

Behavioral risk factors that predispose women to vaginal infections in Turkey

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ABSTRACT

Objective: Vaginal infections are common and when they are not treated, they can cause serious health problems such as getting infected with Human Immunodeficiency Virus (HIV). The aim of this study was to determine the behavioral risk factors for vaginal infections among women with and without vaginal infections.

Methodology: This study was done in a large women's hospital. The sample consisted of 200 women between the ages of 15 and 49. A pelvic examination and clinical assessment were conducted on each woman. Risk factors were analyzed through the use of cross-tabs, t-test, odds ratio and percent analysis.

Results: Behaviors such as washing from back to front after defecation (OR=3.79; 95% CI, 2.05-7.01), cleaning with bare hand in the toilet (OR=4.75; 95% CI, 1.71-13.23), bathing by sitting on a stool (OR=2.64; 95% CI, 1.44-4.84, p<0.001), infrequent change of underwear (OR=6.15; 95% CI, 2.43-15.55, p<0.001) and douching after intercourse (OR=1.84; 95% CI, 1.09-3.07, p <0.05) were risk factors associated with vaginal infections.

Conclusion: The results can provide physicians with the evidence based data to be used when counseling, educating and treating women for vaginal infections.

KEY WORDS: Bacterial Vaginosis, Trichomonas Vaginal, Candidiasis, Hygiene, Behaviour, Risk.

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INTRODUCTION

Over the last decade, there has been a growing concern regarding the prevalence and extent of vaginal infections. The incidence of vaginal infections in the United States increased by 42% between

1971-1981, but the corresponding increase between 1980-1990 was 50%.¹ Prevalence's in sub-Saharan Africa have been reported to be as high as 46% in women of childbearing age.² The local studies conducted in Turkey had reported that the incidence for the vaginal infections between 35%-50% among women aged between 15-49 years old.^{3,4}

In recent studies, the most frequently seen vaginal infections were caused by bacteria, Trichomonas, or Candida.^{5,6} Bacterial Vaginosis is currently the most prevalent form of vaginal infections and believed to account for 40-50% of vaginal infections.⁷ It is associated with gynecologic and obstetric complications such as cervicitis, endometritis, postoperative infections, mildly abnormal Pap smear results (inflammation or atypical squamous cells of undetermined significance), cervical intraepithelial neoplasia (CIN), preterm delivery, amniotic fluid infection, and premature rupture of membranes.^{8,9} Infection with Trichomonas vaginalis has major health conse-

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quences for women, including predisposition to HIV^{10,11}, association with cervical cancer, pelvic inflammatory disease, and complications of pregnancy.¹²

The vagina's normally acidic environment tends to prevent the growth of pathogenic microbes, but this is only one element in a complex balance of genetic, biological, social, emotional and behavioral factors. These factors include menstruation, immunologic status, concomitant infections, genital pathology, use of antibiotics, socioeconomic situation, sexual activity, number of sexual partners, use of contraceptives and hygienic habits.^{5,12} A number of studies have shown an association between vaginal infections and behaviors.^{3,5,13} Behavioral factors associated specifically with vaginal infections include vaginal douching, improper hygiene and smoking.^{3,5,13} Behavioral factors such as frequency of coitus, coitus without a condom, number of sexual partners, and spermicide use have also been found to increase susceptibility to vaginal infections.^{12,14} To our knowledge, hygienic behaviors menstruation, infrequent change of underwear, have not been investigated in the previous studies.

Most of the women find vaginal infections embarrassing to deal with. For this reason women often delay or fail to seek treatment for vaginal infections¹⁵ and can suffer from the same recurring symptoms for years, with a significant reduction in quality of life and severe indirect effects at a societal level. The purpose of the present study was to determine the range of behavioral risk factors that predispose women to vaginal infections.

