Original Article

Factors influencing the Prevalence and pathogenicity of Trichomonas vaginalis

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Summary:

Background: *Trichomonas vaginalis is a common parasite of both male and female genital tracts. Transmission of the infection is mainly by sexual intercourse; however contaminated towels, douche equipments, examination instruments and other objects may be responsible for some infections.*

Aim: *Is to study the influence of some factors that affect the spread of this parasite such as socioeconomic status, marital status, pregnancy and parity …..…etc.*

Methods: *The study was conducted in the period from November 1992 to August 1993 on 480 female patients presented with vaginal discharge with or without itching, compared to 50 females complaining of gynecological problems other than infections.*

Investigations carried out during this study include:

.Wet mount examination.,.Culture on artificial media.,Examination of fixed stained smear with:

a.Gram's stain.

b.Leischman's stain.

c.Giemsa's stain.

d.Papanicolaou's stained smear.

4. Measuring the PH of the vaginal discharge or the PH of the vaginal side wall.

Results: *The effect of some factors on the prevalence and pathology of Trichomonas vaginalis was evaluated in this study. Among different socioeconomic groups, the higher infection rate (65.22%) was seen in the low socioeconomic group. The infection rate of trichomoniasis was found to be higher among married females (19.81%), than divorced (16.66%), widowed (12.5%) or singles (11.11%). Regarding the menstrual cycle, infection with Trichomonas vaginalis was found to be increasing during the postmenstrual phase of the cycle (24.21%) compared to the infection rate obtained from patients in the premenstrual phase of the cycle (16.09%). A higher infection rate was reported among non pregnant females (20%) than pregnant (9.09%).Females using different contraceptive measures showed an infection rate of (28.88%), which was higher than that reported among those not using any contraceptive measures (18.95%). The PH values of the vaginal discharge were measured in 90 patients and the highest infection were seen at PH values 6.0 (28.88%) and 5.5 (20%) respectively.*

Conclusion: *The spread of Trichomonas vaginalis infection may be affected by many factors such as socioeconomic status, marital status, pregnancy status and parity, phase of the menstrual cycle, the use of different contraceptive measures and the PH values of the vaginal discharge..*

Key words: *Epidemiology of Trichomonas vaginalis. Trichomoniasis.*

Introduction:

Trichomonas vaginalis is one of the most important flagellate causing an important type of specific vaginitis (Trichomoniasis).It has been spread in every continent, in every class, in every race and climate. This parasite survives no longer than 24 hours outside the human body, only for a few hours in fresh water, for up to 12 hours in seminal fluid, up to 24 hours in urine. It is susceptible to direct sun light, can live about 1 hour on toilet paper, or moist cloths and on toilet seats (1,2,3).

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Trichomonas vaginalis is capable of causing a low grade of inflammation, apparently the intensity of infection, the bacterial flora, the condition of the vaginal cells, the physiological status of the vagina and the vaginal PH are among factors that determine infection and affecting the pathogenicity of the parasite. Although the flagellate by itself seems capable of inducing vaginitis in normal vaginal mucosa. Thus *Trichomonas vaginalis* may simply thrive under condition resulting from other causes (2).

Patients and methods:

The study was conducted in the period from November 1992 to August 1993 on 480 female patients presented with vaginal discharge with or without prurits vulvae attended the Gynecological and Antenatal Outpatient Clinics in Medical City in

Baghdad, compared to 50 females complaining of gynecological problems other than infection attended the same clinic.

Full informative history was taken directly from the patient and information was arranged in an informative clearly detailed formula sheet.

The females were then examined gynecologically in lithotomy position under a good source of light (4).

Swab collection:

Through the sterile vaginal speculum two samples of the vaginal discharge were taken from the posterior fornix of the vagina by mean of sterile cotton swab, one was immersed immediately into a sterile test tube containing 1ml of sterile normal saline covered with sterile cotton plug (5&6), this tube was kept warm as far as possible till the time of examination. The second swab was put in a sterile empty test tube which was covered with sterile cotton plug as well.

Swabs with transport media were used when available. In virgins the examination was restricted to the discharge which appeared at the vaginal introitus by the aid of sterile cotton swab (4).

