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# Prevalence of *Trichomonas vaginalis* and *Candida albicans* Infections among Women in Karaj City in Alborz Province, Iran (2012-2013)

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**We aimed to estimate the Prevalence of *Trichomonas vaginalis* and *Candida albicans* Infections among women living in Karaj city who were referred to medical centers. The descriptive study was carried out between September 2012 and January 2013 to determine the prevalence of *Trichomonas vaginalis* and *Candida albicans* vaginal infections. Five-hundred vaginal discharge specimens were stained using Loffler (L) and diluted carbol–fuchsin (DC-F) stains, and cultures were done on Sabourau dextrose agar and Dorset medium. The data were analyzed with using chi-squared tests and Student's t-tests. One-hundred participants (20%) were infected with the *Candida* species. *C. albicans* caused the infection in 40 of these participants (8%), with the remaining 60 participants (12%) infected with some other Candida species. *T. vaginalis* was detected in 20 out of 500 women (4%) and 10 out of 500 women (%2) Combined infection. It was concluded that Candidiasis and trichomoniasis are the two most common infections of the urogenital system in women.**

**Key words:** *Candida albicans*, *Trichomonas vaginalis*, Women, Iran.

Infectious vaginitis is a problem encountered in clinical medicine and is a frequent reason that women visit an obstetrician or gynecologist. *Candida albicans* is the most frequently isolated species, but other non-*albicans* species of *Candida* are also found. Vulvovaginal cadidiasis, affects millions of individuals worldwide. Candidiasis is one of the most opportunistic fungal infections. Principally, *Candida* species present as normal flora and they may change into pathogenic forms if the host's immune system weakens[1,2,3]. In developing countries, the prevalence of this infection has increased in recent years. Currently,*Candida* vaginitis is more common than trichomonal and bacterial vaginosis. Patients with *Candida* vaginitis may not show any particular symptoms, but symptoms such as itching, burning, caseous discharge, painful intercourse, and vulva edema and erythema may be reported. That have been linked to idiopathic vulvovaginal candidiasis include changes or imbalance in reproductive hormones, as a result of oral contraception, pregnancy, or hormone replacement therapy, as well as antibiotic usage, and diabetes mellitus[2,4]. Trichomoniasis affects approximately 180 million women worldwide and 2 to 3 million American

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women annually[5] . In most industrialized countries, the prevalence of trichomoniasis has decreased. *Trichomonas vaginalis* is identified in 30 to 40 percent of the male sexual partners of infected women. Trichomoniasis, which is associated with a high prevalence of other sexually transmitted diseases, facilitates transmission of the human immunodeficiency virus (HIV)[6]. Spermicidal agents, such as nonoxynol 9, reduce the transmission of trichomonas.Trichomoniasis in women ranges from an asymptomatic carrier state to severe, acute, inflammatory disease. If untreated in pregnancy, trichomoniasis identical to that seen in nonpregnant women is associated with premature rupture of the membranes, prematurity, and post-hysterectomy cellulitis[7] . In Iran, various studies have determined the prevalence of trichomoniasis to be between 2% to 8%, but based on cultural and social status, this rate can exceed 30% . Signs of contamination vary from a mild and chronic to an acute inflammatory reaction in the urogenital organs[8,9]. Disease may appear as an asymptomatic infection, intensive purulent vaginitis, ulcerative cervicitis and probably even cervical cancer. The vulvar and intertriginous groin areas are spared, and the vaginal rugations are typically only mildly inflamed[10]. This study has been designed to determine the prevalence rates of *C. albicans* and *T. vaginalis* infections in women who were referred to medical centers in Karaj city, Iran.

