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Prevalence of *Trichomonas vaginalis* Infection among Iranian Women Referred to Laboratories: A systematic review and meta-analysis

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Abstract

Introduction: Trichomoniasis and bacterial vaginosis are the most common sexually transmitted infections (STIs), with different prevalence rates in various communities, age groups, and times. The aim of this study was to evaluated the Prevalence of *Trichomonas vaginalis* Infection Among Iranian Women Referred to Laboratories.

Methods: All eligible studies were included in the data collection after systematic review and data were integrated using the forest plot. The random effects model was evaluated based on the overall prevalence of the disease among the participants.

Results: According to the random effects model, the overall Prevalence of *Trichomonas vaginalis* Infection in 4353 Iranian Women Referred to Laboratories was 2% (2-3% at 95% confidence interval and I^2 = 91%)

Conclusion: The diagnosis of *Trichomonas vaginalis* in the gynecology department is based solely on clinical symptoms and some pathological reports. Due to the non-specificity of clinical symptoms, they are of little help in the diagnosis and this necessitates a test to diagnose this disease.

Keywords: *Trichomonas vaginalis*, Bacterial vaginosis, Sex Transmitted Infectious Disease, Prematuration

Introduction

Trichomoniasis and bacterial vaginosis are the most common sexually transmitted infections (STIs), with different prevalence rates in various communities, age groups, and times (1). Gardnerella vaginalis together with a group of anaerobic bacteria are known agents of vulvovaginitis. Candidates, mostly during pregnancy and *Trichomonas vaginalis*, account for up to 30% of cases of urinary tract infections, lower genitourinary tract infections in women (2). Due to general changes in the ecosystem, normal flora and intra-vaginal physiological conditions, and environmental conditions during pregnancy, protective lactobacilli and hydrogen peroxide and lactic acid generators are endangered and/or degraded and as a result, various parasitic and bacterial agents are replaced and expanded in the vaginal area (3). Trichomoniasis and bacterial vaginosis are not only important causes of vulvovaginitis in women but can potentially lead to pelvic inflammatory diseases and total uterine malignancies and facilitate HIV transmission (4). More important than the aforementioned complications, trichomoniasis and bacterial

vaginosis can have adverse effects on pregnancy outcomes (5). In other words, by causing a rupture in fetal membranes and by toxin secretions resembling themselves cause preterm births (before 37 weeks) and low birth weight (of less than 2500 grams) and even fetal death (6). The most important fetal complications include nephritis, necrotizing enterocolitis, intraventricular bleeding, and respiratory failure. Neonatal passage through the vagina of mothers with trichomoniasis and bacterial vaginosis can lead to conjunctivitis in newborns and also vulvovaginitis in female infants (7). The 2-fold prevalence of post-partum fevers in pregnant women with T.V and B.V. against the control group in western countries indicates the importance of the pathogenesis of this infection (8). Since the use of anti-single-cell and bacterial drugs in pregnant women can lead to fetal malformations, early diagnosis and timely treatment of these infections in early pregnancy are of high importance.

Methods

Inclusion Criteria (eligibility criteria)

The methods used in this systematic review are developed based on the Checklist Guidelines (PRISMA). Cross-sectional studies, case control study, and cohort study are included in this study and case reviews, letters to editors, case reports, clinical trials, study protocols, systematic reviews, and review studies are excluded.

Participants: All studies about the Prevalence of *Trichomonas vaginalis* Infection Among Iranian Women Referred to Laboratories .

Results: The main objective of the study was Prevalence of *Trichomonas vaginalis* Infection Among Iranian Women Referred to Laboratories .Sampling Methods and Sample Size: All observational studies were included in the systematic review regardless of their design. The minimum sample size was 25 patients or more.

Search Strategy

The searches were conducted by two independent researchers and the objective was to find studies published from 1/1/2000 to 30/5/2019. Studies were searched in Cochrane Library and the English database, and studies published in MEDLINE were searched through PubMed, and those published in EMBASETM were searched through Ovid. We searched the national database of Magiran and SID to find studies published in Iran. To ensure the adequacy of the studies, a list of references or related reviews found through searches was studied. Systematic review studies were searched through MESH and open-ended terms in accordance with publication standards. After finalizing the MEDLINE strategy, the results were compared to search other databases, and PROSPERO was searched for recent or ongoing systematic reviews. The key words used in the search strategy include: *Trichomonas vaginalis* , Bacterial vaginosis , Sex Transmitted Infectious Disease , Prematuration.

