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Beyond Douching: Use of Feminine Hygiene Products and STI Risk Among Young Women

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Abstract

Introduction—Use of feminine hygiene products (feminine wipes, sprays, douches, and yeast creams) is common, yet understudied.

Aim—We examine the association among these genital hygiene behaviors, condom use, and STI.

Methods—We recruited 295 adolescent young women from primary care clinics as part of a larger longitudinal study of STI among high risk adolescents. Participants completed face-to-face interviews every three months, and provided vaginal swabs for STI testing.

Main Outcome Measures—Using the interview as our unit of analysis, we examined associations between genital hygiene behaviors (use of feminine wipes, feminine sprays, douches, or yeast creams), STI risk factors, and infection with *C. trachomatis*, *N. gonorrhoeae*, and *T. vaginalis*. Data were analyzed with repeated measures logistic models to control for multiple observations contributed by each participant.

Results—Participants reported douching in 25% of interviews, feminine sprays in 29%, feminine wipes in 27%, and yeast creams in19% of interviews. We observed a co-occurrence of douching, spraying and wiping. A past STI (6 months or more prior) was associated with increased likelihood of yeast cream use, and a recent STI (3 months prior) was associated with increased likelihood of feminine wipe use. Condom use was modestly associated with increased likelihood of douching.

Conclusions—Young women frequently use feminine hygiene products, and it is important for clinicians to inquire about use as these products may mimic or mask STI. We found no associations between douching and STI, but instead modest associations between hygiene and STI prevention, suggesting motivation for self-care.

Keywords

Sexually Transmitted Diseases; Vaginal Douching; Feminine Hygiene Product; Adolescent; Condom; Female

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Introduction

Feminine hygiene products such as douches, feminine wipes, feminine sprays and yeast creams represent a multi-million dollar market, and are commonly used by young women [1,2]. However, little is known about product use, and only douching has been studied in relation to sexually transmitted infections (STI) [2-4]. This link between genital cleansing and STI is important, as adolescent and young adult women have the highest age-specific rates of Gonorrhea and Chlamydia, with their attendant short and long term morbidities [5]. Even if feminine hygiene products are not causative of STI, the use of these products may cause symptoms that mimic STIs, such as discharge or irritation, or may mask symptoms of a true STI, delaying diagnosis and treatment.

Among adolescents, cross-sectional studies show associations between douching and cervicitis [3], and bacterial vaginosis [6]. Among adults, cross sectional studies also show associations with cervicitis[7] and BV [8], as well as herpes simplex virus infection [9], pelvic inflammatory disease (PID) [10], and HIV infection [11]. However, it has been unclear in which direction this operates: Does douching cause STI? Or do women with STI douche in response to symptoms? Longitudinal adult data show no prospective associations between douching and Gonorrhea or Chlamydia infections [12], nor between douching and incident HIV infection [11].

Our objectives in this exploratory study are to describe the use of feminine hygiene products in adolescent women at high risk for STI, and then to examine the association of sexual risk and protective factors, and STI, with feminine hygiene product use. Of particular interest are developmental risk and protective factors, such as age at first sexual experience or number of lifetime partners, and risk and protective factors directly related to STI acquisition, such as condom use.

Materials and Methods

As part of a larger longitudinal cohort study of risk and protective factors for STI (for additional details, see Fortenberry, 2005 [13] or Sayegh, 2005 [14]), 295 adolescent women, 14.0 to 17.9 years of age at enrollment, were recruited from primary care adolescent clinics, and were followed for up to 4 years. The clinics serve primarily low and middle income residents living in communities with high rates of early sexual onset and sexually transmitted infections. Sexual experience was not an inclusion criterion; however all participants initiated sexual activity during the study period, and nearly all participants were sexually active during the interviews in which genital hygiene data were collected. Only 8 participants provided 26 interviews before their first sexual experience. Participants could not be pregnant at enrollment; however, participants could remain in the study if pregnant. In 6.9% of quarterly interviews participants identified themselves as pregnant.

