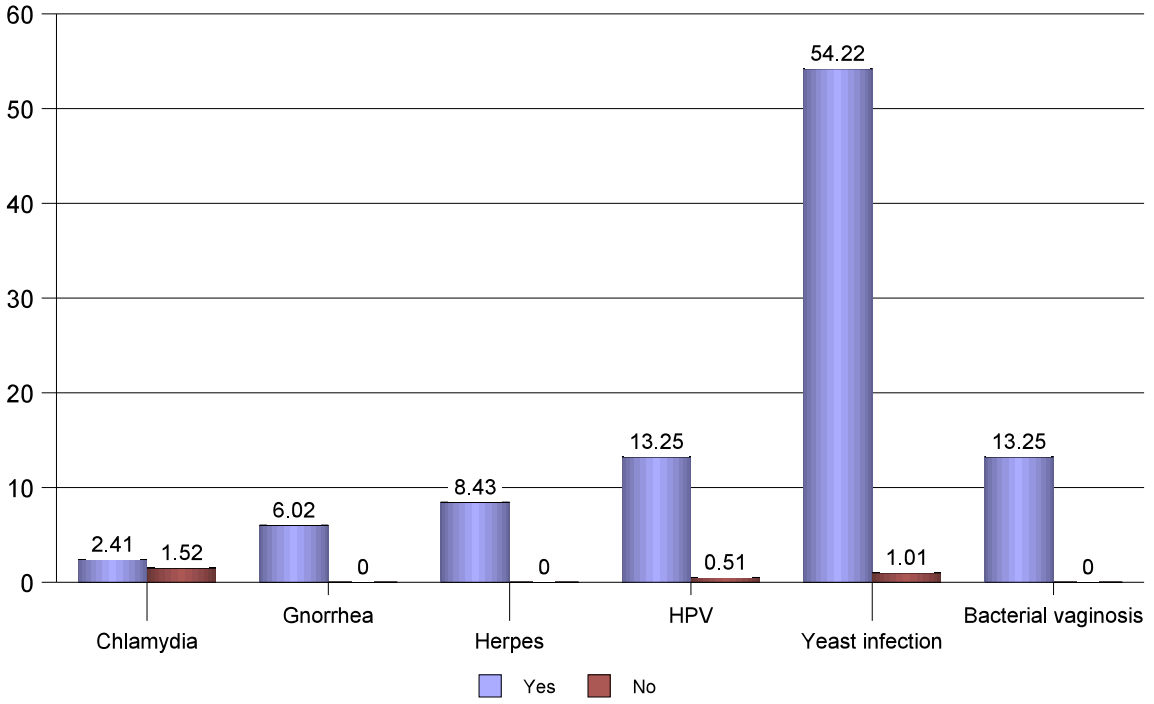


Figure 4-1. Percent of subjects with and without gynecologic complaint diagnosed and treated for sexually transmitted infection

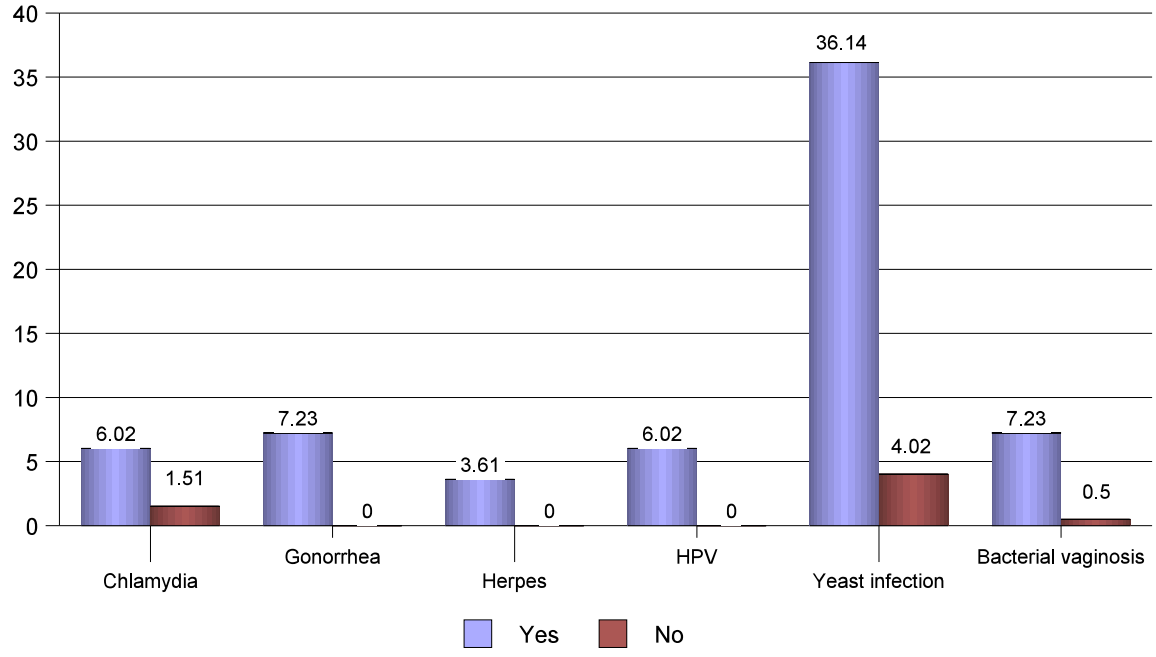


Figure 4-2. A comparison of subjects with and without gynecologic complaints treated more than once for sexually transmitted infection

**Research Question 2**

What are the differences in the number of sexual partners and the amount of high-risk drinking between those who did and did not engage in high-risk sexual activity?

