

Original Article

Evaluation of the Effect of Contraceptives on Prevalence of Candida Species on Vaginal Candidiasis in Dhaka, Bangladesh

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Abstract

This study was designed to find out the relationship between uses of different contraceptives and the prevalence of vaginal candidiasis. High vaginal swabs were obtained from 350 women in the age group of 15-45 years with vaginal discharge attending at Sir Salimullah Medical College Hospital, Dhaka, which comprised of 247 contraceptive users & 103 non-contraceptive users. A detailed clinical history and a thorough examination of all the cases were done. After making the clinical diagnosis, appropriate tests for diagnosing Candidiasis were done by using standard procedures. Of the 247 women of contraceptive users, Candida species was isolated in 140 (56.7%) cases compared to 32 (31.1%) from 103 non-contraceptive users (p value <0.001). Different species of Candida were isolated from 172 (49.1%) cases among 350 women of which *C. albicans* was found in 125 (72.7%) cases, *C. glabrata* in 29 (16.9%) cases, *C. tropicalis* in 13 (7.5%), and *C. krusei* in 5 (2.9%) cases. Among 173 oral contraceptive users, the isolation rate of Candida species was 120 (69.4%). This was followed by injectables (17, 12.2%) and IUCD (03, 2.1%) cases (p value <0.05). The study revealed a strong association between use of contraceptives and the prevalence of vaginal infection by Candida species of which *C. albicans* was the most common species (72.7%). Among all contraceptives, use of oral contraceptive pills (OCP) was found as the most common cause of vaginitis, next to which were injectables and IUCDs.

Key words: Contraceptives; *Candida albicans*, Vulvovaginal Candidiasis, Non-contraceptive users

Introduction

Vulvovaginal candidiasis is a common cause of vaginal infection. It is either a primary or a secondary infection of the vagina involving Candida species with *Candida albicans* being a leading cause.¹ This disease condition could be exacerbated by a change in the normal vaginal ecology.² At least one episode of vulvovaginal candidiasis has been reported in up to 75% of premenopausal women.³

Yeast is always present in the vagina in small numbers, and symptoms only appear with overgrowth. Several factors are associated with the overgrowth of Candida species leading to symptomatic infection in women. These include use of broad spectrum antibiotics and steroids, being in the luteal phase of the menstrual cycle, nulliparity, use of spermicides, uncontrolled diabetes mellitus, T-cell dysfunction, pregnancy, high dose estrogens, and contraceptives.⁴ Recent therapy with broad-spectrum antibiotics such as tetracycline, ampicillin, and oral cephalosporin is also a risk factor, presumably because it eliminates the protective vaginal flora, especially lactobacilli.⁵ Other factors that may increase the incidence of yeast infection include using douches, perfumed feminine hygiene sprays, and topical antimicrobial agents, and wearing tight, poorly ventilated clothing and underwear.⁶

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Contraceptives are chemical substances used for birth control measures which include oral contraceptive pills, intrauterine contraceptive devices, injectable contraceptives like Depo-Provera, jellies, creams, foams, vaginal tablets and cervical caps.⁴ The contraceptives containing oestrogen and progesterone increase glycogen in the vagina which is converted into lactic acid by lactobacilli. Thus overgrowth of Candida species occurs due to decreased pH. The most frequent symptoms of yeast infection in women are itching, burning, and irritation of the vagina. Vaginal discharge is not always present and may be minimal. The thick, whitish-grey discharge is typically described as cottage-cheese-like, although it can vary from watery to thick in consistency.

Hormone containing contraceptives, especially injectable contraceptives and oral contraceptive pills, are the popular methods of contraception in Bangladesh. Depo-Provera (DMPA) is used by more than 15 million women in more than 90 countries worldwide.⁷ Thus, there is a great chance of vaginal candidiasis in the women using this contraceptive method.

The aim of this study was to find out role of contraceptives on the prevalence of vaginal infection caused by different Candida species.

Methods

The present study was carried out during January, 2005 to December, 2005, to investigate the prevalence of vaginal discharge caused by Candida species among the contraceptive users. High vaginal swabs were obtained from 350 sexually active women in the age group of 15-45 years with complains of vaginal discharge. The patients were attending at outpatients department (OPD) of Obstetrics and Gynaecology of Sir Salimullah Medical College Hospital, Dhaka, comprising of 247 contraceptive users and 103 non-contraceptive users.

A detailed clinical history and a thorough examination of all cases were done by using a Cusco's speculum to visualize the vagina and cervix. Any pathology of vagina and cervix like vaginitis, discharge, cervicitis, cervical erosions were looked for.

The amount, colour, character and smell of vaginal discharge, if any, were noted. The discharge was then collected by three sterile swabs from upper part of the posterior fornix and lateral vaginal walls: (i) one was used for inoculation into culture media, (ii) second swab was used for wet mount microscopic examination, and (iii) the third swab to make smears for Gram staining.

Laboratory procedures done:

(a) KOH preparation: A drop of 10% KOH was added to the vaginal secretions taken on a clean glass slide and mounted with a cover slip. Candida was identified as highly refractile, round or oval budding yeast cells.

(b) Gram staining: Smears were prepared by the specimen and was fixed by flaming. Then the slide was stained by Gram's method⁸ and was examined under microscope at 40× for detection of strongly gram positive budding yeast cells, and pseudohyphae.

(c) Culture: Culture was done on Sabouraud's dextrose agar media at 37°C for 24 and 48 hours to see a growth of creamy, greyish moist colonies. Saline wet mount preparation of the colony was made to see budding cells and pseudohyphae.

