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# Correlates of douching frequency, sexually transmitted infections, sexual risk behaviors and reasons for douching among adolescents and young adult women.

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# CORRELATES OF DOUCHING FREQUENCY, SEXUALLY TRANSMITTED INFECTIONS, SEXUAL RISK BEHAVIORS AND REASONS FOR DOUCHING AMONG ADOLESCENTS AND YOUNG ADULT WOMEN

by

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ABSTRACT OF DISSERTATION
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The practice of vaginal douching has been associated with negative reproductive health outcomes. This research involves secondary data analysis examining correlates of douching frequency and current STD and bacterial vaginosis infection, sexual risk behaviors, and reasons for douching during the past 3 months. The study population consisted of 257 adolescents and young adult women between the ages of 14 and 23. The results indicated that, for this sample, current STD infections and bacterial vaginosis were not associated with douching frequency. There was a trend for women and adolescents reporting that they "sometimes" or "never" used a condom during the past 3 months to be more frequent douchers ($p = .0438$). Having more than one partner in a 3-month period, not using a condom during last intercourse, and having more than 3 lifetime partners were not associated with douching frequency. Participants who reported douching to "smell good" ($p = .002$) were more likely to be frequent douchers. Regression analysis identified three variables predictive of more frequent douching: douching after sex (odds ratio = 2.63, 95% confidence interval = 1.54-4.50), use of feminine hygiene spray (odds ratio = 2.21, 95% confidence interval = 1.23-3.96), and age (odds ratio = 1.19, 95% confidence interval = 1.04-1.35).

## DEDICATION

This work is dedicated to my son, Aaron Joseph Plummer, and to my mother, LaVerne Barner Quarles.

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I thank my family and friends for their support during these past 3 years. Without their care, compassion, and strength, it would not have been possible for me to complete this degree. I extend my thank-you to my committee members for assisting me through this rigorous process. I acknowledge Dr. Diane Grimley for her steadfast support in my efforts to finish my dissertation, Dr. M. K. Oh for her generosity and her permission to use the data, Dr. Lucy Annang for her feedback and her help with the dissertation process, Dr. Sharina Person for her expert skill and advice, and Dr. Retta Evans for her feedback and time.

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TABLE OF CONTENTS

*Page*

*Page*

CHAPTER

TABLE OF CONTENTS (Continued)

*Page*

LIST OF TABLES

LIST OF FIGURES

## LIST OF ABBREVIATIONS

| | |
|---|---|
| AOR | adjusted odds ratio |
| BV | bacterial vaginosis |
| CDC | Centers for Disease Control and Prevention |
| CI | confidence interval |
| CT | Chlamydia *trachomatis* |
| GC | gonorrhea |
| HIV | human immunodeficiency virus |
| *M* | mean |
| NIAID | National Institute of Allergy and Infectious Diseases |
| OR | odds ratio |
| *p* | p-value |
| PID | pelvic inflammatory disease |
| RR | relative risk |
| *SD* | standard deviation |
| STD | sexually transmitted disease |
| US | United States |

# CHAPTER 1

# INTRODUCTION

## Background on Douching

Vaginal douching, the practice of introducing liquid into the vagina for hygienic purposes, is a custom performed by women across cultures for many centuries (Barnes, 1960; Monif, 1999). From a historical perspective, the reason women in the United States (US) have douched and continue to douche has been multifaceted. At one point in American history, the douche appeared to be a popular method of contraception used by women from the 1840s through the early 20th century (Brodie, 1999). Clelia Duel Mosher, physician and Stanford University researcher, administered a questionnaire from 1892 to 1912 to her married female patients, the results of which were unpublished and were only rediscovered in 1973; these results revealed that, in the small sample of Victorian era women, douching was the most common form of birth control (42.2%). The douching solutions used by these women varied, including zinc, water, alum and alcohol, borax, and soap suds (Brodie; Tone, 2001).

A study conducted in 1952 showed that physicians of the mid 20th century prescribed douching for treatment of female reproductive health problems and viewed the practice as a normal part of a woman's personal hygiene regimen (Hirst, 1952). From 1940 until 1960, the vaginal antiseptic commercial douche was a favored product of women in the US (Tone, 2001).

Although douching has a long history in women's personal hygiene and reproductive health, its continued practice has been associated with negative reproductive health outcomes in a number of research studies. Increased risks for pelvic inflammatory disease (PID) (Scholes et al., 1993; Wolner-Hanssen et al., 1990; Zhang, Thomas, & Leybovich, 1997), ectopic pregnancy (W. H. Chow, Daling, Weiss, Moore, & Soderstrom, 1985; Daling et al., 1991; Kendrick, Atrash, Strauss, Gargiullo, & Ahn, 1997), bacterial vaginosis (BV; Ness et al., 2002; Schwebke, Desmond, & Oh, 2004), and Chlamydia *trachomatis* (CT; Peters et al., 2000; Stergachis et al., 1993) have been linked to vaginal douching.

Many douching studies have focused upon descriptive and psychosocial factors that may be associated with douching; clinical outcomes such as STD prevalence; and factors specifically associated with douching, such as types of douche products used and douching frequency. Studies examining behavioral interventions designed to prevent douching are rare. To date, Grimley, Oh, Desmond, Hook, and Vermund (in press) have conducted the only behavioral intervention study with the primary outcome of douching cessation.

Understanding the reasons women douche is important to many researchers interested in women's sexual and reproductive health outcomes and has important implications for microbicide use. Microbicides are products that potentially can be inserted into the vagina and are currently being evaluated in clinical trials for the prevention of sexually transmitted infections, HIV, and unintended pregnancy. Researchers are continuing to better understand cultural and behavioral influences concerning women's perception of vaginal lubrication and the role of douching in women's hygiene

(Braunstein & van de Wijgert, 2003). Douching studies in the US report that women primarily douche for a variety of hygienic reasons, including to feel "fresh and clean," to prevent odor, and to cleanse the vagina after menses (Chacko, McGill, Johnson, Smith, & Nenney, 1989; Foch, McDaniel, & Chacko, 2001; Funkhouser, Hayes, & Vermund, 2002; Oh, Merchant, & Brown, 2002). Further examination of the reasons why women douche can provide additional information for the development of appropriate intervention strategies for douching cessation.

Douching frequency helps to assess dose-response relationships in studies examining health risks and douching. Frequency of douching has been linked to increased risk for several disease outcomes, including PID (Scholes et al., 1993; Wolner-Hanssen et al., 1990; Zhang et al., 1997), ectopic pregnancy (Kendrick et al., 1997), BV (Ness et al., 2002), and chlamydial infection (Beck-Sague et al., 1998; Peters et al., 2000).

Although the number of women who douche has declined since 1988, the number of African American, Hispanic, and White women of low educational status who douche continues to remain high. Fifty-five percent of African American women, 33% of Hispanic, non-White women, and 21% of White non-Hispanic women reported douching, according to the 1995 National Survey of Family Growth (Abma, Chandra, Mosher, Peterson, & Piccinino, 1997).

## Purpose of the Study

The purpose of this study was to examine correlates of douching frequency. The study design was cross-sectional and compared douching frequency with (a) the prevalence of vaginal infections, (b) sexual risk behaviors, and (c) the primary reason for

douching for 3 months before program enrollment.

The study also involved an assessment of the prevalence of CT, gonorrhea (GC), Trichomonas, and BV because prior studies have found associations between douching frequency and sexually transmitted infections and BV (Ness et al., 2002; Scholes et al., 1993; Zhang et al., 1997), ectopic pregnancy (Kendrick et al., 1997), and chlamydial infection (Beck-Sague et al., 1998; Peters et al., 2000).

Sexual risk behaviors among the study population were also assessed because of the association of high-risk sexual activity—including age at first intercourse and number of lifetime partners—and douching (Abma et al., 1997; Jossens-Robbie, Eskenazi, Schachter, & Sweet, 1996; Vermund et al., 2001). Reasons women douche (douching rationale) were also explored to gain a better understanding of douching behaviors.

## Statement of the Problem

Given previous research on the negative reproductive health outcomes associated with douching, this study sought to determine whether frequency of douching was associated with psychosocial factors and biological outcomes in a sample of adolescent and young adult women who douche.

## Research Questions

The research was conducted to examine whether

1. Douching frequency is associated with increased STD risk,
2. Douching frequency is associated with sexual risk behaviors, and

3. Douching frequency is associated with reasons young adult women and adolescent girls douche.

## Significance of the Study

Many douching studies have focused on the effects of douching in populations of younger and older women of varying age categories. The results of this study may offer additional insight into douching behaviors of adolescent and young women who are between the ages of 14-23 and whose douching patterns may differ from that of older women.

## Study Hypotheses

This research sought to determine whether the associations among douching frequency, sexual infection, sexual risk behaviors, and douching rationale found in previous research studies are replicated in the present sample of adolescent and young women who report current douching. Thus, the following hypotheses were tested:

$H_1$: Women who douche more than once per month will have a statistically significant higher rate of current STD infection (chlamydia, gonorrhea, trichomonas) and BV compared to women and adolescents who douche less frequently.

$H_2$: There will be statistically significant greater levels of risk behaviors in women and adolescents who douche more than once per month compared to women and girls who douche less frequently. The variables defining sexual risk are identified in detail in the Methods section of this paper.

$H_3$: There will be a statistically significant association between the main reasons for participant douching during the 3 months before intake and the frequency of participant douching.

## Summary

This chapter provided a brief overview of the role of douching in the US and the negative reproductive health outcomes associated with the practice. Understanding the reasons women douche is necessary for future interventions and public health campaigns that promote douching cessation. The significance of this current research study to the body of literature on douching in adolescents and young adult women was presented, and the questions associated with this study were identified. The second chapter provides a more in-depth examination of the douching literature and factors associated with douching and negative reproductive health outcomes.

# CHAPTER 2

# REVIEW OF THE LITERATURE

## Vaginal Douching in the US

Results from the 1995 National Survey of Family Growth, reported by Abma et al. (1997), indicated that the percentage of women 15-44 years of age reporting "regular douching" had declined to 27% in 1995 from 37% in 1988. Despite this overall decrease, 55% of African American women, 33% of Hispanic non-White women, and 21% of White non-Hispanic women reported regular douching. When douching prevalence by region of the United States is examined, the southern United States (35%) represents the greatest percentage of women who douche, according to the 1995 National Survey of Family Growth (Abma et al.).

After examining the prevalence of douching across age and race, Abma et al. (1997) reported that (36.8%) of African American girls age 15-19 years douche compared to 10.8% of their White counterparts. The percentages were even greater for African American women 20-24 years old; 60.4% reported regular douching, compared to 20.4% of white women and 32.5% of Hispanic women in the same age category. Although the rates of douching in the United States have declined since 1988, douching levels among Black and Hispanic non-White women, in addition to women who did not finish high school (53%; Abma et al.), remain considerable.

## Adolescent Douching

Many adolescents, as well as older women, douche for hygienic reasons, including the need to feel "fresh and clean," to prevent odor, and to cleanse the vagina after menses (Chacko et al., 1989; Foch et al., 2001; Funkhouser et al., 2002; Oh et al., 2002). Adolescents also report douching before or after sex and in response to vaginal itching or discomfort (Blythe, Fortenberry, & Orr, 2003; Chacko et al.; Foch et al.) and in some cases believe that douching can prevent pregnancy or STDs (Foch et al.; Oh et al.).