Due to the skewness of the data, reports from 0 to greater than 150, the Wilcoxon rank sum test, instead of a two-sample t test, was used to address Research Question 2. The results indicated that the differences in mean rank of number of times practicing high-risk drinking, number of drinking occasions, number of drinks on each occasion, and numbers of times drinking and having sex among those who engaged in high-risk sexual activity and those who did not, were statistically nonsignificant. However, there were significant differences in mean rank of the number of sexual partners between those who did and did not engage in high-risk sexual activity (Table 4-8). Table 4-8 demonstrates that with an increase in the number of sexual partners, the amount and kinds of sexual activity increase. Therefore those students who have an increased number of sexual partners have also engaged in more diverse sexual activity such as anal sex or oral sex.

Table 4-8. The difference in mean rank of the number of sexual partners (N = 285)

| Variable | (N) | Mean Rank | Z Value | P-Value |
|---|---|---|---|---|
| Masturbating* | | | | |
| No | 141 | 129.24 | 2.35 | 0.0092 |
| Yes | 143 | 155.57 | | |
| Oral sex* | | | | |
| No | 74 | 95.01 | 6.23 | 0.0001 |
| Yes | 209 | 158.64 | | |
| Intercourse | | | | |
| No | 148 | 128.96 | 3.00 | 0.0027 |
| Yes | 137 | 155.90 | | |
| Anal sex | | | | |
| No | 274 | 140.87 | 2.36 | 0.0092 |
| Yes | 11 | 196.05 | | |
| Gynecological complaint | | | | |
| No | 202 | 132.32 | 3.70 | 0.0002 |
| Yes | 83 | 169.00 | | |

*Missing data

**Research Question 3**

What are the combined effects of condom use self-efficacy scale scores, number of partners, high-risk drinking, and sexual risk-taking behaviors on those with gynecological complaints?

Logistic regression was used to address Research Question 3. First, a logistic regression was utilized to determined combined effects of condom use self-efficacy scores, number of partners, drinking alcoholic beverages, and high risk sexual behaviors on those with a gynecological complaint. Table 4-9 lists various criteria for assessing model fit through the quality of the explanatory capacity of the model; for likelihood ratio, score statistic, and Wald statistics, this is done by testing whether the explanatory variables are jointly significant relative to the chi-square distribution. All of these statistics are analogous to the overall F test for the model parameters in a linear regression setting. The *p*-values for the chi-square of Likelihood Ratio, Pearson (Score), and Wald are all significant at a 0.05 level indicating that the explanatory variables are jointly significant in predicting the gynecological complaint.

Table 4-9. Goodness of fit complete model for the logistic regression to determine combined effects of condom use self-efficacy scale scores, number of sexual partners, high-risk drinking, and sexual risk taking on those with a gynecologic complaint

| Test | Chi-square | DF | P-value |
|---|---|---|---|
| Likelihood ratio | 27.7899 | 12 | 0.0059 |
| Score | 28.0611 | 12 | 0.0054 |
| Wald | 23.5284 | 12 | 0.0236 |

With satisfactory goodness of fit, it is appropriate to examine the parameter estimates from the model. Table 4-10 lists the estimated model parameters and their standard errors.

Table 4-10. Analysis of maximum likelihood estimates for logistic regression to determine combined effects of condom use self-efficacy scale scores, number of sexual partners, high-risk drinking, and sexual risk taking on those with a gynecologic complaint

| Parameter | DF | Estimate | Standard error | Wald chi-square | P-value |
|---|---|---|---|---|---|
| Intercept | 1 | -4.2613 | 1.9662 | 4.6972 | 0.0302 |
| CUSES score | 1 | -0.0052 | 0.0084 | 0.3797 | 0.5377 |
| Age | 1 | 0.137 | 0.0799 | 2.9411 | 0.0864 |
| Number of sexual partners | 1 | 0.3151 | 0.0972 | 10.5191 | 0.0012 |
| Drinking and having sex | 1 | -0.0063 | 0.0127 | 0.2469 | 0.6193 |
| High risk drinking | 1 | 0.0008 | 0.0064 | 1.546 | 0.2137 |
| Number of drinking occasions | 1 | -0.0086 | 0.0259 | 0.1106 | 0.7395 |
| Drinks | 1 | 0.0309 | 0.0237 | 1.7026 | 0.1919 |
| Petting | 1 | -0.1575 | 0.347 | 0.206 | 0.6499 |
| Masturbating | 1 | 0.233 | 0.3904 | 0.3562 | 0.5506 |
| Oral sex | 1 | 0.502 | 0.4331 | 1.344 | 0.2463 |
| Intercourse | 1 | -0.2552 | -0.3767 | 0.4587 | 0.4982 |
| Anal sex | 1 | 0.0399 | 0.7242 | 0.003 | 0.9561 |

Table 4-11 shows the odds ratios of the parameters in the complete model. Only the odds ratio of the number of sexual partners (1.37) was statistically significant since its 95% confidence interval did not include one. Based on the calculated odds ratio, the odds of those with gynecological complaints would increase by a factor of 1.37 times for each partner. For every five partners, the odds ratio would increase to 4.83 times ($2.71828^{5(0.3151)D}$).

Step type (stepwise procedure, forward selection, and backward elimination) logistic regression was used to obtain the optimal model. The results indicated that only the number of sexual partners significantly discriminated between those with and without gynecological complaints (chi-square = 13.90, $p = 0.0002$, Table 4-12).

