

# A Systemic Review of *Trichomonas vaginalis* in Iraq

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## ABSTRACT

Systemic *Trichomonas vaginalis* is a single celled parasitic protozoan that's moved by flagella (possess 5 flagella) and its habitat urogenital tract of both sex (female and male) and attached to the vaginal epithelium. It causes vaginitis in female and urethritis in men. This articles deals with the review for the epidemiological studies of this parasitic among different Iraqi province. For this purpose, several studies on *Trichomonas vaginalis* were collected among different governorates to determine and interpret the infection rates by this parasite. Sources of references including Iraqi academic and scientific journals, journal of Karbala university, International journal of advance research and European Scientific Journal. Research article related to the prevalence of *T. vaginalis* among Iraqi people in period from (2013-2017) from different governorates of Iraq were studied in different cities and villages with different geographic distribution. Results of data analysis reveals the highest rate of infection by this parasite was in Baghdad (85.5%) during 2016 while lowest percentage of infection was (3.1%) in Erbil during 2015. It had concluded that geographical location of Iraqi governorates, population density, Tourist cities, industrial cities, education levels, personal hygiene, variation in the number of both gender throughout the Iraqi governorates and types of parasite diagnostic techniques having a basic role in the determination of the prevalence of the trichomoniasis in Iraq.

**Keywords:** PCR, Iraq, Trichomoniasis, *Trichomonas vaginalis*, Vaginitis.

## 1. Introduction

Since the early 1980s, Iraq has faced wars, political irregularity, and economic collapse, leads to the migration of over ten million people, two million have internally displaced according to Queensl and Health Multicultural Services. In addition to several other factors which mentioned by ministry of health [1] includes poor sanitation, poor nutrition and also population density because population of Iraq has more than doubled in the last 25 years.

In general, Health problems among Iraqi population include mental illnesses, intestinal parasites, hepatitis B, tuberculosis, sexually transmitted diseases, HIV/AIDS, malaria and anaemia [2, 3].

Parasitic infection including Protozoans (*Entamoeba histolytica*, *Trichomonas vaginalis*, *Giardia lamblia*, *plasmodium* sp., *Toxoplasma gondii*) and metazoans (*Ascares lumbricoides*, *Enterobius vermicularis*, *Ancylostoma*, *Necator* sp. *Taenia saginata*, *Taenia solium*, *Echinococcus granulosus*) are among the most wide spread

parasitic health problems in Iraq as mentioned by Saheb et al. [4].

Urogenital tract infection is among the most prevalent parasitic infection among Iraqi women (less among men) due to lack of personal hygiene and education levels of our community and lack of information on the urogenital tract in the past two decade as mentioned by Mahdi (1996). Only three studies had been done on the urogenital tract since 1996 and these include one in Baghdad [5], Mosul [6] and Erbil [7] and they recorded 19.5%, 9.6% and 10%, respectively.

*T. vaginalis* cause sexual transmit diseases (STDs) because the main mode of infection is via sexual intercourse. Variation rate of this infection in Iraq during the year between 1999-2001 had been studied by AL-Jumaily [8]. They concluded that *T. vaginalis* is among the most prevalent cases in Iraq.

## 2. Data collections

Research articles were collected among different governorates in Iraq using several academic cites including Iraqi academic and scientific journals, journal of Karbala university, International journal of advance research, European Scientific Journal, Journal of Kirkuk Medical College (JKMC). Research article on the prevalence of *T. vaginalis* were collected which covered among people in period from (2013-2017) from different governorates of Iraq with different methods for collection of samples and also these areas include different cities and villages which are different in geographic distribution.

## 3. Classification

*T. vaginalis* (Donne', 1836) belong to Kingdom: Animalia, Phylum: Metamonada, Class: Parabasilia, Family: Trichomonadida [9].

## 4. Etiology

*T. vaginalis*, has trophozoite only and having no cystic stage. The motile and active stage, trophozoite is oval or pear shape with only one nucleus at the top of the body of the parasites as described by Mehlhorn [10]. Its size ranged between 10-30 micron in length and 5-10 micron in width according to Paniker [11], while its around 10-25micron and in length according to Mehlhorn [10]. It has four apical flagella and one undulating caudal flagellum. Axostyle run throughout the length of the body. Cytoplasm contain

granules. Its active with jerky movement [11]. Short undulating membrane as mentioned by Mahmud et al. [12], Fig. 1.

