Sexual behavior of women with repeated episodes of vulvovaginal candidiasis

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Abstract. One hundred and two women with a history of a median of six episodes of vulvovaginal candidiasis (VVC) and 204 age-matched controls participated in a structured in-depth interview on sexual behavior. Mean and median ages of the two groups were 26.7 and 26 years, respectively. Sexual characteristics, associated with VVC in crude analyses, were adjusted in multifactorial analyses for coital frequency, experience of casual sex, vaginal irritation, smoking, alcohol habits, and having a steady partner. In addition, education, as a measure of socioeconomic status, was added in the multifactorial analyses. VVC was not associated with multiple sexual partners or ever-experience of causal sex. Sexual variables that remained significant or were of borderline significance after adjustment were: age at first intercourse (p = 0.001), casual sex partners the previous month (odds ratio (OR) = 3.1), sex during menstruation (OR = 1.7), regular oral sex (OR = 2.4), experience of anal intercourse ever (OR = 2.4), oral intercourse the last month (OR = 3.1), and frequency of oral intercourse (p = 0.02). Thus, the study indicates that certain sexual activities are associated with repeated episodes of VVC.

Key words: Sexual behavior, Sexually transmitted disease (STD), Vulvovaginal candidiasis (VVC)

Introduction

Candidiasis is the second most frequently diagnosed vaginal microbiological-associated condition in Europe and in the United States, only outnumbered by bacterial vaginosis [1]. The incidence of vulvovaginal candidiasis (VVC) has increased markedly [2, 3], the reason for which is unclear. Approximately two thirds of all women will eventually acquire VVC during their lifetime, and then most often during their reproductive years [4]. Approximately 40 percent of these women will have one or more recurrences [5].

VVC generally has not been considered a sexually transmitted disease (STD) in its established sense [6]. Some studies have found an association with factors considered to measure sexual promiscuity [7], while others have not confirmed such a correlation [8]. Partner treatment has not proved to be efficient in preventing relapses of VVC in the female sex partner [9].

Few sexual data, except for age at first intercourse and the number of lifetime sexual partners, have been analysed in women with VVC [6]. Sexual behavior, might be of importance for both primary infection and relapses. Vulvovaginal micro-lacerations might facilitate the entrance of Candida spp., while circumstances and frequency of vaginal intercourse may increase the risk for developing VVC, as may lesions caused by some sexually transmitted diseases, broad-spectrum antibiotic therapy and immune deficiency syndromes, e.g. HIV infection [10].

The development of germ tubes by C. albicans seems to be correlated to the invasiveness of this organism [11]. The possibility of a gastrointestinal reservoir for Candida spp. associated with VVC opens a possibility for an association with the practice of oral and anal sex. In our study, sexual behavior was investigated in women with a history of at least three episodes of VVC and with the latest relapse within the previous year.

Material and methods

Between November 1989 and January 1991, three to four women per day were randomly chosen from out-patient lists of the family planning clinics at Eskilstuna Hospital, Eskilstuna and Danderyd Hospital, Stockholm and of the youth clinic in Eskilstuna.

One thousand eleven (93.9%) of the 1077 women, who were asked, agreed to participate in the study. Due to incomplete records, 15 women (1.5%) were excluded from the study, which left 996 women to be evaluated.

Midwives conducted a one to two hour long interview. This included detailed questions on different
aspects of sexual behavior. Among the 96 items on such behavior were questions on the number of recent and lifetime sexual partners, oral, anal and group sex, homosexuality as well as questions on causal sex with previously unknown partners, sex during travel and drug use in conjunction with sex. Finally, there were questions about unfaithfulness and sexual harassment.

To ensure as honest answers as possible, anonymity was guaranteed. No details that could identify the women were included in the patient record forms or in the computerized data. Only the authors had access to the patient codes.