Table 4-11. Odds ratio estimates for the parameters of the completed model to determine combined effects of condom use self-efficacy scale scores, number of sexual partners, high-risk drinking, and sexual risk taking on those with a gynecologic complaint

| Effect | Point estimate | 95% Wald confidence limits | |
|---|---|---|---|
| CUSES Scores | 0.995 | 0.979 | 1.011 |
| Age | 1.147 | 0.981 | 1.341 |
| Number of sexual partners | 1.370 | 1.133 | 1.658 |
| Drinking and having sex | 0.998 | 0.969 | 1.019 |
| High risk drinking | 1.008 | 0.995 | 1.021 |
| Number of drinking occasions | 0.991 | 0.942 | 1.043 |
| Drinks | 1.031 | 0.985 | 1.080 |
| Petting | 0.854 | 0.433 | 1.686 |
| Masturbating | 1.262 | 0.587 | 2.713 |
| Oral sex | 1.652 | 0.707 | 3.861 |
| Intercourse | 0.775 | 0.370 | 1.621 |
| Anal sex | 1.041 | 0.252 | 4.303 |

Table 4-12. Analysis of maximum likelihood estimates determining combined effects of condom use self-efficacy scale scores, number of sexual partners, high-risk drinking, and sexual risk taking on those with a gynecologic complaint

| Parameter | DF | Estimate | Standard error | Wald chi-square | P-value | Odds ratio |
|---|---|---|---|---|---|---|
| Intercept | 1 | -1.4577 | 0.2098 | 48.2613 | <.0001 | |
| Number of sexual partners | 1 | 0.3319 | 0.089 | 13.8988 | 0.0002 | 1.394 |

## Summary

This chapter summarized the findings from the statistical analysis of the chlamydia questionnaire and the incidence rates for chlamydia infection for students who access services at the UF SHCC. Incidence rate information also was compared to national and state data. The study provided demographic information to administrative and medical staff at the UF SHCC that was not available in the past. Subsequent discussions on the administrative levels at the UF SHCC are focused on improvements in clinical practice and chlamydia screening.

Questionnaire data indicated that high-risk drinking and sexual risk taking persist into the junior and senior class years for those students who participated in the study. Condom use self-efficacy scale scores were moderate for students who are practicing high-risk drinking and sexual risk taking. A statistical relationship was explored among condom use self-efficacy scale scores, high-risk drinking, and sexual risk taking. Although no statistical relationship was found between the condom use self-efficacy scale scores, high-risk drinking and sexual risk taking, it is alarming to note that both high-risk drinking and sexual risk taking are reported at rates greater than 65%. Further, those female students with more than one sexual partner in the past year, reported more frequent and varied sexual activity. Finally, in determining behaviors that might predict a gynecologic complaint, only the number of sexual partners was statistically significant. Implications of these findings are discussed in Chapter 5.

# CHAPTER 5
# DISCUSSION AND IMPLICATIONS

## Research Purpose

The purpose of this research was to determine current infection rates of chlamydia in the student population who accesses services at the University of Florida Student Health Care Center and to determine relationships between condom use self-efficacy scale scores in female students, high-risk drinking, sexual risk taking, and current rates of chlamydia infection.

## Discussion

### Infection Rates of Chlamydia

This research examined, for the first time, the reported cases of chlamydia infection in students who access the University of Florida Student Health Care Center (UF SHCC). The data reflect a fluctuating but steady increase in incidence rates for these students. In the past year, 2005 rates were calculated at 5.8%. National rates reported by the American College Health Association (ACHA) were 3.8% for the year 2004 (ACHA, 2005). Methodology to calculate these rates is the same (P. Davis-Smith, personal communication, April 5, 2006). But, caution should be taken in generalizing these results as not all colleges and universities reporting to the ACHA have a similar student body population. Also, the ACHA reports that the percentage of those infected are twice as likely to be male (ACHA, 2005). In contrast, the gender percentage of those most infected at the UF SHCC is female.

Statistics reported by the Florida Department of Health also reflect case rates for young females almost six times greater than the rates for young men; 26,145 in females ages 15 to 24 versus 4,857 in males ages 12 to 24 for 2004 (Florida Department of Health, 2006). An increase in the number of female students testing positive may be explained by the volume of female students screened by practitioners in the women's health care team. But increased screening does not explain persistence in increasing reports of chlamydia infection.

Those students who tested positive for chlamydia were most commonly female, Caucasian, 25 years of age, and residing in an apartment off campus. While there is no specific demographic data listed for chlamydia infection in university or college students, national, state, and county agencies have demographics on females in the comparative age range of 18 to 24 years. National data reflect that black females ages 16 to 19 have the highest rates of chlamydia at this point, 49.53% of all reported cases (CDC, 2005; Florida Department of Health, 2006). State of Florida and Alachua County rates consistently report higher cases in females, 16 to 24 (Florida Department of Health, 2006).

Increased cases of chlamydia infection with a disproportion of female to male cases are significant. It gives direction for future research that might include a double arm study to look at the comparisons between a group of students who access screening services under current practices and those who might seek out screening under a new screening policy. The research could describe differences in males and females who seek testing and which screening policy provides the most access to services for both genders.

Changes in clinical practice may also be affected. Currently, students make an appointment, see a nurse and then see a provider before a screening test is ordered and

then the student receives the screening test. This research information on chlamydia case rates and the comparisons with national data can launch a change in clinical practice and screening policy. Generating an improved protocol for screening students who may have a gynecologic complaint and desire screening is highly desirable. This improved protocol would consist of streamlined access for students. They could go directly to the laboratory and request a screening test. Laboratory personnel may choose to keep reports of case rates logged so evaluation of gender, residence and race can direct future screening policy and clinical practice. The change in policy is already in the discussion and planning stages at UF SHCC.

**Research Question 1**

What is the relationship among condom use self efficacy scale (CUSES) scores, sexual risk-taking behavior, and high-risk drinking in female college students who access services at a university student health care center?

The results of statistical analysis demonstrated that there were no relationships among CUSES scores, sexual risk taking, and high-risk drinking. This result challenges previous research that indicates a relationship is usually present between sexual risk taking and high-risk drinking. The CUSES scores reflected a moderate amount of self-efficacy, and this also challenges the logic of a high or moderate score resulting in a predicted change in behavior.

