

Risk factors for bacterial vaginosis in women attending a hospital in Kerman, Islamic Republic of Iran

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عوامل اختطار التهاب المهبل الجرثومي في النسوة اللاتي يراجعن أحد مستشفيات مدينة كرمان
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الخلاصة: يعتبر التهاب المهبل الجرثومي أكثر الاضطرابات المهبليّة التي تصيب النسوة اللاتي هن في سن الإنجاب. وبغية دراسة مدى انتشار هذا الالتهاب وعوامل اختطاره، تم فحص 130 سيدة غير حامل كن يراجعن أحد مستشفيات جامعة كرمان للعلوم الطبيّة. وقد بلغ معدل انتشار هذا المرض 37.7٪، وتبين أن المصابات به كن على مستوى تعليمي واجتماعي واقتصادي منخفض جداً، كما كن على الأرجح من النساء المدخنات. وكان معدل انتشار هذا المرض أكثر ارتفاعاً لدى المريضات اللاتي سبق لهن الإجهاض، ولو أنه ارتفاع لا يُعتد به إحصائياً. وكانت عوامل اختطار هذا المرض أقل لدى النسوة اللاتي يستخدمن حبوباً لمنع الحمل عن طريق الفم، وذلك بنسبة يُعتد بها إحصائياً، كما كانت هناك ترابطات إيجابية يُعتد بها إحصائياً بين الإصابة بالتهاب المهبل الجرثومي والتاريخ المرضي للإصابة بكل من: العدوى المهبليّة، والولادة المبكرة، وتمزق الأغشية المتسر. ولما كان التهاب المهبل الجرثومي شائعاً بين مريضاتنا، وكان لأبداً من أخذ المضاعفات المرضية النسوية والتوليدية المرتبطة بهذا المرض في الحسبان، فمن المقترح فحص ومعالجة النسوة اللاتي تكثر لديهن عوامل اختطار هذا المرض.

ABSTRACT Bacterial vaginosis (BV) is the most prevalent form of vaginal disturbances in women of child-bearing age. This study examined the prevalence and risk factors of BV of 130 non-pregnant women attending a hospital of Kerman University of Medical Sciences. Prevalence was 37.7%. Patients with BV had significantly lower educational and socioeconomic levels. They were also more likely to be smokers. The prevalence of BV was higher in patients with a history of abortion but this was not statistically significant. Women using oral contraceptive pills were at a decreased risk of BV; this was statistically significant. There were significant positive associations between BV and a history of vaginal infection, preterm delivery and premature rupture of the membranes. As BV appears quite prevalent in our patients, and considering the various complications associated with it, screening and treatment of high-risk women is suggested.

Facteurs de risque de vaginose bactérienne chez des femmes consultant dans un hôpital de Kerman (République islamique d'Iran)

RÉSUMÉ La vaginose bactérienne est la forme la plus courante de trouble vaginal chez la femme en âge de procréer. Cette étude a examiné la prévalence et les facteurs de risque de la vaginose bactérienne chez 130 femmes non enceintes consultant dans un hôpital de l'Université des Sciences médicales de Kerman. La prévalence s'élevait à 37,7 %. Les patientes présentant une vaginose bactérienne avaient un niveau d'instruction et un niveau socio-économique significativement plus faibles. Elles étaient aussi plus susceptibles d'être des fumeuses. La prévalence de la vaginose bactérienne était plus élevée chez les patientes ayant des antécédents d'avortement mais cela n'était pas statistiquement significatif. Les femmes utilisant des pilules contraceptives présentaient un risque réduit de vaginose bactérienne ; ceci était statistiquement significatif. Il y avait des associations positives significatives entre la vaginose bactérienne et des antécédents d'infection vaginale, d'accouchement prématuré et de rupture prématurée des membranes. La vaginose bactérienne semblait assez fréquente chez nos patientes, et compte tenu des diverses complications qui y sont associées, le dépistage et le traitement des femmes à haut risque sont recommandés.

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Introduction

Bacterial vaginosis (BV) is a change in vaginal ecosystem where the normally dominant lactobacilli are greatly reduced and replaced with a number of other organisms, predominantly anaerobic flora, such as *Gardnerella vaginalis*, *Mycoplasma hominis*, *Mobiluncus* spp., *Bacteroides* spp. and *Peptostreptococcus* spp. Both anaerobes and *G. vaginalis* are normal inhabitants of the vagina, but overgrowth of the normal lactobacillus-dominant flora by these bacteria results in bacterial vaginosis [1].