Study Selection and Data Extraction

Two researchers independently analyzed the titles and abstracts of the studies according to eligibility criteria. After excluding additional studies, the full texts of the studies were analyzed based on eligibility criteria and information about authors were collected if necessary. General information (relevant author, province, and publication year), study information (sampling technique, diagnostic criteria, data collection method, research conditions, sample size and risk of bias) and exclusion criteria were collected.

Quality Assessment

Hoy et. al.'s developed scale was used to assess the quality of the method and the risk of bias of observational studies.

Data Collection

All eligible studies were included in the data collection after systematic review and data were integrated using the forest plot. The random effects model was evaluated based on the overall prevalence of the disease among the participants. The heterogeneity of the initial studies was assessed using I^2 test. In addition, subgroups were analyzed based on the participants' age,

publication year, and country to determine heterogeneity. Finally, a meta-analysis was performed in STATA14 statistical software.

Results

Study Selection

A total of 564 studies were extracted through initial searches in various databases. Among 564 studies identified by analyzing titles and abstracts, 421 studies were removed due to irrelevant titles. Of the remaining 43 studies, 9met the study criteria (Figure 1).

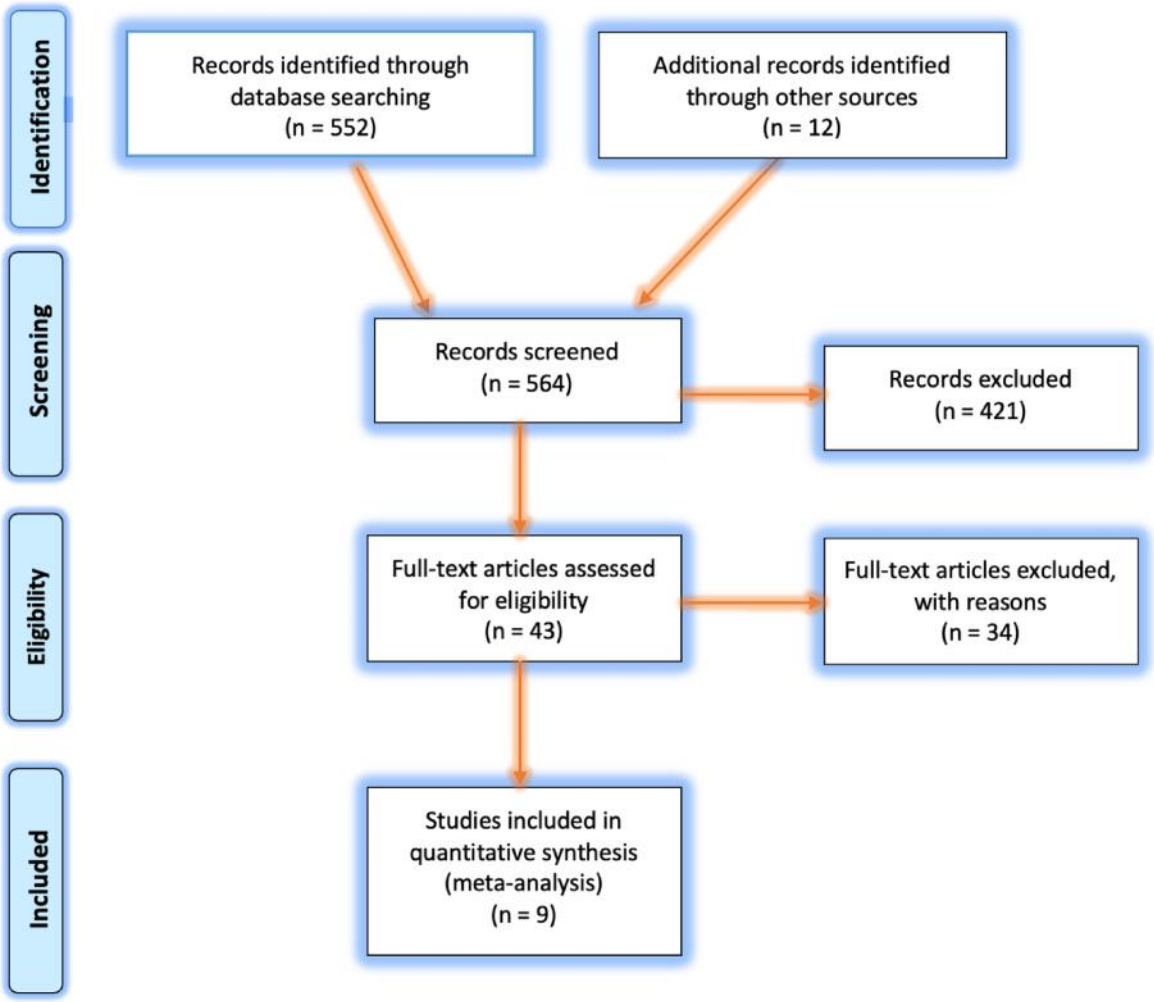

Figure 1.PRISMA flow diagram

Research Properties

A total of 4353 patients undergoing dialysis were evaluated. All studies, were retrospective and the study design was not mentioned in the other study. A total of 9 studies from 6 provinces that met the inclusion criteria were evaluated. 9 studies conducted in Ahvaz, Tehran, Isfahan, Zanjan, Kashan and Ardabil were included in the study. Simple sampling method was used to select the sample (n = 9). In most studies the risk of bias was low. The main method of data collection was medical records. The main study sites were the hospitals (Table 1).

