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Bacterial Vaginosis among Infertile Women: A Descriptive Cross-Sectional Study

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ABSTRACT

Introduction: Bacterial vaginosis is the commonest vaginal infection. Evidence has shown a relationship between bacterial vaginosis and infertility. The objective of this study was to determine the prevalence of bacterial vaginosis among infertile women attending the infertility clinic.

Methods: This was a descriptive cross-sectional study conducted from 20 May 2018 to 19 May 2019 in a tertiary care centre after obtaining ethical approval from the Institutional Review Committee. Patients who had used antibiotics, vaginal creams/ pessaries in the last two weeks, women with genitourinary malignancy, menstruating at the time of sample collection, women with vaginal agenesis/atresia, and history of sexual intercourse 24 hours before the test were excluded from the study. Convenience sampling method was used. Point estimate and 95% Confidence Interval were calculated.

Results: Among 240 patients, bacterial vaginosis was found in 98 (40.83%) (34.61-47.05, 95% Confidence Interval) patients. Symptomatic bacterial vaginosis positive cases were 42 (42.86%), whereas asymptomatic cases were 56 (57.14%). Clue cells were present in 68 (69.39%) and absent in 30 (30.61%) in bacterial vaginosis positive cases.

Conclusions: Bacterial vaginosis was more prevalent in the women presenting to the infertility clinic and higher prevalence was noted in women of low socio-economic status.

Keywords: *bacterial vaginosis, hysterosalphingography, infertility, literacy.*

INTRODUCTION

Infertility is a disorder of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more despite regular unprotected sexual intercourse.[1] Bacterial Vaginosis (BV) may lead to tubal factor infertility.[2,3]

The prevalence of bacterial vaginosis in some tertiary care centers in the general Nepalese female population was found to be around 22-25%.[4,5] Studies done around the world have stated that the prevalence of bacterial vaginosis is higher in the infertile female population (28-75%).[3]

This study aims to identify the prevalence of bacterial vaginosis among infertile women attending an infertility clinic in the tertiary care center.

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METHODS

This is a descriptive cross-sectional study done among women attending the Infertility Clinic of the Department of Obstetrics and Gynecology, Tribhuvan University Teaching Hospital (TUTH), Maharajgunj, Kathmandu, Nepal from 20 May 2018 to 19 May 2019. The study was carried out after obtaining Institutional Review Committee (IRC) approval of TUTH (Reference number: 377(6-11-E)2/ 074/075 on 18 May 2018). All infertile women attending the infertility

clinic of TUTH during the study period were included in the study. Exclusion criteria were patients who had used antibiotics in the last two weeks, used vaginal creams/ pessaries in the last two weeks, woman with genitourinary malignancy, menstruating at the time of sample collection, woman with vaginal agenesis/ atresia, and history of sexual intercourse 24 hours before the test. The convenience sampling method was used. Sample size calculation was done using the following formula:

$n = Z^2 \times p \times q / e^2$

$n = 1.96 \times 1.96 \times 0.5 \times 0.5/(0.07)^2$

$= 196$

Where,

n = minimum required sample size

Z = 1.96 at 95% Confidence Interval (CI)

p = prevalence taken as 50% for maximum sample size calculation

q=1-p

e= margin of error, 7 %

The calculated sample size was 196. However, we have taken 240 patients for the study.

Informed consent was obtained from women meeting the inclusion criteria after explaining the test. A detailed history was taken. The demographic and clinical details, diagnosis, and investigation results were filled on a proforma by an independent student working in the department. Non-lubricated sterile Cusco's bi-valved speculum was inserted into vagina of the woman after keeping her in dorsal position. Presence or absence of vaginal discharge and type of discharge was noted. Three high vaginal swabs were taken from lateral and posterior fornix simultaneously. The first swab was smeared directly on the litmus paper kept on the glass slide, and the color change was assessed, which was then compared with the indicator given in the pack, and thus, pH was noted. With the second swab, a smear was made on a glass slide, and a drop of 10% KOH was added to it (Whiff test). The fishy odor was noted. A third swab was rotated in the posterior and lateral fornices and then was sent to the microbiology lab on the same day after the sample was smeared on the slide, air dried, and fixed in 95% ethyl alcohol for detection of clue cells. Amsel's criteria was used for the diagnosis of bacterial vaginosis.[6] Positive cases were correlated with tubal factor findings of HSG done on a regular basis in all infertile women between days 6-10 of the cycle.

Data was entered into Microsoft Excel and statistically analyzed using IBM SPSS Statistics version 22.0. Point estimate and Confidence interval were calculated for binary data.

RESULTS

Among 240 cases, 98 (40.83%) (34.61-47.05, 95% Confidence Interval) cases were diagnosed to have bacterial vaginosis. A total of 30 (30.61%) patients with BV were above the age of 30 years. (Table 1).

Table 1. The demographics of the patients with bacterial vaginosis (n= 98).