After IRB approval, each adolescent provided written consent, and written permission was obtained from a parent or legal guardian. At baseline and every three months, participants completed a face-to-face interview and provided a self-collected vaginal swab for STI testing. Interviews covered a range of genital cleansing behaviors, condom use, and sexual behaviors. The larger study is ongoing.

Genital hygiene behaviors were measured by self-report. Participants were told, “Young women do different things to keep their genitals feeling clean. During the past three months, how often have you done any of these things?” and specifically asked about, “Douched after my period”, “Douched before sex”, “Douched after sex”, “Used a feminine hygiene spray”, “Used a feminine wipe,” and “Used some vaginal medicine for yeast infections (cream, suppositories, pills).” Douching items showed a high level of overlap, and were combined.

We report whether a participant reported any use of douches, feminine sprays, feminine wipes, or topical yeast medications in the previous three months.

STI risk and protective factors were measured by self report. At each interview, participants were asked developmental risk and protective factors, such as age, age at first sex, and their lifetime number of sexual partners. Participants were also asked about behaviors directly related to STI acquisition, including the number of coital events and the number of condom protected coital events in the previous three months, whether they have given or received oral sex in the previous three months, and, as noted above, lifetime number of sexual partners. We calculated coital frequency, number of condom unprotected coital events, percent condom use, and duration of sexual experience.

Participants were tested for three *sexually transmitted infections* every three months at their quarterly visit during the length of the study. Self-collected vaginal swabs were tested for *C. trachomatis*, *N. gonorrhoeae*, and *T. vaginalis* using polymerase chain reaction (PCR) techniques. We defined *Incident STI* as an STI diagnosed at the interview concurrent with the reported hygiene behaviors. We defined *Recent STI* as an STI diagnosed 3 months prior to the interview. We defined *Past STI* as an STI diagnosed 6 or more months prior to the interview.

Our unit of analysis was the quarterly interview. Each subject contributed multiple interviews. The outcome variables were genital hygiene behaviors – use of douches, feminine wipes, feminine sprays, and topical yeast creams in the previous 3 months. We used bivariate mixed effect logistic regression models to assess the potential associations between independent variables (sexual risk and protective factors and STI diagnoses) and each of the outcome variables. The subject-specific random intercepts in the mixed effect models were introduced to accommodate the dependent structure introduced from multiple quarterly interviews from each participant (ie. a single participant could contribute multiple interviews, causing the data to be clustered). We also explored the interrelations among different genital hygiene behaviors by modeling each outcome with other outcome as independent variables. Similar mixed effect logistic regression models were used for these explorations. All analyses were implemented in SAS Version 9.1. (SAS Institute, Inc., Cary, North Carolina).

The mixed effect regression analysis for repeated measure outcomes is able to quantify the effects of visit-specific characteristics of the study participant on the behavioral outcomes of interest. For example, with such an analysis, we are able to report, for the average participant, whether condoms are more likely to be used during the three month period in which the participant reports douching. In comparison, a subject-level analysis only permits the assessment of associations between the subject characteristics and the outcome variables. In this sense, the performed analysis represents a more refined examination of the associations of interest.

Results

Participants were 90% African American, 7% white, and 3% other or multi-racial. The 295 participants, together, contributed 1606 quarterly interviews, giving an average of 5.4 interviews per participant (SD 2.0; range, 1 to 9 interviews). The mean age at the time of the interviews was 17.6 years (SD 1.9 years). Genital hygiene behaviors were common. On a participant level, 254 of 295 participants (86%) reported use of any product, and 163 (55%) reported using 2 or more in a 3 month period. Similar numbers of participants reported ever using douches (42%), feminine sprays (53%), feminine wipes (50%), and yeast creams (46%).

Table 1 summarizes interview-level data, including STI risk and protective behaviors reported at the time of interviews, STIs, and genital hygiene behaviors. At the time of the interview, this high risk group of participants averaged more than 3 years of sexual experience. A history of STI and an incident STI were common. In 58% of interviews, participants reported any genital hygiene behavior. Use of douches, feminine sprays, and feminine wipes were each reported in approximately one quarter of interviews, and yeast creams in one-fifth of interviews. Genital hygiene behaviors were reported by both sexually inexperienced and sexually experienced participants. In the 26 interviews in which participants were not yet sexually experienced, they reported using douches in 1 interview, feminine sprays in 9, feminine wipes in 6, and yeast creams in 1 interview.