(d) Species identification: The species identification was based on germ tube test, sugar assimilation test, and sugar fermentation test following standard methods.^{8,9}

All statistical analyses were carried out with the Statistical Package for Social Sciences (SPSS), version 10.0; SPSS Software Ltd. Bangladesh. A 'p' value of <0.05 was considered statistically significant. The significance value of isolation rate of Candida species from contraceptive users and non-contraceptive users was determined by unpaired student's 't' test and the prevalence of Candida species among different types of contraceptives was calculated by one-way Anova test.

Result

Of the 247 women of contraceptive users, Candida species was isolated in 140 (56.7%) cases compared to 32 (31.1%) from 103 non-contraceptive users. There was a statistically highly significant relationship (p value <0.001) between the

rates of Candida isolation from contraceptive-users and non-contraceptive users. (Table I)

Table I: Rate of isolation of Candida species from 350 samples

Patient group	Isolates of <i>C. albicans</i>	Negative cultures	Total
Contraceptive users	140 (56.7%)	107 (43.3%)	247 (100%)
Non-Contraceptive users	32 (31.1%)	71 (68.9%)	103 (100%)
Total	172 (49.1%)	178 (50.9%)	350 (100%)

P= 0.001 (highly significant)

Candida species were isolated from 172 (49.1%) cases of from 350 women. Out of 172 Candida species, *C. albicans* was the most frequently isolated species (125, 72.7%). The second most common isolated species was *C. glabrata* found in 29 (16.9%) cases. *C. tropicalis* and *C. krusei* was isolated in 13 (7.5%) and 5 (2.9%) cases respectively. (Table II)

Table II: Different Candida species isolated from contraceptives and non-contraceptives users

Candida species	No (%) of Candida isolated from		Total (n=172)
	Contraceptive users	Non-contraceptive users	
<i>C. albicans</i>	107 (76.4)	18 (56.2)	125 (72.7)
<i>C. glabrata</i>	21 (15.0)	08 (25.0)	29 (16.9)
<i>C. tropicalis</i>	09 (6.4)	04 (12.5)	13 (7.5)
<i>C. krusei</i>	03 (2.1)	02 (6.3)	5 (2.9)
Total	140 (100)	32 (100)	172 (100)

The highest prevalence of vaginal candidiasis was found in OCP users which included 120 (85.7%) out of 173 patients. This was followed by injectables and IUCD users, 17 (12.2) and 03 (2.1%), respectively. There was a significant relationship (p=0.002) between the type of contraceptive used and the prevalence of vaginal infections by Candida species. (Table III)

Table III: Prevalence of Candida species among Contraceptives users.

Name of contraceptives	No. of samples (n=247)		No. infected (n=140)	
	No	%	No	%
OCP	173	70.0	120	85.7
Injectables	68	27.5	17	12.2
IUCD	06	2.5	03	2.1
Total	247	100	140	100

p=0.002 (significant)

Discussion

The present study was carried out to investigate prevalence of vaginal discharge caused by Candida species among the contraceptive users.

Among 350 women studied, Candida species were isolated from 172 (49.1%) cases. From the total of 247 women of contraceptive users, Candida species was isolated in 140 (56.7%) cases compared to 32 (31.1%) cases from 103 non-contraceptive users. Similar pattern of isolation was found by Enweani *et al* who reported a prevalence of 51.5% from the contraceptives users in Nigeria.¹⁰ Out of 172 Candida species isolated in the present study, *C. albicans* was the most frequently isolated. This is with agreement of the result found by Hurley *et al*¹¹ and Marcano *et al*.¹² Enweani *et al* was also found a highest rate of isolation of *C. albicans* (70.7%) from the contraceptive users in Nigeria.¹⁰ There was a significant relationship (P<0.001) between the type of contraceptive used and the prevalence of vaginal infections by Candida species.

Among the women using contraceptives, the highest prevalence of 69.4% was observed in oral pill users as compared to those using injectables and IUCD in 12.2% and 2.1%, respectively, coinciding with the results of Misra *et al*.¹³ Oriol *et al* reported a higher rate of prevalence of vaginal candidiasis in oral contraceptives users than non-contraceptives users.¹⁴ Milson and Ferrsman earlier had suggested that this could be attributed to the presence of estrogen and progesterone hormones in the contraceptives that increased glycogen in the vagina, thus exposing it to the activities of lactobacilli.¹⁵ The lactobacilli are widely believed to play a role in the conversion of glycogen to lactic acid thus decreasing pH of the vagina. The decreased pH reduces activities of the bacterial biota which favours the growth of yeasts including Candida species.¹⁰ Ryley postulated that the low prevalence rate in injectable

contraceptive users may be related to the induction of hormonal changes.¹⁶ The IUCD users accounted for 2.1% of the isolation of Candida species. This might be due to local changes and secretions resulting from foreign body in the vagina.¹⁷

In this study, the results revealed a prevalence of 31.1% of Candida species among the non-contraceptive users. This finding suggested that there might be other causes for the high prevalence of vaginal infections in females apart from the use of contraceptives. It could also be attributed to sexual behavioral predisposition. This is conformed with another report suggesting natural factors to be predisposing to candidiasis.¹ The low personal hygienic practices and illiteracy in our society may also partly explain this high prevalence.

Results of this study have revealed a strong association between the use of contraceptives and prevalence of vaginal infection by Candida species. Oral Contraceptive Pill was the most influencing contraceptives that cause vaginal candidiasis.

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