

Trichomonas vaginalis Infection among Palestinian Women: Prevalence and Trends during 2000-2006

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Aim: *Trichomonas vaginalis* has not been studied in Gaza and there is no available data on the prevalence of this sexually transmitted disease (STD). The objectives of this study were to determine the prevalence of *Trichomonas vaginalis* (*T. vaginalis*) among Palestinian women attending a child and mother care center in Gaza, Palestine and to estimate the trend of prevalence over the period from 2000-2006.

Materials and Methods: A cross-sectional descriptive study was conducted among 430 pregnant women attending a child and mother care center in Gaza. The clinical and gynecologic examinations were performed according to the complaints reported by each woman, especially infertility. Vaginal and cervical swabs were collected and stained with Papanicolaou (Pap) stain.

Results: Out of 423 women, a total of 77 were found to be infected with *T. vaginalis*, for a prevalence of 18.2%. A decrease in the prevalence of *T. vaginalis* was observed with increasing age. A significant association between vaginal discharge and *T. vaginalis* infection was found ($P = 0.001$). No clear trend was noted in the prevalence of *T. vaginalis* over the period from 2000-2006.

Conclusions: A considerable prevalence of *T. vaginalis* was found among pregnant women in Gaza. These results may be useful for health authorities, especially for antenatal care and protection against STDs.

Key Words: *Trichomonas vaginalis*, prevalence, trends, vaginal discharge, pregnant

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Filistinli Kadınlarda *Trichomonas vaginalis* enfeksiyonu: 2000-2006 Yılları Arasındaki Durum

Amaç: Gaza da seksüel yolla bulaşan hastalıklarla ilgili bir veri yok ve *Trichomonas vaginalis* sıklığı da daha önce çalışılmadı. Bu çalışmanın amacı 2000-2006 yılları arasında Gazada çocuk ve anne bakım merkezine başvuran Filistinli kadınlarda *Trichomonas vaginalis* sıklığını saptamak ve yıllara göre değişimini belirlemektir.

Yöntem ve Gereç: Gazadaki anne ve çocuk bakım merkezine başvuran 430 kadında kesitsel bir çalışma yapıldı. Özellikle infertilite başta olmak üzere başvuran kadınların yakınmaları doğrultusunda klinik ve jinekolojik muayeneleri yapıldı. Vaginal ve servikal sürüntü alınarak boyandı.

Bulgular: 423 kadının 77'sinde(%18) *Trichomonas vaginalis* enfeksiyonu saptandı. Yaşla birlikte enfeksiyon sıklığının azaldığı saptandı. Vajinal akıntı ile enfeksiyon arasında anlamlı bir ilişki bulundu. 2000-2006 yılları arasında belirgin bir artış eğilimi saptanmadı.

Sonuç: Gazada hamile kadınlar arasında *Trichomonas vaginalis* enfeksiyonu belirgin oranda yüksek bulundu. Bu veriler antenatal bakım ve cinsel yolla bulaşan hastalıklara açısından sağlık otoriteleri için kullanışlı olabilir.

Anahtar Sözcükler: *Trichomonas vaginalis*, gebelik, Vajinal akıntı

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Introduction

Trichomonas vaginalis (*T. vaginalis*), the etiologic agent of human trichomoniasis, is a protozoan parasite that infects the human urogenital tract leading to the most common non-viral sexually transmitted disease (STD). Historically, the presence of *T. vaginalis* has been viewed as a risk marker for other sexually transmitted agents such as *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, or bacterial vaginosis (1,2). *T. vaginalis* is also considered to be a risk factor in transmitting the human immunodeficiency virus (HIV) (3,4). More than 170 million persons worldwide become infected with chronic cervicitis per year (5). A high prevalence of other sexually transmitted infections has been reported among pregnant women in many developing and even in some developed countries (6-8).

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The sexually transmitted organism *T. vaginalis* is a common cause of vaginitis. *T. vaginalis* infection during pregnancy has been implicated as a cause of adverse pregnancy outcome and neonatal infection (9). It has been associated with several complications in pregnancy, such as premature rupture of membranes, premature delivery and low birth weight in neonates (10-13). Diagnosis of trichomoniasis has traditionally depended on microscopic observation of motile *T. vaginalis* by direct wet examination as conventional method (14,15) and/or molecular techniques (16,17). The aim of this study was to determine the prevalence of *T. vaginalis* among Palestinian pregnant women and to study the trends and extent of prevalence over a period of time (2000-2006).

