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A comparison between Trichomoniasis Infection and other Vaginal Infection among Females in Baghdad Governorate- Iraq

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Abstract

Trichomoniasis is a parasitic disease caused by the protozoan *Trichomonas vaginalis*. It is the most common sexually transmitted protozoal infection. There is no estimated of infection intensity among reproductive-age females. Further studies of the infection intensity of trichomoniasis and other vaginal infection will highlight the importance of this pathogen as a public health problem. A total of 614 females from Baghdad city were screened for *T. vaginalis* from March 2015 to September 2015. Females aged 13–61 years old provided vaginal swab specimens. The vaginal fluids extracted from these swabs were checked for the presence of *T. vaginalis* and other vaginal infection using microscopic examination. Overall, 525 (85.5%) of 614 was screened positive for *T. vaginalis*, 89 of 614 females gave negative results for *T. vaginalis* instead; they were infected with other vaginal infection. In tested females, 82 (13.36%) of the females were infected with bacteria (including *Haemophilus vaginalis*, *Escherichia coli* and *Pseudomonas*); 7 (1.14%) of females was infected with Monilia. In addition, the main age group of infected females concentrated in (more than 30 years) which recorded a higher rate of infection. There were 122 (85.31%) of patients had (4) pus cells per field of microscope in *Trichomonas* infection, 29 (69.05%) of patients had (2) pus cells per field of microscope in bacterial infection, and 2 (33.33%) of patients had (2) pus cells per field of microscope in Monilia infection that was statistically significant. Taking together, the results of this study demonstrate that *T. vaginalis* is endemic of females in Baghdad city and has a higher intensity rate compare with females infect with bacteria or Monilia. A prevention strategy of *T. vaginalis* infection could control the transmission of this parasite.

Keywords: *Trichomonas vaginalis*, vaginal infection, Monilia.

مقارنة بين العدوى بداء المشعرات المهبلية والعدوى بالاصابات المهبلية الاخرى بين الإناث في

محافظة بغداد – العراق

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الخلاصة

داء المشعرات المهبلية هو مرض يسببه طفيلي *Trichomonas vaginalis* وهذا المرض هو الأكثر شيوعاً من بين الطفيليات الابتدائية التي تنتقل بالاتصال الجنسي. لا توجد دراسة وافية عن شدة الإصابة بين النساء في سن الإنجاب وإجراء المزيد من الدراسات لشدة الإصابة من داء المشعرات والعدوى المهبلية الأخرى سوف تسلط الضوء على أهمية هذا العامل الممرض كمشكلة صحية عامة. تم فحص ما مجموعه 614 امرأة من مدينة بغداد للفترة من اذار 2015 الى ايلول 2015. تم فحص عينات المسحة المهبلية في النساء الذين تتراوح أعمارهم بين 13-61 عاماً باستخدام الفحص المجهرى. (85.5%) 525 من 614 إمرأة أعطت

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نتيجة إيجابية للمشعرات المهبلية، 89 من 614 امرأة اعطت نتيجة سلبية للمشعرات المهبلية بدلا من ذلك، كانت مصابة بانواع اخرى من العدوى المهبلية، (13.36%) 82 امرأة كانت مصابة بعدوى بكتيرية تشمل *Haemophilus vaginalis*, *Pseudomonas*, *Escherichia coli* 7 نساء (1.14%) كانت مصابة بالمونيللا. بالإضافة إلى ذلك فقد تركزت الاصابة في الفئة العمرية (أكثر من 30 عاما) التي سجلت أعلى معدل واعلى شدة للإصابة. كان هناك 122 (85.31%) من المرضى لديهم (4) خلايا صديد في مجال المجهر الضوئي ضمن المرضى المصابين للمشعرات المهبلية، 29 (69.05%) من المرضى كان لديهم (2) خلايا صديد ضمن المرضى المصابين بعدوى بكتيرية، و2 (33.33%) من المرضى كان لديهم (2) خلايا صديد في المرضى المصابين بالمونيللا. نتائج هذه الدراسة تثبت أن المشعرات المهبلية منتشرة بشكل وبائي بين النساء في مدينة بغداد ومعدل شدة الاصابة بها أعلى مقارنة مع معدل شدة اصابة بالبكتيريا أو عدوى المونيللا. وعليه فإن هناك حاجة الى استراتيجيات للوقاية من العدوى بالمشعرات المهبلية للتحكم في انتقال هذا الطفيلي الممرض.