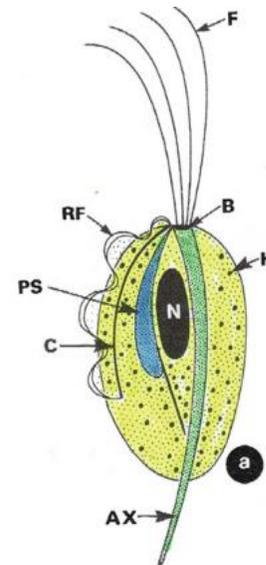


Figure 1: Trophozoite of *T.vaginalis*, scal bar =7 micron AX axostyle; B basal bodies; C costa; F flagellum; H hydrogenosomes; N nucleus; PS parabasal strands; RF attached flagellum.

## 5. Life cycle

The life history of this parasite as follow: The active stage of the trophozoites lives in the urogenital tract of the both sex female and male and may also lives in several genital glands, urethra and ureter of females. In man, it lives especially in the portion of urinary tract and may be occur in prostate gland. It's reproduced by asexual mode of reproduction, longitudinal binary fission. Its life cycle completed in human only. Its transported from one person to another via direct contact by sexual intercourse as described by Mehlhorn [10]. So its high among sexually active person or transport may occur in a polluted pole with the trophozoite of this parasite during swimming.

## 6. Pathology

Incubation period is between 4-24 days, with prepotency around 4-20 and several months of its patency. Its release several enzymes like protease and cysteine which act on the epithelial glycogen and converted it to ammonia and increase the alkalinity of the vagina with amine odor. Slightly raising of hydrogen potential make favorable condition for the growth of pathogenic bacteria (secondary infection). Contact

detachment factors which release as metabolite waste product as a result of parasite lysis lead to detachment of epithelial cells due to its degradable activity on the desmosomes (a cell junction between epithelial cells) which make a cheesy secretion of the vagina [13].

Clinical disorders include vaginal itching, painful urination strawberry vagina (vaginitis), may leads to infertility due to endometritis in female. In male cause urethritis, painful urination and prostate secretion abnormality as described by Mehelhorn [10].

## 7. Chemical Structures

Ryan et al. [14] described the chemical structure of *T. vaginalis*. They noticed that the surface lipoglicane play an important role in the binding epithelial cell galectin-1. They also analyzed that the structure of this lipoglycone which noticed the constitution of rhamanose, N-acetylglucose amine, galactose, xylose, N-acetylegalactoseamine and glucose. Similar description was noticed by Singh et al. [15] with few exceptions including presenting of oligosaccharide and investigation of CPI glycan core and they mentioned that its chemical composition were used in the antigen isolation and diagnostic kit preparation.

## 8. Epidemiology and Prevalence of Infection

The inspection of all academic research articles revealed variation in the recording of *T. vaginalis* infections among different governorates reveals highest percentage of infection by *T. vaginalis* in Baghdad (85.5%) during 2016 [4], while lowest percentage of infection (3.1%) was recorded in Erbil during 2015 [16] Fig. 2. This high rate of infection which was reported in Baghdad city and this is related to that the large population female in Baghdad city suffered with this parasite infection and act as a main sources for parasite transmission (human to human in addition to the occurrences of the multisexual partner female among at such area in addition to health education, personal hygiene and lack of information on this parasite make a large problems in the parasite controlling as mentioned by Saheb et al. [4]. Lowest prevalence of infection were recorded in Erbil city this variation of infection rate among Iraqi provenance confirmed the variation in the sample size, sample population, study site and mode of diagnosis as mentioned by Nouraddin and Alsakee [16]. There were some similarities in results between different governorates of Iraq. The prevalence of *T. vaginalis* in

Baqubah was 54.1% during 2017 [17], it was similar to that recorded in Babil 2015 and Basra 2013 which were 50%, 55.4% [18, 19], also there was similarity in the result that recorded in the same year 2013 in Kut [20] and Kirkuk [21] which were 20% and 20.49% respectively. Data analysis during 2014 and 2017 from two different governorate reveals similar result which were 21.76% and 17.64% from Kut and Najaf [22, 23].