Table 1. characteristics of the included studies

ID	Author	Province	Publications year	Number of patients	Risk of bias
1	KhatereSafaei[17]	Ahvaz	2014	514	Low
2	AbdolrasoulAkbarian[18]	Tehran	2004	368	Low
3	AbdolazizGharaei[19]	Zahedan	2013	400	Low
4	Lame Akhlaghi[20]	Tehran	2005	500	Low
5	Behnam Mohammadi[21]	Ardabil	2014	500	Low
6	Reza Salmani[22]	Zanjan	2012	328	Low
7	MolookBiramvand[23]	Ahvaz	2015	373	Low
8	SimaRasti[24]	Kashan	2009	900	Low
9	Madi Baghaei[25]	Isfahan	2001	470	Low

Meta-analysis of Prevalence of *Trichomonas vaginalis* Infection Among Iranian Women Refered to Laboratories :

According to the random effects model, the overall Prevalence of *Trichomonas vaginalis* Infection in 4353Iranian Women Referred to Laboratorieswas 2% (2-3% at 95% confidence interval and I^2 = 91%) (Figure 2, Table 2).

Table 2. meta-analysis of the Prevalence of *Trichomonas vaginalis* Infection Among Iranian Women Refered to Laboratories

First author	95% conf. interval				Publication year Up	Participants
	Down	Up	ES	Weight		
KhatereSafaei	0.092	0.148	0.12	2.51	2014	514
AbdolrasoulAkbarian	0.030	0.047	0.030	6.64	2004	368
AbdolazizGharaei	0.100	0.129	0.10	2.28	2013	400
Lame Akhlaghi	0.014	0.024	0.014	19.00	2005	500
Behnam Mohammadi	0.025	0.039	0.025	10.55	2014	500
Reza Salmani	0.064	0.090	0.064	2.82	2012	328
MolookBiramvand	0.010	0.020	0.010	19.37	2015	373
SimaRasti	0.020	0.029	0.020	24.28	2009	900
Madi Baghaei	0.020	0.033	0.020	12.54	2001	470
Pooled ES	0.024	0.019	0.028	100	----	-----

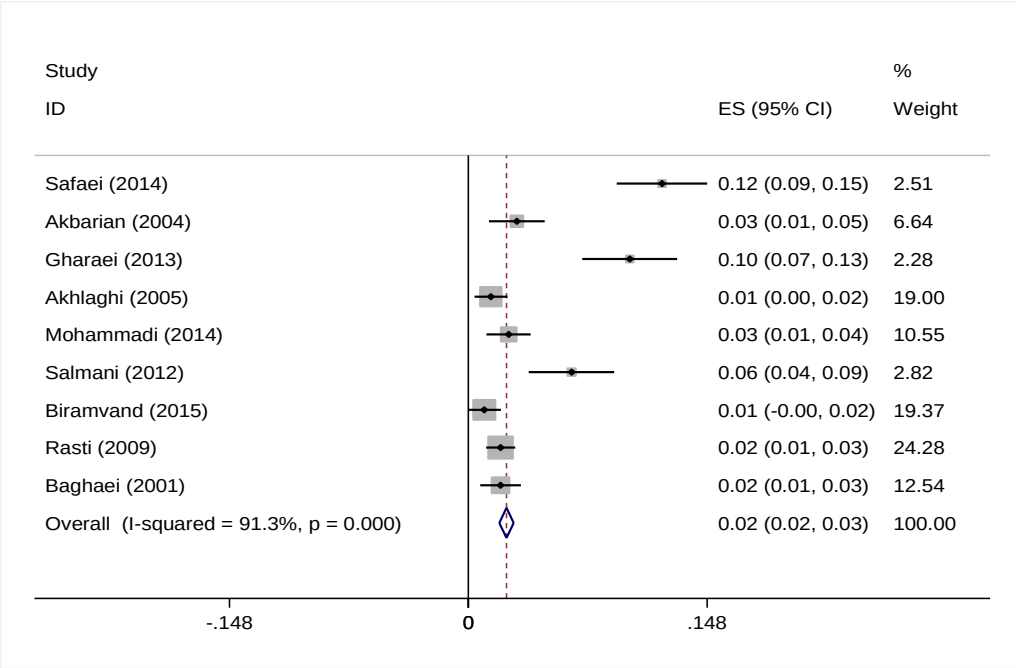

Figure 2. meta-analysis of the Prevalence of Trichomonas Vaginalis Infection Among Iranian Women Refered to Laboratories