The PH of vaginal discharge was tested by placing a drop of the discharge on the PH testing paper; this was read according to change in color. In some cases were the vaginal discharge was not perfuse, vaginal PH was measured by touching a piece of PH testing paper to the vaginal side wall about half way down the length of the vagina (7,8).

The sample in the sterile test tube containing normal saline or that taken by the transport swab were examined for the presence of *Trichomonas vaginalis* by:

1. Wet mount examination.
2. Culture on artificial media/ ready made Difco-Bacto Kupferberg Trichomonas medium.

A smear was made from the second vaginal swab and stained with the following stains to be examined as fixed stained smears.

a.Gram's stain.
b.Leishman's stain.
c. Giemsa's stain.
d. Papanicolaou's stained smear.

Sample was taken with Ayre wooden spatula.

Results:

Some of the factors affecting the prevalence and pathogenicity of *Trichomonas vaginals* were evaluated in this study, including socioeconomic status, marital status, pregnancy and parity, menstrual history, contraceptive measures and the PH value of vaginal discharge as shown in tables 1,2,3,4,5,6 respectively.The total infection rate in patients was (19.16%), and it was (8%) in the control group.

Table (1): The distribution of Trichomonas vaginalis infection according to socio-economic status among 92 infected females (excluding the controls).

Socio-economic status	Positive cases for Trichomonas vaginalis	
	Percentage %	Number
Low socio-economic status	60	65.22
Intermediate socio-economic status	24	26.08
High socio-economic status	8	8.70
Total	92	100

Table (2). Trichomonal infection in relation to marital status (excluding the controls).

Marital status	Number of patients examined	Positive cases	
		Number	%
Married	434	86	19.81
Divorced	12	2	16.66
Unmarried	18	2	11.11
Widowed	16	2	12.5
Total	480	92	

Table (3): Trichomonas vaginalis infection rate in relation to pregnancy status and parity (excluding singles and controls)

Pregnancy status	Number of patients examined	Positive cases Number	%
Pregnant	66	6	9.09
Lactating	26	10	38.46
Non pregnant and non lactating	370	74	20.00
Total number examined	462	90	
Parity			
Multipara	322	74	22.98
Unipara	50	6	12.00
Nullipara	90	10	11.11
Total number examined	462	90	

Table (4): The distribution of Trichomoniasis in relation to menstrual cycle (excluding the pregnant patients and controls)

Menstrual history	Number of patients examined	Number of positive cases	Percentage %
Amenorrhea due to lactation	26	10	38.46
Menstruation	364	74	20.32
Premenstrual phase	174	28	16.09
During menstruation	0	0	0
Post menstrual phase	190	46	24.21
Menopause	24	2	8.33
Total	414	86	

Table (5): The frequency of Trichomonas vaginalis infection among females using contraceptive measures (excluding control, pregnant and single groups).

Contraceptive measures	Number of females using contraceptives	Positive cases for Trichomonas vaginalis Number	%
OCS	26	6	23.07
IUCD	52	18	34.61
Tubal ligation	12	2	16.66
Total	90	26	28.88

Females not using any contraceptives	**306**	**58**	**18.95**

OCS: Oral contraceptives.
IUCD: Intrauterine contraceptive device.

Table (6): The distribution of Trichomonas vaginalis infection at different PH values among 90 positive cases.

PH values	Number of positive cases	Percentage %
4.0	**2**	**2.22**
4.5	**6**	**6.67**
4.8	**6**	**6.67**
5.0	**9**	**10.0**
5.3	**8**	**8.89**
5.5	**18**	**20.0**
6.0	**26**	**28.88**
6.3	**7**	**7.78**
6.7	**6**	**6.67**
6.8	**2**	**2.22**
Total	**90**	**100**

Discussion:

This study was concerned with the effect of certain factors on the infection rate and the pathogenicity of *Trichomonas vaginalis*, regarding the socioeconomic status, we noticed that the highest rate of infection was found among the low socioeconomic group (65.22%), then an infection rate of (26.08%) was seen in the intermediate group and the lowest rate (8.70%) was found among females belong to high socioeconomic group. These results agree with those obtained in America by Gardner et al in1957 (9) . It is to be mentioned here that the low rate of infection among women with social and educational advantages may be due to their better hygienic habits and since they are more prone to ask for medical advice than indigents who accept vaginal discharge and minor irritation as being trivial or normal.

