

## ARTICLE

## ***Trichomonas vaginalis* Infection in Women with Type 2 Diabetes Mellitus and Vaginal Discharge in Benghazi, Libya**

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### **Abstract**

**Background:** There is a wide variation in the prevalence of *Trichomonas vaginalis* in Libyan women. There are no data on prevalence in Libya women with diabetes, a known risk factor for increased genital infection. **Objective:** We wished to ascertain the prevalence of *Trichomonas vaginalis* infection in diabetic women with vaginal discharge in Benghazi, Libya. **Patients and Methods:** A cross-sectional study was performed at one specialized polyclinic between November 2011 and December 2013. One hundred and ten pregnant and non-pregnant diabetic women aged 17-52 years who complain of vaginal discharge were interviewed and high vaginal swabs were taken and tested with wet mount and culture to detect *Trichomonas vaginalis*, candida and bacteria. Random blood glucose levels and VDRL tests were also done for all patients. **Results:** 27 out of 110 vaginal swabs (24.5%) were positive for *Trichomonas vaginalis*. The age of the patient, color and smell of the vaginal discharge significantly concurred

with the *Trichomonas vaginalis* infection status. Highest rate of infection (50%) was observed in diabetic women over 40 years of age. Non-pregnant diabetic women had a slightly higher prevalence (27.7%) than pregnant diabetic women (22.2%). Eighteen of all vaginal discharge (16.4%) were positive for *Candida albicans*. Bacterial vaginosis was mostly due to *Staphylococcus spp* (100%). Additionally, 4 patients (3.6%) had a positive VDRL test. **Conclusion:** Nearly quarter of women with type 2 diabetes mellitus presenting with vaginal discharge in Benghazi had *Trichomonas vaginalis* infection. This is markedly higher than previously reported rates in the general female population of the city.

**Keywords:** *Trichomonas vaginalis* infection, Wet mount, Culture, Diabetes, Benghazi, Libya.

**Introduction**

*Trichomonas vaginalis* is a sexually transmitted flagellated protozoan. The World Health Organization (WHO) estimates the worldwide prevalence of trichomoniasis to be 174 million (1). Prevalence of both candidiasis and trichomonasises increases during pregnancy. This may be attributable to the increased levels of estrogens and corticoids reducing the vaginal defense mechanisms (2). Possible side effects of cervicovaginal infection on the gestation have been suggested over the years. It has a direct effect on the fetus and indirect fetal damage secondary to premature labor and/or premature rupture of membranes (3). Prior studies have shown that certain high-risk behaviors such as poor sexual activity hygiene and multiple sexual partners, reproductive age, pregnancy, diabetes, contraception, antibiotic use are risk factors for vaginitis especially candidiasis (4). Patients with diabetes mellitus have a high prevalence rate (46%) of vulvo-vaginal candidiasis which has been linked to the degree of hyperglycemia (5).

**Patients and Methods**

A cross-sectional observational study was conducted in a specialized polyclinic in the city of Benghazi, Libya between November 2011 and December 2013. A total number of 110 diabetic women (both pregnant and non-pregnant) who presented with vaginal discharge were invited to be included in the study. Patients were interviewed and high vaginal swabs were taken and tested with the wet mount and culture to detect candida and bacteria. Descriptive statistics were used to characterize groups and Chi-square test was used to test differences between groups. P value less than 0.05 was considered statistically significant.

**Results**

Out of the total 110 patients, 27 vaginal swabs (24.5%) were positive for *Trichomonas vaginalis* with the wet mount method. The age of the patient ( $X^2$  7.67, p value 0.02), Random blood sugar (Pearson  $X^2=$  69.1, p value = 0.02) and color ( $X^2 =$  97.9, df=4. P = 0.000) and smell of vaginal discharge ( $X^2=$  21.6, df =1. P = 0.000) was significantly correlated to *Trichomonas vaginalis* infection While pregnancy ( $X^2 =$  0.063, df=1, P=0.802) and nationality ( $X^2 =$  0.95, df=1, P = 0.32) were not. Highest prevalence was for diabetic women above age 40 (50%) (table 1).

Non-pregnant diabetic patients and women with Libyan nationality have slightly higher prevalence (27.7 %, 25.7% respectively) compared to pregnant diabetic women and non-Libyan nationality (22.2%, 11.1% respectively). The most common color of the vaginal discharge for all diabetic patients in the sample was white (65.5%). While patients with positive vaginal swabs for *Trichomonas vaginalis* infection had green and yellow color being most common (40.7% each) (Table 2). Mostly the discharge had fishy smell (65%) (Table 3).

Moderate to high pus cells were present in around (90%). *Candida albican* was positive in 18 (16.4%) and *Bacterial vaginosis* was evident in 100% of all vaginal discharge (Table 4). *Staphylococcus* species were the most common bacteria isolated (60.9%) and the second were *pseudomonas* (11.8%) while *Neisseria gonorrhoea* isolated in 10% of patients (Table 4). VDRL test of syphilis was positive in 4 (3.6%) of the patients.