Maternal and female influences (knowing someone who douches) have been reported by adolescent study participants (Chacko et al., 1989; Oh et al., 2002). In a study of racial differences in douching knowledge, attitudes, and practices among African American and White adolescents, Foch et al. (2001) reported that, of adolescents with a history of vaginal douching, ($n$ = 117), 70% learned the behavior from their mothers. Chacko et al. reported that 66% of adolescent study participants who douched learned the practice from their mothers.

A study of vaginal douching among young women attending college in the southern United States (Funkhouser et al., 2002) indicated that young African-American women were more likely to be encouraged to douche through influences of their mothers but that White women were more likely to report media, television, and advertising influences as sources for encouraging the practice of douching. Black women reported that they were most likely to receive messages discouraging douching from physicians and health care professionals, whereas White women indicated maternal influences in discouraging douching (Funkhouser et al.) Gazmararian, Bruce, Kendrick, Grace, and Wynn

(2001) found that women who douche start at an early age and that their douching behaviors were often reinforced by family, friends, and the media.

In an overview of douching practices in HIV-infected and un-infected adolescents, Vermund et al. (2001) found that recent douching was more common among sexually active females (odds ratio [OR] = 2.2, 95% confidence interval [CI] = 1.2-4.2). Age at first douche has been correlated with age at first sexual intercourse in several studies (Chacko et al., 1989; Foch et al., 2001; Funkhouser et al., 2002).

## Biological Plausibility

There are varying hypotheses on the negative impact that douching may have on the vagina flora. It is possible that "douching may remove normal vaginal flora, permitting the overgrowth of pathogens. It may also provide a pressurized fluid vehicle for pathogen transport, helping lower genital tract infections ascend above the cervix into the uterus, fallopian tubes or abdominal cavity" (Martino & Vermund, 2002, p. 111).

The physiology of adolescents may make them at greater risk for contracting sexually transmitted diseases because of greater cervical ectopy (Centers for Disease Control and Prevention [CDC], 2003). Adolescents may, therefore, be more susceptible to the effects of douching given their physiologic makeup and susceptibility to sexually transmitted diseases (Merchant, Oh, & Klerman, 1999). In addition, adolescents and young adults are at great risk for sexually transmitted infections as a result of risk behaviors such as having multiple partners and engaging in sex without barrier devices (CDC; Miller, Cain, Rogers, Gribble, & Turner, 1999).

## Douching and Sexual Activity

Several douching studies focusing on adolescent douching behaviors have reported associations between douching and sexual activity. Vermund et al. (2001) found associations between recent douching and sexual activity in adolescents. Chacko et al. (1989) reported first douche being associated with age of sexual debut.

## Douching Frequency and Adverse Health Risks

Douching frequency helps to assess dose-response relationships in studies examining associations between health risk and douching. Douching frequency has been linked to increased risk for several disease outcomes, including PID (Scholes et al., 1993; Wolner-Hanssen et al., 1990), ectopic pregnancy (Kendrick et al., 1997), CT infection (Beck-Sague et al., 1998; Peters et al., 2000; Scholes et al., 1998; Stergachis et al., 1993), and BV (Ness et al., 2002).

## PID

Pelvic Inflammatory Disease (PID) is an upper genital tract infection that can adversely affect the female reproductive system, including fallopian tubes, uterus, ovaries, and other parts of the reproductive system (National Institute of Allergy and Infectious Diseases [NIAID], 1998). PID, if left untreated, can lead to infertility, ectopic pregnancy, chronic pelvic pain, and other serious reproductive health outcomes (NIAID). PID has been associated with BV.

It is estimated that, in the United States, more than 1 million women experience an episode of acute PID, with the highest infection rate among adolescents. Nearly 70%

of women diagnosed in the United States with PID are under the age of 25 years (Ivey, 1997). PID leads to infertility in more than 100,000 women each year (NIAID, 1998).

Biological causes of PID occur when pathogens pass from the urethra and cervix into the upper genital tract. GC and CT infections are often associated with PID. Bacteria that are generally present in small numbers in the vagina and cervix may also be a factor in the development of PID (NIAID, 1998).

Risk factors for PID include sexually transmitted diseases, especially gonorrhea and chlamydia (NIAID, 1998). Other risk factors include being sexually active, being younger, having multiple sex partners, being non-White, and having prior episodes of PID (Forrest, Washington, Daling, & Sweet, 1989). Previous episodes of PID may compromise the body's defense against upper genital tract infection (NIAID).

## Douching and PID

Numerous studies have found associations between vaginal douching and PID. In a case-control study examining the role of douching in PID, Scholes et al. (1993) found women who reported douching during the 3 months before study participation had an estimated risk for PID that was higher than those women who did not douche (adjusted odds ratio [AOR] = 2.1, 95% CI = 1.2-3.9). There was an even stronger association between women who douched at least once a week and PID (AOR = 3.9, 95% CI = 1.4-10.9).

In a second case-control study examining the association between douching and pelvic inflammatory disease (Wolner-Hanssen et al., 1990), cases were more likely to have reported douching within the past 2 months as compared to a random control group

(AOR = 1.7, 95% CI = 1.04-2.82) and an internal control group who douched less than once a month (AOR = 1.9, 95% CI = 1.02-3.48). Frequency of douching was associated with increased risk for PID. The risk for women who reported douching three or more times per month was greater when compared with that for the random control group of women who reported douching less than once per month (AOR = 3.4, 95% CI = 1.1-10.4). Cases who douched three or more times per month were 3.3 times more likely to have PID than the internal controls who douched less than once per month were found to be (AOR = 3.3, 95% CI = 1.1-9.7).

Jossens-Robbie et al. (1996) found that cases were significantly more likely than controls were to report douching for purposes of hygiene (OR = 2.1, 95% CI = 1.27-3.48) and douching after menses (OR = 2.18, 95% CI = 1.36-3.50). When the data were stratified by number of lifetime partners, douching showed a stronger association with PID. For persons with 10 or more lifetime partners, having douched within the last month was associated with PID (OR = 5.2, 95% CI = 2.2-12.5).

A meta-analysis of pooled data on vaginal douching and PID (Zhang et al., 1997) found douching associated with risk of pelvic inflammatory disease (Relative Risk [RR] =1.73, 95% CI = 1.07-2.79). An examination of a dose-response pattern between frequency of douching and PID yielded a slope of 0.34 (95% CI = 0.29-0.38), indicating that women who douche once or more per week have nearly 4 times the risk for PID than women who do not douche have.

Studies examining the association between douching behaviors and pelvic inflammatory disease appear to indicate some of the strongest associations of adverse health effects and douching (Martino & Vermund, 2002; Zhang et al., 1997). Despite the

many studies reporting an association between douching and PID, it is important to note that there are studies that have found no association between douching and increased risk for PID. In a recent prospective study of douching and pelvic inflammatory disease, Ness et al. (2005) found no increased risk for PID in women who douched twice per month compared to controls (adjusted hazard ratio = 0.76, 95% CI = 0.42-1.38). In a randomized field trial of douching and PID, Rothman, Funch, Alfredson, Brady, and Dreyer (2003) found no increased risk for PID in women who used a douche product as compared to women who used vaginal wipes (AOR = 1.05, 95% CI = 0.57-1.9).

## Douching and Ectopic Pregnancy

Ectopic pregnancy is the implantation of a fertilized egg and development of the fetus in tissue outside of the uterus. This type of pregnancy most commonly occurs within the fallopian tube but can occur in the ovary, abdomen, or lower uterus. Women with PID have as much as a 10-fold increased risk for ectopic pregnancy. Estimates are that up to 50% of the women with ectopic pregnancy have a prior history of PID (U.S. National Library of Medicine, 2004).

Case-control studies on douching and ectopic pregnancy have found associations between vaginal douching and increased risk for ectopic pregnancy (W. H. Chow et al., 1985; Daling et al., 1991; Kendrick et al., 1997).

In a case-control study on douching and ectopic pregnancy in African-American women, Kendrick et al. (1997) found that women who "ever reported douching" were 3.8 times more likely to have an ectopic pregnancy than women who did not douche were found to be (AOR = 3.8, 95% CI = 1.6-8.9). Those women reporting "routine cleanli-

ness" or "habit" as their main reason for douching had a higher estimated risk for PID (AOR = 3.6, 95% CI = 1.5-8.4). Women who douched at least once per week had a risk for ectopic pregnancy twice that of women who reported never having douched. Each level of douching frequency was associated with increased risk for ectopic pregnancy.

Research by W. H. Chow et al. (1985) yielded findings that the risk for ectopic pregnancy in women who douched at least once a week was twice that of women who reported never douching (AOR = 2.03, 95% CI = 1.03-4.0). Women who used commercial douching solutions instead of water and noncommercial solutions experienced greater risk for PID (AOR = 4.4, 95% CI = 1.6-12.7).

Daling et al. (1991) reported a moderate increase in risk for ectopic pregnancy in women who douched more than twice in the past year (RR = 1.3, 95% CI = 0.9-1.8). Women who reported more than one sexual partner over their lifetime and douched more than twice within the past year had an increased risk for tubal pregnancy (RR = 1.6, 95% CI = 1.1-2.3). The data also tend to suggest that women who were exposed to *Chlamydia trachomatis* and douched may have increased risk for tubal pregnancy (RR = 2.4, 95% CI = 0.8-7.3). J. M. Chow et al. (1990), in a study of chlamydia exposure and PID, determined that current douching was a risk factor for ectopic pregnancy (AOR = 2.1, 95% CI = 1.3-3.5). A meta-analysis of pooled data on vaginal douching and ectopic pregnancy (Zhang et al., 1997) found that douching was associated with risk of ectopic pregnancy (RR = 1.76, 95% CI = 1.10-2.82).

## Douching and BV

Bacterial Vaginosis (BV) is a condition in which the normal balance of bacteria in the vagina is disturbed (CDC, 2003). In BV, $H_2O_2$-producing *Lactobacillus* levels are greatly reduced, and increased levels of bacteria such as "*Gardenella vaginalis*, *Mycoplasma hominus, Ureaplasma urealyticum* and anerobes are produced" (Holzman et al., 2001, p. 1664). BV is the most common vaginal infection in women of childbearing age (CDC, 2003). The cause of this infection is not completely known. BV has been linked to pelvic inflammatory disease (Peipert, Montagano, Cooper, & Sung, 1997) and preterm delivery (Hay et al., 1994; Hillier, Nugent, & Eschenbach, 1995).

A cross-sectional, structured interview study on douching frequency, recent douching, and douching rationale (Ness et al., 2002) identified associations between women who douched at least once per month and BV. Women who had douched "within the last 7 days" experienced the highest risk (OR = 2.1, 95% CI = 1.13-3.1).

## CT and Douching

Chlamydial infection is the most common sexually transmitted disease in the United States. Rates for chlamydia are higher than those for gonorrhea are among women in all 50 states (CDC, 2003). The number of cases of genital chlamydial infection reported to the CDC increased from 2001 to 2002 (278.3 cases per 100,000 population to 296.5 cases per 100,000, respectively), probably because of the increased efforts in screening (CDC). Rates for chlamydia are highest among adolescents and young women. The 2002 rate for chlamydia in female adolescents 15-19 years old was 2,619.1 per 100,000 population and that for young women 20-24 years old was 2,570 per 100,000

population. The state of Alabama ranked 9th in the U.S. for reported cases of chlamydia, with 351.0 cases per 100,000 population. The rate of chlamydial infection in women in Birmingham, Alabama, was 810 per 100,000 population according to CDC 2002 surveillance data (CDC). If left untreated, chlamydial infection can lead to infertility and PID (CDC).

