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COMPARATIVE STUDY ON PREVALENCE OF VAGINAL CANDIDIASIS IN DIABETIC & NON-DIABETIC WOMEN

Shital Sangani[1], Jegan Charlies[2]*, V. Anandi[3] and G. Kandhakumari

[1]Tutor, Department of Microbiology, Zydus Medical College & Hospital, Dahod, Gujarat, India.
[2]Tutor, Department of Microbiology, Sakshi Medical College & Research Centre, Guna, Madhya Pradesh, India.
[3]Professor, Department of Microbiology, Vinayaka Mission's Medical College, Karaikal, Pondicherry, India.
[4]Associate Professor, Department of Microbiology, Sakshi Medical College & Research Centre, Guna, Madhya Pradesh, India.

***Corresponding Author: Jegan Charlies**
Tutor, Department of Microbiology, Sakshi Medical College & Research Centre, Guna, Madhya Pradesh, India.

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ABSTRACT
Background: Vaginal Candidiasis (VC) is a female genital system infection which occurs due to Candida species. It is estimated that as many as 75% of women experience at least one episode of Vaginal Candidiasis during the lifetime. **Aim:** The aim of this study is to compare the prevalence rate of vaginal Candidiasis between diabetic & non-diabetic women. **Materials and Methods:** This comparative study was performed on 50 diabetic women and 50 non-diabetic women referred to Sakshi Medical college & Research Centre, Guna, Madhya Pradesh, India. All specimens were examined under direct microscopy and cultured on Sabouraud Dextrose Agar (SDA) and Chrome agar (for Candida species identification). Complimentary tests also done, such as germ tube test and sugar assimilation test to differentiate the Candida species. Patients' information was collected by a questionnaire. **Observation and Result:** From total 50 diabetic women's samples, 28 (56%) were infected to Vaginal Candidiasis, whereas from total 50 non-diabetic women's samples, 17 (34%) were infected to Vaginal Candidiasis. The frequencies of the isolated Candida species in diabetic women include Candida albicans with 19 (67.9%), Candida glabrata with 3 (10.7%), Candida tropicalis with 4 (14.3%) and Candida parapsilosis with 2 (7.1%), whereas in non-diabetic women, Candida albicans with 9 (52.9%), Candida glabrata with 2 (11.8%), Candida tropicalis with 2 (11.8%) and Candida parapsilosis with 4 (23.5%). **Conclusion:** Vaginal Candidiasis was more prevalent in diabetic women than non-diabetic ones. Candida albicans was, by far, the most predominant fungal isolate. The culture of vaginal discharge should be warranted because culture technique is more sensitive than direct smear.

KEYWORDS: Candida species, Diabetes mellitus, Vaginal Candidiasis, Women.

INTRODUCTION
Diabetes mellitus (DM) predisposes individuals to bacterial andfungal infections, including those caused by Candida species. Many investigators have suggested that vaginal candidiasis (VC) occur more frequently in diabetics.[1–8] Diabetes mellitus is a chronic, insidious disease that can affect any organ of the body. One of the problems associated with this condition is infection.[9] One cause of recurrent VC is hyperglycemia.Candida infection in the vagina can cause a smelly, thick, white–yellow discharge that might be accompanied by itching, burning and swelling. It can also make walking, urinating or sex very painful.[10] Since the symptoms of vaginal candidiasis are not specific to the infection, diagnosis cannot be made solely on the basis of history and physical examination.Candida albicans is the most common species isolated in such an infection in diabetics as well as in non-diabetics. Recently, vaginal infection with Candida non-albicans species has been reported with increasing frequency in non-diabetic groups, possibly due to widespread and empirical use of antifungal drugs.[11,12,13]

MATERIALS AND METHODS
Study design: A comparative study was performed on women with complaints of vaginal infection. According to World Health Organization (WHO), diabetic affliction criterion was Fasting Blood Sugar (FBS) higher than 140 mg/dl in two separate times. We administered a questionnaire to obtain information about: age, occupation, education, symptoms, type and duration of diabetes mellitus.

Sample size & Duration: Total 100 women's swab samples of vaginal discharge were taken for a period of 1 year from July 2015 to June 2016. From total of 100 samples, 50 were of diabetic women and 50 were of non-diabetic women.

Study area: This study was conducted in Bacteriology section, Department of Microbiology, Sakshi Medical College & Research Centre, Guna, Madhya Pradesh, India.

Inclusion Criteria

- **For diabetic women:** Women diagnosed with diabetes.
- **For non-diabetic women:** Women with vaginal infection and doesn't have diabetic history.

Exclusion criteria

Only reason for exclusion was to disagreement of participation.

Methodology

Sample Collection

Two sterile Hi-vaginal swabs were used to collect discharge from vagina and sent it to the laboratory without delay. One swab was used in direct microscopy, and the other was used for fungal culture on sabouraud dextrose agar.The diagnosis of vaginal candidiasis was based on pesudohyphae identified by microscopic examination and candida growth on vaginal swab culture. Isolated strains were identified using the germ tube test and growth on Hi-Chrome agar.