Introduction

Trichomonas vaginalis is common sexually transmitted parasite in the world [1, 2]. Many cases remain undiagnosed because *T. vaginalis* is not a reportable disease, and is asymptomatic in half of infected females [3]. *T. vaginalis* is associated with a number of significant reproductive health infections including pelvic inflammatory disease [4]. *T. vaginalis* infection diagnose in females made by microscopic examination of a vaginal fluid specimen [4–8]. PCR is only available in laboratories or research settings, and to date, there is no US Food and Drug Administration– approved PCR test for routine diagnosis of *T. vaginalis* infection [9]. Prevalence of *T. vaginalis* has been found to vary according to: geographical location; study setting, for example sexual health clinic or community setting; age and sex; and diagnostic techniques used [10 -12]. The prevalence of *T. vaginalis* has been shown to increase with age in females and males. This may be due to the asymptomatic nature of infection and the persistence of untreated infection [13, 14]. The annual incidence in the world has been estimated to be 174 million new cases [1, 2]. In the United States, three- five million cases have been estimated yearly [15]. In USA, a study has been revealed that the prevalence of trichomoniasis of young females (age, 18–25 years and above) was 2.8% [16]. Therefore, the prevalence of trichomoniasis in reproductive-age females is unidentified and the epidemiology of the disease is still poorly understood [14]. The global incidence of trichomoniasis infection increased between 1999 and 2005. An overall incidence of 54 cases per 1000 person-years was reported in 1999 [17]. Another study estimates were provided for females (63 cases per 1000 person-years) and men (82.2 cases per 1000 person-years) in 2005 [18]. In Sulaimaina governorate- Iraq, the prevalence of *T. vaginalis* was 10 (1.66%). The highest is found in women at the age group (26-35) years old [19]. Another study in AL-Liqa'a Hospital in Baghdad, Trichomoniasis was detected in 18 (7.2%) out of 250 women. The highest rate of Trichomoniasis was found in age between (25-29) years [20]. It is apparent that there is no indication that trichomoniasis infection is decreasing [21]. *Candida Albicans* (Monilia), or yeast, is present in the vagina of many normal females and is the most common cause of vaginal infections. An infection may be induced through intercourse or oral-genital contact [22]. The aim of this study was to update the reader on the infection intensity of trichomoniasis and compare it with other vaginal infection.

Patients and methods

A total of 614 females attending the clinics in Al-Resafa, Baghdad city, with symptoms of vaginal discharge were screened for *T. vaginalis* from March 2015 to September 2015. Samples were collected from females aged 13–61 years old provided vaginal swab specimens. The study was done for 614 smears diagnosed and examined microscopically at (x40). Vaginal fluids were extracted from the self-collected vaginal swabs, and these fluids were evaluated for the presence of *T. vaginalis* by microscopic examination. *T. vaginalis* can be visualized in fixed vaginal, cervical and urine sediment smears stained using two staining methods including Gram and Giemsa stain, after staining examined under microscope and noticed motile protozoa. The Statistical Analysis System- SAS (2012) was used to effect of different factors in study parameters. Chi-square test was used to significant compare between percentages in this study.

Results and Discussion

Overall, 614 participating females who were provided swab specimens that were evaluable, 525 (85.5%) of 614 screened positive for *T. vaginalis* that was statistically significant ($P<0.01$), 89 of 614 females give negative results for *T. vaginalis* instead; they were infected with other vaginal infection. In tested females, 82 (13.36%) were infected with bacteria (including *Haemophilus vaginalis*, *Escherichia coli* and *Pseudomonas*); 7 (1.14%) of females was infected with Monilia as shown in Table-1.

