

# Clinical features and sociodemographic factors affecting *Trichomonas vaginalis* infection in women attending a central sexually transmitted diseases clinic in Sri Lanka

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## Abstract

**Introduction:** Trichomoniasis is a relatively neglected area of research in Sri Lanka. Given the number of infections observed, an analysis of sociodemographic characteristics of patients would be valuable in prevention. **Materials and Methods:** Data were collected from 359 newly registered women at a tertiary level sexually transmitted diseases clinic over a period of 18 months. Trichomoniasis was diagnosed by culture of vaginal swabs collected from the posterior fornix. **Results:** The prevalence of trichomoniasis in the sample was 7.2%. Of those who tested positive for trichomoniasis, 76% were in the age group of 21-45 years, 68% were married and living with a spouse and 60% were unemployed. A diagnosis of Trichomoniasis was associated with being married (OR, 1.6; CI, 0.56-4.41), age over 33 years (OR=1.3, CI, 0.55-2.9), being employed (OR, 1.3; CI, 0.56 – 2.94), having an education of less than ten years at school (OR, 3.0; CI 1.28-7.26) and not using condoms during the last sexual act (OR 2.0, CI 0.84-4.86). The risk was less among commercial sex workers (OR, 0.3, CI: 0.14-0.85), those with multiple sexual partners (OR, 0.2; CI: 0.073-0.408) and women reporting extramarital sexual relationships (OR, 0.3; CI, 0.128-0.733). **Conclusions:** Education on safe sex and recognition of symptoms is currently targeted at high risk groups such as commercial sex workers. Extending these programmes to the rest of the community will further reduce the risk of transmission of trichomonas.

**Key words:** Sexually transmitted diseases, socioeconomic factors, trichomonas vaginalis

## INTRODUCTION

Trichomoniasis is a sexually transmitted disease (STD) caused by the protozoan parasite, *Trichomonas vaginalis*. In women, trichomoniasis has a range of presentations, from an asymptomatic to an

acute inflammatory disease with a copious and malodorous vaginal discharge. Infection is also linked to preterm labour, prenatal morbidity<sup>[1-3]</sup> and a two-fold increased risk of Human Immunodeficiency Virus (HIV) acquisition.<sup>[4]</sup> Thus, control of *T. vaginalis* infection is important in improving reproductive health of women, neonatal health and prevention of HIV/AIDS.

It is estimated that 19 million new trichomonas infections occur globally each year, almost half of them among young people aged 15-24 years.<sup>[5]</sup> The prevalence of trichomoniasis is reported as 15% or higher in developing countries where

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	<b>DOI:</b> 10.4103/0253-7184.93813

### How to cite this article:

Fernando SD, Herath S, Rodrigo C, Rajapakse L. Clinical features and sociodemographic factors affecting *Trichomonas vaginalis* infection in women attending a central sexually transmitted diseases clinic in Sri Lanka. Indian J Sex Transm Dis 2012;33:25-31.

access to health care is limited.<sup>[6]</sup> Such rates make trichomoniasis one of the most common STDs.<sup>[6]</sup>

The incidence of trichomoniasis has declined sharply in developed countries in the recent past probably due to early diagnosis, use of better diagnostic techniques, proper management and emphasis on behavioural change.<sup>[7,8]</sup> In contrast, in developing countries, and amongst disadvantaged groups in developed countries, the infection appears to be widespread.<sup>[9]</sup>

Clinic based studies in two referral centers for gynaecology in Sri Lanka reported the prevalence of trichomoniasis to be 4.4% in women.<sup>[10]</sup> More recently, Banneheke *et al.*, reported a prevalence of 4.2% in women attending a STD clinic.<sup>[11]</sup> The community prevalence of trichomoniasis appears to be significantly lower than facility based prevalence in Sri Lanka. For example, Hemachandra reported a trichomoniasis prevalence of 1% in women of a reproductive age group in a community based sample representative of the population of the Ratnapura district in the Sabaragamuwa province which is a predominantly rural population (the percentage of rural population in this district was 84%).<sup>[12]</sup> In contrast, assessing a deprived urban community in the capitol city Colombo, Herath reported a prevalence of 0.6% amongst women in a reproductive age group.<sup>[13]</sup>

As *Trichomonas* prevalence depends on factors such as age, number of sex partners and pattern of sexual activity, a better understanding of the local epidemiology of the infection in women would be useful in planning prevention strategies.<sup>[14]</sup> The objectives of this study are to characterise the presenting clinical features and socio-demographic factors of women diagnosed with trichomoniasis in a tertiary care referral center in Sri Lanka.

