

# Risk factors for vaginal trichomoniasis among women in Basra, Iraq

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عوامل اختطار الإصابة بداء المشعرات المهبلية بين النساء في البصرة، بالعراق  
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خلاصة: قمنا بتجريب داء المشعرات المهبلية بين النساء في البصرة. وعند القيام بالفحوص السريرية والمختبرية على 352 من النساء المصابات بإفرازات مهبلية، ووجد أن 46 امرأة منهن كنّ مصابات بالعدوى، بحيث كان معدل العدوى 13%. ولم يكن هناك فروقات هامة في استفراد المشعرات المهبلية بين النساء وفقاً للمهنة أو للمستوى الثقافي والوضع الاقتصادي والعمر والحالة الزوجية والولادة والحالة الحيضية واستعمال موانع الحمل. وقد كانت الفروق بين معدلات استفراد المشعرات المهبلية في النساء اللواتي لديهن سوابق إجهاض (7.6%) وبينها في النساء اللواتي ليس لديهن سوابق إجهاض 15.7%، فروقا يُعتدّ بها إحصائياً.

ABSTRACT We investigated *Trichomonas vaginalis* infection among 352 women with vaginal discharge, 46 were found to be infected, an infection rate of 13%. There were no significant differences in the isolation rate of *T. vaginalis* in women according to occupation, educational level, economic status, age, marital status, parity, menstrual status and contraception use. The difference in the isolation rates of *T. vaginalis* in women with a history of abortion (7.6%) and in women with no history of abortion (15.7%) was statistically significant.

## Facteurs de risque de trichomonase vaginale chez les femmes à Bassora (Iraq)

RESUME Nous avons examiné l'infection due à *Trichomonas vaginalis* chez 352 patientes ayant des écoulements vaginaux ; on a constaté que 46 d'entre elles étaient infectées, ce qui donne un taux d'infection de 13 %. Il n'y avait pas de différence significative dans le taux d'isolement de *T. vaginalis* chez les femmes en fonction de leur profession, leur niveau d'instruction, leur situation économique, leur âge, leur état matrimonial, du nombre d'enfants, de leur statut menstruel et de l'utilisation de la contraception. La différence des taux d'isolement de *T. vaginalis* chez les femmes qui avaient des antécédents d'avortement (7,6 %) et chez celles qui n'en avaient pas (15,7 %) était statistiquement significative.

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## Introduction

Urogenital trichomoniasis is a sexually transmitted disease affecting both men and women caused by the flagellate protozoan *Trichomonas vaginalis* [1]. It is rarely reported in females before puberty or after menopause, but is common during the childbearing years and peaks during pregnancy [2]. Patients characteristically present with offensive vaginal discharge and itching or irritation. In women, infection causes vaginitis and cystitis and in men urethritis and proctitis. Infected women or men may also be asymptomatic.

Vaginal trichomoniasis is diagnosed either by the observation of motile protozoa on a wet mount of vaginal or urethral discharge, or by culturing the organism. Some infections are also diagnosed by cervical cytology [3]. The standard treatment for trichomoniasis infection is metronidazole given as 250 mg three times a day for 7 days [4].

In Iraq there have been some studies of the infection rate in Basra, Baghdad, Mosul and Arbil (11.3%, 19.54%, 9.6% and 10% respectively) [5–8]. In this study we undertook a search for risk factors affecting rates of trichomoniasis.

## Methods

We examined all 352 women attending the outpatient gynaecology clinic of Basra Maternity Hospital during the period from January to September 1999 complaining of vaginal discharge with or without pruritus vulvae. Their ages ranged between 7 and 65 years.

A sample of vaginal discharge was taken from the posterior fornix of the cervix or from the vaginal wall using a sterile cotton swab after the introduction of a sterile vaginal speculum without antiseptic or lu-

bricant. The organism was detected by microscopic examination of a saline mount of the secretion [9,10]. The swabs on which the vaginal material was collected were inoculated onto 9.5 mL of medium (Difco No. 0911.02) containing 0.5 mL of sterile human serum. Urine samples were also collected from patients and examined microscopically.

## Results

Of the 352 women examined, 46 (13%) women examined were found to be infected with *T. vaginalis*. The locations from which these samples were isolated are shown in Table 1. The highest isolation rate (69.6%) was obtained from the vaginal discharge.