Female students, who agreed to complete the chlamydia questionnaire, were asked "In the past 12 months I have used condoms: Never, 20% of the time, 50% of the time, 70% of the time, or always." At least 27.02% of the students indicated that they never used condoms and, conversely, 29.12% always used condoms while engaging in a sexual activity in the past 12 months. The mean total score for condom use self-efficacy

was 93.91, indicating a moderate knowledge of potential benefit of condom use. These data suggest that, despite knowledge about condom use, students do not use condoms without fail and put themselves at risk for acquiring not only chlamydia but many other kinds of sexually transmitted infections. But there are no statistical relationships among CUSES scores, high-risk drinking, and sexual risk taking.

Risk factors documented in current research literature for sexually transmitted diseases, including chlamydia, are condom use, sexual risk taking, and high-risk drinking. The most common form of sexual risk taking is penile vaginal intercourse without the use of a condom (Grady & Gillam, 2003). Inconsistent condom use is a persistent trend in sexual behaviors for college and university students accompanied by alcohol use (Bay-Cheng, 2003). Additional research notes that inconsistent condom use is highly correlated with high-risk drinking (Albarracin et al., 2004).

High-risk drinking is defined as underage drinking and binge drinking. Binge drinking is defined by researchers as five or more drinks at one occasion (Dejong & Langford, 2002). Current research literature examines the social pressures of peer groups such as sorority pledging, dating events, and athletics that directly influence sexual risk taking and high-risk drinking (Wechsler et al., 2002). Additional research literature describes the interpersonal and behavioral implications from sexual risk-taking activity on college campuses, supporting consideration of the sociocultural environment as a predictor of high-risk activities (Gurman & Borzekowski, 2004). The impact of the campus culture may impact behavior more than previous research could demonstrate.

So, although students may demonstrate a moderate amount of condom use self-efficacy, this does not translate into a behavior. If it did, the expectation would be a very low mean on the CUSES scores. The findings indicate that population specific risk

factors for chlamydia infection must include other factors that have not been examined in the context of college health. The significance of these results is discussed further under implications.

**Research Question 2**

What are the differences in the number of sexual partners and the amount of high-risk drinking between those who did and did not engage in high-risk sexual activity?

Univariate statistics were used to evaluate sexual risk taking in response to questions that asked the number of sexual partners each female had in the past year, types of sexual behavior they engaged in, and the number of occasions they were drinking and having sex. The results report students were drinking and having sex an average of 6.45 occasions, in the past 12 months. The mean number of sexual partners was 1.64. But, there were no significant relationships among number of sexual partners, high-risk drinking, and sexual risk taking. This data is contrary to other research. Research in college health has reported a correlation among the spread of sexually transmitted infections, alcohol use, and engaging in sex (LaBrie et al., 2002; Liccardone, 2003). Many researchers believe this is due to the effects of alcohol, specifically decreased inhibition in a population that routinely practices risk taking (Wechsler et al., 2002).

Sexual activity, along with other risk behaviors such as binge drinking, underage drinking, sexual activity while using alcohol, and sexual contact without the use of barrier methods, contributes to the spread of sexually transmitted infections and suggests that these behaviors or risk factors be examined and their relationships explored (Donovan, 2004; Ross, 2002; Von Sadovsky et al., 2002). Not surprisingly, sexual risk taking is also associated with high-risk drinking in other research studies that explore college student behavior (LaBrie et al., 2002; Liccardone, 2003).

The implications of these finding are multifaceted and complicated by study limitations discussed later in this chapter. One rationale for the results is the infinite possibility of relationship types that occur during this time period for young people. While female students may prefer an exclusive sexual relationship, many male students do not. The health of the men with whom these young women are having sex is crucial. They may spread genital chlamydia to many partners if they are not diagnosed and treated. Drinking and sexual expectations of men and the subsequent effects on their female partners cannot be ignored. Young men in this age group may have limited access to sexual and reproductive health resources (Guttmacher Institute, 2006). This void of information impacts sexual behavior and health choices. Young men practicing sexual risk taking not only put their partners at risk but their own health status can be compromised (Guttmacher Institute).

This implication generates questions for additional research. One research question might ask what kinds of sexual expectations do men discuss with their partners and what kinds of sexual relationships do they desire? How are these expectations communicated? These questions, in the context of rigorous research methodology, would provide information on what other risk factors impact female university students and subsequent infection rates on a university or college campus.

**Research Question 3**

What are the combined effects of condom use self-efficacy scale (CUSES) scores, number of sexual partners, high-risk drinking, and sexual risk taking behaviors on those with a gynecologic complaint?

This group of data was examined using logistic regression. Results indicated that only the number of sexual partners significantly discriminated between those with and

those without a gynecological complaint (chi-square = 10.52, p = 0.0012). This finding indicates that the number of sexual partners may predict the likelihood of a gynecologic complaint. A CUSES score, high-risk drinking, and sexual risk taking do not seem to predict a gynecologic complaint or a chlamydia infection. Conversely, the increase in sexual partners may predict a predisposition to a gynecologic compliant. Hopefully the female student would seek treatment if she is symptomatic or at risk. But seeking medical treatment is not always the decision made by the student, especially if symptoms are vague or transient. Decisions to seek treatment and live independently are part of transitioning to campus life. Female students make erroneous decisions as they transition to this new life and develop life management skills.

Researchers describe the transition from home to attending a university or college as a challenge for most young women (Farrow & Arnold, 2003). Students may learn for the first time how to manage time, academic deadlines, financial obligations, and social events. There is a steep learning curve, and a campus culture can be overwhelming. The culture of a college campus is replete with gender and power issues also. Examples include formation of male/female relationships and academic pressures imposed by professors. These situations in themselves are not harmful, but making decisions on unfamiliar topics and navigating the consequences and potentially negative situations is a challenge for young female students. Making decisions about sexual risk taking and increasing sexual activity is common for women in this age group (Smith, 2003).

