Genital infection by *Trichomonas Vaginalis* in women referring to Babol health centers: prevalence and risk factors

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Abstract

Background: There is little information about the prevalence and risk markers of *Trichomonas Vaginalis* (TV) in Islamic Republic of Iran. This study aimed to determine the prevalence of TV and to examine the factors associated with this infection.

Methods: A sample of 550 sexually active women aged less than 45 years living in Babol were enrolled using systematic sampling technique. They were interviewed using a questionnaire, and all the subjects underwent pelvic examination and a discharge ectocervix sample was collected for the diagnosis of TV using wet smear.

Results: The prevalence of TV was 4%, there being a significant association between TV and the socio-demographic variables such as the husband's education, and woman's age (20-30 years). The behavioral markers significantly associated with the infection were, not using condom, having ever heard of lack of information about STD/HIV (Sexual Transmitted Disease)*,* and protected last sexual contact in that month and cigarette smoking by husbands. The signs significantly associated with the infection were vaginal discharge, mucopurulent cervicitis, and redness of vulvovaginal. Syndromic diagnosis revealed a moderate sensitivity of 55% and poor positive predictive value for infection.

Conclusion: The prevalence of positive TV is low in the studied women. Therefore, a net diagnosis using laboratory tests is necessary before the initiation of treatment.

Keywords: *Trichomonas Vaginali*s; Risk factors;, High-Risk behaviors

Introduction

Trichomonas Vaginalis (TV) is a sexual disease. Symptoms in acute vaginitis TV are usually vaginal discharge, vulvae itching/burning, dysuria and dysparunia.[1] Transmission is often by coitus specifically through infectious and asymptomatic men.[2,3] This disease is common worldwide but its prevalence is varied. The prevalence of infection has been reported up to 20%. In the female prisoners and in women communities with low health the prevalence is reported up to 50-75%.[3] In Iran, the rate of TV has been reported to be 26%).[4-7] In other countries, it varies from 3% to 7%.[8-12] TV is associated with infertility, abortion, ectopic pregnancy, preterm labor, Low Birth Weight (LBW) and cervix cancer. In men, it may cause, uretheritis and prostatit.[13,14] In our community, diagnosis is frequently made without laboratory tests, only on the basis of clinical grounds. However, due to drug side effects/ resistance, it should be treated after laboratory diagnosis. With regards to the importance of this disease, the necessity of detection and treatment of infectious individuals this study was designed to assess the prevalence of TV and its causal factors in Babol, northern Iran.

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Materials and Methods

This Study was carried out among women referring to the health centers of Babol University of Medical

Sciences, Babol, Iran. 550 women (P=0.10 and D= 0.025) who attended six health therapeutic centers of Babol were prospectively enrolled by an expert midwife in each health center. The Medical Ethical committee of the university approved the study and informed consent was provided from all participants.

Our inclusion criteria were: women aged 15-45 years who were sexually active and had referred to gynecology units in these centers. They could be either symptomatic (vaginal discharge, genital ulcer and lower abdominal pain) or asymptomatic (routine examination). The exclusion criteria were: antibiotic intake within the past 4 weeks, pregnancy, or uterine bleeding.

A standardized questionnaire was administered and all the subjects were followed by pelvic examination. The data were collected using a questionnaire including the following information: 1) Socio-demographic data including age, educational and professional status, marital status, and income, 2) Behavioral variables including age of the onset of sexual activity, extramarital sex, marriage, marital status of the women, perception of the husband having extramarital sex in the previous 3 months, history of sexual abuse, addiction, cigarette smoking, alcohol, current type of contraception, use of condom, lack of information on STD and HIV, history of STD and PID (Pelvic Inflammatory Disease) and their frequency, 3) Clinical variables studied were reasons of presentation to the clinic, chief complaint, data recorded by physical examination, number of pregnancies, abortions, and infertility. The questionnaires were delivered to one of the authors in order to ensure confidentiality.

The discharged ectocervix samples were delivered to a single laboratory where all the tests were performed. A vaginal discharge sample was taken for *Trichomonas Vaginalis* diagnosis using wet smear as follows: briefly, the samples were placed into a tube containing 0/5 ml of normal saline and delivered to bacteriology department of laboratory immediately. Direct wet mount was formed from this specimen and examined for the presence of TV under low and high power field (440X and 200 X) of light microscope. The statistical analysis was performed using SPSS package version 11. Comparison of the results was performed by Chi-square test analysis and Fisher's exact two-tailed test where appropriate. All the tests were two-sided and the level of significance was 0.05. The simple logistic regression model was used to estimate the odd ratio (OR) and 95% confidence interval (95% CI). The diagnostic performance was evaluated using the following indices: sensitivity, specificity, positive and negative predictive values.