Studies have reported an association between douching and presence of *Chlamydia trachomatis.* A cross-sectional study assessing risk variables with chlamydial infection (Stergachis et al., 1993) found that douching within the past year was associated with infection (OR = 2.2, 95% CI = 1.1-4.2). The referent group consisted of women who did not douche. In a study of adolescents and young women under the age of 21 years, the investigators reported monthly or more frequent douching was associated with the presence of *Chlamydia trachomatis* (RR = 1.47, 95% CI = 1.04-2.09; Peters et al., 2000).

## Douching and Cervical Cancer

Evidence of an association between douching and cervical cancer has been conflicting (Zhang et al., 1997). A meta-analysis examining the relationship between douching and cervical cancer yielded a pooled-data (RR) of 1.25 (95% CI = 0.99-1.59). For women who douched at least once a week, however, the pooled-data adjusted risk for cervical carcinoma was 1.85 (95% CI = 1.29-2.68; Zhang et al.). In a case-control study of douching and cervical carcinoma, Gardner and colleagues (1991) also found an association between douching and cervical cancer in women who douched more than once per week (AOR = 4.7, 95% CI = 1.9-11). In a case-control study of women with cervical cancer conducted from 1959 to 1963 in Buffalo, New York, Graham and Schotz (1979)

reported that cases were more likely than controls were to have douched frequently (≥1 week; RR = 1.69, 95% CI = 1.21-2.36, $p$ = .0018) and to have douched for many years (RR = 2.25, 95% CI = 1.60-3.17, $p$ < .00001).

## Douching and Non adverse Health Outcomes

Published reports on non adverse health outcomes of douching appear limited. However, Monif, Thompson, Stephens, and Baer (1980) found that in vivo douching with povidone-iodine produced a decrease in the total number of vaginal bacteria. Within 2 hrs of douching, the bacteria counts had increased to baselines levels, and Lactobacilli were the first bacteria to recover. On the basis of these results, some beneficial aspects of douching have been claimed. Countering this argument is the challenge that the experimental nature of the research may not reflect real-world behaviors. Women may engage in other activities that alter the vaginal flora before the 2-hr "recovery" period demonstrated in the study.

Other studies reporting some beneficial aspects of douching consist of very high-risk groups and women in underdeveloped countries where intravaginal cleansing is a common practice. For example, Joesoef et al. (1996) examined sexually transmitted diseases in 599 pregnant women who attended a public clinic in Indonesia. Ninety-one percent (91%) of the women reported douching at least once within the previous month. The results found no association between douching after sex with water only and STD infection. However, douching after sex with soap and water (AOR = 2.6, 95% CI = 1.0-7.1) and douching after sex with betel leaf (a natural antiseptic agent) or commercial

products (AOR = 2.7, 95% CI = 0.5-14.5) were associated with a higher prevalence of STDs.

Reed, Ford, and Wirawan (2001), in a study of vaginal cleansing and STDs in low-priced commercial sex workers in Bali, found women who reported vaginal cleansing after each act of intercourse also reported less discolored genital discharge than women who reported vaginal cleansing only once per day did ($p < .00001$). Despite the report of fewer discharge symptoms, the prevalence of STDs did not differ between the two groups.

In an examination of HIV infection and douching in the Central African Republic, Gresenguet, Kreiss, Chapko, Hillier, and Weiss (1997) found that a greater percentage of HIV-seropositive women than HIV-seronegative women reported regular douching with noncommercial preparations (AOR = 1.7, 95% CI = 1.0-3.0). However, data indicated an inverse association in that women who douched with commercial preparations were less likely to be HIV-seropositive (AOR = 0.6, 95% CI = 0.3-1.0).

In a randomized field trial of vaginal douching and pelvic inflammatory disease, there was little evidence of greater risk for pelvic inflammatory disease among women who were assigned to use a douche product than among women who were assigned to use a wipe product (AOR = 1.05, 95% CI = -.057-1.9; Rothman et al., 2003). Ness et al. (2005), in a prospective study of douching and PID, gonorrhea, and chlamydia, found no increased risk of PID for women who douched twice per month (adjusted hazard ratio = 0.76, 95% CI = 0.42-1.38).

The findings of beneficial effects or non effects of douching in the aforementioned studies, with the exception of Monif et al. (1980) and Ness et al. (2005), indicate

the benefit of using one type of douching solution or feminine hygiene product instead of others.

## Summary

This chapter provided an overview of the literature on douching, including its prevalence, biological plausibility, and influences, as well as the association between douching and sexually transmitted diseases and other negative reproductive health outcomes. This chapter also examined research literature that reported no evidence of harmful effects associated with douching.

# CHAPTER 3

# METHODS

## Research Questions

This study sought to determine associations among douching frequency, current STD infection, BV, sexual risk behaviors, and reasons for douching in a sample of adolescent and young women.

The research questions were:

1. Is douching frequency associated with increased STD risk?
2. Is douching frequency associated with sexual risk behaviors?
3. Is douching frequency associated with reasons why women and girls douche?

## Overview of Study Methodology

Table 1 provides an overview of the study hypotheses and the study variables, with their corresponding response options.

## Hypotheses

To address the research questions, three research hypotheses were developed.

*Research Hypotheses 1*

Women who douche more than once per month will have a statistically significant higher rate of current STD infection (chlamydia, gonorrhea, trichomonas) and BV compared to women and adolescents who douche less frequently.

*Research Hypothesis 2*

There will be a statistically significant association between higher levels of sexual risk behaviors (number of lifetime partners, number of partners within the last 3 months, younger age at first intercourse) and lower rates of condom use at last intercourse, as well as over the past 3 months, among adolescent and young adult women who douche more than once per month compared to adolescents and young women who douche only one time per month.

*Research Hypothesis 3*

There will be statistically significant associations between the "main reasons for participant douching during the 3 months prior to intake" and the frequency of participant douching. Specific associations are as follows.

1. There will be a statistically significant association between women and girls who report douching "to please partner" and douching frequency.

2. There will be a statistically significant association between women and girls who report douching "to avoid going to the doctor" and douching frequency.

3. There will be a statistically significant association between women and girls who report douching "before going to the doctor" and douching frequency.

4. There will be a statistically significant association between women and girls who report douching "to tighten the vagina before sex" and douching frequency.

5. There will be a statistically significant association between women and girls who report douching "to remove menstrual blood" and douching frequency.

6. There will be a statistically significant association between women and girls who report douching "to remove vaginal odor" and douching frequency.

7. There will be a statistically significant association between women and girls who report douching "to get rid of discharge" and douching frequency.

8. There will be a statistically significant association between women and girls who report douching "to get rid of vaginal itching and irritation" and douching frequency.

9. There will be a statistically significant association between women and girls who report douching "to prevent pregnancy" and douching frequency.

10. There will be a statistically significant association between women and girls who report douching "to be clean and fresh or smell good" and douching frequency.

11. There will be a statistically significant association between women and girls who report douching "to remove semen" and douching frequency.

12. There will be a statistically significant association between women and girls who report douching "to prevent or kill STDs" and douching frequency.

13. There will be a statistically significant association between women and girls who report douching "because everyone does it" and douching frequency.

14. There will be a statistically significant association between women and girls who refuse to answer reasons they douche and douching frequency.

15. There will be a statistically significant association between women and girls who report douching "for other reasons" and douching frequency.

Table 1

Hypotheses and Response Variables

| Hypotheses | Independent variables/ Response categories |
|---|---|
| $H_1$: There will be a statistically significant higher rate of current STD infection and BV in adolescents and young women who douche more than once a month compared to women and girls who douche less frequently. | Douching frequency |
| $H_2$: There will be statistically significant greater levels of risk behaviors in women and adolescents who douche more than once per month compared to women and girls who douche less frequently. | Age at first sex<br>Number of lifetime partners<br>Number of partners past 3 months<br>Condom use during last intercourse<br>Condom use during last 3 months |
| $H_3$: There will be statistically significant association between the "main reasons for participant douching during the 3 months before intake" and frequency of participant douching | "Please partner"<br>"Avoid going to doctor"<br>"Before going to doctor"<br>"Tighten vagina"<br>"Remove menstrual blood"<br>"Remove vaginal odor"<br>"Rid of discharge"<br>"Rid of itching/discharge"<br>"Prevent pregnancy"<br>"Clean fresh, smell good"<br>"Remove semen"<br>"Prevent or kill STD"<br>"Everyone does it"<br>"Refused to answer"<br>"Other reason" |

*Note*. BV = bacterial vaginosis.

## Study Design

The current research used a cross-sectional study design involving secondary data analysis of baseline data from a randomized control study that examined douching behaviors of 276 adolescent and young women between the ages of 14 and 23 years (Grimley et al., in press).

## Study Participants

Eligibility for the original study included females between the ages of 14 and 23 who reported douching within the last 35 days before intake. Exclusion criteria consisted of refusal to participate, current pregnancy, presence of serious medical conditions with compromised immune responses, or impaired mental functioning. The study design and protocol were approved by the University of Alabama at Birmingham Institutional Review Board for Human Use (see Appendix B).

## Survey Instrument

After providing informed consent, participants were assessed on key variables via an interviewer-administered survey. At the completion of the behavioral assessment, study participants were taken to the clinical staff to have a pelvic examination, and cultures for BV, CT, GC, and trichomonas were obtained. The Nugent method was used to assess for Bacterial Vaginosis. *Trichomonas vaginalis* was detected through use of the InPouch TV culture technique. Urine specimens were taken to determine the presence of *Neisseria gonorrhoeae* (GC) and CT through use of the ligase chain reaction test. Respondents who tested positive for infection were treated by clinic staff.

## Study Measures

### *Demographics*

The study examined descriptive statistics of study participants, including the continuous variables age and age at menarche. Race was initially coded into five categories: (a) African American, (b) Asian/Pacific Islander, (c) Hispanic, (d) Multi race/Other, and (e) White. On the basis of very small numbers of or the absence of participants in some categories, race was recoded into three categories (African American, White, and Multi-race/ Other).

### *STD*

Sexually transmitted disease status and bacterial vaginosis were determined by the presence or absence of (a) chlamydia, (b) gonorrhea, (c) trichomonas, and (d) bacterial vaginosis through vaginal cultures. BV was initially coded at three levels to represent the level of vaginal flora--normal (0-3), intermediate (4-6), and high (7-10). Scores of 7-10 were categorized as BV positive, and scores between 0 and 6 were categorized as BV negative.

### *Sexual Risk Behaviors*

Five measures were used to assess the construct of sexual risk in the study. The "total number of lifetime partners" was recoded into two levels for this study: $\leq 3$ partners or $>3$ partners. The "number of partners in the last 3 months" was a continuous variable that was recoded into a dichotomous nominal variable: $\leq 1$ partner and $>1$ partner. When the data on partners during the past 3 months were examined, it was noted that several

girls ($n$ = 26, 10.1%) reported having no partner. Mantel Haenszel statistics were run to determine any differences among "0", "1" and "more than 1" partner across levels of douching frequency. There were no statistically significant differences ($p$ = .09), and girls reporting "0" partners during the past 3 months were combined with women reporting 1 partner and were recoded to the response category of ≤1. "Condom use during the last act of intercourse" had four levels of response: "yes," "no," "don't know/remember," or "refused to answer." On the basis of the very small numbers and absence of responses ($n$ = 8), the categories "don't know/remember" or "refused to answer" were omitted from the analysis. "Condom use during the last 3 months" offered five response options for participants–"always," "most of the time," "sometimes," "never," and "no sex." After a preliminary examination was done for differences in response rates across categories by douching frequency, the response "no sex" was excluded, and the data were run with the remaining four response categories for this ordinal variable. "Age at first intercourse" was a continuous variable that was examined through use of the $t$-test.