Individual concerns about physical symptoms in response to actively engaging in intimate sexual activity are influenced by social expectations and perception of socio cultural or campus culture issues (Berry, 2004). For some students, a vague symptom may be an indicator of sexual activity and an embarrassment. They do not seek medical

care. Conversely, some students may seek care immediately. The desire to establish intimate relationships with the approval of and adherence to peer group expectations has a considerable influence on the female student. Female students may fear being stigmatized or dirty by seeking treatment; they are less desirable or at risk of being left out of the peer group (Oprendek & Malcarne, 1997). Real or perceived power influences are critical to their perceptions and choices. These power relationships are part of gender and sociocultural expectations affecting condom use and disease transmission because they involve females and males (Gomez & Van Oss Martin, 1996).

The negative outcome of ignoring a vague symptom or gynecologic complaint may be a by product of a sociocultural expectation. The sociocultural expectation that a female who believes her partner is faithful, declines condom use, and will not need treatment for a gynecologic complaint. In many instances there is a struggle between condom use and the desire of the female student to be part of a couple, which may mean sex without condom. The negotiation of condom use is affected by power in interpersonal relationships (Few, 1997).

Studies on sexually transmitted diseases describe a moment when a young woman decides how, when, and with whom she shares sexual activity. This moment is shaped by her sociocultural environment (Berry, 2004; Kenney, 2000). There is a connection between person, behavior choice, and outcome. For example, if the expectation is to have a boyfriend, an important part of social acceptance on campus, this may imply that sex and drinking are expected. Having sex without a condom is a demonstration of the student's trust in her partner (Davidson-Harden et al., 2000).

Research that addresses the sociocultural perspectives of male-female interaction addresses the fact that not using a condom leaves the female vulnerable to infection. The

persistence of a partner saying, "Everything is okay" may lead to the perception that there is low risk or no risk (Smith, 2003). In effect, the female student wants to believe there is no risk because she wants to trust that her lover would not deceive her just to have sex (Davidson-Harden et al., 2000).The perception of risk and infection are not significant correlates. Feeling that she is not at risk does not protect the individual from infection (Kalichman et al., 2002). The student's realization that she is vulnerable to infection is significant because it affects the perception of presenting symptoms and the decision to seek medical treatment (Oprendek & Malcarne, 1997). If the student does not think she is vulnerable, the presence of a gynecological complaint or a vague symptom may be dismissed and medical treatment delayed.

Overall, behavior and condom use research support the need for further study on attitudes about the initiation of condom use (Davidson-Harden et al., 2000). Students' attitudes about the information they receive are crucial. Nurse researchers report that even in the context of a life-threatening illness, the students' acceptance of information is paramount to the subsequent follow through or practice of health promoting activities (Collins et al., 2003). College students repeatedly put themselves at risk by practicing unhealthy behavior such as sexual risk taking and high-risk drinking (Rozmus et al., 2005). Other examples are smoking, using illegal drugs, underage drinking, binge drinking, having sex with unknown partners, and having sex while under the influence of alcohol or drugs (Von Ah et al., 2004). These results demonstrate that the number of sexual partners may predict a gynecologic complaint, and when a female student sees a provider for a gynecologic complaint, screening should be offered. No research to date has provided this data in such specific terms.

## The Significance and Revisions to the Campus Chlamydia Model

### Implications of Research Results

The presence of primary and secondary prevention measures (health education, distribution of free condoms, encouraging STI screening, and inexpensive treatment) and increasing rates of reported chlamydia infection is concerning. The expectation is that these rates would be much lower than national rates or, at minimum, infection would be decreasing. A study to determine prevalence of the chlamydia infection on this university campus would be helpful to direct screening programs, comprehensive sexual and reproductive health education, earlier treatment, and diagnosis of not only chlamydia but other sexually transmitted infections.

The statistical analysis indicated that only the number of sexual partners significantly discriminated between those with and without gynecological complaints. If female students only seek treatment in the presence of a gynecological complaint, and this occurs only with those who practice sex with multiple partners, then many students are at risk for infection. Vague symptoms including burning upon urination, pelvic pain, and vaginal bleeding may be present, but asymptomatic infection is common (Weir, 2004). Mild symptoms, or lack thereof, leave these young women at risk for chlamydia-related morbidity, most specifically pelvic inflammatory disease (PID). Chlamydia PID can lead to infertility (Stamm, 2004). Unfortunately, inexpensive and effective treatment is often delayed because of the vague or absent symptoms previously mentioned (Hu et al., 2004).

The Condom Use Self-efficacy Scale has been a valuable tool on college campuses. This was the rationale for including it in the Campus Chlamydia Model developed in Chapter 2. Unfortunately, students who scored moderately well on the

Condom Use Self-efficacy Scale still engaged in sexual risk taking and high-risk drinking. A secondary analysis of the individual CUSES items would reflect individual responses of the subjects regarding sexual negotiation, comfort using a condom when using alcohol or drugs, and the mechanics of applying a condom. This information could then improve health education programs by targeting the gaps in education. This would positively affect primary prevention measures.

A secondary analysis may also provide direction to help nurses better educate students in a sociocultural environment where sexual risk taking and high-risk drinking continue into junior and senior class levels. Research on risk reduction interventions of sexually transmitted infections report that skill-based interventions are most effective (Jemmott, Jemmott, Braverman, & Font, 2005). These skill-based interventions involve the actual application of condoms on anatomical models. Role playing that includes negotiating condom use is also included. If this skill-based intervention was used, male students also should be targeted for education to not only reduce rates of chlamydia infection but to possibly instill positive attitudes about condom use (Pinkerton, Holtgrave, & Jemmott, 2000).

