Prevalence of Selected Reproductive Tract Infections among Pregnant Women Attending an Urban Maternal and Childcare Unit in Dhaka, Bangladesh

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ABSTRACT

A cross-sectional study was conducted during May-December 2000 among pregnant women attending an urban maternal and childcare-delivery unit in Dhaka, Bangladesh, to assess the prevalence of bacterial vaginosis, *Trichomonas vaginalis*, and syphilis. All pregnant women at 16-24 weeks gestation attending the clinic for antenatal check-up irrespective of symptoms were enrolled. Sociodemographic information and obstetric history were obtained from each enrolled subject. High vaginal swabs and serum samples were tested for bacterial vaginosis, and *T. vaginalis* and syphilis respectively. In total, 284 pregnant women were enrolled. Of them, 17.7% had bacterial vaginosis, 1.4% had *Trichomonas* infection, and 3% had syphilis. The prevalence of bacterial vaginosis was higher in women with low socioeconomic status.

Key words: Vaginosis, Bacterial; Pregnancy; *Trichomonas vaginalis*; Syphilis; Cross-sectional studies; Bangladesh

INTRODUCTION

Reproductive-tract infections (RTIs), including bacterial vaginosis, are a major public-health problem among sexually-active women of reproductive age in developing countries. Among RTIs, bacterial vaginosis alone is responsible for 40-50% of vaginal infections in sexually-active women (1). Bacterial vaginosis is a polymicrobial syndrome characterized by a shift in the vaginal flora from the dominant flora of *Lactobacillus sp.* to a mixed vaginal flora that includes *Gardnerella vaginalis*, *Bacteroides* sp., *Mobiluncus* sp., and *Mycoplasma hominis* (1). Evidence associating bacterial vaginosis

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with serious medical complications during pregnancy has accumulated. These associations include premature rupture of membranes, chorioamnionitis, amniotic fluid infection, premature labour and delivery, and post-partal endometritis (2-4).

Sufficient data on the prevalence of bacterial vaginosis among pregnant and non-pregnant women in developing countries are not available. In a multi-centre study in the USA enrolling 10,397 pregnant women, the prevalence of bacterial vaginosis was found to be 16% (4). In Bangladesh, the prevalence of bacterial vaginosis among urban and rural non-pregnant females attending primary healthcare-delivery units was found to be 30% and 20% respectively (5,6). Results of a study among pregnant women in Indonesia showed that the prevalence of bacterial vaginosis was 12% (7). Longitudinal studies on bacterial vaginosis among pregnant women have shown that women whose vaginal flora was normal

initially rarely had developed bacterial vaginosis at the end of pregnancy; however, spontaneous recovery has been observed in 50% of women who had bacterial vaginosis at early pregnancy (7,8).

The pathogenesis of bacterial vaginosis in pregnancy is not well-understood. Results of a prospective study showed that women who had bacterial vaginosis at the beginning of the second trimester had a five-fold increase in risk of having pre-term labour or late miscarriage and pre-term low-birth-weight infants independent of other recognized risk factors (7). Bacterial vaginosis-associated pathogenesis usually occurs in early gestation (late first trimester), although its outcome is often late (third trimester).

Bangladesh has one of the highest reported frequencies of pre-term delivery. A community-based study in Dhaka and Matlab found that the rates of pre-term deliveries ranged from 13% to 17% (9). However, the prevalence of bacterial vaginosis among pregnant women and the association between pre-term birth and bacterial vaginosis have never been studied in Bangladesh. We report here the results of a cross-sectional study conducted to assess the prevalence of bacterial vaginosis among pregnant women attending an urban maternal and childcare-delivery unit in Dhaka, the capital of Bangladesh.

MATERIALS AND METHODS

This cross-sectional study was conducted during May-December 2000 among pregnant women attending an urban maternal and childcare-delivery unit for routine antenatal check-up in Dhaka, Bangladesh. All women attending the clinic, aged 15-45 years, with a gestational age of 16-24 weeks and with and without symptoms of RTIs were eligible for enrollment. Subjects were excluded from the study if they were on antimicrobial therapy in the preceding two weeks. The participants were informed of the study, and written consent was obtained. Individuals who fulfilled the selection criteria and gave informed consent were enrolled.

A trained social worker interviewed the participants to obtain sociodemographic data and obstetric history. A physician interviewed the subjects for symptoms of RTIs (abnormal vaginal discharge, dysuria, and lower abdominal pain) and performed gynaecological examinations, including speculum examination. High vaginal swabs and 5 mL of venous blood were collected for diagnosis of RTIs.