We observed significant overlap of genital hygiene behaviors (see table 2). If, in an interview, the participant reported having douched, she was twice as likely to also have used a feminine wipe, 3.6 times as likely to have used a feminine spray; and 1.9 times as likely to have used a yeast cream. Using feminine sprays and wipes were similarly associated, as were the use of feminine wipes and yeast creams.

Associations between genital hygiene behaviors and STI risk and protective factors are shown in table 3. The use of feminine sprays or wipes showed no associations with risk or protective factors. For douches and yeast creams, we first examined behaviors that act as markers for sexuality development. For each year increase in age, each year increase in sexual experience, and each additional lifetime sexual partner, participants were between 1.1 and 1.5 times as likely to report using a douche or yeast cream. We next examined behaviors directly linked to STI acquisition. In interviews where participants reported a higher mean percent condom use, they were more likely to report douching. As noted above, in interviews where participants reported more lifetime partners, they were also more likely to report douching. In contrast to the positive association between douching and condom use, yeast cream use was associated with less condom use. In interviews where participants reported more condom unprotected events, they were more likely to use yeast creams. As the number of unprotected events increased, the likelihood of using yeast creams increased. Higher coital frequency, more lifetime partners and oral sex were also associated with increased likelihood of yeast cream use. While these odds ratios for condom use were small, the differences are within- subjects, and represent variation within the individual directly related to the use of douches and yeast creams.

Associations of genital hygiene behaviors with incident STI (positive STI test at the time of the interview), recent STI (positive STI 3 months prior to the current interview) and past STI (positive STI 6 or more months prior to the interview) are also shown in table 3. We found no associations between incident STI and genital hygiene behaviors. When participants had a recent STI, they were 1.7 times more likely to report using feminine wipes. When participants had a past STI, they were 1.6 times more likely to report using yeast creams. There were no associations between STI and douche or STI and feminine spray.

Discussion

Adolescent African American females at high risk for STI frequently use feminine hygiene products. This represents a significant investment of money and time on genital hygiene. The few associations among genital hygiene, STI and risk and protective behaviors have both STI prevention, developmental and cultural implications.

Consistent with prospective adult studies [12], this well powered, within-subject analysis showed no associations between douching or the use of other feminine hygiene products and incident STI. The association of STI diagnosed at the start of the 3 month reporting period

with the use of feminine wipes during that reporting period, suggests that genital cleansing may actually be a response to receiving an STI diagnosis or experiencing STI symptoms, rather than a cause. This is supported by the lack of biologic arguments for feminine wipes or sprays causing cervicitis. One caution is that this interpretation is only a hypothesis, as we did not collect data on STI symptoms. A second, related limitation, is that other common vulvo-vaginal infections, such as yeast and bacterial vaginosis (BV), were not tested for in this STI study. It is unclear whether and how inclusion of BV might change our model, given the high prevalence of BV among African American women[1], and BV's lack of relationship with incident infections of common bacterial STI [15]. Even with these limitations, our findings overall reinforce the need for clinicians to inquire about the use of genital cleansing products as part of a sexual history.

The majority of participants were low income African American young women from a medium-sized Midwestern city. Research on genital hygiene in the US has focused primarily on douching. Among both adolescents and adults, the incidence of douching is higher among lower income African American women compared to other populations [16]. Adult research suggests that most women who douche, regardless of ethnicity, do so for cleanliness, odor control, and symptoms (discharge, itching) [7,17,18]. In studies of high risk adolescents, participants additionally reported partner encouragement to douche [2,19]. Given the homogeneity in age and ethnicity in our sample, it is difficult to differentiate cultural effects and age and developmental effects. It is equally possible that this attention to genital hygiene may be due to adolescent interest in genital appearance.