**Campus Chlamydia Model**

The present research findings void the model presented in Chapter 1. The expectation was that clear statistical findings would support that the independent variables of high-risk drinking and sexual risk taking predict a positive chlamydia screen, a diagnosis of a sexually transmitted infection, or gynecologic complaint. Then, conversely, a high condom use self-efficacy score would provide a negative chlamydia screen, no diagnosis of sexually transmitted infection, and absence of a gynecologic complaint.

This was not the case. The statistical findings indicated that the correlation between CUSES scores, age, number of sexual partners, number of times practicing high-risk drinking, number of drinking occasions, number of drinks on each occasion, and numbers of drinking and having sex were statistically not significant. The results indicated that the differences in mean rank of number of times having five drinks, number of drinking occasions, number of drinks on each occasion, and numbers of drinking and having sex between those who engaged in high-risk sexual activity and those who did not were statistically not significant. However, there were significant differences in mean rank of the number of sexual partners between those who did and did not engage in high-risk sexual activity. This is logical as female students who are not engaged in sexual risk-taking behaviors would not have an increase in number of sexual partners.

It was expected that clear evidence supported by statistics would reflect the positive linear relationship between person, behavior, and outcome affected indirectly by efficacy expectation and outcome expectations. But that was not the case. The CUSES scores from the students, who represent the person in the model, did not have a direct correlation with behavior, using or not using condoms.

But in this specific age group, female university students, other factors such as peer subcultures, gender-power issues, and transitioning to college may impact the students so strongly that self-efficacy is affected, and these additional factors should be studied to determine their efforts on sexual risk-taking behavior in this group.

Transitioning to campus life may be a population specific risk factor because of the influence this transition has on health behavior choices. The choice of a sexual partner or high-risk drinking may be impacted by peer group subcultures. Conversely,

sexual risk taking may influence a female university student's choice in peer groups. Gender-based power issues can influence students in their choices of risk taking behavior. The influence of a male partner can affect condom use. Unprotected sex puts both partners at risk but may also be a pledge of trust for either party.

## Limitations

Limitations of the chlamydia questionnaire data may be one reason for this lack of consistent results with previous research. Added questionnaire items were developed by the researcher based on literature review and previous research. The addition of another tool in combination with the Condom Use Self-efficacy Scale (CUSES) might yield different results or results consistent with previous findings. What the data does reflect is the need for further study. The use of a qualitative methodologic study may explain inconsistency of these findings and the lack of statistical support for the campus chlamydia model.

## Recommendations for Future Research

A connection between the transition to campus culture and the subsequent health behavior choices for students is probable. A qualitative research study could ask specific questions about relationships formed during the freshmen and sophomore years to explore sexuality, relationships, and risk factors with attention to sexual risk taking and high-risk drinking. Since sexual risk taking and high-risk drinking have already been identified in the literature as risk factors for sexually transmitted infections, their interaction with adaptation to peer subcultures and gender-based power issues may address gaps in current research literature. Qualitative research, in particular narrative analysis, would elicit personal accounts or stories from the students that may provide further valuable information regarding risk behaviors. Narrative analysis from personal

interviews would provide insight into the life and culture of the students, exploring and answering questions found in this research (Patton, 2002; Reissman, 1993).

The narrative stories of sexuality, relationships, and risk behaviors of female freshmen and sophomores could be transcribed and then thematic categories developed to answer the research questions (Ryan & Bernard, 2003). For example, an explanation of why female students of junior class standing still persist in high-risk drinking and sexual risk taking despite primary and secondary prevention measures. This research did not use any qualitative methodology, limiting some of the findings and raising more questions.

A prevalence study at the University of Florida would also be helpful to complete a picture of this phenomenon. A prevalence of an infection is studied by convenience sampling over a short period of time (Last, 2001). The true prevalence of the disease may change medical and nursing practice at the UF SHCC. This could increase screening and improve the likelihood of early treatment.

An additional limitation to this study was the focus exclusively on women. Researchers have noted that the influence of men on women's sexual behavior is substantial in this age group (Arnett, 2004). Further, experts warn that men are sexually active for at least 10 years before being married, on average, and that only 14% of these men report they had seen a health care provider for a sexual or reproductive health issue (Guttmacher Institute, 2006). Research that focuses on the role of men in women's sexuality along with the reproductive and sexual health needs of men is needed to fill the gaps in defining population specific risk factors for chlamydia infection.

## Contribution to Nursing Science

This research contributes to the body of nursing science by providing new information on possible risk factors and directions for future research. These findings

indicate that comprehensive reproductive health and sexual health education with an increase in chlamydia screening on college and university campuses is needed. Valuable information on chlamydia infection rates, demographics of those infected, and comparisons to national and state data provide nurses with valuable information they need to care for the college health population. Nurses interact with college or university students at crucial moments when students are attempting to transition to college life, a university campus, make personal health choices, and seek medical care. This research provides information that may improve these very crucial interactions, fostering positive health behaviors for a lifetime.

## Conclusion

The purpose of this study was to determine the current incidence rates of chlamydia in the student population that access services at the University of Florida Student Health Care Center. Second, to determine the relationships between condom use self-efficacy scale scores in female students, high-risk drinking, sexual risk taking, and the current incidence rates of genital chlamydia infection. This research was not designed to test a hypothesis but to provide a more accurate picture of what may be occurring in the health of female students on a university campus. A more detailed picture was sought because current primary and secondary measures of prevention have failed to decrease reported cases of chlamydia infection in this population.

Incidence rates of chlamydia infection for all students who access services at UF SHCC are higher than nationally reported rates. Self-efficacy is a significant predictor of health behaviors but may be impacted so strongly by the transition to a campus culture it scarcely affects condom use.

