Sexually transmitted infections and vaginal douching in a population of female sex workers in Nairobi, Kenya

K Fonck, R Kaul, F Keli, J J Bwayo, E N Ngugi, S Moses, M Temmerman

Objective: To assess the association between vaginal douching and sexually transmitted infections (STI) among a group of female sex workers (FSWs) in Nairobi, Kenya.

Methods: This study was part of a randomised, placebo controlled trial of monthly prophylaxis with 1 g of azithromycin to prevent STIs and HIV infection in a cohort of Nairobi FSWs. Consenting women were administered a questionnaire and screened for STIs.

Results: The seroprevalence of HIV-1 among 543 FSWs screened was 30%. HIV infection was significantly associated with bacterial vaginosis (BV), trichomoniasis, gonorrhoea, and the presence of a genital ulcer. Regular douching was reported by 72% of the women, of whom the majority inserted fluids in the vagina, generally after each sexual intercourse. Water with soap was the fluid most often used (81%), followed by salty water (18%), water alone (9%), and a commercial antiseptic (5%). Douching in general and douching with soap and water were significantly associated with bacterial vaginosis (p = 0.03 and p = 0.04 respectively). There was a significant trend for increased frequency of douching and higher prevalence of BV. There was no direct relation observed between douching and risk for HIV infection or other STIs.

Conclusion: The widespread habit of douching among African female sex workers was confirmed. The association between vaginal douching and BV is of concern, given the increased risk of HIV infection with BV, which has now been shown in several studies. It is unclear why we could not demonstrate a direct association between douching and HIV infection. Further research is required to better understand the complex relation between douching, risk for bacterial vaginosis, and risk for HIV and other STIs.

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Keywords: vaginal douching; sexually transmitted infections; female sex workers

Introduction
Heterosexual intercourse is the major route of transmission of HIV in sub-Saharan Africa. The role of ulcerative and non-ulcerative sexually transmitted infections (STIs) in facilitating the transmission of HIV is well established. However, the role of local genital tract factors in HIV transmission is less clear.

There is some evidence that frequent vaginal douching may increase women’s susceptibility to sexually transmitted agents, through modification of the vaginal flora. Several studies have suggested that vaginal douching may increase risk for cervical infections. Others have shown that douching predisposes women to pelvic inflammatory disease (PID), with a twofold increased risk of PID associated with douching. Genital tract infections such as cervicitis and PID have, in turn, been identified as a risk factor for HIV acquisition. Hence, vaginal douching may indirectly have a facilitating role in the heterosexual transmission of HIV. In addition, vaginal douching has been reported to be associated with reduced fertility. Finally, douching has been suggested as a risk factor for cervical cancer, although the evidence for this has been inconsistent. The insertion of various substances into the vagina is a common global practice. Intravaginal substances, largely through their astringent properties, are perceived to enhance sexual pleasure in many areas of sub-Saharan Africa. In Zimbabwe, 87% of clinic attendees and nurses interviewed reported this habit. The use of vaginal agents for the treatment of vaginal discharge was reported by 30% of women in a study in the Central African Republic and is also common in Malawi.

This study was undertaken to assess the association between vaginal douching and sexually transmitted infections among a group of female sex workers (FSWs) in Nairobi, Kenya, as part of a large randomised trial of monthly azithromycin prophylaxis to prevent STIs and HIV infection in a cohort of Kenyan sex workers. The study design and baseline and preliminary findings have been published elsewhere.

Methods
As part of a randomised, placebo controlled trial of monthly prophylaxis with 1 g of azithromycin to reduce the incidence of STIs and HIV infection among female sex workers in a Nairobi slum area, a structured questionnaire was administered to all women presenting for screening into the study. Written, informed consent was obtained from all women. The questionnaire gathered data regarding vaginal douching, which was defined as the insertion of any liquid into the vagina,
and also included data on demographics, current sexual behaviour (client numbers, condom use, and sex practices), and reproductive and medical histories over the past year. A full physical examination, including speculum examination and laboratory STI testing, was performed at the screening visit. Data on the first 543 women screened are presented here. The study was approved by ethics review committees of the University of Nairobi and the University of Manitoba. A detailed description of the specimens taken and the laboratory tests performed has been published elsewhere.14