Table 1- Distribution of study samples according to type of infection

Type of infection	Number	Percentage (%)
<i>T. vaginalis</i>	525	85.5
Bacteria	82	13.36
Monilia	7	1.14
Total	614	100%
Chi-square (χ^2)	---	9.861 **
** (P<0.01)		

Regarding the differences to type of intensity in *Trichomonas* infection, 155 (29.52%) of the patient had intensity infection (1) pus cells per field of microscope that was statistically significant ($P<0.01$), while 37 (7.05) of patients had (5) pus cells as expressed in Table-2.

Table 2- Distribution of study samples according to type of intensity in *Trichomonas* infection

Intensity score	Number	Percentage (%)
No pus cells	4	0.76
1	155	29.52
2	129	24.57
3	57	10.86
4	143	27.24
5	37	7.05
Total	525	100%
Chi-square (χ^2)	---	9.561 **
1 (+), 2 (++) , 3 (+++) , 4 (++++), 5 (+++++) pus cells ** (P<0.01)		

Regarding the differences to type of intensity in bacterial infection, 32 (39.02%) of the patients had intensity infection (1) pus cells per field of microscope that was statistically significant ($P<0.01$), while 5 (6.10%) of patients had (3) pus cells as expressed in Table-3.

Table 3- Distribution of study samples according to type of intensity in bacterial infection

Intensity score	Number	Percentage (%)
No pus cells	0	0.00
1	32	39.02
2	42	51.22
3	5	6.10
4	3	3.66
Total	82	100%
Chi-square (χ^2)	---	11.539 **
1 (+), 2 (++) , 3 (+++) , 4 (++++) pus cells ** (P<0.01)		

Regarding the differences to type of intensity in Monilia infection, 1 (14.29%) of the patients had intensity infection with no pus cells, while 6 (85.71%) of patients had (1) pus cells per field of microscope that was statistically significant ($P<0.01$) as expressed in Table-4.

Table 4- Distribution of sample study according to type of intensity in *Monilia* infection

Intensity score	Number	Percentage (%)
No pus cells	1	14.29
1	6	85.71
Total	7	100%
Chi-square (χ^2)	---	13.944 **
1 (+) pus cells		** (P<0.01)

Comparing the differences according to type of intensity among *Trichomonas*, bacteria and *Monilia*, (7.05%) of the patient had intensity infection (5) pus cells in *Trichomonas* infection while in bacteria and *Monilia* infection (0%) of patients had (5) pus cells that was statistically significant ($P<0.01$) as expressed in Table-5.

Table 5- Compare between *Trichomonas*, bacteria and *Monilia* type according to type of intensity

Intensity score	Bacteria	<i>Trichomonas</i>	<i>Monilia</i>	Chi-square(χ^2)
No pus cells	0.00	0.76	14.29	5.061 *
1	39.02	29.52	85.71	11.375 **
2	51.22	24.57	0.00	11.094 **
3	6.10	10.86	0.00	4.169 *
4	3.66	27.24	0.00	8.417 *
5	0.00	7.05	0.00	4.003 *
Total	82 (100%)	525 (100%)	7 (100%)	100%
1 (+), 2 (++), 3 (+++), 4 (++++), 5 (+++++) pus cells				* (P<0.05), ** (P<0.01)

Considering the age groups and it's relation with the intensity of the infection by *T. vaginalis*, the results have shown that the infection among age group (more than 30) years the highest intensity of infection was statistically significant ($P<0.01$) as follow: 122 (85.31%) of patients had intensity infection (4) pus cells while 32 (86.49%) of patients had intensity infection (5) pus cells per field of microscope as clearly observed in Table-6.

Table 6- Distribution of sample study according to age group with difference type of intensity in *Trichomonas* infection

Intensity score	No.	Age group			Chi-square(χ^2)
		Less than 20	20-30	More than 30	
No pus cells	4	0 (0.00%)	0 (0.00%)	4 (100.0%)	15.00 **
1	155	9 (5.81%)	65 (41.94%)	81 (52.26%)	9.746 **
2	129	4 (3.10%)	33 (25.58%)	92 (71.32%)	11.024 **
3	57	5 (8.77%)	13 (22.81%)	39 (66.10%)	9.816 **
4	143	2 (1.40%)	19 (13.29%)	122 (85.31%)	13.739 **
5	37	0 (0.00%)	5 (13.51%)	32 (86.49%)	13.755 **
1 (+), 2 (++), 3 (+++), 4 (++++), 5 (+++++) pus cells					** (P<0.01)

Considering the age groups and it's relation with the intensity of the infection by bacteria, the results have shown that the infection among age group (more than 30) years had the highest intensity of infection that was statistically significant ($P<0.01$) as follow: 29 (69.05%) of patients had intensity infection (2) pus cells as clearly observed in Table-7.