METHODOLOGY

In this study, a total of 200 women between 15 and 49 years old participated. The study population was composed of women who were diagnosed with or without vaginal infections during their visits to the Women's Hospital. Participants were from the lower socio-economic populations and represented diverse cultural backgrounds. The sample size was calculated to be 100 according to the method of Lemeshow.¹⁶ From this population, 100 women who were clinically diagnosed with vaginal infection for the study and 100 women seeking Intra Uterine Device (IUD) placement at the family planning center of the hospital during this same period for the control group were selected. To be included in the control group, women had to be currently free of vaginal infection including *Candida Albicans* with no history of vaginal infection for the previous two years. The groups were matched according to their

diagnosis for vaginal infections. A pelvic examination was conducted on each woman and specimens were collected for direct microscopy. The clinical diagnosis was based on the combinations of symptoms, direct observation of wet mount, homogeneous discharge, vaginal pH > 4.5, and detection of the amine odor after exposure of vaginal secretions to 10% Potassium Hydroxide (KOH). Clinical and microscopic assessments were done by the physician who was in charge and made the diagnosis of vaginal infections. A questionnaire developed from a review of the relevant literature was used for data collection.^{3,7,15-18} The questionnaire was pilot tested, modified, and retested with 20 women for clarity and comprehension. 52 item questions were included in the questionnaire. First, participants were asked questions regarding age, number of marriages, educational level, occupation, employment status, and partner's educational level. Second, participants responded to questions about behavioral risk factors that have been found to impact vaginal infections.

The researcher administered the questionnaire with each participant after the examination, independent of the clinical assessment. Women who were pregnant, had infertility problem and in menopause were not included in the study.

Statistical analyses were performed through the use of SPSS for Windows. Relations between the dependent variable and behavioral risk factors were analyzed through the t-test, odds ratio and its 95% confidence intervals and percent analysis.

Ethical Considerations: Ethical permission was obtained from Hacettepe University Ethics Committee. Institutional Review Board (Social Insurance Organization) approved the study before starting to gather data.

RESULTS

In this study, educational level and employment status of women was not found to be correlated with vaginal infections ($p > 0.05$), but the risk of vaginal infections in the group of women who has primary school and under educational level was 1.76 times higher than that among women who had middle school or higher (0.98-3.15, $p > 0.05$) (see Table-I).

Behaviors Associated with Vaginal Infections: Cleaning behavior after defecation was found to be statistically significant ($p < 0.001$). Women who washed perineum with their bare hand had a 4.75-fold higher risk for vaginal infections compared to women washing with toilet paper (1.71-13.23). Also

the risk of infection was 3.79 times higher among women who wiped perineum from back to front and 4.80 times high risk among women who mix washed perineum after defecation (2.05-7.01). This is a very important finding of this study.

Women who did not use any method for drying perineum had a 2.83-fold higher risk of vaginal infection than women who dried perineum with toilet paper. Hygiene during menstruation was also found to be correlated with vaginal infections. Among women who did not take shower during menstrual period they had 2.59 times higher of vaginal infections compared to women who had shower during menstruation (1.86-7.56) (see Table-II).

There was also a relation between type of bath and risk of vaginal infection. Women who bathed by sitting on a stool had a 2.64-fold higher risk for vaginal infection than women who took showers (1.44-4.84, $p < 0.001$). Frequent change of underwear was associated with a decreased risk of vaginal infection. Among women who changed their underwear at intervals of 3 or more days, vaginal infections were seen 6.15 times more frequent compared to women who change underwear everyday (2.43-15.55, $p < 0.001$). There was also a relation between daily pad wear and risk of vaginal infection. Women who wear daily pad had a 2.34-fold higher risk for vaginal infection than women who did not use daily pads (1.30-4.21, $p < 0.01$). Vaginal douching after intercourse was associated with an increased risk of

vaginal infection. Among women who douched after intercourse, vaginal infection was 1.84 times more frequent than among women who did not douche after intercourse (1.09-3.07, $p < 0.05$) (Table-II).

Women who has a history of previous vaginal infection were 3.81-fold higher risk for infection compared to women who never had vaginal infections (2.11-6.86, $p < 0.001$). Among women who had been treated for a previous vaginal infection but whose partners had not been treated, current vaginal infections were 2.59 times more frequent (1.05-6.40, $p < 0.05$) (Table-II).