Materials and Methods

Study population: This study included 423 pregnant women aged 16 to 50 years who were attending a child and mother care center in Gaza. Their visits were periodical to follow-up pregnancy and/or to seek treatment for various reasons, including hemorrhage during pregnancy and miscarriage. Their complaints included clinical signs, vaginal discharge, cervicitis, and chronic cervicitis. All patients provided informed consent and were examined by a gynecologist to provide vaginal or cervical sample. None of the women over 50 years old attending the clinic were pregnant.

Parasitological methods: The cervical samples were collected using wooden spatula during the pelvic area examination. Fresh thin preparations of Papanicolaou (Pap) smear were prepared for each sample and examined by a qualified specialist. The motile and dead organisms were observed using microscopy.

Results

A total of 77 Palestinian pregnant women (18.2%) out of 423 were identified to be infected with *T. vaginalis* during the period 2000-2006.

Distribution of infection with *T. vaginalis* by age is shown in Table 1. The age group of 21-30 years had the highest prevalence of infection (22.9%), with a significant difference ($P = 0.05$). Infection rates were lower in age groups of <20 years and >50 years. The second highest rate of infection was determined in the age group of 31-40 years (20.1%). In the present study, 45.9% of infected women with *T. vaginalis* showed vaginal discharge and 19.5% had chronic cervicitis.

Two cases with history of cervix cancer were included but revealed negative results for *T. vaginalis* infection. It was observed that 32.5% of women infected with *T. vaginalis* had chronic cervicitis compared to only 29.8% of women with no *T. vaginalis* infection, and the difference was statistically significant ($P = 0.001$). During the study period, the highest prevalences of trichomoniasis were determined in 2002 (23.5%) and 2005 (25.3%), as indicated in Figure 1. Prevalence rates in 2000 and 2003 were 12.5% and 12.3%, respectively. The monthly distribution of *T. vaginalis* prevalence in 2005 was not consistent and no clear trend could be determined (Figure 2). February and May had similar prevalences (at 16.7%) versus rates of 4.2% in January, July, September, November and December and of 12.5% in April, June and August.

Table 1. Prevalence of *Trichomonas vaginalis* in pregnant women by age.

Age group	No. examined	No. infected	%
16-20 years old	19	1	5.3
21-30 years old	118	27	22.9
31-40 years old	164	33	20.1
41-50 years old	91	15	16.5
>50	31	1	3.2
Total	423	77	

($\chi^2 = 9.128$, $df = 4$, $P = 0.05$)

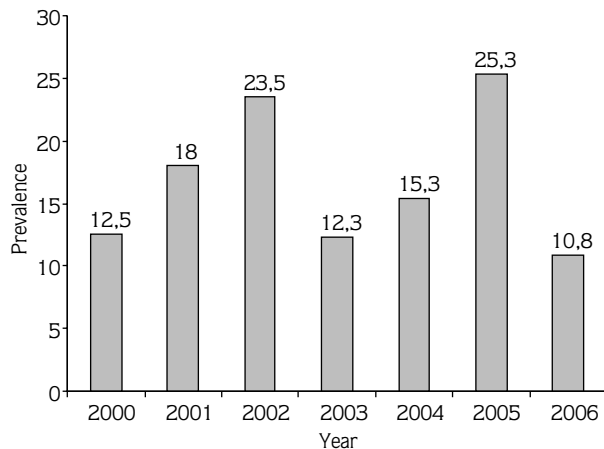


Figure 1. Distribution of *T. vaginalis* among pregnant women from year 2000-2006.

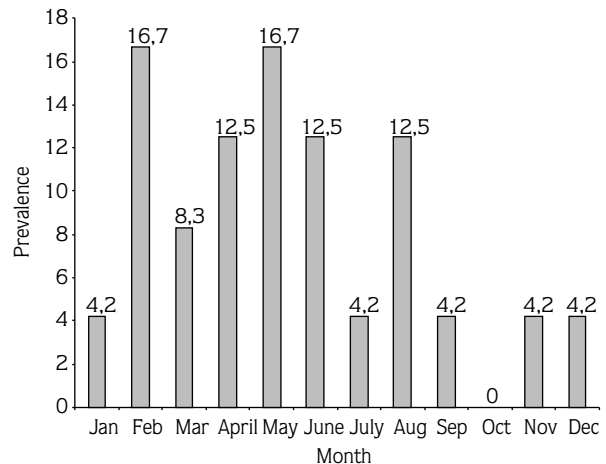


Figure 2. Monthly distribution of *T. vaginalis* in year 2005.