*Candida albicans* was diagnosed on wet smears, prepared from material from the lateral vaginal wall for detection of blastospores and pseudohyphae. On one slide the secretion was mixed in a drop of 10% KOH solution. Vaginal and rectal cultures for yeast fungi were made on Sabouraud agar and *Candida* spp. isolates were subjected to serum tests (germ tube test) to identify *C. albicans*.

Vulvovaginal candidiasis was defined as detection of *C. albicans* by wet smear microscopy and/or by culture of vaginal secretion and at least one symptom (i.e. pruritus, abnormal discharge or burning and smarting pain) and one sign (i.e. discharge, erythema, excoriations and fissures).

Women with at least three clinically diagnosed episodes of VVC and with the last episode within a year were regarded as VVC cases. The patient's medical record was checked, so that only documented episodes were noted. For each VVC case, two age-matched controls were randomly selected as a comparison group (COMP). Before selecting the COMP, consisting of 204 women, women with a history of 1-2 episodes of VCC or with findings of current vaginal *Candida* spp. on wet smear or culture (n = 474; 47.6%) were excluded from the study population.

The material was computerized and odds ratios (OR) and 95% confidence intervals (95% CI) were calculated with the JMP statistical program [12]. Initial significance tests were done with chi-square for nominal variables (Pearson and likelihood ratio) and t-test for continuous variables. In order to assess the simultaneous effect of more than one variable, multi-way frequency tables were analysed by means of logistic regression (analysis of log-likelihood), so as to identify and check for possible confounding.

**Results**

One hundred and two women (10.2%) fulfilled the inclusion criteria for repeated VVC. None were HIV positive. Thirty-six (35.3%) cases were diagnosed by wet smear microscopy only, 35 (34.4%) cases were diagnosed by culture and 31 cases (30.4%) were positive for *C. albicans* with both methods.

The mean age for women with VVC and for those in the COMP group was 26.7 years. 10% of the women were less than 20 years old, 38% 20-24, 25% 25-29, 12% 30-34, 10% 35-39, while 6% were 40 years or older.

The median lifetime number of episodes in the VVC group was six. Sixty-eight women (66.7%) had had at least five lifetime episodes of VVC.

In Table 1, parameters often used as markers of promiscuity are given. A history of multiple sexual partners, i.e. more than ten lifetime partners or more than one partner the last and the last six months, respectively, was not associated with repeated VVC. Age at first intercourse and experience of casual sex with previous unknown partners the previous month were more frequently found in the VVC group than among the controls. When these variables were introduced in multifactorial analyses with adjustment for education, smoking and alcohol habits (not shown in Table 1), both an early sexual debut (p = 0.001), and casual sex the previous month, however (OR = 3.1; 95% CI = 1.1–9.7), remained significantly associated to repeated VVC.

Unfaithfulness and ever-experience of casual sex were not associated with VVC (Table 2).

Thirty percent of the females with VVC normally practiced vaginal intercourse during menstruation, which was significantly more often than in the COMP group (Table 3). Oral sex, defined as a natural and regular part of the sexual life, as well as ever-experience of receptive anal sex, were significantly

<table>
<thead>
<tr>
<th>Table 1.</th>
<th>Sexual partnerships in women with repeated episodes of vulvovaginal candidiasis (VVC) and in a comparison group (COMP)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>VVC (%) (n = 102)</td>
</tr>
<tr>
<td>Sexual debut (years + SD)</td>
<td>15.9 (0.22)</td>
</tr>
<tr>
<td>&gt;10 Life-time sexual Partners</td>
<td>26 (25.5)</td>
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<tr>
<td>&gt;1 Partner the last 6 months</td>
<td>26 (25.5)</td>
</tr>
<tr>
<td>&gt;1 Partner the last month</td>
<td>3 (2.9)</td>
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<tr>
<td>Casual sex the last month</td>
<td>9 (8.8)</td>
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</tbody>
</table>

* Odds ratio and 95% confidence interval.