Subgroup Analysis:

Meta-Regression Results:

Results of Meta-Regression Between Participants' publication year and Prevalence of *Trichomonas vaginalis* Infection Among Iranian Women Referred to Laboratories:

Regression of the study was analyzed based on the relationship between Prevalence of *Trichomonas vaginalis* Infection Among Iranian Women Referred to Laboratoriesand publication year. There was no significant linear trend in univariate meta-regression to explain the change in effect size of participants' age (Figure 3).

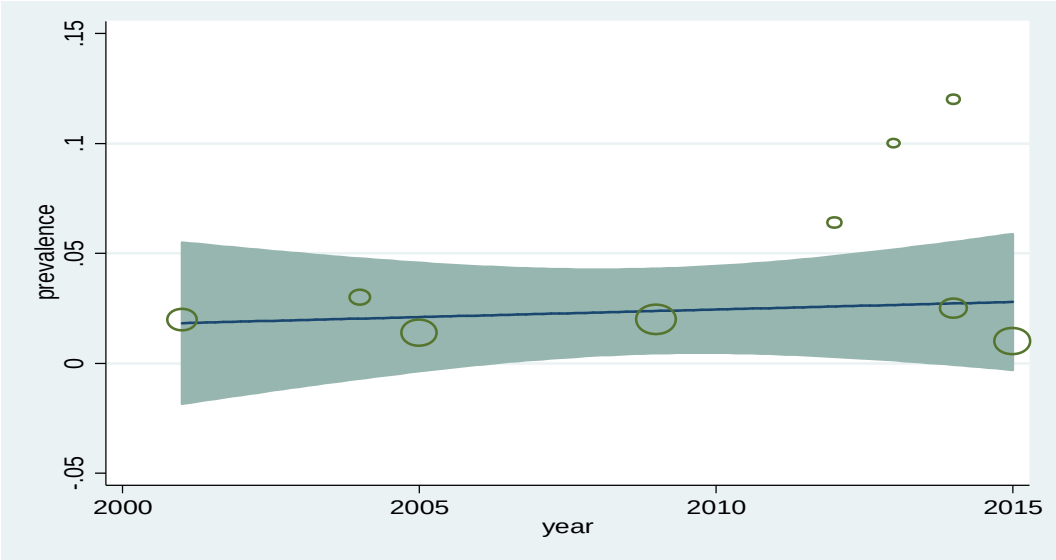

Figure 3. Meta-regression between publication year of study and the Prevalence of *Trichomonas vaginalis* Infection Among Iranian Women Referred to Laboratories

Discussion

According to the random effects model, the overall Prevalence of *Trichomonas vaginalis* Infection in 4353 Iranian Women Refered to Laboratories was 2% (2-3% at 95% confidence interval and I^2 = 91%) .The results of the present study on pregnant women showed that in general, changes caused by *Trichomonas vaginalis* and bacterial vaginosis infections as the most common types of vaginitis should not be disregarded (9). However, the extensive hormonal, immunological, physiological and pH changes, and other vaginal conditions occurring during pregnancy can provide favorable conditions for the implantation and growth of trichomonas and bacterial vaginosis infections (10). The unfavorable outcomes of these infections can cause infertility, premature births, and low birth weight. About 10 million health centers deal with vaginal complaints each year (11). Vaginal symptoms are related to one of bacterial vaginitis, candidiasis vulvovaginitis, and trichomoniasis. Besides, *Chlamydia trachomatis* and *Neisseria gonorrhea* are other causes of vaginitis. The most common complaint about vaginal trichomoniasis is vaginal discharge, which often occurs with skin irritation, itching or abrasion (12). When we look at the vagina with a speculum, we sometimes see a bloody mucous and some red spot lesions (13-16). Frequent urination and burning are the most common symptoms, and there is urethral involvement in a large number of patients. Besides, a low percentage of patients may develop cystitis, with a possible association between this inflection and uterine carcinoma (21-28).

The diagnosis of *Trichomonas vaginalis* in the gynecology department is based solely on clinical symptoms and some pathological reports. Due to the non-specificity of clinical symptoms, they are of little help in the diagnosis and this necessitates a test to diagnose this disease.

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