Table 7- Distribution of study samples according to age group with difference type of intensity in bacterial infection

Intensity score	No.	Age group			Chi-square(χ^2)
		Less than 20	20-30	More than 30	
1	32	2 (6.25%)	16 (50.0%)	14 (43.75%)	9.811 **
2	42	2 (4.76%)	11 (26.19%)	29 (69.05%)	12.074 **
3	5	0 (0.00%)	0 (0.00%)	5 (100.0%)	15.00 **
4	3	0 (0.00%)	0 (0.00%)	3 (100.0%)	15.00 **
1 (+), 2 (++), 3 (+++), 4 (+++++) pus cells					** (P<0.01)

Considering the age groups and its relation with the intensity of the infection by Monilia, the results have shown that the infection among age group (more than 30) years had the highest intensity of infection that was statistically significant ($P < 0.01$), 2 (33.33%) of patients had intensity infection (1) pus cells as clearly observed in Table-8.

Table 8- Distribution of sample study according to age group with difference type of Intensity in Monilia infection

Intensity score	Age group			Chi-square(χ^2)
	Less than 20	20-30	More than 30	
No pus cells	0 (0.00%)	0 (0.00%)	1 (100%)	15.00 **
1	0 (0.00%)	4 (66.67%)	2 (33.33%)	11.783 **
1 (+) pus cells			** ($P < 0.01$)	

In the present study 614 females were tested for vaginal swab, 525 (85.5%) were found to be infected with *T. vaginalis*, 82 (13.36%) were infected with bacteria; 7 (1.14%) of females were infected with Monilia. This indicates a considerable number of females in Baghdad city harboring the parasite, acting as the main reservoir and transmitter to other people and it is representing a real problem that should be not neglected. Other Iraqi studies in Mosul reported (25.86%) of *T. vaginalis* infection [23], and in Baghdad (22.6%) as reported by [24]. The age groups of our patients ranged between (13-61) years and the peak of infection intensity was at the age of (more than 30 years). This pattern differs from the epidemiology of other acute sexually transmitted infections, such as chlamydia and gonorrhea; for those infections, the prevalence is highest among adolescents and young adults [25, 26]. Apparently, the prevalence of *T. vaginalis* infection does not decrease with age. In *Trichomonas* infection, 122 (85.31%) of patients had (4) pus cells per field of microscope, 29 (69.05%) of patients had (2) pus cells in bacterial infection, and 2 (33.33%) of patients had (1) pus cells in Monilia infection. This result was agreed with study reported by [27], where the highest incidence could be occurred at the age group (21-40) years; this may be related to multi pregnancy and presence of suitable environment for growth of *T. vaginalis* and its survival. The main causes of infection with this parasite are personal hygienic habit and absence of the health education about this disease may lead to increase cases of trichomoniasis among illiterate females than in educated females [28]. Our result has shown that the peak of infection intensity of disease in females who infected with *T. vaginalis* had the highest rate of intensity compare with the bacterial and Monilia infection.

In summary, our data show that *T. vaginalis* infection is a highly prevalent among reproductive females aged 30-61 years old. In addition, our data provide new information on a wider age group of females, compared with the previously reported estimated prevalence of trichomoniasis of 2.8% among 18–25 year-old and above females [14]. Moreover, our study has shown a significantly high positive predictive value for detection of *T. vaginalis* compare with other vaginal infection including bacterial and Monilia infections. In conclusion, optimal prevention and control strategies for *T. vaginalis* infection should be further investigated as a means of decreasing other adverse health outcomes associated with this sexually transmitted infection.

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