*Douching Behaviors*

Three measures were used to assess douching behaviors. They include (a) age at first douche, (b) frequency of douching and (c) reasons for douching within the past 3 months. "Age at first douche" was a continuous variable and was examined by using the $t$-test. Frequency of douching (participants who report douching 1 time per month and those who douche more than once per month) was categorized as a nominal, dichotomous variable. The "main reasons for douching during the past 3 months" measure was examined by using 15 items, with each response option recoded into "yes" or "no." The

response choices were not mutually exclusive. The items consisted of (a) "to please partner," (b) "to avoid going to the doctor," (c) "before going to the doctor," (d) "to tighten the vagina," (e) "to remove menstrual blood," (f) "to remove vaginal odor," (g) "to get rid of discharge," (h) "to get rid of vaginal itching and irritation," (i) "to prevent pregnancy," (j) "to be clean and fresh/smell good," (k) "to remove semen," (l) "to prevent/kill STD," (m) "everyone does it," (n) "refused to answer," (o) "other."

## Data Analysis

Douching frequency in the parent study was categorized into four levels. Each participant self-reported her douching frequency: (a) douche less than once per month, (b) douche only once per month, (c) douche 1-2 times per week, or (d) douche 2-3 times per month. Because the focus of this research was on potential differences in the behaviors and sexually transmitted infection rates of study participants who douche regularly, participants who reported douching less than one time per month ($n = 19$) were excluded from the analyses. The adjusted dataset included 257 participants who were classified into one of two categories: (a) adolescents and women who reported douching one time per month ($n = 125$) and (b) those who reported douching more than once per month ($n = 132$). The power analysis for the study was based upon a statistical power of 95% with a two-sided Type I error rate of 1% and a medium effect size of .30. On the basis of these power calculations, the study was able to provide 97% power (Cohen & Cohen, 1983).

The data were analyzed with SPSS (Statistical Package for the Social Sciences), Version 13.0, and SAS, Version 9.0. Descriptive statistics were conducted to provide measures of central tendency with the continuous variables such as age, age at first

douche, age at menarche, age at first intercourse, number of sexual partners within the past 3 months, and number of lifetime sexual partners. The chi-square or independent-*t*-test statistics were used to examine associations between the levels of douching frequency and the various independent variables. When douching was identified as the independent variable, chi-square statistics were used to determine the association between STD and BV infection and frequency of douching. Logistic regression was used to develop a model of variables associated with douching frequency. Variables with a significance of $p \leq .05$ in the chi-square and independent *t*-tests were used in the regression model. The plan used for data analysis is presented in Table 2.

## Summary

This chapter provided information on the design, methods used, measures assessed, and the research hypotheses involved in this baseline secondary data analysis study.

Table 2

Data Analysis Plan

| Hypotheses | Independent variable | Level of measurement | Dependent variable | Level of measurement | Statistics |
|---|---|---|---|---|---|
| $H_1$: There will be a statistically significant higher rate of STD and BV infection in young women and adolescents who douche more than once per month compared to those who douche less frequently | Douching frequency | Dichotomous/Nominal<br>1x per month<br>>1x per month | STD and BV infection | Dichotomous/Nominal<br>Negative<br>Positive | Chi-square<br>Logistic regression |
| $H_2$: There will be statistically significant greater levels of sexual risk behaviors in women and adolescents who douche more than once per month compared to those who douche less frequently | Sexual risk behaviors<br><br>-No. of lifetime partners<br>-No. of partners in past 3 months<br>-Condom use last sex<br>-Age at 1st sex<br>-Condom use in last 3 months | Dichotomous/Nominal/ Ordinal<br>≤3 or >3<br><br>≤1 or >1<br>Yes/No<br>Continuous<br><br>Always/Most times/ Sometimes/Never | Douching frequency | Dichotomous/Nominal<br>1x per month<br>>1x per month | Chi-square<br>*t*-test<br>Logistic regression |
| $H_3$: There will be a statistically significant association in the "main reasons for douching during the past 3 months" and frequency of participant douching | Reasons for douching in past 3 months | Dichotomous/Nominal<br><br>16-category response<br>Item checked<br>Item not checked | Douching frequency | Dichotomous/Nominal<br>1x per month<br>>1x per month | Chi-square<br>Logistic regression |

*Note.* BV = bacterial vaginosis

# CHAPTER 4

# RESULTS

## Introduction

This chapter delineates the findings of this secondary analysis research study.

## Study Participants

### *Demographics*

Table 3 shows that the age of study participants ranged from 14 to 23 years, with a mean age of 18.97 years. The majority of the sample (91.0%) was African American. Age of menarche ranged from 8 to 17 years, with a median age of 12 years.

Table 3

Demographic Characteristics ($N = 257$)

| Variables | *n* | *M* or % | *SD* |
|---|---|---|---|
| Age (mean years ± *SD*) | | 18.97 | 2.12 |
| 14-15 | 19 | 7.4 | |
| 16-17 | 40 | 15.5 | |
| 18-19 | 87 | 33.8 | |
| 20-21 | 78 | 30.4 | |
| 22-23 | 33 | 12.8 | |
| Race | | | |
| African American | 234 | 91.0 | |
| White | 21 | 8.2 | |
| Other | 2 | 0.8 | |
| Age at menarche (means years ± *SD*) | | 11.97 | 1.65 |
| 8-11 | 90 | 38.9 | |
| 12-13 | 112 | 43.9 | |
| 14-17 | 45 | 17.5 | |

*Note.* *N* may fluctuate because of missing cases.

Nearly 46% of the sample had BV at the time of recruitment. The overall percentage of women with at least one sexually transmitted infection was 24.9% ($n$ = 64; data not shown). More women tested positive for chlamydia infection than for gonorrhea or trichomonas (Table 4).

Table 4

Frequency Distribution of Bacterial Vaginosis and STD Infection

| Variable | *n* | % |
|---|---|---|
| Bacterial vaginosis | | |
| Positive | 118 | 45.9 |
| Chlamydia | | |
| Positive | 43 | 16.3 |
| Trichomonas | | |
| Positive | 21 | 8.2 |
| Gonorrhea | | |
| Positive | 14 | 5.4 |

Note. *N* may fluctuate because of missing cases.

*Sexual Risk Behaviors*

The mean age at sexual initiation was 15.10 years for the total study population (Table 5). The number of sexual partners during the past 3 months ranged from 0 to 6, with a mean of 1.18 partners; however, having more than one partner over the past 3 months was associated with current BV and chlamydia infection ($p$ = .002, and p = .007, respectively).

Women and girls who reported having a "regular partner" were older than participants who did not have a regular partner were found to be ($M$ = 19.17 years vs. $M$ = 18.12 years; respectively $p$ = .004). Younger women were more likely to report condom

use during last intercourse than older women were ($M$ = 18.34 years vs. $M$ = 19.75 years, respectively; $p$ = .000), and participants reporting >3 or more lifetime partners were older than participants with ≤ 3 partners over their lifetime were found to be ($M$ = 19.56 years compared to $M$ = 18.37 years, $p$ < .0001).

Table 5

Frequency Distribution of Sexual Risk Behaviors ($N$ = 257)

| Variable | *n* (%) | *M* | *SD* |
|---|---|---|---|
| Age at first sex (years) | | 15.10 | 1.66 |
| Partners over 3 months | | | |
| ≤1 | 199 (79.6) | | |
| >1 | 51 (20.4) | | |
| Lifetime partners | | | |
| ≤3 | 116 (46.6) | | |
| >3 | 133 (53.4) | | |
| Regular partner | | | |
| Yes | 209 (83.6) | | |
| No | 41 (16.4) | | |
| History of STDs | | | |
| Yes | 102 (40.0) | | |
| No | 153 (60.0) | | |
| Condom use last sex | | | |
| Yes | 130 (52.2) | | |
| No | 119 (47.8) | | |

*Note.* $N$ may fluctuate because of missing responses.

*Douching Characteristics*

The age at first time of douching ranged from 9 to 21 years. Frequency of douching was distributed across two levels; 125 (48.4%) of adolescents and young women reported douching one time per month, whereas 132 (51.6%) reported douching more than once per month. Participants had douched on average for 3.24 years, with a range of

>1 to 11 years. Douching characteristics for the overall study population are provided in Table 6.

Table 6

Frequency Distribution of Douching Characteristics by Study Population

| Variable | *n* (%) | *M* | *SD* |
|---|---|---|---|
| Age at first douche (years) | | 15.72 | 2.028 |
| Frequency of douching | | | |
| 1x per month | 125 (48.4) | | |
| >1x per month | 132 (51.6) | | |
| Last time douched | | | |
| ≤7 days | 98 (38.1) | | |
| >7 days | 158 (61.5) | | |
| Type of douche used | | | |
| Commercial | 247 (96.1) | | |
| Homemade | 4 (1.6) | | |
| Both | 6 (2.3) | | |
| Last douche product used[a] | | | |
| Vinegar and Water | 167 (65.0) | | |
| Scented | 69 (26.8) | | |

Note. *N* may fluctuate because of missing responses. [a] Categories with very small response sizes were omitted.

There were several significant associations found among douching frequency, douching characteristics, and use of feminine hygiene products. Table 7 shows that study participants who douched more than once a month reported douching for a longer duration and had douched more closely to the time of intake than participants who douched once per month did. No differences were detected for douching frequency and age of douching initiation.

Table 7

Douching Characteristics by Douching Frequency ($N = 257$)

| Variable | Douche 1x per month ($n = 125$) $n$ (%) | Douche >1x per month ($n = 132$) $n$ (%) | $p$ |
|---|---|---|---|
| Age at first douche (mean years ± *SD*) | 15.81 ± 1.97 | 15.66 ± 2.09 | 0.54 |
| Duration of douching (mean years ± *SD*) | 2.81 ± 2.13 | 3.64 ± 2.13 | 0.002 |
| Days since last douche (mean days ± SD) | 17.21 ± 10.42 | 10.73 ± 8.21 | 0.000 |
| Last douche | | | |
| >7 days | 93 (75.0) | 65 (49.2) | 0.000 |
| ≤7 days | 31 (25.0) | 67 (50.8) | |

Note. $N$ may fluctuate because of missing responses.

Regarding the association between timing of douching and douching frequency, only two situations were statistically significant. Participants who douched more than once a month were more likely to douche before and after sex than participants who douche once per month were likely to do (Table 8).

Table 8

Timing of Douching by Douching Frequency ($N = 257$)

| Variable | Douche 1x per month ($n = 125$) $n$ (%) | Douche >1x per month ($n = 132$) $n$ (%) | $p$ |
|---|---|---|---|
| Sometimes douche | | | |
| After period | 110 (88.0) | 113 (86.3) | .678 |
| After sex | 44 (35.2) | 82 (62.6) | .000 |
| Before sex | 13 (10.4) | 27 (20.8) | .023 |
| Itch/Discomfort | 10 (8.0) | 13 (10.1) | .564 |
| Discharge | 13 (10.4) | 20 (15.4) | .236 |
| Odor | 40 (32.0) | 52 (40.0) | .184 |
| Before visit to doctor | 10 (8.0) | 14 (10.9) | .437 |

In terms of other feminine hygiene products, women who douche more than once a month were significantly more likely to use vaginal sprays than women who douche with less frequency were likely to do (Table 9).