The infection rate of *T. vaginalis* among women involved in this study did not show any statistically significant differences with age ( $\chi^2 = 1.03$ ,  $P > 0.05$ ). The high prevalence rate of *T. vaginalis*-infection (12.6%) was found in women of reproductive age (ages 14 to 40 years) (Table 2). One girl in a younger age group (1 to 10 years) was positive for vaginal trichomoniasis. Married women had an infection rate of 12.5%, while widows had a higher rate of 27.3%. However, only a single positive case was diagnosed in the 5 unmarried fe-

Table 1 Distribution of cases of *Trichomonas vaginalis* by site of isolation

Site of isolation	Positive cases No.	%
Vagina	32	69.6
Urethra	4	8.7
Vagina and urethra	10	21.7
Total	46	100

Table 2 Infection rate of *Trichomonas vaginalis* according to age, marital status and parity

Variable	n	Positive cases		Statistical tests
		No.	%	
<b>Age group (years)</b>				
1-10 <sup>a</sup>	3	1	33.3	$\chi^2 = 1.03$ , $P > 0.05$
11-20 <sup>a</sup>	32	5	15.6	
21-30	172	20	11.6	
31-40	113	15	13.3	
Over 40	32	5	15.6	
<b>Marital status</b>				
Married	336	42	12.5	$\chi^2 = 2.084$ , $P > 0.05$
Single <sup>b</sup>	5	1	20.0	
Widowed <sup>b</sup>	11	3	27.3	
<b>Parity</b>				
0-4	260	36	13.8	$\chi^2 = 0.52$ , $P > 0.05$
5-14	92	10	10.9	

<sup>a</sup>Because of the small sample size in the age group 1-10 years, it was added to the age group 11-20 years for the  $\chi^2$  test.

<sup>b</sup>Because of the small sample size of the single women, it was added to the widowed group for the  $\chi^2$  test.

males examined in this study. There was no significant difference according to marital status (married, single or widowed) ( $\chi^2 = 2.084$ ,  $P > 0.05$ ). Furthermore, there was no statistically significant difference according to parity ( $\chi^2 = 0.52$ ;  $P > 0.05$ ), although *T. vaginalis* infection was more common in women with parity less than 5.

Pregnant women and postmenopausal women showed the highest infection rate (18.6% and 16.0% respectively) (Table 3), but there was no significant difference in relation to menstrual history ( $\chi^2 = 3.92$ ,  $P > 0.05$ ).

*T. vaginalis* infection was more common among women who did not use contraceptives (14.2%) than among those

Table 3 Infection rate of *Trichomonas vaginalis* according to menstrual history

Menstrual history	n	Positive cases	
		No.	%
Pregnant	59	11	18.6
Non-pregnant	218	27	12.4
Lactating	46	3	6.5
Postmenopausal <sup>a</sup>	25	4	16.0
Prepubertal <sup>a</sup>	4	1	25.0

<sup>a</sup>Because of the small sample size in the prepubertal group, it was added to the postmenopausal group (females not of reproductive age) for the  $\chi^2$  test  
 $\chi^2 = 3.92$ ,  $P > 0.05$ .

using oral contraceptive (13.6%) (Table 4), and there were no positive cases of *T. vaginalis* diagnosed among condom users. The difference between users or non-users of contraceptives was not reach statistical significance ( $\chi^2 = 2.61$ ,  $P > 0.05$ ).

The infection rate in women working outside the home (18.3%) was not signifi-

Table 4 Infection rate of *Trichomonas vaginalis* according to contraceptive methods

Type of contraceptive	n	Positive cases	
		No.	%
<b>Mechanical</b>			
Intrauterine device	56	4	7.1
Condom	11	0	0
Tubal ligation	2	1	50.0
<b>Systemic</b>			
Pill	66	9	13.6
Injection	6	2	33.3
Non-users	211	30	14.2

$\chi^2$  was performed for the mechanical, systemic and non-user groups.

$\chi^2 = 2.61$ ,  $P > 0.05$ .

cantly higher than the rate in housewives (11%) ( $\chi^2 = 3.35$ ,  $P > 0.05$ ) (Table 5). There were no significant differences between low, moderate and high education levels ( $\chi^2 = 2.41$ ,  $P > 0.05$ ), nor between low, moderate and high economic status ( $\chi^2 = 4.71$ ,  $P > 0.05$ ).

Of the 235 women with no history of abortion, 37 (15.7%) were infected with *T. vaginalis* while 9 (7.7%) of the 117 women who had previously had an abortion were infected. The difference between these two groups was statistically significant ( $\chi^2 = 4.38$ ,  $P > 0.05$ ).

## Discussion

Vaginal trichomoniasis is a recognized sexually transmitted disease. In this study, 46 out of 352 (13%) women were infected with *T. vaginalis*. This indicates that a number of females carry the parasite and act as reservoirs for transmitting the disease by direct or indirect means. This thus

presents an important public health problem, which should be drawn to the attention of the public as well as the health authorities.

The highest isolation rate was from vaginal discharge (69.6%). Since the vagina is the normal habitat of *T. vaginalis*, a higher rate of isolation was found in vaginal discharge than in the urine. The high infection rate in married women of reproductive age is probably related to the higher level of sexual activity in these women and may be due to transmission from their husbands. However, the infection may also be acquired from toilet facilities, medical instruments or the exchange of underclothing [1,14]. The observed case of infection in a young girl might be due to contact with her infected mother or through toilet facilities or fomites.