Results

The mean age of women with positive TV was 29.8 years; about half of these women (54.5%) and 36.4% of their husbands had primary education. 18.2% of the women and their husbands had diploma degrees, and only 7.5% of them and 12.4% of their husbands had a university degree. The majority were housewives, and 54.5% of their husbands were self-employed. Regarding the economic status, only 21.3% of the study subjects could save money.

The mean age for the first sexual intercourse was 18 years. There was no history of having sex with more than one partner, extramarital sex, or history of sexual abuse. Most of the women (95%) were not aware of their husbands' extramarital sex relationships. 9.1% and 50% of their husbands were addicts and smokers, respectively. The most common contraceptive methods used were OCP and then withdrawal (22.7% and 18.2%, respectively), and only 18.2% of the participants had always used condom.

The mean gravidity and abortion were 2.45 and 0.55, respectively; 22.7% of the women had a history of pelvic inflammatory disease and 4.5% history of infertility. All the women denied having a past history of sexually transmitted infections and they did not know their symptoms, or they thought they were not important, or were ashamed to visit the health centers. In fact, 93.5% of them had not heard about STD, while 95.5% heard of HIV. STI services are not free of charge and 86.2% mentioned stigma/social barriers against seeking STD services, and the mean (±SD) time taken to reach the STI services was 12.3 ± 8.2 minutes.

The prevalence of *Trichomonas Vaginalis* was 4%. The main reasons for presentation at the gynecology clinics in positive TV were urogenital complaints (59.1%), the most frequent ones being vaginal discharge (6.8%), dysparoeunia (6.6%) and genital itching (5.9%) in positive TV. The most frequent signs were redness of vulvevaginal (11.3 %%), MPC (13.8%) and leucorrhea (9.5%). Dysparoeunia, MPC and lekureahe were risk factors for TV. Totally 59.1% of the women with positive TV had symptoms and 50% had signs; 18.2% of the individuals with TV in examination were positive by laboratory test. Association of urogenital manifestations with T vaginalis infection is shown in Table 1. Analysis of demographic markers showed that a significant association was

Table 1: Frequency of *Trichomonas vaginalis*, and the associated factors.

Factor	*Trichomonas vaginalis* Positive		P value
	NO.	%	
-Education of husband			P<0.04
Illiterate	0	0	
Primary school	8	3.7	
High school	9	9.4	
Diploma	4	2.7	
Academic education	1	1.5	
-Cigarette smoker of Husband			P<0.03
Yes	11	6.6	
No	11	2.9	
-Use of condom	4	2.7	P<0.05
Mostly / sometimes	18	12.3	
Never			
-Last sexual contact in month			P<0.04
Protected	10	6.8	
Unprotected	12	3	
-Having ever heard of STD			P<0.02
Yes	1	0.8	
No	21	4.9	
-Reasons for attendance at clinic			NS
Urogenital syndrome	13	4	
Routine follow up	9	4	
-Clinical final diagnosis			P<0.008
Illness (vaginitis –cervicitis- PID)	11	7	
Healthy	2	5.1	
Undiagnosed	9	0.9	

present between the women's age (20-30years) with TV infection. In fact the age group 20-30 years was associated with a significantly higher risk of TV infection. Also the husbands' low education was significantly associated with TV positive (P<%5) as a risk factor for TV. The results of the analysis of behavioral markers showed a significant association between not using condom, lack of knowledge on STD, and unprotected last sexual contact in that month and cigarette smoking by the husband with TV infection. Table 2 shows the prevalence of TV with respect to different risk factors and the odd ratio (95% CI) derived from logistic regression model. Syndromic diagnosis of TV infection had low sensitivity and positive-predictive value (Table 3).

Discussion

Our findings showed that the prevalence of contamination with *Trichomonas Vaginalis* (TV) was 4% (95%, CI: 0.034-0.056). In comparison with some community-

based studies in Iran, this estimated rate of contamination is lower: Tabriz (22.6%), Ilam (14.7%), Esfahan (7.15%),[15-17] but in comparison with other community-based studies such as those conducted in Ghazvin (1.5%), Kashan (2.1%), Sari (2.3%), Sirjan and (2.2%), our estimated rate is higher.[18-21] Since the method of diagnosis in all of these studies was the same as that in our research, this may be due to the difference in healthy and behavioral markers in the population of different cities. The prevalence of TV varies from 3 to 70% in other countries.[8-12] It seems that the prevalence of positive TV is not high among the educated women, whereas many of the women referring to health centers with a chief complaint of vaginal discharge were treated only based on clinical diagnosis. WHO has recommended syndromic treatment,[22] but the prevalence of TV has decreased during the past 30 years, because of the increasing awareness over health issues, observance of individual/ social health, and also by the use of various anti-fungal drugs in our community.[23] Therefore, there is a need for modifications in treatment measures.