## MATERIALS AND METHODS

This descriptive study was conducted between September 2012 and January 2013. The Participants included 500 housewives referred to medical centers with different reasons, such as routine checkups, urogenital difficulties, family planning, etc. Women who were menstruating, pregnant, postmenopausal, or diabetic or who had an immune deficiency were excluded from the study. Before collection of the specimens, the participants were asked to complete a questionnaire and to undergo speculum examination during which samples were collected from each participant using 5 intravaginal cotton swabs. The swabs were used to determine the pH with a pH indicator, and for Giemsa and lacto phenol cotton blue staining and for yeast cultures in Sabouraud dextrose agar and some other mycological media; in addition, a Germ tube test was conducted to detect *C. albicans*, and a culture was done on Dorset medium to detect *T. vaginalis and* for wet mount microscopy and staining by Loffler and carbol–fuchsin stains respectively. The data were analyzed by using SPSS software with chi-squared tests and Student's t-tests[11-14]

## RESULTS

The results indicated that One-hundred participants (20%) were infected with the Candida species. *C. albicans* caused the infection in 40 of these participants (8%), with the remaining 60 participants (12%) infected with some other Candida species. *T. vaginalis* was detected in 20 out of 500 women (4%) whose vaginal discharge samples were examined. *T. vaginalis* was identified in 15 wet mount specimens and 20 cultured samples and 10 out of 500 women (%2) Combined infection. Clamidoconidia production and the Germ tube test identified *C. albicans*. No association between affliction with these two pathogens and variables such as age, education level, or parity was observed ($p > 0.05$). Most participants infected with these two organisms were between 25-35 years old, had not finished high school,. They had visited the clinics for routine checkups and family planning. No association was observed between infection with *T. vaginalis* and any methods of contraception ($p > \%5$). The association between infection with *C. albicans* and certain contraception methods was significant. Only 1 out of 7 participants infected with *T. vaginalis* was asymptomatic; the other 6 participants showed symptoms such as vaginal discharge, pruritus and burning sensations, and painful intercourse and Abdominal pain, colpitis, and vulvar pruritus were other common recorded symptoms and signs. Leucorrhea was the most commonly observed symptom in pregnant women who tested positive for both candidiasis and trichomoniasis; however, it was a symptom present in fewer than 50% of the women with positive samples. A significant association was observed between pH and infection with these organisms. The pH of 56% of participants infected with *C. albicans* was 3-4, and the pH of the vaginal discharges of 67% of those infected with *T. vaginalis* was 6-7. Also, a significant association was observed between the

white blood cell (WBC) counts in each microscopic field with Í40 magnification and infection to these pathogens. Among participants infected with *C. albicans* 33% had a WBC count of 4-10 in each wet mount microscopic field. In 51% of those infected with *T. vaginalis*, the WBC count was more than 15 in each wet mount microscopic field.