Discussion

This was the first study to determine the prevalence of *T. vaginalis* among Palestinian pregnant women in Gaza. The difficulty in collection of vaginal and cervical samples constitutes an obstacle in attempting such an important study. The present study found that 18.2% of Palestinian pregnant women presenting to a child and mother care center showed positive result when Pap smears were examined for *T. vaginalis*. Prevalences reported in different countries include 3.2% in China (18) and 8.6% in the United States (19). Early diagnosis via periodical examination of women in developed countries may help in minimizing infection with *T. vaginalis*. The difficult social and economic conditions faced by Palestinian women present significant obstacles that can prevent their seeking private medical care, which is expensive. As a result, many women in our society may prefer to stay at home in spite of their symptoms.

According to the Ministry of Health's (MOH) Annual Report 2004, one of the most important reported cases of STDs was 60 cases of trichomoniasis (incidence rate per 100,000, 3.2) in males and 240 cases among females (20). Because the prevalence of trichomoniasis in the Gaza Strip is unavailable, the present prevalence recorded in this study could constitute a basis for STDs. In addition, the reported cases of STDs in MOH centers (hospitals and clinics) were categorized according to etiological causes and syndromic diagnosis.

The prevalence of trichomoniasis varied significantly by age (Table 1). The highest prevalence (22.9%) was observed in the 21-30 years of age group and lowest (5.3%) in the age group <20 years old ($P = 0.05$). This could be correlated to marriage. In our society this is the age of marriage, so sexual activity may have contributed to this high prevalence through legal marriage.

Trichomoniasis has been associated with vaginitis, cervicitis, urethritis and pelvic inflammatory disease (21). In the present study we employed wet mount smear examination and Pap stain to detect *T. vaginalis* organisms in vaginal samples. This method, however, has some limitations. It cannot detect non-viable protozoa and only motile organisms can be identified (22).

Cultivation of *T. vaginalis*, considered to be the most dependable method for diagnosis of genital trichomoniasis, especially in chronic and latent cases, was not available (23). Several studies have associated *T. vaginalis* with symptoms of yellow vaginal discharge and vulva irritation, as well as signs of a purulent vaginal discharge, and vulva and vaginal erythema (2, 24). It was found that sexually transmitted infections are also significantly associated with adverse pregnancy outcomes such as spontaneous abortion, preterm delivery, ectopic pregnancy, preterm rupture of membranes, intrauterine infection of the fetus and low birth weight in infants (25,26).

Variation in prevalences between years could be explained by many factors, like health behavior of the women, their ability to present to a physician, availability of treatment in case of infection, and their awareness and knowledge. This needs further investigation. Because 2005 demonstrated the highest prevalence, we studied the monthly distribution of *T. vaginalis* in that year. The highest prevalences were in February and May, covering two different seasons (May in Gaza is hot and humid; February is cold), so no clear trend or explanation for such similarity in rates of prevalence according to month could be determined.

It was concluded that *Trichomonas vaginalis* is present among Palestinian women, with a considerable prevalence, and the associated symptoms are a confirmation of the infection. The related risk factors might be a subject of future studies.

