ORIGINAL ARTICLE

Study of Bacterial Vaginosis among Women of Reproductive Age Using Contraceptive Methods in a Tertiary Care Hospital

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Abstract:

Background: Vaginal infection is recognized as a major public health concern that causes variety of problems for women of reproductive age. The risk of genital infection is increased by the choice of contraceptive methods. *Aim and Objectives*: The present study was undertaken to determine the incidence of vaginal infections among women using various contraceptive methods. *Material and Methods:* The present prospective observational study was carried out in the Department of Microbiology over a period of three years. A total of 206 women in the age group of 18 to 45 years with vaginal discharge were included in this study. Detailed history was taken and gynaecological examination was done. Each woman was evaluated by Amstel's Criteria and Nugent's Criteria. Vaginal discharge was also examined for budding yeast and motility of trichomonads in wet mount. *Results:* Of the 206 women, 126(61.16%) women had undergone tubal ligation, 18(8.7%) used condom, 12(5.8%) women had inserted Intrauterine Contraceptive Device (IUCD) and 50 (24.27%) women did not use contraception. Of the 206, 134 (65.04%) and 86 (41.74%) were diagnosed to have Bacterial Vaginosis (BV) by Amsel and Nugent's Criteria respectively. Women with tubal ligation, condom and copper T showed BV 92 (73.01%), 8 (44.44%), 8 (66.66%) by Amsel's, while 60 (47.61%), 4 (22.22%), and 6(50%) by Nugent's Criteria respectively. Also 66 (32.03%) women had Vulvovaginal Candidiasis (VVC), 28 (13.59%) had trichomoniasis and 4 (1.94%) had gonococcal infection. *Conclusion:* Influence of contraceptive methods lead to the change in the vaginal flora, which may predispose to various genital infections. Thus, it is suggested that regular monitoring of women for infections should be done in women using contraception.

Keywords: Prevalence, Infection, Bacterial Vaginosis, Intrauterine Contraceptive Device

Introduction:

Vaginal flora of healthy adult women of reproductive age constitutes predominantly lactobacillus which inhibits the growth of other organisms by maintaining acidic pH. Among reproductive age women Bacterial Vaginosis (BV) is the most common vaginal infection [1-2]. Intrauterine Contraceptive Device (IUCD) is the most widely used method of contraception because of its safety and cost effective benefit. The insertion of IUCD is one of the most prevalent and effective reversible method of contraception worldwide. IUCD used in the community is less than expected, mostly due to the concerns of risk of complications linked to its use, particularly Pelvic Inflammatory Disease (PID) and subsequent sequelae [2]. Contraceptives can produce inflammation and morphologic atypia in both squamous and endocervical columnar cells. Most of these are benign, representing degenerative or reparative changes [3].

Most common cause of vaginitis in pre-menopausal group is bacterial vaginosis, candidiasis and trichomonas vaginalis [4]. Previous studies have shown that IUCD caused a change in the cervicovaginal flora that results in the predominance of anaerobic species [5-8]. These alterations may affect the vaginal health and may cause more vaginal infections and symptoms such as itching, soreness and abnormal discharge [9]. Bacterial vaginosis is usually caused by an overgrowth of anaerobic bacteria which live in the normal vaginal flora. These anaerobic micro-organisms comprise of *Gardnerella vaginalis*, *Bacteroides*, *Mycoplasmahominis*, *Mobil uncus spp*. amongst these most prevalent agent of BV is *Gardnerella vaginalis*. The present study was conducted with the aim to compare the incidence of vaginal infections with various contraceptive methods used by women in reproductive age.

Material and Methods:

The present study was a prospective study conducted over the period of three years in the Department of Microbiology, where the samples of vaginal discharge from the women of reproductive age i.e. between 18 to 45 years were collected and processed. A total of 206 non-pregnant women were enrolled in the study which had vaginal discharge as their chief complaint. Informed consent was obtained from all the women included in the study and institutional ethical clearance was obtained for the study. For each patient's complete information about age, occupation, residency, parity and use of contraception were obtained. This information also included the history of abnormal vaginal discharge, pain in lower abdomen, itching, dysuria, dyspareunia and odour. Women having vaginal bleeding at the time of specimen collection and those who were on medication for any bacterial, fungal, parasitical or viral infections for up to a month prior to sample collection were excluded from the study. Women with vaginal discharge were subjected to comprehensive pelvic examination using the vaginal speculum by the gynaecologist. Cotton tipped swabs were used to collect the discharge from lateral vaginal wall and posterior fornix and immediately transported to the Microbiology laboratory. The nature of the discharge was noted and the swab collected was used for Gram staining, pH determination and whiff's test.

The vaginal discharge was then assessed by using Amsel's Criteria [10] which includes the presence of homogeneous vaginal discharge, pH of vagina $\geq$4.5, presence of clue cells and a positive whiff's test. According to Amsel's Criteria, 3 of the 4 Criteria should be positive to warrant the patient is having BV. Vaginal pH was determined with the help of pH paper strip (Merck pH indicator paper) ranging from 3.5–6.0. The colour change was compared with a standardized colourimetric reference chart. For whiff test, a drop of vaginal discharge was mixed with a drop of 10% potassium hydroxide which emits fishy odour indicating positive test. To determine clue cells, the vaginal discharge was smeared and stained by Gram stain and vaginal epithelial cells completely covered by Gram variable coccobacilli were considered as clue cells. At least 20 or more clue cells per slide were taken as indicator of BV in association with other findings. Gram stained vaginal smears were scored using Nugent's scoring for BV [11] which was categorised on the basis of types and number of bacteria per oil immersion field into normal, intermediate or BV group with score 0-3, 4-6, 7-10

respectively. The specimen of vaginal discharge was also examined for candidiasis and trichomonas vaginalis by observing budding yeast and typical motility of trichomonads in wet mount preparation respectively.