## MATERIALS AND METHODS

### Study site and study population

This clinic based prospective study was carried out at the Sri Lanka National STD/AIDS Control Programme (NSACP) over a period of 18 months from October 2007 to April 2009. The study population comprised of newly registered female clinic attendees aged 15-60 years. Those not consenting to speculum examination were excluded from the study.

### Data collection

Prior to the study, a focus group discussion was held at the clinic by the investigators involving

patients who presented with symptoms suggestive of trichomoniasis. These individuals were not included in the study. Once the local terminology, beliefs and practices regarding trichomoniasis were understood, an interviewer administered questionnaire was formulated. The questionnaire was first prepared in English and translated into Sinhalese by an independent experienced translator, and then retranslated into English. The questionnaire was pilot tested and corrections were made in the terminology. The final questionnaire collected data on demography (age, occupation, level of education), risk behaviour (number of sexual partners ever, condom usage at last sexual intercourse) and the clinical details relating to infection (recorded by the attending physicians trained in venerology).

### Diagnosis of trichomoniasis

Diagnosis of the disease was confirmed by culture of *T. vaginalis* which is considered to be the gold standard in diagnosis.<sup>[15]</sup> Culture for *Trichomonas vaginalis* was carried out using Trichomonas medium (OXOID code; CMO 161B enriched with Horse serum and incorporated with Chloramphenicol) based on manufacturer's instructions. The tube containing the culture media was incubated at 37°C for three days. Afterwards, for the next seven days, a fresh smear was prepared every 24 hours from the medium taken from the bottom of the tube and examined microscopically for the presence of motile flagellates.

### Ethical considerations

Ethical approval for the study was obtained from the Ethics Review Committee, Faculty of Medicine, University of Colombo. Informed verbal consent was obtained from all participants after explaining the purpose of the study. Patient identity was kept confidential.

### Data processing, analysis and results

Data was analyzed using SPSS version 15<sup>®</sup>. Frequency distribution of demographic data, characteristics of the population, sexual history and clinical manifestations were analyzed. The relationship between selected risk factors and the prevalence of trichomoniasis was determined by using unadjusted Odds Ratios (OR) and Chi square tests.

## RESULTS

### Characteristics of the patients diagnosed with trichomoniasis

A total of 359 women were recruited for the study. Vaginal samples were collected from 96% (346) of patients. Thirteen (4%) individuals refused speculum examination and were excluded. The prevalence of

trichomoniasis as confirmed by culture was 7.2% (25/346).

The socio-demographic characteristics of the study population are given in Table 1. Seventy six percent of those who tested positive for *T. vaginalis* were in the age group of 21-45 years (the mean age of the entire sample was 33 years). Of those who tested positive for trichomoniasis, 20% were unmarried (5/25) while 68% (17/25) were married and living with a spouse. The majority of those with trichomoniasis (60%) were unemployed.

There was a significant difference in the educational status of the individuals who presented to the STD clinic for consultation and those who actually tested positive for *T. vaginalis* (Chi Square test, df-1,  $\chi^2$ -4.49,  $P=0.034$ ). Approximately 53% of women who presented to the clinic for consultation regarding STD had completed over ten years of school education and sat for the first national examination in Sri Lanka, the GCE O-Level examination (held at the 11<sup>th</sup> year of school

education). However, in the trichomoniasis positive subgroup, 16% had no formal education and 52% had only completed up to nine years of education. There were no statistically significant differences regarding other socio demographic variables in the trichomoniasis positive subgroup in comparison to the total sample [Table 1].