Table 9

Use of Feminine Hygiene Products by Douching Frequency ($N = 257$)

| Variable | Douche 1x per month ($n = 125$) $n$ (%) | Douche >1x per month ($n = 132$) $n$ (%) | $p$ |
|---|---|---|---|
| Spray | 30 (24.0) | 53 (40.2) | .006 |
| Suppositories | 6 (4.8) | 6 (4.5) | .923 |
| Wash | 27 (21.6) | 29 (22.0) | .943 |
| Powder | 32 (25.6) | 26 (19.7) | .258 |

*BV and STDs*

BV was the most common infection for women in this sample (45.9%), followed by chlamydia (16.3%), trichomonas (8.1%), and gonorrhea (5.4%; Table 4). Persons who tested positive for infection were treated at the UAB Adolescent Clinic by the research study's medical staff. Coinfection with two STDs was found among study participants; however, the associations were not significant, with the exception of women who were co-infected with chlamydia and trichomonas infection $\chi^2(1, N = 7) = 4.66$, $p = .03$; data not shown.

## Douching Frequency and Descriptive Variables

As a group, participants who douched more frequently tended to be older ($M =$ 19.32 years) than participants who douched less frequently ($M = 18.62$ years) were found

to be. Women who douched more often were more likely to use injections/implants for birth control ($p = .03$) than women were who douched only one time per month. Table 10 provides a list of demographic and sexual risk behaviors variables by level of douching frequency.

Table 10

Demographic and Behavioral Characteristics by Douching Frequency ($N = 257$)

| Variable | Douche 1x per month ($n = 125$) $n$ (%) | Douche >1x per month ($n = 132$) $n$ (%) | $p$ |
|---|---|---|---|
| Demographics | | | |
| Age (mean years ± *SD*) | 18.62 ± 2.18 | 19.32 ± 2.01 | 0.008 |
| Race | | | |
| African American | 118 (94.4) | 116 (87.9) | 0.12 |
| White | 7 (5.6) | 14 (10.6) | |
| Other | 0 (0.0) | 2 (1.5) | |
| Age at menarche (mean years ± *SD*) | 11.96 ± 1.46 | 11.98 ± 1.81 | 0.93 |
| Sexual Behaviors | | | |
| Age at first sex (mean years ± *SD*) | 14.87 ± 1.74 | 15.23 ± 1.73 | 0.11 |
| Injection/Implant birth control | | | |
| No | 108 (87.1) | 100 (82.4) | 0.03 |
| Yes | 16 (12.9) | 31 (23.7) | |
| Partners in last 3 months | | | |
| ≤1 | 91 (76.5) | 108 (82.4) | 0.24 |
| >1 | 28 (23.5) | 23 (17.6) | |
| Lifetime partners | | | |
| ≤3 | 57 (47.9) | 59 (45.4) | 0.69 |
| >3 | 62 (52.1) | 71 (54.6) | |
| Last sex | | | |
| >7 days | 72 (60.5) | 62 (47.3) | 0.04 |
| ≤7 days | 47 (39.5) | 69 (52.7) | |
| Condom use during last sex | | | |
| Yes | 69 (58.5) | 61 (46.6) | 0.06 |
| No | 49 (41.5) | 70 (53.4) | |

Note. $N$ may fluctuate because of missing cases.

## Hypotheses Testing and Results

Hypothesis 1 stated that women who douched more than once per month would have a statistically significant higher rate of current BV and STD infection (chlamydia, gonorrhea, trichomonas) as compared to women and adolescents who douched less frequently. Chi-square testing did not support this hypothesis, because current STD and BV infection was not associated with douching frequency in the study population (Table 11). However, testing positive for chlamydia and BV infection was associated with having more than one partner over the past 3 months ($p$ = .002 and $p$ =.007, respectively; data not shown).

Table 11

Frequency of Bacterial Vaginosis and STD Infection by Douching Frequency ($N$ = 257)

| Variables | Douche 1x per month ($n$ = 125) $n$ (%) | Douche >1x per month ($n$ = 132) $n$ (%) | $p$ |
|---|---|---|---|
| Bacterial vaginosis | | | |
| Positive | 58 (46.4) | 60 (45.5) | .88 |
| Chlamydia | | | |
| Positive | 23 (18.5) | 19 (14.4) | .37 |
| Trichomonas | | | |
| Positive | 8 (6.4) | 6 (4.5) | .51 |
| Gonorrhea | | | |
| Positive | 9 (7.3) | 12 (9.2) | .58 |

Note. $N$ may fluctuate because of missing cases.

Hypothesis 2 stated that "there will be a statistically association between higher levels of sexual risk behaviors (number of lifetime partners, number of partners within the last 3 months, younger age at first intercourse) and lower rates of condom use at last intercourse, as well as over the past 3 months, among adolescent and young adult women

who douche more than once per month compared to adolescents and young women who douche only one time per month". The results of Hypothesis 2 are as follows:

*Number of Lifetime Partners*

The mean number of lifetime sexual partners was actually higher (but not statistically significant) for participants who douched one time per month (5.69, $SD = 9.139$) in comparison to women and girls who douched more than once per month (5.25, $SD = 6.053$). When the number of lifetime partners was recoded into a dichotomous variable ($\leq 3$ or $> 3$), chi-square statistics revealed no significant association between women who douched once per month and those who douched more frequently in the reporting of 3 or more lifetime partners $\chi^2(1, N = 249) = .158$, $p = .69$; Table 10).

*Number of Partners During the Past 3 Months*

The mean number of sexual partners during the past 3 months was slightly higher in women who douched once per month (1.20, $SD = .873$) compared to women who douched more frequently (1.17, $SD = .756$); again, as with lifetime partners, the results were not statistically significant ($p = .11$). When the number of sexual partners was recoded from a continuous to a dichotomous variable, no significant associations were found between women reporting more than one partner over the past 3 months and douching frequency $\chi^2(1, N = 250) = 1.37$, $p = .24$; Table 10).

*Age at First Intercourse*

There was little difference between the mean age of first-time intercourse for women and girls across levels of douching frequency. The mean age at first intercourse for women who douched once per month was 14.88 years in comparison with 15.23 years for more frequent douchers ($p = .11$, CI = -.791 -.077; Table 10).

*Condom Use Last Sex*

A chi-square analysis of douching frequency and whether a condom was used during last sexual intercourse revealed that nearly 48% of respondents reported no condom usage. However, more frequent douching was not associated with lack of condom use during last intercourse $\chi^2(1, N = 239) = 3.529, p = .06$; See Table 10).

*Condom Use Frequency*

Figure 1 shows that condom use frequency (always, most of time, sometimes, never) was significantly association with douching frequency ($Q_{SMH} = 4.09, p = .04$ ). Women and girls who reported "no condom use" or used condoms "sometimes" were more likely to be frequent douchers.

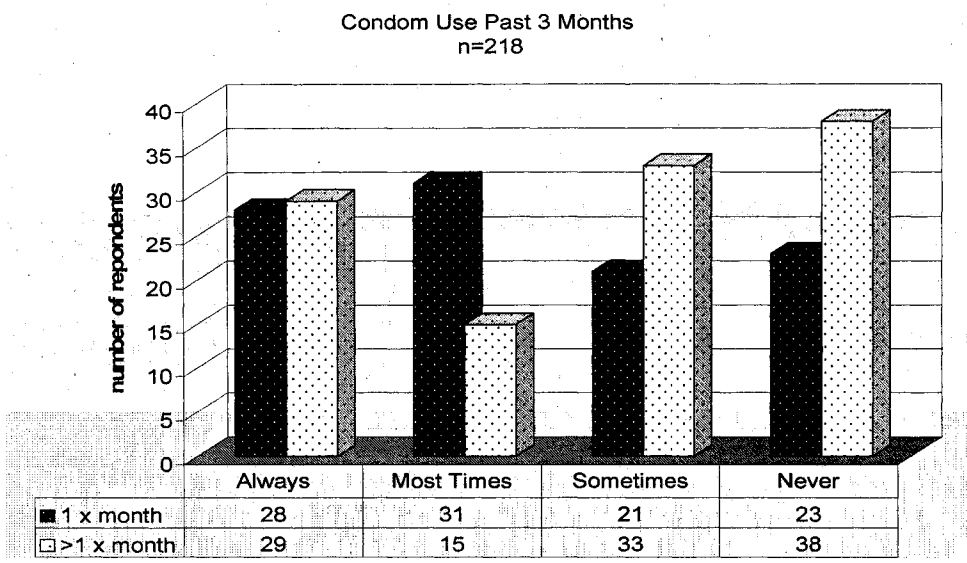


*Figure* 1. Douching frequency by 3 month condom usage ($N = 218$).

Hypothesis 3 stated that there will be a statistically significant association in the "main reasons for participant douching during the 3 months before intake" and frequency of douching. Chi-square statistics indicated that women and girls who reported douching "to feel clean and fresh/smell good" were more likely to douche more than once per month $\chi^2(1, N = 218) = 9.48,\ p = .002$; Table 12).

Table 12

Reasons for Douching During the Past 3 Months by Douching Frequency

| Response | 1x per month | >1x per month | *p* |
|---|---|---|---|
| Please partner | 2 (1.6) | 7 (5.4) | .17 |
| Avoid doctor | 1 (0.8) | 0 (0.0) | .49 |
| Before seeing doctor | 8 (6.4) | 6 (4.7) | .59 |
| Tighten vagina | 2 (1.6) | 4 (3.1) | .58 |
| Remove menstrual blood | 82 (65.6) | 72 (55.0) | .08 |
| Deodorize | 52 (41.6) | 63 (48.5) | .27 |
| Discharge | 21 (16.8) | 28 (21.5) | .34 |
| Itch | 7 (5.6) | 12 (9.2) | .27 |
| Birth control | 1 (0.8) | 2 (1.6) | 1.00 |
| Feel clean and fresh/ Smell good | 82 (65.5) | 108 (82.4) | .002 |
| Everyone does it | 0 (0.0) | 2 (1.5) | .50 |
| Semen | 6 (4.8) | 11 (8.5) | .24 |
| STD | 1 (0.8) | 0 (0.0) | .31 |
| Refused to answer | 0 (0.0) | 0 (0.0) | Constant |
| Other reasons | 2 (1.6) | 5 (3.9) | .45 |

## Model Fitting

Logistic regression by using backward, forward, and stepwise selections was performed to identify the best predictive model of frequent douching. The variables selected for entry into the regression analysis and corresponding outcomes can be found in Table 13. The variables selected for the final model were identical for the stepwise, backward and forward selection procedures.

Table 13

Logistic Regression Modeling of Frequent Douching

| Variables entered | Estimated coefficient | OR | 95% CI | *p* |
|---|---|---|---|---|
| Injection/Hormonal birth control | — | | | |
| Douching >3 years | — | | | |
| Douching before sex | — | | | |
| Douching to smell good | — | | | |
| Sex within last 7 days | — | | | |
| Age | 0.1704 | 1.19 | 1.04, 1.35 | .01 |
| Douching after sex | 0.9681 | 2.63 | 1.54, 4.50 | .0004 |
| Feminine hygiene spray | 0.7925 | 2.21 | 1.23, 3.96 | .008 |

*Note.* Dashes indicate that the variable was not in the final model. OR = odds ratio, CI = confidence interval.

The results of the final model revealed that older age ($p = .01$), use of other hygiene products (spray, $p = .008$), and douching after sex ($p = .0004$) remained significant predictors of frequent douching.

## Summary

This chapter provided an overview of the study population and examined the results in terms of the research hypotheses. A discussion of the findings and their implications, along with the limitations and the strengths of the study, is contained in chapter 5.