Data were entered into a database in Microsoft ACCESS (Office 97 format) and analysis performed after export into spps for Windows, version 8.0 (SPSS Inc, Chicago, IL, USA). In univariate analysis, the odds ratios and 95% confidence intervals were used for the measurement of associations between proportions. Comparisons were made using Pearson’s \( \chi^2 \), Fisher’s exact test, and \( \chi^2 \) test for trend. Student’s t test was used for comparison of means. Logistic regression models were developed to analyse risk factors for HIV and BV. These models used input variables that were associated with HIV or BV in univariate analysis in this cohort, or which have been reported elsewhere.14

Results

Between May 1998 and August 1999, 543 female sex workers were screened. Three women declined examination after interview and were excluded. The mean age was 30 years (SD 7.8 years). Overall, 161 women (30%) were HIV-1 seropositive. The prevalence of bacterial vaginosis was 49%, candidiasis 10%, trichomoniasis 16%, gonorrhoea 10%, chlamydia 9%, syphilis 6%, clinical ulcer 1%, and CIN 2%. Only one woman presented with genital warts.

Demographic characteristics, sexual behaviour, and medical history of HIV positive and HIV negative women are compared in table 1. There was no association between age, marital status, duration of prostitution, number of partners, and HIV serostatus. HIV positive women had had their first sexual experience at younger age than HIV negative women, charged less per sexual act, used condoms less often, were less likely to report a regular partner, and used alcohol more frequently. Use of oral contraceptives, douching, sex during menses, anal intercourse, and history of STIs were not associated with HIV serostatus. On multivariate analysis only age at first sex and alcohol use remained significantly associated with HIV seropositivity (p = 0.02 and p = 0.05, respectively). STI prevalence at the time of screening stratified by HIV serostatus is shown in table 2. Bacterial vaginosis, trichomoniasis, gonorrhoea, and the presence of a genital ulcer were significantly more common among HIV positive women. CIN was three times more prevalent in the HIV seropositive group.

Of the 543 women interviewed, 392 (72%) gave a history of douching. Most of the women who practised douching reported doing so after each sexual intercourse (91%) and most of the women drenched with water and soap (81%). Water mixed with salt was used by 18%, water alone by 9%, a commercial antiseptic by 5%, and washing powder was used by 1%. The majority of women who reported douching did so more than once per day (93%). There was no difference in age, marital status, age at first sexual intercourse, place of work (home, bar, or club), and duration of prostitution between women who drenched and those who did not (data not shown). There was a stepwise association between condom use and douching: women who sometimes or always used condoms were 1.4 and 2.5 times more likely to douche, respectively, than women who never used condoms (p = 0.003). Although women who drenched had significantly more partners per day (4.1 v 3.6; p = 0.01) and practised anal sex more often (19% v 5%; p<0.001), they were less likely to report a history of any STI (21% v 45%; p<0.001), vaginal discharge (11% v 21%; p=0.003), or abdominal pain (15% v 36%; p<0.001). On multivariate analysis, condom use (p = 0.001), a history of anal sex (p = 0.0001), and number of daily partners (p = 0.05) remained significantly associated with douching.

The relation between genital infections and different vaginal douching practices is shown in table 3. Among the small number of women

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**Table 1** Characteristics of HIV positive and HIV negative sex workers

<table>
<thead>
<tr>
<th></th>
<th>HIV negative</th>
<th>HIV positive</th>
<th>OR (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>31.2 (273)</td>
<td>29.5 (169)</td>
<td>1.2 (0.9–1.5)</td>
<td>0.05</td>
</tr>
<tr>
<td>Mean number of partners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.7 (n)</td>
<td>1.7 (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age at first sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>25.3 (200)</td>
<td>23.5 (110)</td>
<td>1.1 (0.9–1.4)</td>
<td>0.03</td>
</tr>
<tr>
<td>Drugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>55% (176)</td>
<td>66% (92)</td>
<td>0.7 (0.5–0.9)</td>
<td>0.01</td>
</tr>
<tr>
<td>Condom use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular partner</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of oral contraceptives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex during menses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anal intercourse</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of STIs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of douching</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2** STI prevalence among female sex workers by HIV serostatus