Regarding the marital status, (19.81%) of the infected cases were married, (16.66%) were divorced, (12.5%) were widowed and (11.11%) were singles. These results showed that most of the infected patients were those with direct sexual contacts (the married women). The infection among other females may be due to extra sexual routes like using contaminated under wears of infected females or through contaminated rubber gloves, instruments and articles during gynecological examination. Many investigators studied the infection rate according to marital status, similar results were obtained by some of them (4), others reported different results (10,11).

Pregnancy is considered as a state of hyperestrogenism which provides higher estrogen and glycogen level in the vaginal mucosa which offers good medium for the growth of *Trichomonas vaginalis* (9), factors other than pregnancy come to mind to account for the higher rate of infection in pregnant women, among these factors are iatrogenic infection and frequency in the use of toilets (9,12,13). During this study an infection rate of (9.09%) was found among pregnants in comparison to non pregnant women who showed an infection rate of (20%), these results may agree with those

obtained in Egypt by Nagaty and Salem in 1962 (4), but may disagree with those obtained in America by Kean and Day in1954 (12). The low infection rate found in pregnant females during this work may be due to the small sample size of pregnant women examined (only 66 pregnant females) in comparison to non pregnant (370 females), or the cause may be that large number of pregnant females avoid sexual intercourse due to the fear of abortion early in pregnancy, or premature uterine contraction and premature labor late in pregnancy, or because of the fear of acquiring infection.

Investigators differed in their options about the relationship of parity with *Trichomonas vaginalis* infection, some stated that there is association between trichomoniasis and parity (10,11), while others found that the infection rate was more in the bipara then it was reduced with higher parity (14). During this study a higher infection rate was found among the multipara than the unipara or the nullipara, this could be explained by the fact that most of the widowed and divorced women were belong to the last two groups, hence they were less active sexually than the married or multipara women, and ultimately less exposure to infection by sexual route is expected, also the very limited number of them complaining of gynecological disorders reduce the chance of transmission of the disease by the examination articles such as unsterilized rubber gloves or speculum. Concerning the menstrual history of 414 females, we noticed that the highest infection rate (38.46%) was found among the lactating women. It must be mentioned here that large number of the lactating women were newly delivered, hence they may acquired the infection from contaminated or unsterilized rubber gloves or instruments which were used during labor.

Inspite of the marked state of hypoestrogenism at the menopausal age, still *Trichomonas vaginalis* could be reported in these females, this may be due to the possibility that the parasite may survive in the environmental conditions of the resulting atrophic vaginitis, when the epithelium is already traumatized giving rise to serum transudate which help in the propagation of the parasite (15).

Regarding the infection rate at the pre and post menstrual phase of the cycle, our results agree with those who believed that the infection rate increases soon after menstruation, and symptoms become worse, probably because the PH of the vagina is favorable to the growth of trichomonads, since the relative alkalinity of menstrual blood flow alters the PH of the vaginal fluid increases the chance of multiplication of the parasite (16,17). In the current study the overall infection rate of *T. vaginalis* among 90 females using contraceptive measures was (28.88%), while the infection rate among females not using any contraceptive measures was (18.95%), the majority were those using IUCDs. These results could be compared with those obtained by many workers (18,19). It is clear that contraceptive measures have given women freedom from unwanted pregnancies but not from infection, since these women are attempted to have greater sexual freedom than those without any contraceptive measures. The PH values of 90 positive cases were ranging from 4.0 to 6.8 with the highest rate of infection at PH 6.0 (28.88%) and 5.5 (20%) respectively, which agrees with the results obtained by Karnaky in 1959 (20), it is agreed by many workers that the normal vaginal acidity is the most important barrier against infection (21,22). *Trichomonas vaginalis* is found to thrive with more alkaline values although the PH in most instances remain in the acid range, lowering the PH of the vagina have been considered as a successful method of treatment of *T. vaginalis* infection, it has been found that lowering vaginal PH to 1.8-2.2 and holding it near that PH for 4-10 days can inhibit the growth of *T. vaginalis* (17,.20).

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