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References

- Petrin D, Delgaty K, Bhatt R, Gaiber G. Clinical and microbiological aspects of *Trichomonas vaginalis*. Clin Microbiol Rev 1998; 11: 300-317.
- Wolner-Hanssen P, Krieger JN, Stevens CE, Kiviat NB, Koutsky L, Critchlow C et al. Clinical manifestations of vaginal trichomoniasis. JAMA 1989; 261: 571-576.
- Laga M, Monoka A, Kivuva M, Maleate B. Non ulcerative sexually transmitted diseases as risk factors for HIV-I transmission in women: results from a cohort study. AIDS 1993; 7: 95-102.
- Sorvillo F, Kerndt P. *Trichomonas vaginalis* and implication of HIV-1 transmission 1998; 351: 213-214.
- World Health Organization, An overview of selected curable sexually transmitted diseases. In: World Health Organization, editor. Global Programme on AIDS. Geneva, Switzerland: World Health Organization; 1995.
- Sullivan EA, Abel M, Tabrizi S, Garland SM, Grice A, Pomeroy G et al. Prevalence of sexually transmitted infections among antenatal women in Vanuatu, 1999-2000. Sex Transm Dis 2003; 30: 362-366.
- Ortashi OM, El Khidir I, Herieka E. Prevalence of HIV, syphilis, *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Trichomonas vaginalis* and candidiasis among pregnant women attending an antenatal clinic in Khartoum, Sudan. J Obstet Gynaecol 2004; 24: 513-515.
- Norman JE, Wu O, Twaddle S, Macmillan S, McMillan L, Templeton A et al. An evaluation of economics and acceptability of screening for *Chlamydia trachomatis* infection, in women attending antenatal, abortion, colposcopy and family planning clinics in Scotland, UK. BJOG 2004; 111: 1261-1268.
- Grice AC. Vaginal infection causing spontaneous rupture of the membranes and premature delivery. Aust N Z J Obst. Gynaecol 1974; 14: 156-158.
- Minkoff H, Grunebaum AN, Schwarz RJ, Feldman J, Cummings M, Crombleholme W et al. Risk factors for prematurity and premature rupture of membranes: a prospective study of the vaginal flora in pregnancy. Amn J Obstet Gynecol 1984; 150: 965-972.
- Draper D, Jones W, Heine RP, Beutz M, French JI, McGregor JA. *Trichomonas vaginalis* weakens human amniochorion in an in vitro model of premature membrane rupture. Infect Dis Obstet Gynecol 1995; 2: 267-274.
- Pastorek JG, Cotch MF, Martin DH, Eschenbach DA. The Vaginal Infections and Prematurity Study Group. Clinical and microbiological correlates of vaginal trichomoniasis during pregnancy. Clin Infect Dis 1996; 23: 1075-1080.
- Cotch MF, Pastorek JG, Nugent BP, Hillier SL, Gibbs RS, Martin DH et al. The Vaginal Infections and Prematurity Study Group. *Trichomonas vaginalis* associated with low birth weight and preterm delivery. Sex Transm Dis 1977; 24: 1-8.
- Rothenberg RM, Simon R, Chipperfield E. Efficacy of selected diagnostic tests for sexually transmitted disease. JAMA 1976; 236: 49-51.
- Krieger JN. Urologic aspects of trichomoniasis. Invest Urol 1981; 18: 411-417.
- Jordon JA, Lowery D, Trucco M. TaqMan-based detection of *Trichomonas vaginalis* DNA from female genital specimens. J Clin Microbiol 2001; 39: 3819-3822.
- Crucitti T, Van Dyck E, Tehe A, Abdellati S, Vuylsteke B, Buve A et al. Comparison of culture and different PCR assays for detection of *Trichomonas vaginalis* in self collected vaginal swab specimens. Sex Transm Infect 2003; 79(5): 393-398.
- Chen XS, Yin YP, Chen LP, Thuy NTT, Zhang GY, Shi MQ et al. Sexually transmitted infections among pregnant women attending an antenatal clinic in Fuzhou, China. Sex Transm Dis 2006; 33(5): 296-301.

19. Plitt SS, Garfein RS, Gaydos CA, Strathdee SA, Sherman SG, Taha TE. Prevalence and correlates of *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Trichomonas vaginalis* infections, and bacterial vaginosis among a cohort of young injection drug users in Baltimore, Maryland. *Sex Transm Dis* 2005; 32(7): 446-453.
20. Ministry of Health, Annual Report, 2004 (Palestinian Ministry of Health).
21. Swygard H, Sena AC, Hobbs MM, Cohen MS. Trichomoniasis: clinical manifestations, diagnosis and management. *Sex Trans Infect* 2004; 80: 91-95.
22. Thomason JL, Gelbart SM. *Trichomonas vaginalis*. *Obstet Gynecol* 1989; 74: 536-541.
23. Philip A, Carter-Scott P, Rogers C. An agar culture technique to quantitate *Trichomonas vaginalis* from women. *J Infect Dis* 1987; 155: 304-308.
24. McLellan R, Spence MR, Brockman M, Raffel L, Smith JL. The clinical diagnosis of trichomoniasis. *Obstet Gynecol* 1982; 60: 30-34.
25. Gravett MG, Nelson HP, DeRouen T, Critchlow C, Eschenbach DA, Holmes KK. Independent associations of bacterial vaginosis and *Chlamydia trachomatis* infection with adverse pregnancy outcome. *JAMA* 1986; 256: 1899-1903.
26. Mardh PA. Influence of infection with *Chlamydia trachomatis* on pregnancy outcome, infant health and life-long sequelae in infected offspring. *Best Pract Res Clin Obstet Gynaecol* 2002; 16: 847-864.