The scores from CUSES had no apparent relationship with high-risk drinking or sexual risk taking. Despite a reasonable degree of self-efficacy using condoms, female

students continue, even at junior class standing, to participate in high-risk drinking and sexual risk taking. The number of sexual partners was the only significant predictor of whether a female student had a gynecologic complaint. Female students reported on average 1.64 partners in the past year. The picture of what is occurring in the health of these young women is unclear, and chlamydia infection is increasing.

Fortunately policy changes are already being discussed at UF SHCC to change clinical practice and screening policies as a result of this research. This research has made an impact directly on the lives of students. But, further research is needed to determine other population specific risk factors that influence the prevalence of chlamydia infection in female university students and their male classmates. Research to promote changes in health policy and nursing practice could make the difference in the lives of all students. This research was just a beginning.

APPENDIX A
CHLAMYDIA QUESTIONNAIRE

Please complete the following information. Where a blank is present put the number that corresponds or list your race as you report it for the University of Florida Registrar's Office. Circle the answer that best describes you and your experiences.

1. Age ____

2. Ethnicity – circle one: White Hispanic Black Asian Other

3. Class Standing–circle one:
   Freshman Sophomore Junior Senior Grad Student

4. Residence–circle one:
   On-campus dormitory On-Campus sorority house Off Campus–Apartment
   Off campus–living at home

5. The number of sexual partners I have had in the last 12 months _____.

6. I have engaged in the following sexual behaviors in the past 12 months, please circle:
   Petting (touching of the genitals or breasts with clothing off or on)
   Masturbating Oral Sex Sexual Intercourse Anal Sex

7. My partners are strictly: Male Female Both

8. In the past 12 months I have used condoms:
   Never 20%of the time 50 % of the time 70% of the time Always

9. In the past 12 months, the numbers of occasions I consumed alcohol and engaged in sexual activity at the same time or during the same occasion were _____.

10. In the past 12 months, I have had 5 drinks (one beer = 1 drink, one shot = 1 drink, one glass of wine = 1 drink) or more the following number of times _____.

11. The number of occasions in the past two weeks I chose to drink _____.

12. The number of drinks (one beer = 1 drink, one shot = 1 drink, one glass of wine = 1 drink) I had on each occasion _____.

13. My comfort with asking my partner about seeking treatment if they were diagnosed with a sexually transmitted infection:
    Uncomfortable Somewhat Comfortable Moderately Comfortable Very Comfortable

14. My comfort with discussing a diagnosis of a sexually transmitted infection in myself with my current partner is:
    Uncomfortable Somewhat Comfortable Moderately Comfortable Very Comfortable

15. I have been diagnosed in the past or I am currently being treated for:
    Chlamydia Gonorrhea Herpes HPV Yeast Infection Bacterial Vaginitis None

16. I have been treated more than once for the following :
    Chlamydia Gonorrhea Herpes HPV Yeast Infection Bacterial Vaginitis None

**Condom Use Self-efficacy Scale**
(Brafford & Beck, 1991)

These questions ask about your own feelings about using condoms in specific situations. Please respond even if you are not sexually active or have never used (or had a partner who used) condoms. In such cases indicate how you think you would feel in such a situation.

1. I feel confident in my ability to put a condom on myself or my partner
   Strongly Disagree Undecided Agree Strongly Disagree Agree

2. I feel confident I could purchase condoms without feeling embarrassed.
   Strongly Disagree Undecided Agree Strongly Disagree Agree

3. I feel confident I could remember to carry a condom with me should I need one.
   Strongly Disagree Undecided Agree Strongly Disagree Agree

4. I feel confident in my ability to discuss condom usage with any partner I might have.
   Strongly Disagree Undecided Agree Strongly Disagree Agree

5. I feel confident in my ability to suggest using condoms with a new partner.
   Strongly Disagree Undecided Agree Strongly Disagree Agree

6. I feel confident I could suggest using a condom without my partner feeling "diseased."
   Strongly Disagree Undecided Agree Strongly
   Disagree Agree

7. I feel confident in my own or my partner's ability to maintain an erection while using a condom.
   Strongly Disagree Undecided Agree Strongly
   Disagree Agree

8.* I would feel embarrassed to put a condom on myself or my partner.
   Strongly Disagree Undecided Agree Strongly
   Disagree Agree

9.* If I were to suggest using a condom to a partner, I would feel afraid that he or she would reject me.
   Strongly Disagree Undecided Agree Strongly
   Disagree Agree

10.* If I were unsure of my partner's feelings about using condoms, I would not suggest using one.
   Strongly Disagree Undecided Agree Strongly
   Disagree Agree

11. I feel confident in my ability to use a condom correctly.
   Strongly Disagree Undecided Agree Strongly
   Disagree Agree

12. I would feel comfortable discussing condom use with a potential sexual partner before we ever had any sexual contact
   (e.g., hugging, kissing, caressing, etc.)
   Strongly Disagree Undecided Agree Strongly
   Disagree Agree

13. I feel confident in my ability to persuade a partner to accept using a condom when we have intercourse.
   Strongly Disagree Undecided Agree Strongly
   Disagree Agree

14. I feel confident I could gracefully remove and dispose of a condom after sexual intercourse.
   Strongly Disagree Undecided Agree Strongly
   Disagree Agree

15.* If my partner and I were to try to use a condom and did not succeed, I would feel embarrassed to try to use one again (e.g., not being able to unroll condom, putting it on backwards or awkwardness).
Strongly Disagree Undecided Agree Strongly
Disagree Agree

16. *I would not feel confident suggesting using condoms with a new patner because I would be afraid he or she would think I've
had a past homosexual experience.
Strongly Disagree Undecided Agree Strongly
Disagree Agree