Pregnant women had a high infection rate (18.6%). This is the result of the greater pelvic vascularity and raised oestrogen production. The action of oestrogens on

Table 5 Infection rate of *Trichomonas vaginalis* according to occupation, education and economic status

Variable	n	Positive cases No.	Test of significance -%
<i>Occupation</i>			
Working outside the home	98	18	18.4
Housewife	254	28	11.0
<i>Educational level</i>			
Low	94	10	10.6
Moderate	198	23	12.2
High	70	13	18.6
<i>Economic status</i>			
Low	109	14	12.8
Moderate	225	28	12.4
High	18	4	22.2

None of the differences was statistically significant.

the vaginal epithelium causes growth, maturation and exfoliation of the squamous cells. There is an increase in glycogen deposits in such cells, produced by the high oestrogen level. *T. vaginalis* is also associated with the alkaline vaginal environment that occurs during pregnancy, due to changes in the pH of the vaginal mucosa.

On the other hand, the postmenopausal women in this study had an infection rate of 16.0%. After menopause, the vaginal mucosa can become easily abraded and infected (atrophic vaginitis). Trichomonads can survive in the glycogen-poor atrophic vagina without causing symptoms, and infection may only appear when these women are treated with oestrogens or undergo a vaginal surgical procedure [3].

The observed cases of vaginal trichomoniasis before puberty can be attributed to the low levels of oestrogen present to act upon the vagina, resulting in a thin, easily abraded epithelium. In addition the pH of the vagina is alkaline, so vaginitis during childhood is not uncommon.

Symptomatic vaginal trichomoniasis is extremely unusual in lactating patients, since the glycogen-poor atrophic vagina of the breastfeeding woman is relatively hostile to the trichomonad [3]. In this study, lactating patients showed the lowest infection rate (6.5%).

We observed that women who did not use contraceptives had a higher rate of *T. vaginalis* infection. The decrease in infection rate in women using oral contraceptives may be due to the progestin component causing thickening of the cervical mucosa, which then inhibits sperm and bacterial penetration [11]. The decreased duration of menstrual flow that accompanies the use of oral contraceptives theoretically also creates a shorter interval in which bacterial colonization may occur [12]. Barrier contraception (condoms) was

effective in preventing *T. vaginalis* infection. It has proven to be the most effective mechanical barrier to various microorganisms [13–15]. Thus women using either barrier or oral contraceptives in the 6 months before becoming pregnant are far less likely to be colonized by *T. vaginalis* [16].

We found no statistically significant differences in the infection rate by *T. vaginalis* in relation to occupation, level of education or economic status. Similar lack of significance was also reported among women with normal pregnancies and women with habitual abortions in Basra [17]. In many studies, *T. vaginalis* is not implicated as a factor in abortion, premature labour or intrauterine growth retardation [18–20]. Others, however, have reported a detectable association with premature rupture of the membranes, preterm labour and low birth weight [21–23]. The low rate of infection we observed among women with a history of abortion may be related to the routine administration of metronidazole and antibiotics after curettage.

In conclusion, *T. vaginalis* is an important protozoan which can be transmitted by sexual intercourse or by nonvenereal means, and which can be responsible for specific vaginitis and lower urinary tract infection. The high infection rate with trichomoniasis vaginalis (13%) among the women in our study indicates that this infection is of public health concern.

As regards prevention and treatment, both partners should receive careful examination and treatment. Furthermore, medical examination instruments must be sterile in order to prevent transmission of the disease. Routinely screening and treating women for trichomoniasis vaginalis before any reproductive tract surgery and also before pregnancy and after delivery or abortion may help to prevent the occurrence of

infection. Barrier protection (condoms) should be used during intercourse until the infection is eradicated in both partners. The population must be educated about this dis-

ease and the means of transmission, since education on sexual behaviour and genital hygiene may help in its prevention and control.

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#### **Guidelines for the management of sexually transmitted infections**

Sexually transmitted infections (STI) remain a public health problem of major significance in most parts of the world. The incidence of acute STI is believed to be high in many countries and failure to diagnose and treat STI at an early stage may result in serious complications and sequelae. In 1991, WHO published recommendations for the management of patients with STI within the broader context of control, prevention and care programmes for STI and HIV infection. WHO convened an Advisory Group Meeting on Sexually Transmitted Diseases Treatment in May 1999 to review and update treatment recommendations in the light of recent developments. This document presents the revised recommendations, both for a syndromic approach to the management of patients with STI symptoms and for the treatment of specific STI, based on global evidence and surveillance data. It also provides information on the notification and management of sexual partners and on STI in children and adolescents. This document can be obtained from: World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland. It is also available free on the Internet at: [http://whqlibdoc.who.int/hq/2001/WHO\\_HIV\\_AIDS\\_2001.01.pdf](http://whqlibdoc.who.int/hq/2001/WHO_HIV_AIDS_2001.01.pdf)