Germ tube production

A small amount of candida colony was suspended in every tube containing fresh serum. The test tubes were incubated at 37°C for 2 to 3 hours. After incubation, a drop of each tube candida-serum suspension was placed on a glass slide, to be observed as a wet preparation. Under the high power objective, each slide was examined for the presence of germ tube.

Urease Test

Christensen's urea broth indicates the presence of the enzyme urease, which splits urea into ammonia, resulting in an alkaline environment. The phenol red indicator turns the media from a straw yellow to pink at pH 8.4.

Sugar Assimilation test

Diluted suspension of Candida culture was prepared in distilled water equal to a No. 1 McFarland standard. Then one drop suspension was added to each tube of yeast fermentation broth. A layer of molten Vasper was added directly on to the top of the broth. All the tubes were finally incubated at 30^0C and shaken daily. Reading was taken every 3 days for the two week. Sugar assimilation was examined by the color change of broth from blue to yellow in the presence of pH indicator bromothymol blue.

RESULTS

Among 50 diabetic and 50 non-diabetics Hi-Vaginal swabs cultures from clinical cases of Vaginal Candidiasis were included in the study. From which 28 (56%) diabetic and 17 (34%) non diabetic patients were infected Vaginal Candidiasis, from which diabetic women's age varied from 25 to75 years with mean fasting blood sugar level 191 ± 67 mg/dl and their mean duration of diabetes mellitus was 12 ± 6 years. The duration of diabetes in 50% of them was ≤ 7 and in remaining 50% was > 7 years. 2% of the patients had type I diabetes mellitus and 98% of them type II. Mean glycosylated hemoglobin level in these patients was 7/3 ± 2. 58% of the patients had clinical symptoms such as burning, itching and discharge and 42% of them had no symptoms. Regarding educational level, 95% of our patients were illiterate or had a middle school degree and 5% were college graduates. 98% of patients were housewives, and the rest were working women. The frequencies of the isolated Candida species in diabetic women include Candida albicans 19 (67.9%), Candida glabrata 3 (10.7%), Candida tropicalis 4 (14.3%) and Candida parapsilosis 2 (7.1%), whereas in non-diabetic women, Candida albicans 9 (52.9%), Candida glabrata 2 (11.8%), Candida tropicalis 2 (11.8%) and Candida parapsilosis 4 (23.5%).

Table 1: Results of different sugar assimilation by candida species.

Sr. no.	Sugar	Candida species			
		Candida albicans	Candida tropicalis	Candida parapsilosis	Candida glabrata
1.	Glucose	+	+	+	+
2.	Sucrose	+	+	+	-
3.	Maltose	+	+	+	+
4.	Lactose	-	-	-	-
5.	Galactose	+	+	+	-
6.	Cellobiose	-	+	-	-
7.	Inositol	-	-	-	-
8.	Xylose	+	+	+	-

DISCUSSION

Although it is commonly believed that vulvovaginal candidiasis in most of the diabetic women is more prevalent than the non-diabetic ones, its conservative relation is not yet known.[3] Vaginal yeast infection is usually diagnosed on the basis of clinical symptoms, direct microscopic examination and vaginal culture. The microscopic examination of the clinical material is rapidly performed and may identify the presumptive etiologic agent, but vaginal culture is indispensable to confirm the diagnosis.[14] Different studies indicated that vulvovaginal candidiasis infection is more common in women with diabetes than in the normal population.[9,16,17] The prevalence rate ranged from around 7 to more than 50%,[1,9] and most of which was attributed to C. albicans,[9,18,19] Goswami, et al (2006) reported the prevalence rate of 46% in 78 diabetic women.[20] Peer et al. (1993) reported the prevalence rate of the vulvovaginal candidiasis infection 24% in 111 diabetic women. These statistics show that different prevalence rates of vulvovaginal candidiasis in diabetic women are seen.[21] A high rate of prevalence of Candidanon-albicans species was not achieved in our study.The first step in establishing a yeast infection is bonding to the vaginal mucosa. It seems that Candida albicans is more adhesive than other Candidanon-albicans species. This could be considered as one of the likely reasons that this species are predominant rather than Candidanon-albicans.[14,22] From this study it was proven that candida colonization was higher in diabetics than normal individuals as observed by other studies.[23,25] And also it was proven that even without any clinical lesion candidiasis; diabetic patients tend to have subclinical colonization of opportunistic fungus Candida species.

CONCLUSION

The present study involved 100 women patients, from those 50 were diabetics and 50 were non-diabetics, for 1 year of duration. There is need to perform similar study in large number and for a longer duration. But according to the results in this study and similar ones, diabetic was introduced as one of the risk factors of Vaginal Candidiasis; it is recommended that these patients should observe blood sugar control and hygienic issues as compared to non-diabetic patients.

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