# CHAPTER 5

# DISCUSSION

## Introduction

The purpose of this study was to examine douching frequency and its association with current BV and STD infection, sexual risk behaviors, and reasons young women and adolescents douche. This chapter discusses the study's findings, limitations and strengths, and recommendations for additional research.

## Study Findings

Overall, among this sample of primarily of African American adolescents and young adult women who douched, nearly 46% had current BV. The percentage of women with at least one STD was 26.9% (16.3%, chlamydia; 8.2%, trichomonas; and 5%, gonorrhea). The rates of BV and STD infection were similar to those reported in previous douching studies (Beck-Sague et al., 1998; Holzman et al., 2001; Ness et al., 2002; Peters et al. 2000). In addition, 40% of the sample self-reported a history of sexually transmitted infections. Having a history of STDs was not associated with current sexually transmitted infection.

The mean age of sexual initiation was 15 years. Over half of the sample reported three or more lifetime partners. Twenty percent of study participants reported having more than one partner in the past three months. Having more than one partner over the past 3 months was associated with current BV and chlamydia infection ($p$ =.007, and

$p$ = .002, respectively).

Older adolescent and young adult women were more likely to report having a main or "regular" partner, being less likely to use condoms, and having more lifetime partners than younger participants were. These findings suggest that older women may not think they need to use a condom with a steady partner and that, as age increases, so does the number of sexual partners. More than half (52%) of the sample douched more than once per month; more frequent douchers were older.

Age at douching initiation was nearly identical to age at sexual initiation (15.7 years vs. 15.1 years, respectively). Consistent with earlier studies (Funkhouser et al., 2002; Ness et al., 2003) nearly all participants reported using commercial douche products (basically vinegar and water products as well as scented douche products).

Many study participants reported the use of other feminine hygiene products such as spray and wipes. Girls and women who used vaginal spray for feminine hygiene were likely to douche more than once per month ($p$ = .006).

Hypothesis 1 stated that women who douched more frequently than once per month would have higher rates of BV and STDs than women who douche once per month would have. This hypothesis was not supported by the current data. Despite the findings of previous studies reporting an association between douching frequency and BV and sexually transmitted infection (Beck-Sague et al., 1998; Ness et al., 2002; Peters et al., 2000; Scholes et al., 1998), no association was found between BV, gonorrhea, trichomonas, or chlamydia infection and douching frequency. For example, Scholes et al. (1998), in a study of douching and chlamydial infection in women age 18-34 years, found a stronger association between douching and chlamydial infection in women and

girls who were 24 years of age and younger who douched once per month or more (OR = 4.89, CI = 2.02-11.8); however results, although significant, were based upon a reportedly small number of women. In a study of douching of 106 high-risk adolescents ages 12-18 years Oh, et al. (2002) found that 23% of the study participants reported douching to relieve symptoms that may have been caused by vaginal infection.

Hypothesis 2 stated that there would be a statistically significant difference between frequency of douching and sexual risk behaviors. The sexual risk behaviors identified in this study were for the most part not associated with douching frequency in this population. Women and girls who douched more frequently did not have a statistically significant greater number of lifetime partners or number of partners within the past 3 months, than women and girls who douched only once a month. In addition, more frequent douching was not associated with age at first intercourse as hypothesized. However, as found in earlier studies (Chacko et al., 1989; Foch et al., 2001; Funkhouser et al., 2002) age at first intercourse correlated positively with age at first douche ($r$ = .46, $p$ = .01).

Nearly one half of the study participants (47.1%) reported no condom use during their last act of intercourse. Of women and girls who did not use condoms, 28.1% douched more than once per month, whereas 19.7% douched only once per month. The results were not statistically significant ($p$ = .06). Thus, last time of condom use was not associated with douching frequency in this study population. However, condom use frequency was lower among women who douched more than once a month than among women who douched less frequently. Thus, Hypothesis 2 was only partially supported. Further assessment of this finding, revealed that women who douched frequently were on

average older than women who douched less frequently were found to be. The facts that women who were older had regular partners, were more likely to use injection/hormonal birth control, and did not use condoms during their last act of intercourse may partially explain this finding.

Hypothesis 3 stated that there would be statistically significant associations between the main reasons offered for douching and douching frequency; however, only one reason out 15 possible reasons was statistically significant. Women who reported that they douched to feel fresh and clean/smell good were more likely to douche more than once a month ($p = .002$). This finding provided partial support of the hypothesis of an association between reasons for participant douching and douching frequency.

It appeared that the reasons for douching, timing of douching, and sexual behaviors were closely related in this study, because reports of douching to feel fresh/smell good were associated with "sometimes douching" before sex ($p = .013$) and after sex ($p = .035$). In a cross-sectional analysis of why women douche during the past 3 months, douching to "feel fresh/smell good" was associated with douching to remove menstrual blood ($p = .003$) and douching to remove vaginal odor ($p = .000$). These findings may reflect that the category of douching "to feel fresh/smell good" was overarching in scope, encompassing many specific underlying reasons for douching. Women who reported douching to "feel fresh/smell good" were older on average than women were who did not report douching to "feel fresh/smell good." Frequency of douching remained associated with douching to "feel fresh/smell good" after I controlled for age. The relationship between sexual behaviors and douching was evident in this study, because a higher mean number of acts of sexual intercourse over the past 90 days was associated with douching

to remove vaginal odor ($p$ = .026) and BV infection ($p$ = .027). The mean number of acts of intercourse in the past 90 days was 20.79 for girls and women who reported douching to remove odor and was 14.65 for women who did not douche to remove odor. Women who tested positive for BV infection had on average 19.94 acts of intercourse in the past 90 days, compared to 14.02 for women who did not test positive for BV infection. However, positive BV infection was not associated with reports of women douching to remove vaginal odor.

The reasons women and girls in this study douched were in keeping with the literature (Foch et al., 2001; Gazmararian et al., 2001; Ness et al., 2003). Many women reported douching for hygienic purposes, including "to be clean" or "to deodorize"; however, the results were not significant across levels of douching frequency. Very few women and girls reported douching to please their partners or for birth control.

Results from the regression analysis indicated that women and girls who douched more than once a month were older, were 2.5 times more likely to report douching after sex ($p$ = .02), and were twice as likely to use vaginal sprays ($p$ = .008) than women were who douched only once a month.

## Limitations of the Study

The current research involved a secondary analysis; therefore, there are limitations that occurred as part of the study design. I did not have the ability to manipulate study questions to better address research concerns and did not have access to the study population to clarify potential discrepancies that could not be addressed through examining participant files. The potential for bias in participant recall or for concerns about

confidentiality in the interviewer-administered survey are also potential limitations of this study. Participants were recruited from multiple sites, including local health department clinics and primary care facilities serving children and youth. Flyers were placed in college student centers, and advertisements were placed in a university newspaper. Thus, because participants were recruited through venues that provided access to health care or a higher education, the results may not be generalizable to the entire population of adolescents and young women who douche.

## Study Strengths

This study provides additional information on vaginal douching among adolescents and young adult women. Because this population remains at high risk for sexually transmitted infections, research on the impact of douching on their reproductive health continues to be important. Many douching studies (Ness et al., 2003; Scholes et al., 1993, 1998; Stergachis et al., 1993) have focused on adult women or incorporate girls and adolescents within the study, thereby creating a broad age range of participants, which may potentially limit the amount of information available to researchers on younger respondents.

## Recommendations

The results of this study reinforce the link between the reasons women and girls may douche and the frequency of douching practices. Unfortunately, this study was limited in its ability to explore in-depth associations between reasons for douching and douching frequency. A further examination of maternal influences and media influences

may have been helpful and of particular interest in this study because previous studies have cited these influences on adolescent douching behaviors (Chacko et al., 1989; Foch et al., 2001; Funkhouser et al., 2002; Oh et al., 2002).

In view of health education and health promotion efforts, understanding the reasons women douche and perceived consequences if they stop douching can be beneficial in developing douching cessation interventions. Ness et al. (2003), in an examination of douching practices and influences in girls and women 13-36 years of age, reported that many women, when asked what would happen if they stopped douching, reported that "nothing" would happen or that they would feel "less clean" if they stopped. Smaller numbers of women reported that they would feel less sexually attractive or were more likely to get an infection. Women who were advised by a health professional to stop douching and women who perceived less adverse consequences if they stopped douching were more likely to have made an attempt to stop douching (Ness et al., 2003).

Given the current debate on the role of douching in acquisition of sexually transmitted infections and given the view by many health professionals that douching is not a necessary part of feminine hygiene, several types of studies may add information to the research. More prospective studies examining the role of douching and the acquisition of sexually transmitted infections and BV are needed. In addition, qualitative studies may be helpful that further explore the reasons women douche and the barriers to douching cessation in light of information on the role that maternal and media influences play in a girl's decision to start douching. Intervention studies are needed to further examine the role and influence of health professionals in promoting douching cessation. Case-control

studies comparing women who douche with those who do not douche are also needed, especially within the population of girls and young adult women.

Studies on adolescents and young women, including Hispanic females, might provide additional cultural information that may yield further insight into differences that may exist among adolescent and young adult women who douche.

The reasons women douche are complex and appear deeply enmeshed with timing of douching and sexual behaviors. Further studies are needed to better clarify these relationships. Women and girls for the most part appear to douche in an attempt to promote and maintain vaginal cleanliness. Because studies indicate the role of health providers in promoting douching cessation, it is important to develop interventions that will educate and appropriately address female concerns and perceptions of vaginal odor and cleanliness.

## Summary

This chapter provided a summary of the study findings and addressed the limitations and strengths of the research. Recommendations for future research were provided.

# REFERENCES

Abma, J. C., Chandra, A., Mosher, W. D., Peterson, L. S., & Piccinino, L. J. (1997). Fertility, family planning, and women's health: New data from the 1995 National Survey of Family Growth. *Vital Health Statistics, 23*(19), 1-114.

Barnes, J. (1960). Uses and abuses of vaginal douching. *The Practitioner, 184*, 668-670.

Beck-Sague, C., Farshy, C. E., Jackson, T. K., Guilory, L., Edelkind, D., Bullard, J. C., et al. (1998). Dectection of chlamydia trachomatis cervical infection by urine tests among adolescents clinics. *Journal of Adolescent Health, 22*, 197-204.

Blythe, M. J., Fortenberry, J. D., & Orr, D. P. (2003). Douching behaviors reported by adolescent and young adult women at high risk for sexually transmitted infections. *Journal of Pediatric and Adolescent Gynecology, 16,* 95-100.

Braunstein, S., & van de Wijgert, J. (2003). Cultural norms and behavior regarding vaginal lubrication during sex: Implications for the acceptability of vaginal microbicides for the prevention of HIV/STIs. *The Robert H. Ebert Program on Critical Issues in Reproductive Health. The Population Council.*

Brodie, J.F. (1999). *Contraception and abortion in nineteenth-century America.* Ithaca, NY: Cornell University Press.

Centers for Disease Control and Prevention. (2003). *Sexually transmitted disease surveillance, 2002.* Atlanta, GA: U.S. Department of Health and Human Services.

Chacko, M. R., McGill, L., Johnson, T. C., Smith, P. B., & Nenney, S. W. (1989). Vaginal douching in teenagers attending a family planning clinic. *Journal of Adolescent Health Care, 10,* 217-219.

Chow, J. M., Yonekura, M. L., Richwald, G. A., Greenland, S., Sweet, R. L. & Schachter, J. (1990). The assocation between chlamydia trachomatis and ectopic pregnancy. *Journal of the American Medical Association, 263*(23), 3164-3167.