### Risk factors for trichomoniasis

Table 2 shows the univariate unadjusted Odd Ratios (OR) of the risk factors for trichomoniasis infection in the sample. Factors associated with trichomoniasis included being married (OR=1.6; CI, 0.56-4.41), being over the mean age (33 years) of the sample (OR=1.3, CI, 0.55-2.9), having an education of less than ten years at school (OR=3.0; CI 1.28-7.26) and not using condoms during the last sexual act (OR=2.0; CI 0.84-4.86). Interestingly, the prevalence of trichomoniasis was lower among commercial sex workers (OR=0.3; CI, 0.14-0.85), those with multiple sexual partners (OR=0.2; CI, 0.07-0.41) and women reporting extramarital sexual relationships (OR=0.3; CI, 0.13-0.73). The risk was also low in those who

**Table 1: Comparison of demographic characteristics of women having trichomoniasis with other clinic attendees**

Variable	Number investigated (%)	Number positive for <i>T.vaginalis</i> (%)	$\chi^2$	P
Age			5.760	0.568
11-15	5 (1.4)	1 (4.0)		
16-20	17 (4.9)	2 (8.0)		
21-25	68 (19.7)	5 (20.0)		
26-30	59 (17.1)	3 (12.0)		
31-35	63 (18.2)	4 (16.0)		
36-40	64 (18.5)	5 (20.0)		
41-45	32 (9.2)	2 (8.0)		
> 46	38 (11.0)	3 (12.0)		
Marital status			3.022	0.697
Unmarried	49 (14.2)	5 (20)		
Married	214 (61.8)	17 (68)		
Divorced living alone	37 (10.7)	1 (4)		
Divorced living with another person	33 (9.5)	2 (8)		
Living alone Widowed	12 (3.5)			
Widowed living with another person	1 (0.3)			
Occupation			10.9101	0.143
Unemployed	188 (54.3)	15 (60.0)		
Sex worker	53 (15.3)	8 (32)		
Self employed	30 (8.7)	2 (8)		
Factory worker	52 (15)			
Other	23 (6.8)			
Educational level			10.418	0.034
No formal education	31 (9.0)	4 (16.0)		
Grade* 1-4	15 (4.3)			
Grade 5-9	103 (29.8)	13 (52.0)		
Grade 10-12	184 (53.2)	8 (32.0)		
Higher education	13 (3.8)			

\*Grade- a grade in Sri Lankan education system refers to one year of formal education starting from grade 0 at 6 years of age. A complete school education has 12 grades or 13 successive years of education

had their last sexual contact over 30 days ago (OR=0.75; CI, 0.33-1.7).

### Clinical history and examination

Pruritus, vaginal discharge and vulvovaginal soreness were significantly higher in women with trichomoniasis [Table 3]. In 47% of women with vaginal discharge, it was a characteristic yellowish, frothy and malodorous discharge. Interestingly, in 68% of infected women the cervix appeared normal on speculum examination. Cervical abnormalities, such as inflammation (16%) and punctuate haemorrhages (16%) which are typically seen in trichomoniasis was observed in the balance 32% of the population.

Dysuria, a common symptom of trichomoniasis, was reported by 12% of infected women. None of them presented with dysuria as the only symptom. Only one patient complained of lower abdominal pain [Table 3].

## DISCUSSION

Every year, estimates of diagnosed STDs in Sri Lanka

vary from approximately 60,000 to 200,000, of which only 10-15% are reported by government clinics.<sup>[16]</sup> The estimated number of commercial sex workers in Sri Lanka range from 5000-50,000 but the likely number is around 30,000.<sup>[16]</sup> Preliminary findings from the 2006 behavioural surveillance survey in Sri Lanka suggest that STDs and HIV infection among commercial sex workers are relatively low, as they see few clients per day and have a relatively high condom use.<sup>[16]</sup>

The prevalence of trichomoniasis reported in this study was 7%. An analysis of the trends of data since 1992 to 2006 in Sri Lanka has shown that while bacterial and protozoal STDs have declined, there is an increase in the number of reported viral STDs.<sup>[17]</sup>

The symptoms of trichomoniasis reported by patients in this study, namely the characteristic frothy greenish vaginal discharge and pruritus are well established.<sup>[18-21]</sup> Trichomonas infections involve the urethra as well and dysuria is also a common symptom.<sup>[22]</sup> Another characteristic feature of infection are small punctate hemorrhagic spots referred to as “strawberry appearance” found on