The result of this article review showed a similarity in the prevalence of occurrence of *T. vaginalis* in Erbil during 2015 [16] and Nasseria (4.8%) during 2013 [24]. The prevalence of *T.vaginalis* in Baqubah was 12.41% in 2017 [25] and this was in agreement with the incidence of *Trichomonas vaginalis* in Tikrit in 2014 which was 7.5% [26]. During year 2014 the variation rate of *Trichomonas vaginalis* was similar from two governorates Baghdad city and Babil [27] which was 33.8% and 27.48% respectively. Nearly recorded data among different region are due to similar women chance to exposed this parasite under the same environmental condition [17]. Similarity in the results between different governorates may due to using of the similar sample sizes and from similar socioeconomic state and same material status and using the same techniques for identification of *T. vaginalis*.

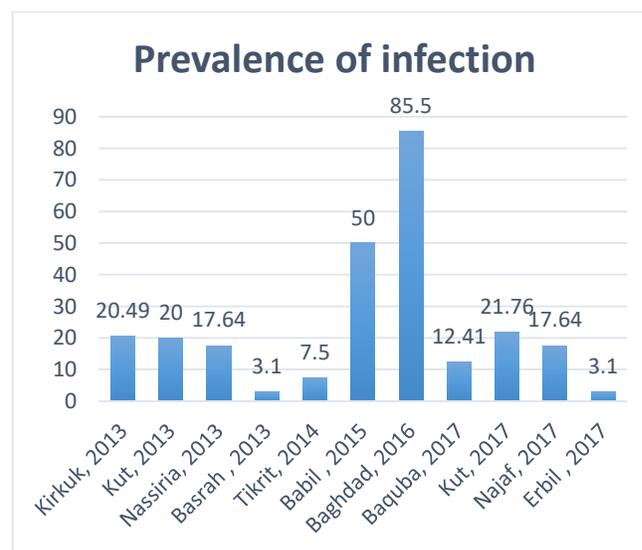


Figure 2: Histogram shows Total prevalence of infection by *T.vaginalis* among Iraqi governorates during the period from (2013-2017).

It's necessary to mention the role of the type and methods of diagnosis in the variation of the rate of infection among different Iraqi governorates. In Iraq, the main methods for the

diagnosis of *T. vaginalis* is vaginal swab and general urine examination, both methods are not accurate because sometimes *T. vaginalis* appears as pus cells so it gives false negative tests or vice versa due to pseudo-parasites may lead to false positive tests. Depending on the previous study, there have been few major advances in diagnostic methods for parasitic infections except in the few last years ago including those of AL- Hadraawy *et al.* [28] that evaluate IL-6 from patient serum infected with *T. vaginalis* from Najaf. They isolate the parasite from women's vagina and diagnosed it by using PCR (using primer OP 1 and PO 2 for amplified specific target gene sequence). Molecular-based identification of parasites by using of 28S rDNA sequence, Phylogenetic and secondary structure analysis, using PCR, gel electrophoresis and sequencer as reported by Koyee *et al.* [29] in Erbil city. They performed similar recent steps technique as mentioned before (DNA sequencing) in addition of the secondary structure analysis of rRNA using bioinformatics data analysis. Diagnosis based on the parasite isolation and morphology appearance of the trophozoites from vagina or in urethral secretion and DNA extract of *T. vaginalis* were analyzed using real time PCR from Baghdad by Ali *et al.* [30]. They use multiplex RT-PCR for the amplification of different regions on the target gene of this parasite. Genetic variation of *T. vaginalis* was studied by Merdaw *et al.* [22]. They extracted DNA of *T. vaginalis* from culture media isolated from vagina of patient from Baghdad and then amplified its target sequence using multilocus sequence typing (MLST) method for 6 housekeeping genes. Authors' results with MLST show different alleles and they confirmed the glutaminase gene with the highest degree of variation. Al Abodi *et al.* [31] investigated *T. vaginalis* in Muthana provenance during 2019. They used Polymerase chain reaction (PCR) for the genetic amplification (using 18SrRNA) which gives more accurate results.

## 9. Conclusion

Data analysis reveals the highest rate of infection by this parasite in Baghdad (85.5%) during 2016 while the lowest percentage of infection was (3.1%) in Erbil during 2015. It has been concluded that geographical location of Iraqi governorates, size of population, tourist cities, industrial cities, rate of female/male in population, personal hygiene, education levels and types of parasite diagnostic techniques having a basic role in the determination of the prevalence of the trichomoniasis in Iraq.

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