BV is the most prevalent form of vaginal disturbances in women of childbearing age [2]. The average incidence of BV varies and is reported to be 10%–35% in patients visiting gynaecological clinics, 10%–30% in patients visiting obstetric clinics and 20%–60% in patients visiting services of sexually transmitted diseases [3]. BV has been associated with many gynaecological and obstetrical complications such as cervicitis, salpingitis, endometritis, postpartum infection, urinary tract infection, pelvic inflammatory disease, mild abnormal Pap smear results and possible link with cervical intraepithelial neoplasms, preterm delivery, premature rupture of the membranes (PROM), chorioamnionitis and post-partum endometritis [3,4].

A typical clinical symptom of BV is a thin, homogenous, gray, malodorous vaginal discharge, without significant pruritus or pain [5]. However more than 50% of all women with BV are asymptomatic. Diagnosis of BV is established by Amsel's criteria whereby 3 of the 4 following signs are found: homogenous discharge, vaginal fluid pH > 4.5, positive amine test and microscopic analysis of Gram stained smear of

vaginal discharge with clue cells seen [6,7]. Vaginal culture of *G. vaginalis* has no place in the evaluation of asymptomatic women because this organism is carried by 30%–40% of women who do not have bacterial vaginosis [8]. The treatment of BV consists of metronidazole or clindamycin orally or intravaginally.

A study in southern Islamic Republic of Iran indicated a high prevalence of BV [9]. Thus we decided to determine the prevalence and risk factors of BV in a university hospital Kerman.

Methods

In 2002 (January–December) a cross-sectional study was carried out of all non-pregnant patients who presented with a complaint of vaginal discharge to the Gynaecology Clinic of Bahonar Hospital, Kerman University of Medical Sciences. A senior resident recorded each patient's history and made a pelvic examination during which vaginal specimens were collected for laboratory testing. Demographic and clinical data recorded included: age, weight, height, occupation, educational level, current marital status, smoking status, contraceptive use, parity and obstetric history. Diagnosis of BV was established by Amsel's criteria (presence of 3 of the following 4 symptoms or signs: homogenous vaginal discharge, positive whiff test after addition of 10% potassium hydroxide, vaginal pH > 4.5 and presence of clue cells).

Fisher exact test, Student *t*-test and chi-squared test were calculated in the analysis. $P > 0.05$ was considered as a limit of significance. Odds ratios with 95% confidence intervals (CI) were also computed.

Results

In this study, 130 non-pregnant women visiting the Gynaecology Clinic of Bahonar Hospital in 2002 were examined for BV. BV was diagnosed in 49 women (37.7%) (Table 1). BV was not correlated with age, body mass index, current marital status and parity ($P > 0.05$). Patients with BV had significantly lower educational ($P = 0.006$) and socioeconomic ($P = 0.021$) levels (Table 2). There was a statistically significant association between BV and smoking ($P = 0.033$). The prevalence of BV was higher in patients who had a history of abortion than in women who did not report such history, but the difference was not statistically significant ($P = 0.07$). There were positive associations between the occurrence of BV and history of vaginal infection ($P < 0.001$), history of preterm delivery ($P < 0.001$) and history of PROM ($P = 0.028$) (Table 2). There was a statistically significant association between lack of use of contraceptive pills and BV ($P = 0.035$). BV was more prevalent in women who used intrauterine devices than in other women (71.4% versus 38.3%), al-

though this difference was not statistically significant ($P = 0.091$) (Table 3).

Discussion

Bacterial vaginosis is the most common cause of vaginal discharge in women of child-bearing age. The prevalence of BV differs in various populations (11%–71%) [10]. In the present study the prevalence of BV was 37.7%. This is less than that reported from northern Islamic Republic of Iran (61.7%) [11], but similar to findings of studies in Denmark in 2002 [12], Jordan in 2001 [13] and Indonesia in 2001 [14].