**Table 2: Risk factors for trichomonas positivity in the sample**

Variable	Number positive for <i>T.vaginalis</i> , n=25 (%)	Others investigated n=321 (%)	Odds ratio	95% confidence interval
Marital status				
Unmarried	5 (10.2)	44 (89.8)		
Married	20 (6.7)	277 (93.3)	1.574	0.56 - 4.41
Age (mean age 33.0)				
Below mean age	15 (7.9)	174 (92.1)		
Above mean age	10 (6.4)	147 (93.6)	1.267	0.55 - 2.90
Educational status				
Above Grade 10	8 (4.1)	189 (95.9)		
Up to Grade 10	17 (11.4)	132 (88.6)	3.043	1.27 - 7.25
Employment				
Unemployed	15 (8.0)	173 (92.0)		
Employed	10 (6.3)	148 (93.7)	1.283	0.56 - 2.94
Type of employment				
Unemployed /other occupation	17 (5.8)	276 (94.2)		
Sex worker	8 (15.1)	45 (84.9)	0.346	0.14 - 0.85
Number of partners within last three months				
One	9 (4.1)	209 (95.9)		
More than one	16 (20.0)	64 (80.0)	0.172	0.073 - 0.408
Relationship to partner				
Husband	8 (4.2)	184 (95.8)		
Other*	17 (12.4)	120 (87.6)	0.307	0.128 - 0.733
Use of condoms during last sexual act				
Yes	10 (14.9)	84 (89.4)		
No	12 (5.6)	204 (94.4)	2.024	0.84 - 4.86
Last sexual intercourse				
Within last 30 days	15 (6.7)	114 (93.3)		
Over 30 days	10 (8.7)	190 (91.3)	0.754	0.33 - 1.7

\*Other: boyfriend, client, extramarital affair

**Table 3: Comparison of clinical features of women having trichomoniasis with other non infected clinic attendees**

Variable	Number investigated (%)	Number positive for <i>T.vaginalis</i> (%)	$\chi^2$	P
History at the time of presentation				
Pruritus			9.969	0.007
Yes	110 (31.8)	15 (60)		
No	223 (67.3)	10 (40)		
Not answered	3 ( 0.9)			
Tactile or visual presence of ulcers/rash in genital area			0.670	0.715
Yes	69 (19.9)	4 (16)		
No	237 (68.5)	17 (68)		
Don't know	40 (11.6)	4 (16)		
Dysuria			0.936	0.437
Yes	67 (19.4)	3 (12)		
No	279 (80.6)	22 (88)		
Vaginal discharge			7.831	0.005
Yes	119 (34.4)	15 (60)		
No	227 (65.6)	10 (40)		
Bleeding after sexual Intercourse			0.007	1.000
Yes	15 (4.3)	1 (4)		
No	331 (95.7)	24 (96)		
Lower abdominal pain			2.027	0.363
Yes	45 (13.0)	1 (4)		
No	300 (86.7)	24 (96)		
Not answered	1 (0.6)			
Vulvovaginal soreness			11.01	0.004
Yes	40 (11.6)	8 (32)		
No	306 (88.4)	17(68)		
Speculum examination findings				
Presence of a discharge			22.227	<0.001
Yes	115 (33.2)	19 (76)		
No	229 (66.2)	6 (24)		
Not examined	2 (0.6)			
If discharge present, nature of the discharge			19.227	<0.001
Watery/mucoid	56 (48.7)	6 (31.5)		
Thick white/powder like	41(35.7)	4 (21.1)		
Greenish/frothy/odorous	17 (14.8)	9 (47.4)		
Not recorded	1 (0.8)			
Cervix			5.489	0.064
Normal	289 (83.5)	17 (68)		
Inflamed	33 (9.5)	4 (16)		
Ectropion	23 (6.6)	4 (16)		
Not visualized	1 (0.3)			

the vaginal and cervical mucosa.<sup>[21]</sup> In our study however, 68% of infected women had an apparently normal cervix on speculum examination indicating that this clinical sign has a low sensitivity.

The risk factors associated with trichomoniasis in this study are in agreement with published literature. Older age as a risk factor has been reported by several other authors.<sup>[23-25]</sup> The increased prevalence of infection in older women may be indicative of long standing infection that does not spontaneously resolve and that is likely missed by screening programs focused on younger women.<sup>[26]</sup>

The normal incubation period for trichomoniasis is 4-28 days and if infected, patients are expected to be symptomatic within this period or immediately after.<sup>[27]</sup> This may explain the lower risk of finding an infection in those who had sexual intercourse over 30 days ago.