<table>
<thead>
<tr>
<th>STI</th>
<th>HIV negative</th>
<th>HIV positive</th>
<th>OR (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial vaginosis</td>
<td>138/303 (46%)</td>
<td>73/129 (57%)</td>
<td>1.5 (1.0–2.3)</td>
<td>0.05</td>
</tr>
<tr>
<td>Candida</td>
<td>28/303 (9%)</td>
<td>11/130 (9%)</td>
<td>0.9 (0.4–1.9)</td>
<td>0.9</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td>43/369 (12%)</td>
<td>41/156 (26%)</td>
<td>2.7 (1.4–4.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Chlamydia</td>
<td>30/327 (9%)</td>
<td>11/124 (9%)</td>
<td>1.0 (0.5–2.0)</td>
<td>1.0</td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>30/370 (8%)</td>
<td>22/156 (15%)</td>
<td>1.9 (1.0–3.3)</td>
<td>0.04</td>
</tr>
<tr>
<td>Syphilis</td>
<td>23/369 (6%)</td>
<td>8/159 (5%)</td>
<td>0.8 (0.3–1.8)</td>
<td>0.7</td>
</tr>
<tr>
<td>Clinical ulcer</td>
<td>2/373 (1%)</td>
<td>5/161 (3%)</td>
<td>6.0 (1.1–31.0)</td>
<td>0.03</td>
</tr>
<tr>
<td>CIN</td>
<td>4/373 (1%)</td>
<td>5/161 (3%)</td>
<td>3.0 (0.8–11.2)</td>
<td>0.2</td>
</tr>
</tbody>
</table>

*Denominators differ because of missing specimens.*
who used water alone for vaginal douching, a significantly lower HIV prevalence was found (p = 0.02). In multivariate analysis, however, including variables associated with HIV seropositivity in this or other studies (number of partners per day, practice of anal sex, history of STI, history of vaginal discharge, condom use, presence of bacterial vaginosis, gonorrhoea, trichomoniasis, and clinical ulcers), the association between HIV and douching with water disappeared.

A significantly higher prevalence of bacterial vaginosis was found among women who douch (OR 1.5, 95% CI 1.0–2.3, p = 0.05). This association was also found in the subgroup of women douching with soap (OR 1.6, 95% CI 1.0–2.5, p = 0.03). The correlates of bacterial vaginosis are shown in table 4. Bacterial vaginosis was more prevalent among women who used alcohol more often, among women with trichomoniasis, chlamydial infection, and HIV infection. Bacterial vaginosis was less prevalent among pregnant women and women and women with a history of past vaginal discharge. When the variables associated with bacterial vaginosis in univariate analysis (p <0.1) were included in a logistic regression model, bacterial vaginosis remained significantly associated with any douching (OR 1.6, 95% CI 1.0–2.5, p = 0.05) as well as with douching with soap and water (OR 1.6, 95% CI 1.0–2.6, p = 0.04).

Among women who reported douching, the mean frequency of douching was 13 times per week. There was a significant trend for increased frequency of douching and prevalence of bacterial vaginosis: 53% BV prevalence in the group douching more than once per day, 46% in the group douching once per day, and 14% among those douching less than once daily (p = 0.05). More frequent douching was also associated with higher pH (p = 0.05). A lack of lactobacilli was detected significantly more often in women douching with salt (73% versus 47%, OR 0.3, 95% CI 1.1–5.0, p = 0.04). There was no difference in lactobacilli detection observed among women douching with other products.

### Table 4 Characteristics of female sex workers with and without bacterial vaginosis

<table>
<thead>
<tr>
<th>Variables</th>
<th>BV negative (n = 231)</th>
<th>BV positive (n = 39)</th>
<th>OR (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years)</td>
<td>31.0</td>
<td>30.5</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Never married</td>
<td>49%</td>
<td>45%</td>
<td>0.9 (0.8–1.1)</td>
<td>0.4</td>
</tr>
<tr>
<td>Mean age at first sex (years)</td>
<td>16.0</td>
<td>15.9</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Mean duration of prostitution (years)</td>
<td>6.4</td>
<td>6.2</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Mean number of sex partners/day</td>
<td>3.8</td>
<td>4.0</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Mean number of sex partners/week</td>
<td>13.8</td>
<td>14.9</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Mean charge per act (Kenya shillings)</td>
<td>110</td>
<td>116</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