Chow, W. H., Daling, J. R., Weiss, N. S., Moore, D. E., & Soderstrom, R. (1985). Vaginal douching as a potential risk for tubal ectopic pregnancy. *American Journal of Obstetrics and Gynecology, 153,* 727-729.

Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd ed.). L Erlbaum: Hillsdale, NJ

Daling, J. R., Weiss, N. S., Schwartz, S. M., Stergachis, A., Wang, S., Hjordis, F., et al. (1991). Vaginal douching and the risk of tubal pregnancy. *Epidemiology, 2*(1), 40-48.

Foch, B. J., McDaniel, N. D., & Chacko, M. R. (2001). Racial differences in vaginal douching knowledge, attitude, and practices among sexually active adolescents. *Journal of Pediatric and Adolescent Gynecology, 14*, 29-33.

Forrest, K.A., Washington, A.E., Daling, J.R., & Sweet, R.L. (1989). Vaginal douching as possible risk factor for pelvic inflammatory disease. *Journal of the National Medical Association, 81*(2), 159-165.

Funkhouser, E., Hayes, T. D., & Vermund, S. H. (2002). Vaginal douching practices among women attending a university in the southern United States. *Journal of American College Health, 50*(4), 177-182.

Gardner, J. W., Schuman, K. L., Slattery, M. L., Sanborn, J.S., Abbott, T.M., & Over all, J.C. (1991). Is vaginal douching related to cervical carcinoma? *American Journal of Epidemiology, 133*, 368-375.

Gazmararian, J.A., Bruce, F.C., Kendrick, J.S., Grace, C.C., & Wynn, S. (2001). Why do women douche? Results from a qualitative study. *Maternal and Child Health Journal, 5*(3), 153-160.

Graham, S., & Schotz, W. (1979). Epidemiology of cancer of the cervix in Buffalo, New York. *Journal of the National Cancer Institute, 63*(1), 23-27.

Gresenguet, G., Kreiss, J. J., Chapko, M. K., Hillier, S .L., & Weiss, N. S. (1997). HIV infection and vaginal douching in Central Africa. *AIDS, 11,* 101-106.

Grimley, D. M., Oh, M. K, Desmond, R. A., Hook, E. W., III, Vermund, S. H. (in press). *Sexually Transmitted Diseases.*

Hay, P. E., Lamont, R. F., Taylor-Robinson, D., Morgan, D. J., Ison, C., & Pearson, J. (1994). Abnormal bacterial colonization of the genital tract and subsequent preterm delivery and late miscarriage. *British Medical Journal, 308*(6924), 295-298.

Hillier, S. L., Nugent, R. P., & Eschenbach, D. A. (1995). Association between bacterial vaginosis and preterm delivery of a low-birth-weight infant. *New England Journal of Medicine, 333*(26), 1772-1774.

Hirst, D.V. (1952). Dangers of improper vaginal douching. *American Journal of Obstetrics and Gynecology, 64,* 179-183.

Holzman, C., Leventhal, J. M., Qiu, H., Jones, N. M., Wang, J., & BV Study Group. (2001). Factors linked to bacterial vaginosis in nonpregnant women. *American Journal of Public Health, 91*(10), 1664-1670.

Ivey, J.B. (1997). The adolescent with pelvic inflammatory disease: Assessment and management. *Nurse Practitioner, 22*(2), 78, 81-84, 87-88.

Joesoef, M.R., Sumampouw, H., Linnan, M., Schimd, S., Idajadi, A., & St. Louis, M.E. (1996). Douching and sexually transmitted diseases in pregnant women in Surabaya, Indonesia. *American Journal of Obstetrics and Gynecology, 174*(1), 115-119.

Jossens-Robbie, M. O., Eskenazi, B., Schachter, J., & Sweet, R. L. (1996). Risk factors for pelvic inflammatory disease: A case-control study. *Sexually Transmitted Diseases, 23*, 239-247.

Kendrick, J. S., Atrash, H. K., Strauss, L. T., Gargiullo, P. M., & Ahn, Y. W. (1997). Vaginal douching and the risk of ectopic pregnancy among black women. *American Journal of Obstetrics and Gynecology, 176*(5), 991-997.

Martino, J. L., & Vermund, S. H. (2002). Vaginal douching: Evidence for risks or benefits to women's health. *Epidemiologic Reviews, 24*(2), 109-124.

Merchant, J. S., Oh, M. K., & Klerman, L. V. (1999). Douching: A problem for adolescent girls and young women. *Archives of Pediatric and Adolescent Medicine, 53*, 834-837.

Miller, H. G., Cain, V. S., Rogers, S. M., Gribble, J. N., & Turner, C. F. (1999). Correlates of sexually transmitted bacterial infections among U.S. women in 1995. *Family Planning Perspectives, 31*(1), 4-9, 23.

Monif, G. R. (1999). The great douching debate: To douche or not to douche. *Obstetrics and Gynecology, 94*(4), 630-631.

Monif, G. R., Thompson, J. L., Stephens, H. D., & Baer, H. (1980). Quantitative and qualitative effects of povidone-iodine liquid and gel on the aerobic and anaerobic flora of the female genital tract. *American Journal of Obstetrics and Gynecology, 137*, 432-438.

Ness, R. B., Hillier, S. L., Kip, K. E., Richter, H. E., Soper, D. E., Stamm, C. A., et al. (2005). Douching, pelvic inflammatory disease, and incident gonococcal and chlamydial genital infection in a cohort of high-risk women. *American Journal of Epidemiology, 161*(2), 186-195.

Ness, R. B., Hillier, S. L., Kip, K. E., Richter, H. E., Soper, D. E., Stamm, C. A., et al. (2003). Why women douche and why they may or may not stop. *Sexually Transmitted Diseases, 30*(1), 71-74.

Ness, R. B., Hillier, S. L., Richter, H. E., Soper, D. E., Stamm, C., McGregor, J., et al. (2002). Douching in relation to bacterial vaginosis, lactobacilli, and facultative bacteria in the vagina. *Obstetrics and Gynecology, 100*(4), 765-772.

National Institute of Allergy and Infectious Diseases, National Institutes of Health. Office of Public Liaison. (1998, July). Pelvic inflammatory disease. Retrieved July 21, 2004, from http://www.niaid.nih.gov/factsheets/stdpid.htm

Oh, M. K., Merchant, J. S., & Brown, P. (2002). Douching behavior in high-risk adolescents: What do they use, when and why do they douche? *Journal of Pediatric and Adolescent Gynecology, 15*, 83-88.

Peipert, J. F., Montagano, A. B., Cooper, A. S., & Sung, C. J. (1977). Bacterial vaginosis as a risk for upper genital tract infection. *American Journal of Obstetrics and Gynecology, 177*, 1184-1187.

Peters, S. E., Beck-Sague, C. M., Farshy, C. E., Gibson, I., Kubota, K. A., Solomon, F., et al. (2000). Behaviors associated with neisseria gonorrhoeae and chlamydia trachomatis: Cervical infection among young women attending adolescent clinics. *Clinical Pediatrics, 39*, 173-177.

Reed, B. D., Ford, K., & Wirawan, D. N. (2001). The Bali STD/AIDS study: Association between vaginal hygiene practices and STDs among sex workers. *Sexually Transmitted Infections, 77*, 46-52.

Rothman, K. J., Funch, D. P., Alfredson, T., Brady, J., & Dreyer, N. A. (2003). Randomized field trial of vaginal douching, pelvic inflammatory disease and pregnancy. *Epidemiology, 14*(3), 340-348.

Scholes, D., Daling, J. R., Stergachis, A. Weiss, N. S., Wang, S., & Grayston, J. T. (1993). Vaginal douching as a risk factor for acute pelvic inflammatory disease. *Obstetrics and Gynecology, 81*(4), 601-605.

Scholes, D., Stergachis, A., Ichikawa, L. E., Heidrich, F. E., Holmes, K. K., & Stamm, W. E. (1998). Vaginal douching as risk factor for cervical trachomatis infection. *Obstetrics and Gynecology, 91*(6), 993-997.

Schwebke, J. R., Desmond, R. A., & Oh, M. K. (2004). Predictors of bacterial vaginosis in adolescent women who douche. *Sexually Transmitted Diseases, 31*(7), 433-436.

Stergachis, A., Scholes, D., Heidrich, F. E., Sherer, D. M., Holmes, K.K., & Stamm, W. E. (1993). Selective screening for chlamydia trachomatis infection in a primary care population of women. *American Journal of Epidemiology, 138*(3), 143-153.

Tone, A. (2001). *Desires and Devices*. NY: Hill and Wang.

U.S. National Library of Medicine. (2004).Ectopic pregnancy in *Medline Plus medical encyclopedia*. Retrieved July 21, 2004, from http://www.nlm.nih.gov/medlineplus/ency/article/000895

Vermund, S. H., Sarr, M., Murphy, D. A., Levin, L., Abdalian, S. E., Yong, M., et al. (2001). Douching practices among HIV infected and uninfected adolescents in the United States. *Journal of Adolescent Health, 29*(suppl.), 80-86.

Wolner-Hanssen, P., Eschenbach, D. A., Paavonen, J., Stevens, C. E., Kiviat, N. B., Critchlow, C., et al. (1990). Association between vaginal douching and acute pelvic inflammatory disease. *Journal of the American Medical Association, 263*(14), 1936-1941.

Zhang, J., Thomas, A. G., & Leybovich, E. (1997). Vaginal douching and adverse health effects: A meta-analysis. *American Journal of Public Health, 87*(7), 1207-1211.

# APPENDIX A

# PARTICIPANT SURVEY

University of Alabama at Birmingham

PATID [ ][ ][ ] - [ ][ ] - [ ][ ] - [ ][ ]
(Pt. last name 3 initials + Pt. First name 2 init. + DOB mo + DOB day)

# B-WELL STUDY

Initial Visit

Random #: [ ][ ][ ][ ]  Staging: [ ]

ENT#: [ ][ ][ ][ ]

*[NOTE: Use ONLY this form for initial visits after 7/30/01]*

Today's Date: [ ][ ] / [ ][ ] / [ ][ ][ ][ ]

DOB: [ ][ ] / [ ][ ] / [ ][ ][ ][ ]

Race:

☐ African-Am ☐ AS/PI ☐ Hispanic ☐ Multi/Other ☐ White

ZIP: [ ][ ][ ][ ][ ]

## Menstrual History

1. What was your age when you started your period? [ ][ ] (Years)

2. Do you currently use the Depo shot or have Norplant for birth control?

☐ No  When was the first day of your last menstrual period? [ ][ ] / [ ][ ] / [ ][ ][ ][ ]

☐ Yes  When was your last vaginal bleeding? [ ][ ] / [ ][ ][ ][ ]
(Mo) (Year)

☐ Don't know/don't remember

☐ Refused to answer

## Feminine Hygiene Practice

3. What kinds of feminine hygiene products do you use? *(Mark all that apply.)*

☐ Spray (like FDS)
☐ Suppositories (like Norform)
☐ Wipes or towelettes
☐ Feminine wash
☐ Feminine powder
☐ Douching
☐ None
☐ Other _____

4. How old were you when you first started douching? [ ][ ] (Years)

PATID ☐☐☐ - ☐☐ - ☐☐ - ☐☐
(Pt. last name 3 initials + Pt. First name 2 init. + DOB mo + DOB day)

5. **How often do you douche?** ☐ Once a week or more
☐ Two to three times a month
☐ About 1 time a month
☐ Less than 1 time a month

6. **How many days ago did you last douche?** ☐☐ (Days)