## DISCUSSION

The epidemiologic data on *candida* vulvovaginitis, a nonreportable disease, are incomplete. Prevalence estimates rely mainly on self-reported histories of diagnosis by a physician. Vulvovaginal candidiasis is routinely diagnosed without the benefit of microscopy or culture, and as many as half of the women given this diagnosis may have other conditions. The widespread use of over-the-counter antimycotic drugs may make future epidemiologic studies very difficult. Although the condition is rare before menarche, by the age of 25 half of all college women will have had at least one physician-diagnosed episode of vulvovaginal candidiasis. It is less common in post-menopausal women. In other populations, at least one episode of vulvovaginal candidiasis is reported in up to 75 percent of premenopausal women[15-18]. *Candida albicans* in other studies have determined it to be the principal cause of vaginitis in Europe and the second most common after bacterial vaginosis in the United States. The prevalence has also been reported to be high in specific regions, such as in the Mining Triangle of Brazil. In pregnant women, reports of several countries indicate the prevalence is around 20% (eg, 23% in Papua; 19.2% in Brazil; 20.8% in Poland. However, in a review, Ferrer cites prevalence values between 30% and 40%. The prevalence of trichomoniasis, some of the published literature indicates there has been a consistent decline globally. However, results vary widely from 0% to 34%. Keeping in mind that this infection can be a cause of premature childbirth and indirectly a cause of newborn deaths, our findings confirm the necessity to increase measures against this infection during gestation including correct diagnosis and appropriate treatment as well as educating our population about these infections. other factors such as improper use of antibiotics, tropical climate, and sexual habits may contribute to the high prevalences. Risk factors for trichomonas infection include lower socioeconomic status and having a greater number of sexual partners and malnutrition, which negatively affects immune system functioning, blindly treating trichomoniasis with metronidazole without seeking a laboratory diagnosis. smoking increases trichomonas colonization through a physiologic effect on the vaginal environment. [19-26] With respect to candidiasis prevalence by age group, it was higher in pregnant women between young 20- 30 years. The another report, showed that age is not a factor that seriously affects candidiasis prevalence.The differences we observed in prevalence of trichomoniasis by age range agree with findings of other studies. It speaks to the fact that age is a risk factor for these infections in pregnant women 20 -30 years, perhaps due to poorly developed resistance among the very young. Together our data suggest a possible increase in vaginal immunity with age.The observed differences between hospitals with respect to candidiasis and trichomoniasis prevalence reflect the same distribution pattern of women with clinical vaginitis, showing a correspondence between clinic and immunologic diagnosis.Leucorrhea was the most commonly observed symptom in pregnant women who tested positive for both candidiasis and trichomoniasis; however, it was a symptom present in fewer than 50% of the women with positive samples. The other commonly but less detected symptoms in positive cases were abdominal pain, colpitis, and vulvar pruritus, confirming that clinical criteria are not very useful for diagnosis. Candidiasis and trichomoniasis are the two most common infections of the urogenital system in humans. Although these infectious organisms are not fatal, they might lead to serious problems, including abortion, abrasive cervical ulcers, and inflammation of the urogenital system. [27,28]The pH of normal vaginal secretions in women of childbearing age is between 3.8 and 4.5. The presence of sperm, blood, amniotic fluid, or cervical mucus raises the vaginal pH. The amount and fluidity of the discharge can vary over the menstrual cycle. Cervical mucus becomes more fluid around ovulation, and women frequently mistake this change in consistency for an abnormal discharge. Stress increases the rate of vaginal desquamation and thus the amount of discharge,

which patients can also mistake for a pathologic discharge. Women generally do not have other symptoms if their discharge is physiologic. The world incidence of these diseases varies in different regions. It has been reported that in Iran, the incidence of *C. albicans* is 4-25.5% , and that of T. vaginalis is 2%-8% . In the study by falahati and et al, results indicated that 150 of the participants(30%) were infected with a *Candida* species.Clamidoconidia production and the Germ tube testidentified *C. albicans* in 67 of those 150 participants(13.4%). Also, the tests showed that 83 of the participants (16.6%) were infected with other *Candida* species.*T. vaginalis* was detected in 7 out of the 500 participants (1.4%) whose vaginal discharge samples were examined. *T. vaginalis* was identified in 5 wetmount specimens and 7 cultured samples. No association between affliction with these two pathogens and variables such as age, education level,or parity was observed ($p > 0.05$). Most participants infected with these two organisms were between 20-30 years old. [15]The incidence of *trichomonas* infection has been declining for the past 20 years, and currently this accounts for only 10% to 25% of vaginal infections, depending on the population studied. The most sensitive diagnostic modality is a *trichomonas* culture, which is relatively inexpensive. Despite the low cost, many laboratories do not culture *trichomonas*. This requires a special liquid medium (Dorset) that allows growth of the organism so that it can be subsequently visualized on wet mount. Rapid identification of these organisms by Loffler and diluted carbol–fuchsin staining yielded variable results. Several other methods are also being evaluated for the diagnosis of trichomonas infection, including a polymerase chain reaction–based test, a direct fluorescent antibody test, and an enzyme immunoassay. Sensitivities and specificities of these tests, however, are not clearly established. Fluorescent antibody tests are commercially available; however, the sensitivity of these tests is low, and use of a fluorescent microscope is needed. In regard to *candida*, the yeasts and mycelia were clearly stained and sharply identifiable. However, in regard to *trichomonas*, the results were not satisfactory, i.e., sometimes the flagella, karyosomes, and cytoplasmic organelles were not stained, and the parasites could not be identified. [29-31]Additionally, according to the results of this study, Laboratory confirmation should be done before treating against these organisms.

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