Variables		n (%)
Age group (years)	20-24	20 (20.41)
	25-29	18 (18.37)
	30-34	30 (30.61)
	>35	30 (30.61)
Education	Literate	56 (57.14)
	Illiterate	42 (42.86)
Social status	Upper	14 (14.29)
	Middle	74 (75.51)
	Lower	10 (10.20)
Marital status	Married	98 (40.83)

All the patients in our study were married. Out of the 142 literate patients in our study, 56 (57.14%) patients had BV, while out of the 98 illiterate patients, 42 (42.86%) patients had BV. Out of the 12 patients from a lower socioeconomic class, 10 (83.33%) patients had bacterial vaginosis. There was normal HSG in 88 (89.80%) cases with BV present. Cases with BV accounted for 98 (40.83%) cases of infertility both primary and secondary (Table 2).

Table 2. Various clinical factors of patients with bacterial vaginosis (n= 98).

Variables		n (%)
Types of infertility	Primary	74 (75.51)
	Secondary	24 (24.49)
pH	Normal	88 (89.80)
	Abnormal	10 (10.20)
	Acidic	88 (89.80)
	Basic	10 (10.20)

Symptoms like itching, discharge, fishy vaginal odour	Yes	42 (42.86)
	No	56 (57.14)
Whiff test	Positive	90 (91.84)
	Negative	8 (8.16)
Clue cells	Yes	68 (69.39)
	No	30 (30.61)

DISCUSSION

In this study, 40.83% cases were diagnosed to have bacterial vaginosis. In previous studies in Nepal, the prevalence of BV was 22-25 %.[4,5] In this study, the prevalence of BV among infertile women was 40.83%, which was nearly double that of the previously reported studies.[7] The advancement of Artificial Reproductive Technology (ART) in the present day has led many infertile women to seek medical attention. The routine examination of the vaginal flora is a part of the investigations done for infertility. This might have led to the diagnosis of asymptomatic BV cases in infertile women.

A study suggests that the worldwide prevalence of BV ranges from 4.2%- 70.34%.[8] Our prevalence is between this two extremes, and we believe that this variation in the prevalence may be due to socioeconomic and cultural differences.

In this study, the prevalence of BV was greater in women > 30 years of age, 44.12% in the 30-35 years and 51.72% in the > 35 years age group. In the study by Durugho et al., 88% of the infertile women with BV were above 25 years of age.[9] The higher prevalence in the older age group can be attributed to the high recurrence rate of BV of up to 76% as noted in the literature. The recurrence can occur within six months of treatment due to antibiotic resistance against pathogenic bacteria and their biofilms, increasing the prevalence of the disease.[7]

BV was diagnosed in 75.51% of primary infertile and 24.49% of secondary infertile women. Though the percentage of patients with primary infertility was higher in the study population, the prevalence of BV was similar in both groups (40.22% and 42.89%, respectively, among patients with primary and secondary infertility). The equal prevalence of BV in primary and secondary infertility indicates that BV might be a significant risk factor for infertility. In contrast to our finding, a study by Dhont et al showed that women with secondary infertility were more likely to have a diagnosis of BV than women in primary sub-fertility, attributing the cause to the interventions under unhygienic conditions, particularly during delivery or induced abortions, which predisposes patients prone to infection.[10,11]

The percent of patient showing a higher pH in vaginal swab, a positive Whiff test and clue cells in the swab was significantly higher in patient who had BV. This result also supports the role of Amsel's criteria in diagnosing BV in women. The efficacy of diagnosing BV using Amsel's criteria has also been validated by many studies. The result of this study also helps to validate the authenticity of Amsel's criteria.[6]

In this study, the prevalence of BV in the lower socioeconomic group was 83.33 %. The finding is similar to the study done by Durugbo I. et al. (2015) done in Nigeria which stated that lower socioeconomic class had an increased risk of BV.9 In studies from the USA, a lower socioeconomic class was found to be associated with poor health-seeking behavior and higher risk of STIs, which in turn increase risk for infertility, especially of tubal cause.[11] In another study conducted in India, the highest prevalence of BV was seen in urban slum (38.6%), followed by rural community (28.8%) and urban middle class (25.4%).[12] This shows that the prevalence of bacterial vaginosis varies widely among different areas and communities within the country. The contrasting prevalence figures may be because of various reasons, such as differences in economic status and educational background.

The prevalence of abnormal HSG in infertile patients with bacterial vaginosis was 83.33%. In many instances, BV goes untreated, hence creating the necessary milieu for ascending organisms to cause tubal damage.[10] Similarly, other possible reasons that have been put forward for BV being a cause of tubal infertility are due to the association of BV with sub-clinical PID, tubal motility disorders, and autoimmune infertility. The higher prevalence of BV in patients with abnormal HSG in other studies also helps to validate our findings.[9,13,14] Many possible reasons have been put forward in mechanisms of BV leading to infertility, like plasma cell endometritis (sub-clinical PID), tubal motility disorders, and autoimmune infertility, thus most pointing toward ascending infection.[3] All these studies support our study that tubal cause can be the result of BV infection.

This study had a large sample of cases, so the data generalizability may be appropriate. The data were taken by a student blinded to the study, hence minimizing the bias. Standard diagnosing criteria have been used in the study. A single-center study and convenience sampling method

might affect the generalizability of the results. Cases on antibiotics, menstruation, and recent sexual intercourse could alter the investigation results and were excluded. But, following up on the patient and taking data after 2 weeks could have increased the sample size and validity of the data.

CONCLUSIONS

Bacterial vaginosis was more prevalent in the women presenting to the infertility clinic and higher prevalence was noted in women of low socio-economic status.

Conflict of interest: None.

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