The current study confirms that vaginal douching is a widespread practice among African female sex workers, as previously described. In our study, 72% of the women reported vaginal douching. Vaginal douching is also widely practised among pregnant women and women attending STD clinics in Africa. The use of vaginal products for the treatment of vaginal symptoms as well as the use of vaginal agents to achieve a tightening effect is widespread. The specific preparations used for douching vary according to local cultural factors. In several African settings, herbs and dry leaves are used for treatment of vaginal infections or for a “tightening effect” to achieve dry sex. Although the question was not specifically asked in our study, it appears that personal hygiene was the main reason for douching, as most women did so after each intercourse. Most women used water alone or a combination of water and soap. Commercial products were rarely used. The women in our study belonged to a low socioeconomic group, and hence may not have been able to afford rather expensive commercial products.

The STD and HIV rates in this population are similar to other African cohorts, except for the CIN rate of 2%, which is lower than reported from most other studies, even in low risk groups in east Africa. Health seeking
behaviour and previous screening and treatment of cervical lesions might explain these low rates of CIN.

We describe a significant association between douching (with soap and water) and an increased prevalence of bacterial vaginosis. More frequent douching was also significantly associated with more prevalent bacterial vaginosis. This is consistent with results from other studies. A case-control study has shown that genital hygiene accounts for a twofold increase in the risk of bacterial vaginosis. Although the genital hygiene accounts for a twofold increase between douching (with soap and water) and an increased risk of bacterial vaginosis. This is consistent with results from other studies. A case-control study has shown that bacterial vaginosis is associated with more prevalent bacterial vaginosis, and that the presence of bacterial vaginosis has a role in the acquisition of HIV. Hence, vaginal douching may indirectly facilitate the heterosexual transmission of HIV infection. We did not find a direct association between douching and HIV prevalence, but other factors associated with douching in our cohort may have acted to reduce HIV risk. Women who reported douching were more likely to report using condoms all the time. Vaginal douching appeared to be used as a form of personal hygiene, and it seems reasonable that women more concerned with hygiene might also be more likely to use condoms. The association between douching and BV would still be apparent, but this increased condom use would bias our ability to detect any effect of BV on enhanced HIV acquisition. As has been seen in previous studies on this subject, there appears to be a complex relation between HIV infection and vaginal douching. In a study in the Central African Republic, Gresenguet et al found a positive association between HIV and the use of vaginal agents for the self treatment of discharge and itching. In women without vaginal symptoms, however, the use of vaginal agents was not associated with HIV infection. Dallabeta et al found an increased prevalence of HIV infection among women using non-commercial medicines in Malawi. The potential mechanisms whereby vaginal douching could possibly enhance HIV transmission are twofold: (1) through irritation of the vaginal mucosa, thus promoting the proliferation of lymphocytes which are target cells for HIV; and (2) through dehydration of the vaginal mucosa, rendering the vaginal epithelium more vulnerable to local trauma.

In summary, frequent douching seems to be a common practice among female sex workers in Africa, and we found a significant association between douching and bacterial vaginosis, but not with other STIs or HIV infection. The association between vaginal douching and bacterial vaginosis is of concern, given the increased risk of HIV infection with BV, which has now been shown in several studies. It is unclear why we could not demonstrate a direct association between douching and HIV infection, but this may be due to a complex interaction with behavioural and other factors associated with douching. Further research is required to better understand the complex relation between douching, risk for bacterial vaginosis, and risk for HIV and other STIs.

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Contributors: RF supervised fieldwork of data entry, data analysis, writing of the paper; RK supervised fieldwork of data entry, laboratory procedures, interpretation of data, revision of draft paper; FR was responsible for fieldwork, revision of draft paper; JJB supervised the study, supervised laboratory procedures, revision of draft paper; ENN supervised the study, revision of draft paper; SM was involved with the design of study, data analysis, revision of draft paper, overall responsibility of the study; MT was involved with design of study, data interpretation, and revision of draft paper.


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