As reported in other studies, women who were less educated were more at risk of developing trichomoniasis.<sup>[28-30]</sup> However it should be noted that 53% of all participants in our study who presented to the clinic for assessment had completed over 10 years of school education. Thus it may

be possible that better education was associated with early seeking of confirmation of diagnosis and treatment for STDs. However, being actually diagnosed with trichomoniasis was associated with a lower education status. Hypothetically, this may be related to risk behaviours such as unprotected intercourse and multiple sexual partners as most miss out on sex education which is addressed at latter stages of school curriculum. This highlights the need for community education on STDs as a short term measure and overall improvement of access to education on a long term basis.

Sri Lanka has a well-established island-wide network of STD clinics providing free services including diagnostic services, treatment, counseling and health education aimed at high risk groups (commercial sex workers). Condoms are also made available through grass root public health services units. The positive impact of these measures was shown by the high rate of condom usage among commercial sex workers in Sri Lanka; in one survey 90.5% reported condom use with their most recent paying client.<sup>[31]</sup> In this study, 15% (53) participants were commercial sex workers and they had a lesser risk of testing positive for trichomoniasis compared to rest of the sample. This is partly explained by an increased awareness about STDs among commercial sex workers resulting in preventive measures such as condom use.<sup>[16]</sup> As expected, not using condoms carried a 2 fold risk of trichomoniasis. It is also possible that commercial sex workers who are liable to repeat infections are aware of the effectiveness of metronidazole in relieving symptoms, and seek over the counter purchase of drugs (thus rendering them culture negative at screening).

This study also showed that a considerable number of unemployed women (non commercial sex workers) had trichomoniasis. In fact, they were more likely to be positive for the infection than commercial sex workers. The health education in preventing STDs in Sri Lanka as mentioned previously is extensively targeted at high risk groups. While this may be effective in keeping the HIV and STD prevalence rates low within these groups (with an indirect contribution towards an overall low prevalence in the community by reducing transmission) it does not necessarily substitute for an overall community awareness programme. Sex and sex related topics are considered taboo in Sri Lanka and sex education at schools is rudimentary. The input in mass media in promoting sexual health is far less when compared to other topics like cardiovascular health due to the social and cultural frictions on the subject. Treating sex as taboo may have a negative impact

on sexual health of the population increasing their vulnerability to trichomoniasis and other STDs due to ignorance.

Lack of sexual assertiveness may also restrict an 'ordinary' woman's ability to demand that her partner wears a condom since it would amount to questioning his fidelity (in contrast to commercial sex workers, where insisting on condom use is obviously acceptable). A combination of these factors may explain the unexpected paradoxical observation of commercial sex workers having a lower risk of trichomoniasis compared to a non sex worker.

One limitation of the study was the small number of women with trichomoniasis that prevented the carrying out of a valid logistic regression model. Furthermore, individuals who routinely present to STD clinics (commercial sex workers) are not representative of the general Sri Lankan female population with regard to their sexual behaviours and knowledge on STDs. This limits our ability to extrapolate certain findings such as the prevalence of trichomoniasis to the general population.

## CONCLUSIONS

The findings of this study highlight the importance of educating all women about STDs (condom usage, symptom recognition, early diagnosis and treatment). It also shows that a longer formal education at school was negatively correlated with contracting trichomoniasis. In contrast, it was positively associated with early treatment seeking behaviour for suspected STDs. A well established National Strategic Plan in Sri Lanka for prevention of HIV/AIDs (2007-2011) is designed to target sections of the population identified as "high risk groups" for sex education.<sup>[31]</sup> However, since STDs are seen as a stigma in Sri Lanka and sex related topics considered to be taboo, educating the larger community is a problem. Yet this is a need of the hour as ignorance puts the majority at risk.

## RECOMMENDATION

It is our recommendation that there should be a policy decision to increase awareness of STDs in the community via mass media and public institutions as a short term goal. In the long run, increasing access to formal education, empowerment of women, promoting open discussion on sex related issues and initiating a positive change in attitude to reduce the stigma on STDs will have a considerable impact on controlling trichomoniasis and probably other STDs in Sri Lanka.

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**Source of Support:** Nil. **Conflict of Interest:** None declared.