Although the odds ratios are modest, the associations between genital hygiene behaviors and STI prevention behaviors are of developmental interest. Increased condom use was associated with douching. This may represent a motivation for self care (improved cleanliness from douching and STI protection from condom use) that we should be tapping into as we counsel similar young women. This association with self care may be important for development of STI prevention products such as vaginal microbicides. Associations of age and sexual experience with the use of douches and yeast creams point to a developmental component that is not seen with feminine sprays and wipes. This makes sense, as sprays and wipes require less touching and manipulation of one's genitals. The use of feminine hygiene products may play a role in a young woman's understanding of, and comfort with, her sexual self.

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Table 1

Interview Level Risk and Protective Behaviors, STI Diagnoses, and Use of Hygiene Products

	Mean (SD) or Percent
Mean Age on date of interview	17.6 (± 1.9)
Duration Sexual Experience (years)	3.4 (± 2.6)
N Lifetime Partners	4.6 (± 5.1)
N Sexual Events (past 3 mo.)	9.9 (± 19.1)
Mean % Condom Use	34% (± 42%)
Giving Oral Sex	17.6%
Receiving Oral Sex	33.0%
Incident STI	14.4%
Recent STI	13.3%
Past STI	48.0%
No Use of Hygiene Products	42%
Douche	25%
Feminine Spray	29%
Feminine Wipe	27%
Topical Yeast Medicine	19%
>=2 Hygiene Products	29%

N=1606 interviews

Table 2
Odds Ratios Showing Overlap of Genital Hygiene Behaviors

Predictor-Outcome	OR	95% Confidence Interval
Douche – Feminine Wipe	**2.0**	**1.2-3.2**
Douche – Feminine Spray	**3.6**	**2.2-5.9**
Douche – Yeast Cream	**1.9**	**1.2-2.9**
Feminine Spray – Feminine Wipe	**4.6**	**3.0-7.1**
Feminine Spray – Yeast Cream	1.5	1.0-2.5
Feminine Wipe – Yeast Cream	**2.0**	**1.3-3.2**

Table 3
Associations with STI Risk Factors, Protective Factors, and Diagnosis

	Douching	Feminine Wipe	Feminine Spray	Yeast Cream
	OR (95% CI)	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Risk/Protective Factor				
Age at interview	**1.37 (1.11-1.69)**	0.96 (0.81-1.12)	0.89 (0.76-1.05)	**1.39 (1.22-1.58)**
Duration of Sexual Experience	**1.49 (1.21-1.84)**	1.02 (0.90-1.16)	1.00 (0.88-1.14)	**1.39 (1.27-1.53)**
N Lifetime Partners	**1.09 (1.01-1.17)**	0.99 (0.93-1.05)	1.03 (0.97-1.09)	**1.14 (1.09-1.18)**
N Sexual Events (past 3 mo.)	1.00 (0.99-1.01)	1.00 (0.99-1.02)	1.00 (0.99-1.01)	**1.01 (1.01-1.02)**
N Condom Unprotected Events (past 3 mo.)	1.00 (0.98-1.01)	1.00 (0.99-1.02)	0.99 (0.98-1.01)	**1.01 (1.00-1.02)**
Percent Condom Use (past 3 mo.)	**1.01 (1.00-1.01)**	1.00 (1.00-1.01)	1.00 (1.00-1.01)	1.00 (1.00-1.01)
Giving Oral Sex (past 3 mo.)	1.19 (0.59-2.39)	0.74 (0.43-1.30)	1.15 (0.65-2.02)	**1.97 (1.23-3.16)**
Receiving Oral Sex (past 3 mo.)	1.38 (0.79-2.41)	1.09 (0.71-1.67)	1.05 (0.68-1.60)	**2.10 (1.43-3.09)**
STI				
Incident STI	0.76 (0.43-1.34)	1.10 (0.68-1.79)	0.93 (0.57-1.51)	1.10 (0.69-1.73)
Recent STI	0.83 (0.47-1.48)	**1.70 (1.05-2.76)**	1.01 (0.61-1.66)	0.87 (0.54-1.39)
Past STI	1.94 (0.95-3.96)	0.89 (0.53-1.49)	0.79 (0.47-1.32)	**1.61 (1.02-2.54)**