BV has been clearly linked to adverse reproductive and gynaecological outcomes in women. Thus many studies have been conducted on the prevalence of BV in pregnant women. Various rates have been reported: 66% for BV or candidiasis or both in Sofia in 1999 [15], 20.6% in Kenya in 1996 [16], 38.5% in India in 2001 [17] and 44.1% in Jamaica in 2000 [18]. These results on pregnant women are similar to our result on non-pregnant women.

Table 1 Clinical and laboratory findings in the women with and without bacterial vaginosis

Clinical and laboratory findings	Bacterial vaginosis		P-value
	Present (n = 49) %	Absent (n = 81) %	
Specific vaginal discharge	100	34.6	< 0.001
Vaginal burning and pruritus	77.6	79.0	0.505
Urinary symptoms	55.1	23.5	< 0.001
Presence of clue cell	14.3	0.0	< 0.001
Positive whiff test	100	33.3	< 0.001
Vaginal pH [Mean (SD)]	6.73 (1.00)	4.06 (0.91)	< 0.001

SD = standard deviation.

Table 2 Odds ratio for bacterial vaginosis associated with some related factors

Variable	Odds ratio	95% confidence interval
Education level ^a	3.80	1.68–8.64
Current smoking ^b	3.76	1.07–13.22
Single (at present)	0.27	0.06–1.28
History of abortion ^b	1.83	0.88–3.80
History of vaginitis ^b	6.27	2.05–19.21
History of preterm birth ^b	11.18	3.50–35.69
History of premature rupture of the membranes ^b	2.36	1.06–5.24

^aEducation level was considered low if only up to primary school had been completed.

^bAs reported by the women.

P < 0.05 was considered statistically significant.

The complexity of the sociodemographic picture challenges the field of public health to continue to explore the role of BV and its relationship to a whole host of social and biomedical conditions that may contribute to adverse health outcomes among society's most vulnerable members. These factors include, for example, education level, socioeconomic status, contraceptive use and reproductive history.

Table 3 Odds ratios for bacterial vaginosis associated with contraceptive method

Contraceptive method	Odds ratio	95% confidence interval
No contraception	1.04	0.50–2.16
Oral contraceptive use	0.37	0.14–0.99
Barrier use	2.07	0.44–9.71
Intrauterine device use	4.03	0.75–21.70
Tubal ligation	0.48	0.16–1.43

According to one study in 2001 on African-American women, education and contraceptive use were associated with BV. Adjusted odds ratios for BV remained significant in the women with 13 or fewer years of education (OR = 5.5, 95% CI: 2.1–14.5) and hormone use within the past 6 months (OR = 0.5, 95% CI: 0.2–0.8) [19]. Systemic contraceptives appeared protective whereas little education was linked to an increase in prevalence; these results are similar to our study. Culhane et al. in 2001 showed sociodemographic variables and behavioural characteristics such as use of illicit drugs were significantly associated with the presence of BV [20]. Hellberg et al. in 2000 showed that, after adjustment for possible confounding factors, smoking was significantly associated with BV [21]. Age-adjusted odds ratio for smokers was 2.3 before and 3.0 (95% CI: 1.3–6.9) after adjustment for sexual risk behaviour, reproductive history and alcohol use. In our study the odds ratio for smokers was similar at 3.76 (CI: 1.07–13.22).

Baeten et al. showed that users of oral contraceptive pills or depot medroxyprogesterone acetate were at increased risk for acquisition of chlamydia and at decreased risk for BV [22]. Our results were similar. On the other hand, several studies have suggested that BV is more common among intrauterine device users than non-users [12,23]. Our study demonstrated similar results.

Bacterial vaginosis is strongly associated with cervicitis and pelvic inflammatory disease, and upper genital tract infection is an important factor for preterm birth and PROM. Preterm birth is one of the most common causes of prenatal morbidity and mortality. Thus BV is associated with adverse pregnancy outcomes across all gestational ages, such as first and second trimester fetal loss, chorioamnionitis, low-

birth weight infants and maternal/neonatal infectious mortality. Liah Camp et al. concluded that in women who had had at least one late miscarriage, BV was twice as common as in women who had had only early losses [24]. In the present study the prevalence of BV in women who had history of at least one abortion was higher than other women, but the difference was not significant.

BV was quite prevalent in our sample of non-pregnant women and there is no reason to think it would be less prevalent in pregnant women in our community. Given the complications of BV, especially in pregnancy, it is a problem which the public health authorities need to address and one which should be brought to the attention of the public.

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