Results:

For the present study, premenopausal non-pregnant women of age group between 18 years to 45 years were included using various methods of contraception. The mean age of the women in the study was 27.9 ± 3.5 years. Amongst these women, 126 (61.16%) women had undergone tubal ligation after their last child birth, 18 (8.7%) used condom, 12 (5.8%) women had inserted IUCD and 50 (24.27%) women did not use any method of contraception. In the present study, all these women were examined by both Amsel's and Nugent's Criteria. In this, of 206 non-pregnant women, Amsel's Criteria showed 134 (65.04%) women positive for BV and 72 (34.95%) negative for BV. Whereas, by using Nugent's Criteria 86 (41.74%) were having BV, 102 (49.51%) were negative for BV and 18 (8.7%) showed transition phase of having BV (Table 1). In the present study, the positivity of BV was compared between the Criteria of Amsel's and Nugent's amongst non-pregnant women using different methods of contraception (Table 2).In this study out of the total patients 66 (32.03%) had Vulvovaginal Candidiasis (VVC), 28 (13.59%) had trichomoniasis and 4 (1.94%) had gonococcal infection as shown in Table 3 below.

Table 1: Prevalence of BV as Detected by Amsel's Criteria and Nugent's Criteria

	BV positive	BV negative	Transition
Amsel's Criteria	134 (65.04%)	72 (34.95%)	-
Nugent's Criteria	86 (41.74%)	102 (49.51%)	18 (8.7%)

Table 2: Comparison of Amsel's Positive and Nugent's Positive BV amongst Non-pregnant Women Using Different Methods of Contraception (n = 206)

Method of contraception	Number	Amsel positive BV (%)	Nugent negative BV (%)
Tubal ligation	126	92 (73.01)	60 (47.61)
Condom	18	8 (44.44)	4 (22.22)
Copper T	12	8 (66.66)	6 (50)
No contraception	50	26 (52)	16 (32)
Total	206	134 (65.04)	86 (41.74)

Table 3: Infections Detected Amongst Women Using Different Methods of Contraception (n = 206)

Method of contraception	Number	Candidiasis	Trichomoniasis	Gonorrhoea
Tubal ligation	126	32 (25.39%)	20 (15.87%)	2 (1.58%)
Condom	18	10 (55.55%)	2 (11.11%)	2 (11.11%)
Copper T	12	4 (33.33%)	2 (16.66%)	0
No contraception	50	20 (40%)	4 (8%)	0
Total	206	66 (32.03%)	28 (13.59%)	4 (1.94%)

Discussion:

Among women of reproductive age, BV is the most common cause of vaginal symptoms [12]. Many studies have showed higher positivity of BV among contraceptive users than those not using contraception and findings were consistent and comparable with these studies [13-14]. In this study, the prevalence of BV was 65.04% by Amsel and 41.74% by Nugent's Criteria. This shows higher prevalence as compared to the study of Jogi *et al.* [15] which showed 40.66% and study of Levett *et al.* [16] showed 33%. According to the study of Lago *et al.* [2] and Shoubnikova *et al.* [17] the prevalence of BV among IUD users was 19.7% and 24.1% respectively which showed lower that this study. The study done by Josoef *et al.* [14] showed BV was associated with IUD use and suggested that women with IUD and BV may be at a higher risk for PID, especially if BV is presented prior to insertion. By using Nugent's Criteria, the prevalence in this study was 41.74% which showed less than the study done by Bradshaw *et al.* [18], Chaijareenont *et al.* [19] and Sha *et al.* [20], prevalence of BV seems to vary significantly from study to study. The results of our study were in concordance with the study of Bhalla *et al* [21] who reported 32.8% prevalence of BV among women in Delhi and study done by Verma *et al*. [22] who observed prevalence among women with vaginal discharge of 29.2%. In the context of our country, in rural area due to lack of facilities, many times vaginal discharge remains unnoticed as it is not a major health problem, for which a woman does not seek treatment. BV is an important health problem which may lead to intermenstrual bleed, prolonged menstrual bleeding, chronic itching and foul smelling discharge and chronic lower back pain if not treated [23]. Strong association between the presence of bacterial vaginosis and their reproductive age of >25 years have been reported by many studies [24, 25]. In the present study, higher incidence of vaginal candidiasis was observed in the women of reproductive age could be due to the presence of hormones such as oestrogens and progesterone in IUCD that may increase the glycogen levels in the vaginal fluid and thus promote the growth of candida species, which are consistent with the findings of the studies conducted by Enweani *et al.* [26] and Hurley *et al.* [27].

Conclusion:

The incidence of BV in non-pregnant women of reproductive age with vaginal discharge was found to be 65.04% by using Amsel's Criteria and 41.74% by Nugent's Criteria. This shows that the choice of contraceptive method has effect on the vaginal microbial flora, having important implications for women who suffer from infections associated with disruptions in the vaginal ecology, such as BV. Hence, it is suggested that regular microscopic examination should be done in women using contraception.

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