At the study clinic, a wet mount of vaginal fluid was prepared, and an experienced technician examined it microscopically for motile *Trichomonas vaginalis*. A smear of vaginal fluid was prepared and fixed with methanol for gram-staining.

Gram-stained smear was evaluated for bacterial vaginosis using the criteria of Nugent (10). Two experienced technicians read each slide independently. Vaginal smears with a score of 7 or more were considered consistent with bacterial vaginosis.

The sera were screened for antibodies to *Treponema pallidum* by rapid plasma reagin (RPR) test (Becton-Dickinson, Cockeysville, MD) and by *Treponema pallidum* haemagglutination (TPHA) test (Fujirrbio, Tokyo, Japan). A patient was considered to have syphilis if both RPR and TPHA tests were positive.

All the subjects were treated for symptoms of RTIs/ STIs as per the WHO syndromic management guideline (11).

Data collected were entered in a SPSS database, and analysis was done using the SPSS-PC (SPSS 10) software package. Frequency tables were obtained to see the pattern and distribution of data and to calculate the prevalence rates of selected STIs. Bivariate analyses were used for determining associated risk factors for bacterial vaginosis among the study subjects.

RESULTS

In total, 284 consecutive women attending the clinic were enrolled in the study. Of the enrolled subjects, 19 refused to give blood samples, and two refused to give high vaginal swabs. Sociodemographic data of the enrolled subjects and subjects with and without bacterial vaginosis are presented in Table 1. Of the 284 enrolled subjects, most were married, muslim, and housewife; their mean age was 24 years; 60% were married before 18 years of age; and approximately, two-thirds had symptoms of RTIs.

The prevalence of various RTIs among the enrolled subjects is shown in Table 2. Of the 284 pregnant women, 59 (20.7%) had any vaginal infection. Bacterial vaginosis was found in 50 (17.7%) of 282, syphilis in 8 (3%) of 265, and trichomoniasis in 4 (1.4%) of 282 subjects. Mixed infections were found in 3 (1%) of the 282 cases.

In bivariate analysis, no association was found between bacterial vaginosis and age, religion, occupation, education, symptoms of RTIs, and use of

Table 1. Sociodemographic characteristics, obstetric history, and clinical presentation of 284 pregnant women with and without symptoms of RTIs

Indicator	No. of pregnant women (n=284)	Bacterial vaginosis	
		Positive (%) (n=50)	Negative (%) (n=232)
Sociodemographic characteristics			
Age (years)			
<18	2	0	2 (.9)
18-25	186	31 (62)	153 (65.9)
>26	96	19 (38)	77 (32.2)
Age at first marriage (years)			
<18	173	24 (48)	146 (62.9)
>18	106	26 (52)	80 (34.4)
not available	8	0	6 (2.5)
Religion			
Islam	276	49 (98)	225 (97)
Hindu	8	1 (2)	7 (3)
Education			
No education	78	16 (32)	61 (26.3)
Primary	122	21 (42)	101(43.5)
Secondary	78	12 (24)	65 (28)
Graduate and above	6	1 (2)	5 (2.2)
Occupation			
Housewife	268	45 (90)	221 (95.3)
Service	16	5 (10)	11 (4.7)
Income (Tk/month)			
Up to 3,000	147	31 (62)	114 (49.1)
3,001-5,000	66	7 (14)	59 (25.4)
5,001-8,000	27	4 (8)	23 (9.9)
>8,000	44	8 (16)	36 (15.5)
Obstetric history			
Pre-pregnancy contraceptive method			
Contraceptive user	229/284	41 (82)	185/227 (81.5)
Oral pill	157/229	31/41 (75.6)	123/185 (66.5)
Condom	20/229	3/41 (7.3)	17/185 (9.2)
Injection	19/229	1/41 (2.4)	18/185 (9.7)
Pill and/or injection and condom	22/229	1/41 (2.4)	21/185 (11.3)
Others	11/229	5/41 (12.2)	6/185 (3.2)
No. of previous pregnancies			
1	179	32 (64)	146 (62.9)
2	76	12 (24)	63 (27.1)
>3	28	6 (12)	21 (9.1)
History of stillbirth			
None	277	50 (100)	225 (97.4)
1	5	0	4 (1.7)
2	2	0	2 (.9)
History of neonatal death			
None	263	48 (96)	212 (91.8)
1	14	2 (4)	12 (5.2)
>2	7	0	7 (3)
History of spontaneous abortion			
None	256	47 (94)	209 (90.5)
1	18	2 (4)	
>2	7	1 (2)	6 (2.6)
History of premature rupture of membranes	3	1 (2)	2 (.9)
			Contd...