7. **What type douches do you use?** ☐ Commercial products **[Go to 7a]**
☐ Home-made solutions **[Go to 7b]**
☐ Both store-bought and homemade **[Answer BOTH 7a & 7b]**

**7a. If store-bought, which brand do you use the most often?** ☐ Massengill
☐ Summer's Eve
☐ Generic
☐ Other _____

**7b. How do you make the solutions (ingredients)?** *[Mark all that apply]*
☐ Water
☐ Vinegar
☐ Scent
☐ Soap
☐ Baking soda
☐ Other _____

8. **What kind of douche did you use the last time you douched?**

☐ Water only
☐ Baking soda (Homemade)
☐ Clorox (Homemade)
☐ Lysol (Homemade)
☐ Vinegar & water (Store bought)
☐ Vinegar & water (Homemade)
☐ Pine-sol (Homemade)
☐ Baking soda (Store bought)
☐ Betadine (Store bought)
☐ Scented (Store bought)
☐ Unknown
☐ Refused to answer
☐ Other _____

PATID ☐☐☐ - ☐☐ - ☐☐ - ☐☐
(Pt. last name 3 initials + Pt. First name 2 init. + DOB mo + DOB day)

**9. What kind of douche do you use the most often?**

☐ Water only
☐ Baking soda (Homemade)
☐ Clorox (Homemade)
☐ Lysol (Homemade)
☐ Vinegar & water (Store bought)
☐ Vinegar & water (Homemade)
☐ Pine-sol (Homemade)
☐ Baking soda (Store bought)
☐ Betadine (Store bought)
☐ Scented (Store bought)
☐ Unknown
☐ Refused to answer
☐ Other _____

**10. What kind of douche do you use 2nd most often?**

☐ Water only
☐ Baking soda (Homemade)
☐ Clorox (Homemade)
☐ Lysol (Homemade)
☐ Vinegar & water (Store bought)
☐ Vinegar & water (Homemade)
☐ Pine-sol (Homemade)
☐ Baking soda (Store bought)
☐ Betadine (Store bought)
☐ Scented (Store bought)
☐ Unknown
☐ Refused to answer
☐ Other _____

**11. What douching instrument do you usually use?**

☐ Disposable bottle
☐ Reusable rubber bag
☐ Other _____

PATID ☐☐☐ - ☐☐ - ☐☐ - ☐☐
(Pt. last name 3 initials + Pt. First name 2 init. + DOB mo + DOB day)

## SELF ADMINISTERED QUESTONS

***Please answer the following questions. Put an "X" in the selected boxes.***

**12. What are some of the times that you douche?** *(Mark all that apply.)*

- ☐ After period
- ☐ After sex
- ☐ Before sex
- ☐ When I have discomfort like itching
- ☐ When I have unusual discharge
- ☐ When I have odor
- ☐ Before I go to the doctor
- ☐ Other _____

**13. When do you douche the most often?** *(Select ONLY one answer)*

- ☐ After period
- ☐ After sex
- ☐ Before sex
- ☐ When I have discomfort like itching
- ☐ When I have unusual discharge
- ☐ When I have an odor
- ☐ Before I go to the doctor
- ☐ Other _____

**14. In the past 3 months, what were your main reasons for douching?** *(Mark all that apply)*

- ☐ To please partner
- ☐ To avoid going to the doctor
- ☐ Before going to the doctor or nurse
- ☐ To tighten my vagina before sex
- ☐ To remove menstrual blood
- ☐ To remove vaginal odor
- ☐ To get rid of discharge
- ☐ To get rid of vaginal itching or irritation
- ☐ To prevent pregnancy
- ☐ To be clean and fresh/smell good
- ☐ To remove semen
- ☐ To prevent or kill STD
- ☐ Because everyone does it!
- ☐ Refused to answer
- ☐ Other _____

PATID [ ][ ][ ] - [ ][ ] - [ ][ ] - [ ][ ]
(Pt. last name 3 initials + Pt. First name 2 init. + DOB mo + DOB day)

## Gynecologic History

**When we talk about sex in this section, we are talking about vaginal sex, that is, where a man's penis is in a woman's vagina. Do you understand what I mean by that?**

15. **Have you ever had sex?** ☐ Yes ☐ No ☐ Don't know ☐ Refused to answer *[IF NO, SKIP TO #29 on last page]*

*If yes continue on this page.*

~~16. How old were you when you first had sex?~~ [ ][ ] (Years)

Comment: [ ]

17. **How many days ago did you last have sex?** [ ][ ][ ] (Enter actual # days)

18. **Do you have a regular partner?** ☐ Yes ☐ No ☐ Refused to answer

19. **Total number of partners in last 3 months:** [ ][ ]

20. **Total # of partners in lifetime:** [ ][ ]

21. **Number of times you had sex in the last 3 months:** [ ][ ] *(Enter actual number or best estimate 99=Refused to answer)*

22. **The last time you had vaginal sex, was a (Male) condom used?**
☐ Yes ☐ No ☐ Don't know/don't remember ☐ Refused to answer

23. **Have you ever used a female condom?**
☐ Yes ☐ No ☐ Don't know/don't remember ☐ Refused to answer

24. **In the last 3 months, how often was a condom used when you had sex?**
☐ Always ☐ Most of the time ☐ Sometimes ☐ Never ☐ No sex

25. **For the last 5 times you had sex, how many times did you use a condom?** [ ] *(Put actual #)*

PATID ☐☐☐ - ☐☐ - ☐☐ - ☐☐
(Pt. last name 3 initials + Pt. First name 2 init. + DOB mo + DOB day)

**26. During the past 3 months, have you or your partner done anything to prevent pregnancy?**

☐ Yes ☐ No ☐ N/A (No sex in last 3 months) ☐ Don't know/don't remember

*If yes:*

**26a. Mark all that apply:**

☐ Birth control pills
☐ Male condom (rubbers)
☐ Female condom (rubbers)
☐ Vaginal sponge (Norform)
☐ Diaphram with jelly or foam
☐ Diaphram without jelly or foam
☐ Implant (ex. Norplant)
☐ Injections (ex. Depr-Provera)
☐ Withdrawal (Partner removes penis before end)
☐ Rhythm or natural planning (Have sex during "safe" times)
☐ Abstinence (Not having sex to avoid pregnancy)
☐ "Morning after" pills
☐ Douching
☐ Foam, jelly, cream, suppositories, or film
☐ Refused to answer
☐ Other _____

**27. Have you ever been pregnant?** ☐ No ☐ Yes

*If yes:*

**27a. How many times have you ever been pregnant?** ☐☐

**27b. Are you currently pregnant?** ☐ No ☐ Yes ☐ Not sure

**27c. What was the outcome of all pregnancies?**

**# Live births** ☐☐ **# Abortions** ☐☐

**# Miscarriages** ☐☐ **# Ectopic pregnancies** ☐☐

**28. Have you ever been told you had an STD?** ☐ No ☐ Yes

*If yes:*

**28a. Mark all that apply:**

☐ Gonorrhea
☐ Trichomonas
☐ HIV
☐ Syphilis
☐ Genital Warts
☐ Chlamydia
☐ Herpes
☐ Other _____

**28b. How many times have you had a curable STD?** ☐☐ *(Put actual #)*

*[NOTE for interviewer: This question refers to gonorrhea, chlamydia, trich, or syphilis]*

PATID ☐☐☐ - ☐☐ - ☐☐ - ☐☐
(Pt. last name 3 initials + Pt. First name 2 init. + DOB mo + DOB day)

28c. Were you treated for an STD in the last 3 months?
☐ Yes → When were you last treated? ☐☐ / ☐☐
☐ No
MO YR

29. Have you ever had PID or a tube infection?
☐ Yes ☐ No ☐ Don't know/don't remember ☐ Refused to answer

*If yes:* 29a. Were you hospitalized with the PID, tube infecction, or any STD related illness?
☐ Yes ☐ No ☐ Don't know/don't remember ☐ Refused to answer

29b. What was the name of the hospital? _____

29c. When were you admitted to the hospital? ☐☐ / ☐☐ / ☐☐

30. Mark any vaginal infections you have had:
☐ Bacterial vaginosis
☐ Yeast infection
☐ Other _____

31. Have you taken any type antibiotic in the last 10 days?
☐ Yes
☐ No
☐ Don't know/don't remember

*If yes:* 31a. Why or which one? _____

That is the end of the interview. Thank you very much for taking time to answer these questions. All of the information that you have given us is confidential and we will not share it with anyone. Do you have any questions for me?

*INSTRUCTIONS: Get release of information and obtain hospital record and verify diagnosis. File the hospitalization record for review by Dr. Oh.*

Comments: _____

_____

_____

# APPENDIX B

## UNIVERSITY OF ALABAMA AT BIRMINGHAM
## INSTITUTIONAL REVIEW BOARD FOR HUMAN USE APPROVAL FORMS

UAB THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

*Institutional Review Board for Human Use*

Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56 and ICH GCP Guidelines. The Assurance became effective on November 24, 2003 and the approval period is for three years. The Assurance number is FWA00005960.

| | |
|---|---|
| Principal Investigator: | PLUMMER, PAMELA |
| Co-Investigator(s): | |
| Protocol Number: | **X040830005** |
| Protocol Title: | *Correlates of Douching Frequency and STD Infection, Sexual Risk Behaviors, and Douching Rationale in Adolescents and Young Women* |

The IRB reviewed and approved the above named project on 07-15-05. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.

IRB Approval Date: 7-15-05

Date IRB Approval Issued: 07-15-05

Marilyn Doss

Marilyn Doss, M.A.
Vice Chair of the Institutional Review
Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.

470 Administration Building
701 20th Street South
205.934.3789
Fax 205.934.1301
irb@uab.edu

The University of
Alabama at Birmingham
Mailing Address:
AB 470
1530 3RD AVE S
BIRMINGHAM AL 35294-0104

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

*Institutional Review Board for Human Use*

Form 4: IRB Approval Form
Identification and Certification of Research
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| Principal Investigator: | PLUMMER, PAMELA |
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| Protocol Number: | **X040830005** |
| Protocol Title: | *Correlates of Douching Frequency and STD Infection, Sexual Risk Behaviors, and Douching Rationale in Adolescents and Young Women* |

The IRB reviewed and approved the above named project on 9-1-04. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.

IRB Approval Date: 9-1-04

Date IRB Approval Issued: 9-3-04

Marilyn Doss

Marilyn Doss, M.A.
Vice Chair of the Institutional Review
Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

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**GRADUATE SCHOOL**
**UNIVERSITY OF ALABAMA AT BIRMINGHAM**
**DISSERTATION APPROVAL FORM**
**DOCTOR OF PHILOSOPHY**

**Name of Candidate** Pamela Q. Plummer

**Graduate Program** Health Education / Promotion

**Title of Dissertation** Correlates of Douching Frequency, Sexually Transmitted Infections, Sexual Risk Behaviors, and Reasons for Douching Among Adolescents and Young Adult Women

**I certify that I have read this document and examined the student regarding its content. In my opinion, this dissertation conforms to acceptable standards of scholarly presentation and is adequate in scope and quality, and the attainments of this student are such that she may be recommended for the degree of Doctor of Philosophy.**

**Dissertation Committee:**

| Name | | Signature |
|---|---|---|
| Diane Grimley | **, Chair** | Diane Grimley |
| Lucy Annang | | |
| Retta R. Evans | | |
| M. Kim Oh | | |
| Sharina Person | | |
| | | |

**Director of Graduate Program**

**Dean, UAB Graduate School** Bryan W. Noel

**Date** 12/22/05