17. *I would not feel confident suggesting using condoms with a new partner because I would be afraid he or she would think I have a sexually transmitted disease.
Strongly Disagree Undecided Agree Strongly
Disagree Agree

18. *I would not feel confident suggesting using condoms with a new partner because I would be afraid he or she would think I thought they had a sexually transmitted disease.
Strongly Disagree Undecided Agree Strongly
Disagree Agree

19. I would feel comfortable discussing condom use with a potential sexual partner before we ever engaged in intercourse.
Strongly Disagree Undecided Agree Strongly
Disagree Agree

20. I feel confident in my ability to incorporate putting a condom on myself or my partner into foreplay.
Strongly Disagree Undecided Agree Strongly
Disagree Agree

21. I feel confident that I could use a condom with a partner without "breaking the mood."
Strongly Disagree Undecided Agree Strongly
Disagree Agree

22. I feel confident in my ability to put a condom on myself or my prtner quickly.
Strongly Disagree Undecided Agree Strongly
Disagree Agree

23. I feel confident I could use a condom during intercourse without reducing any sexual sensations.
Strongly Disagree Undecided Agree Strongly
Disagree Agree

24. I feel confident that I would remember to use a condom even after I have been drinking.
    Strongly Disagree Undecided Agree Strongly
    Disagree Agree

25. I feel confident that I would remember to use a condom even if I were high.
    Strongly Disagree Undecided Agree Strongly
    Disagree Agree

26. If my partner didn't want to use a condom during intercourse I could easily convince him or her that it was necessary to do so.
    Strongly Disagree Undecided Agree Strongly
    Disagree Agree

27. I feel confident that I could use a condom successfully.
    Strongly Disagree Undecided Agree Strongly
    Disagree Agree

28. I feel confident I could stop to put a condom on myself or my prtner even in the heat of passion.
    Strongly Disagree Undecided Agree Strongly
    Disagree Agree

* item reverse scored

APPENDIX B
POSITIVE CHLAMYDIA RESULTS BY MONTH

Data gathering instrument used to record reported cases of chlamydia in students who access services from the University of Florida Student Health Care Center via laboratory records.

| Month/ Year reported | Jan 99 | Feb 99 | Mar 99 | Apr 99 | May 99 | June 99 | July 99 | Aug 99 | Sept 99 | Oct 99 | Nov 99 | Dec 99 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Females | | | | | | | | | | | | |
| Males | | | | | | | | | | | | |
| Total | | | | | | | | | | | | |
| | 38717 | 38748 | 38776 | 38807 | 38837 | 38868 | 38898 | 38929 | Sept 00 | Oct 00 | Nov 00 | Dec 00 |
| Females | | | | | | | | | | | | |
| Males | | | | | | | | | | | | |
| Total | | | | | | | | | | | | |
| | 38717 | 38748 | 38776 | 38807 | 38837 | 38868 | 38898 | 38929 | Sept 01 | Oct 01 | Nov 01 | Dec 01 |
| Females | | | | | | | | | | | | |
| Males | | | | | | | | | | | | |
| Total | | | | | | | | | | | | |
| | 38718 | Feb 02 | 38777 | 38808 | 38838 | 38869 | 38899 | 38930 | Sept 02 | 38991 | Nov 02 | 39052 |
| Females | | | | | | | | | | | | |
| Males | | | | | | | | | | | | |
| Total | | | | | | | | | | | | |
| | 38719 | 38750 | 38778 | 38809 | 38839 | 38870 | 38900 | 38931 | Sept 03 | 38992 | Nov 03 | 39053 |
| Females | | | | | | | | | | | | |
| Males | | | | | | | | | | | | |
| Total | | | | | | | | | | | | |

APPENDIX C
DEMOGRAPHIC CHARACTERISTICS FOR POSITIVE CHLAMYDIA RESULTS

Data collection log for review of chlamydia cases reported by laboratory results form the laboratory at the University of Florida Student Health Care Center.

| Case number | Age | Sex | Ethnicity | Repeat infection | Residence |
|---|---|---|---|---|---|
| Jan 99 # 1 | | | | | |
| Jan 99 # 2 | | | | | |
| Jan 99 # 3 | | | | | |
| Jan 99 # 4 | | | | | |
| Jan 99 # 5 | | | | | |
| Jan 99 # 6 | | | | | |
| Continue asneeded | | | | | |

Information on this data sheet will be recorded as follows. A number will signify age, sex will be noted as 0 for male and 1 for female and ethnicity will be reported as 0 for Caucasian, 1 for African American, 3 for Hispanic, 4 for Asian, 5 for Native American, 6 for nonwhite other. Repeat infection will be indicated as 0 for no and 1 for yes and residence will be recorded as 1 for on-campus dormitory, 2 for on-campus sorority or fraternity house, 3 for off-campus apartment/house and 4 for off-campus home.

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## BIOGRAPHICAL SKETCH

Ms. Thomas graduated from Saint Petersburg Junior College in 1979 with an associate degree in nursing science and an associate's degree in social arts. She received a bachelor's degree in nursing science from the University of Florida in 1996 and a master's degree in nursing science from the University of Florida in 1998. Ms. Thomas' expertise includes 18 years of clinical nursing experience in maternal newborn nursing, neonatal intensive care, adult critical care, and advanced practice nursing. Advanced practice areas include general pediatrics, pediatric forensics, adolescent gynecology, college health, primary care, and women's reproductive health. She has also enriched her career with 8 years of progressive management experience, including clinical supervision, charge nurse roles, and director levels. She has garnered 6 years of research during her career including coordination of an NIH funded study, clinical trials, and epidemiologic research. Epidemiology is Ms. Thomas's minor course of study. Presently, Ms. Thomas serves as a research associate and site coordinator for the Addictive and Health Behaviors Research Institute and as an advanced registered nurse practitioner at the University of Florida Student Health Care Center.