Table 1. Contd...			
	No. of pregnant women (n=284)	Bacterial vaginosis	
Indicator		Positive (%) (n=50)	Negative (%) (n=232)
Clinical presentation			
Symptoms			
Asymptomatic	101/284	17 (34)	84 (35.9)
Symptomatic	183/284	33 (66)	148 (64.1)
Itching	70	15 (30)	54 (23.4)
Vaginal discharge	109	19 (38)	89 (38.5)
Dyspareunea	33	5 (10)	28 (12.1)
Dysuria	41	7 (14)	34 (14.7)
Lower abdominal pain	104	17 (34)	86 (37.2)
Clinical signs			
Vaginal discharge	71/284	17 (34)	54 (23.2)
Genital ulcer	6/284	0 (0)	6 (2.5)
Red and swollen vulva	25/284	7 (14)	18 (7.7)

contraceptives. However, those with a marital age of more than 18 years were more likely to have bacterial vaginosis than those with a marital age of over 18 years (confidence interval 1.05-3.97, odds ratio=2.04, p=0.034). Approximately, two-thirds of the bacterial vaginosis-positive subjects had a monthly income of less then 3,000 taka (US$ 53) per month compared to half of the bacterial vaginosis-negative women (Table 1).

Table 2. Prevalence of selected RTIs among pregnant women			
Aetiological diagnosis	Subjects		95% CI
	No.	%	
Bacterial vaginosis	50/282	17.7	13.25-22.15
Trichomoniasis	4/282	1.4	0.1-2.7
Syphilis*	8/265	3	1-5
Multiple infections	3/282	1	0.1-2.7
Any infection	59/282	23.5	16.02-25.38
* Positive in both rapid plasma reagin and *Treponema pallidum* haemagglutination tests CI=Confidence interval RTIs=Reproductive-tract infections			

DISCUSSION

Bacterial vaginosis is a major public-health problem among pregnant women due to its sequellae and adverse effects on pregnancy and pregnancy outcomes. The impact of bacterial vaginosis in pregnancy for the causation of premature rupture of membranes, pre-term birth, and low birth-weight is well-established (3). In poor countries, data on RTIs, including bacterial vaginosis and their complications, are limited, resulting in substantial underestimation of the burden of these diseases. Bacterial vaginosis is often asymptomatic, and its diagnosis is inexpensive but needs technical skill. As observed elsewhere, about two-thirds of the women with bacterial vaginosis in the present study were asymptomatic. A similar observation was also reported in an earlier study where asymptomatic infection ranged from 43% to 75% (12). The lack of symptoms among women with bacterial vaginosis is a major constraint in its diagnosis and treatment.

Approximately, two-thirds of the pregnant women in the present study were married before they were aged 18 years. Early marriage is a risk factor for spontaneous abortion, poor pregnancy outcome, and maternal and infant morbidity and mortality (13). However, the present study showed that women who were married before 18 years of age were less likely to have bacterial vaginosis than those married after 18 years.

Although there have been few studies on the prevalence of RTIs, including bacterial vaginosis, among females from the general population in Bangladesh, little data on the prevalence of bacterial vaginosis in pregnancy are available. The present study revealed that bacterial vaginosis was more common among pregnant women than any other RTIs studied.

Bacterial vaginosis is associated with race, previous pregnancy, sexual activity, socioeconomic conditions, and contraceptive use (4). In the present study, approximately two-thirds of the women with bacterial vaginosis were very poor (monthly income below 3,000 taka), and half of the women without bacterial vaginosis were also very poor.

The prevalence of syphilis in the present study was 3%. A similar prevalence has also been reported in an earlier study (14). Such a high prevalence of syphilis among pregnant women indicates the need for antenatal screening for syphilis in this population, which is cost-effective (15). A low prevalence of *T. vaginalis*-associated infection was observed in the present study, which is in agreement with the findings of earlier studies (5,6).

Currently, pregnant women with and without symptoms of RTIs are not routinely screened or treated for bacterial vaginosis, while other infections, such as trichomoniasis and candidiasis, are usually diagnosed and treated during pregnancy. As bacterial vaginosis in pregnancy is associated with premature rupture of membranes, premature delivery, and chorioamnionitis, it needs particular attention. A further study is required for the implementation of a programme for screening and treatment of bacterial vaginosis and syphilis during antenatal check-up.

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