Table 2: Association of urogenital manifestations with *chlamydia* and *trichomonas*

Presence of urogenital manifestations Symptoms	*Trichomona vaginalis* %	No	OR (95% CI)	P. value
Vaginal discharge	6.8	10	2.37 (1-5.6)	0.04
Frequent postcoital bleeding	5.6	1	1.43 (0.18-11.26)	NS
Lower abdominal pain	0.8	1	0.158 (0.02-1.19)	NS
Genital itching	5.9	5	1.64 (0.59-4.59)	NS
Difficult urination	5.8	3	1.54 (0.44-5.4)	NS
Dyspareunia	6.6	11	2.4 (1.02-5.7)	0.03
Menstrual irregularities	2.2	2	0.48 (0.11-2.1)	NS
Signs				
Cervical friability	2.7	2	0.64 (0.14-2.8)	NS
Cervical ectopy	6.1	6	1.75 (0.66-4.6)	NS
Redness of vulvevaginal	11.3	7	4 (1.6-10.3)	0.007
Mucopurulent cervicit	13.8	4	4.47 (1.4-14.2)	0.02
Lower abdominal tenderness	2.2	2	0.48 (0.11-2)	NS
Rebound in the lower abdominal	5.9	2	1.55 (0.34-6.9)	NS
Cervix motion tenderness	6.1	2	1.6 (0.35-7.17)	NS
Uterine- adnex tenderness	1.6	2	0.37 (0.49-2.8)	NS
Discharge	9.5	7	3.2 (1.3-8.2)	0.01

Table 3: Association of syndromic diagnosis of *Trichomona* vaginalis with laboratory tests.[1]

TV syndromic diagnosis	Laboratory test			
	Positive		Negative	
	%	Count	%	Count
Positive	7	11	93	146
Negative	5.1	9	94.9	168
	True Positive		True Negative	
	0.55		0.53	

[1]Out of 550 patients in 216 patients was because of syndromic diagnosis of TV in these patients were unclear.

Our results showed that the highest rate of TV was observed in 20-30 age group. This is similar to the findings of other studies.[24] This group is at a higher risk for genital infection because of their more sexual intercourses. Moreover, the semen fluid causes an increase in pH and gives rise to fungal growth.[24] Based on our findings, most of the contamination was observed in illiterate women and those with low education. These results are also similar concerning husband education. This point emphasizes the importance of education in disease prevention and control.

However, there was no significant association between the income and TV contamination that was more common in low-income individuals. Regarding behavioral features, the results showed that the use of condom as a contraception method leads to a reduction of infection. The literature shows that in women whose husbands used condom; the infection rate of TV was 20% less than that in others.[1,2, 8-10] The association between the use of condom and TV infection has been significant in many studies[1-3] similar to our findings. In this study, we observed more infection in those making use of OCP. Probably sexual hormones provide favorable condition for fungal growth.[3]

As to sexual behaviors, most of the responses were negative. Its main cause is religious beliefs in our community about extramarital sex and the sense of guilt. So such behaviors were performed secretly and their wives were not informed. However, appropriate data in this regard are impossible to be gathered in our community because they are often illegal and no authority is informed.

In our findings, the most complaints were vaginal discharge, dysparoeunia and genital itching. The most

signs were redness of vulvevaginal, MPC and leucorrhea. These were significant in this study as in other studies. Wet smear is one of the diagnostic methods for TV with varying sensitivity and specificity in various studies. In Memarpoor's study (1998), 92.7% sen and 90.4% spe were reported in wet smear and culture, respectively.[25] Ziaei (1998) showed 85.2% sen in wet smear vs. 70% in culture.[20] Sharbatdaran (2005) mentioned the highest sen and spe in wet smear compared to the culture. He proposed the use of wet smear before initiation of treatment, because high false positive was only based on clinical manifestations.[26] In a study by Hazrati Tapeh (2004), also wet smear has more sen and spe than the culture.[27] Landres (2004) reported that sen, spe and ppv in wet smear were 62%, 97%, and 75%, respectively.[28] Consequently, wet smear can be used as an adequate, simple, cheep and rapid method for diagnosis of TV. The use of culture in suspicious cases increases diagnostic sen to 98% and spe to 100%.[26]

Overall, education, sufficient income, use of condom, and health knowledge on STD are the most important effective factors in TV infection rate. Thus, an intervention program is required for disease control and community health promotion. Among these factors, our findings indicate that the prevalence of TV was low. Considering the majority of cases, the disease was asymptomatic and because the prescription of physicians in our community is based on signs/symptoms due to drug resistance, drug fee and drug side effects. It is suggested that treatment be performed after a definite diagnosis, using wet smear first and in suspicious cases by culture.

Acknowledgments

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