**Table 1.** Age-related prevalence of *Trichomonas vaginalis* infection among diabetic women with vaginal discharge

Age group (years)	<i>Trichomonas vaginalis</i> status		Statistical results: $X^2 = 7.67, df=2, P = 0.02$
	Negative	Positive	
17-29 (N=42)	33	9 (21.4%)	
29-40 (N=50)	41(82%)	9 (18%)	
>40 (N=18)	9 (50%)	9 (50%)	
Total	83	27	

**Table 2.** Characteristic of vaginal discharge for all the sample of diabetic patients and their percentage

Color	Frequency	Percent	Valid %	Cumulative %	<i>Trichomonas vaginalis</i> status	
					Negative	Positive
Bloody	6	5.5	5.5	5.5	6	0 (0%)
Green	11	10.0	10.0	15.5	0	11 (40.7%)
Clear	9	8.2	8.2	23.6	9	0 (0%)
White	72	65.5	65.5	89.1	67	5 (18.5%)
Yellow	12	10.9	10.9	100.0	1	11 (40.7%)
Total	100	100	100		83	27 (100%)

$X^2 = 97.9$ ,  $df = 4$ ,  $P = 0.000$

**Table 3.** Characteristic smell of vaginal discharge for patients with positive vaginal swab for *Trichomonas vaginalis* infection and their percentage.

<i>Trichomonas vaginalis</i> status	Smell of vaginal discharge		Total
	fishy	not fishy	
Negative	7 (8.5%)	76 (91.5%)	83
Positive	13 (65.0%)	14 (15.5%)	27
All	20 (18.2%)	90 (81.8%)	110

$X^2 = 21.6$ ,  $df = 1$ ,  $p = 0.000$

**Table 4.** Type of bacteria isolated using culture from the high vaginal swab in diabetic patients and their percentage.

Organisms	Frequency	Percent	Valid percent	Cumulative percent
<i>E. coli</i>	11	10.0	10.0	10.0
<i>Klebsiela spp</i>	8	7.3	7.3	17.3
<i>Nieseria gonorrhoea</i>	11	10.0	10.0	27.3
<i>Pseudomonas</i>	13	11.8	11.8	39.1
<i>Staphylococcus spp.</i>	67	60.9	60.9	100.0

## Discussion

There is a wide variation in the prevalence of *Trichomonas vaginalis* in Libyan women. Whereas in the Albatnan district at the far eastern end of the country, it was reported at 26.8% (6), it was reported at much higher level of 36.7% in Zawia district in the western region of the country (7). In contrast, its prevalence in Benghazi city was very low at 1.2% only (8). To our knowledge, there are no data on the prevalence of *Trichomonas vaginalis* in diabetic patients in Libya. Therefore this study aimed to estimate that prevalence of *Trichomonas vaginalis* in diabetic patients in a gynecology clinic setting in Benghazi.

In our study, nearly quarter of the high vaginal swabs from diabetic women complaining of chronic vaginal discharge were positive for *Trichomonas vaginalis* with the wet mount method. This prevalence is significantly high when compared with the previously reported prevalence in general female population in Benghazi (8). This may be partially explained by defective immune system in diabetic patients and increase risk of infection especially in those uncontrolled. The prevalence is nearly similar to the general female population in Albatnan District in 2012 which was 26.8% and lower than its prevalence in general female in Zawia district, which was 36.7%. (6,7). In our study the age of the patients was significantly correlated to *Trichomonas vaginalis* infection. Actually this result is in agreement with many studies, but in contrast highest prevalence was for diabetic women of 40 years (50%) Figure 2. while most of the previous studies show highest prevalence below age of 40 (10) where there is great sexual activity and high estrogen level making good environment for growth of *Trichomonas vaginalis*. Although our result can be explained by the fact that as the diabetes duration increase the immunity become more defective especially in uncontrolled individual. The color and smell of vaginal discharge were significantly related to *Trichomonas vaginalis* infection which is in agreement with most of the previous studies. Green and yellow color being most common (40.7% each) and fishy odor was reported in 65% of the *Trichomonas vaginalis* infected patients

Pregnancy was reported to be one risk factor for vaginal infection especially *Trichomonas vaginalis*. In contrast our results showed pregnancy was not significantly correlated to *Trichomonas vaginalis* infection and non-pregnant diabetic women have slightly higher prevalence (27.7%) compared to pregnant diabetics women (22.2%). These findings are in agreement with some previous reports that

showed slight difference of 5.7% versus 3.8% (11) but at variance with other studies which showed markedly greater prevalence in non-pregnant women than in pregnant women (83.8% versus 16.2% respectively) (6,12).

Surprisingly, the prevalence of *Candida* in our diabetic women was low compared to *Trichomonas vaginalis* infection (16.4%, 24.5). The presence of moderate to high pus cells in the vaginal discharge of diabetic women was 90% and invariable presence of bacterial vaginosis (100%) is not unusual. Lakshmi K, et al showed a high prevalence of bacterial vaginosis in diabetic women (98%) (12) with *Staphylococcus spp.* being the most common bacteria isolated (60.9%) and *Pseudomonas* being the second (11.8%). However, this is in contrast to other studies, which showed that *E. coli* as the most prevalent bacteria followed by *Staphylococcus spp.* (12,13). Further more, our findings of *Neisseria gonorrhoea* in around 10% and positive VDRL test in 3.6% of patients is not strange as sexually transmitted diseases may coexist.

In conclusion, this study revealed a high rates of *Trichomonas vaginalis* infection affecting nearly quarter of all women with type 2 diabetes mellitus presenting with vaginal discharge in Benghazi. This is markedly greater than the previously reported rates in the general female population of the city.

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