Behaviors not associated with Vaginal Infections: Smoking behavior was not found to be related to vaginal infections ($p > 0.05$), but the risk of vaginal infections in the smoking group was higher and the risk of infection had increased as the number of cigarettes smoked increase.

No statistical relationship was found between frequency of changing hygienic pad during menstruation and risk of vaginal infection between groups ($t = -1.244$; SD 198; $p > 0.05$). But women who change their hygienic pads more than six times daily have less risk of catching vaginal infections (0.27-1.48). As for bathing behavior, no statistical relationship between number of weekly bathing and development of vaginal infections was found ($t = -0.82$; SD 198; $p > 0.05$). Although bathing type was not found to be correlated with vaginal infections, the risk of vaginal infections was 2.33 times higher among

Table-I: Socio-Demographic Characteristics of Participants

Characteristics	Study (n=100)	Control (n=100)	Total	OR (95%CI)	p
Lifetime Number of Sexual Partners					
One	98 (98.0)	95 (95.0)	193 (96.5)		
Two	1 (1.0)	5 (5.0)	6 (3.0)		
None	1 (1.0)		1 (0.5)		
Education level					
Primary school and under	70 (70.0)	57 (57.0)	127 (63.5)	1.76 (0.98-3.15)	$p > 0.05$
Middle school and above	30 (30.0)	43 (43.0)	73 (36.5)	1	
Employment Status					
Employed	11 (11.0)	12 (12.0)	23 (11.5)	1	
Not Employed	89 (89.0)	88 (88.0)	177 (88.5)	1.10 (0.46-2.63)	$p > 0.05$
Partner's Education Level					
Primary school and under	44 (44.0)	38 (38.0)	82 (41.0)	1.28 (0.73-2.26)	$p > 0.05$
Middle school and above	56 (56.0)	62 (62.0)	118 (59.0)	1	
Partner's Employment					
Employee	94 (94.0)	85 (85.0)	179 (89.5)	2.76 (1.03-7.45)	$p < 0.05$
Self employed/ Clerk	6 (6.0)	15 (15.0)	21 (10.5)	1	

women who bathed by sitting on the ground (0.78-6.97) .

We found no significant relation with wearing tight clothes ($p > 0.05$), frequency of intercourse ($t=0.90$, $SD: 198$, $p > 0.05$), daily hand washing ($p > 0.05$) and risk of vaginal infection. In this study we found that nylon underwear users were 2.22 times at more risk than women who use cotton underwear (0.47-10.62, $p > 0.05$).

DISCUSSION

The complaint of vaginal infections are very common, particularly in the rural part of Turkey where about a half of women between ages 15–49 diagnosed with vaginal infections.^{3,4} According to demographic characteristics (age, marital status, lifetime number of sexual partners, educational level, employment status etc) we did not find any statistical significant difference between women with vaginal infections and without vaginal infections.^{17,18}

Behaviors related to toilet hygiene such as wiping behavior (wiping from back to front) and washing perineal area with bare hand after defecation were found to be particularly important risk factors for vaginal infections. The association of vaginal infections with wiping behavior has been previously reported by several studies.^{3,4,13} Another important factor was toilet paper use. We found that if toilet paper was used for cleaning and drying of perineum, the risk of vaginal infection was lessened.

In this study, daily pad usage was found to be a risk factor for vaginal infections. Using daily pad

prevent perineal ventilation and increase the risk of vaginal infections. This behavioral practice is also common in the rural areas of Turkey.³ This finding shows a strong need of education for women who live in the rural part of Turkey.

We found that vaginal douching after intercourse also increases the risk (almost 2 times higher risk) of vaginal infections. As reported by other authors, vaginal douching can reduce vaginal pH and increase the risk of vaginal infection.^{14,17} A study by McClelland (2007) indicated that vaginal douching for hygienic reasons is an important risk factor and doubles the risk of acquiring vaginitis.¹¹ Vaginal douching is a very common practice in Turkey.⁴ International studies have generally found that women in developed countries do vaginal douching for hygienic reasons,^{4,11} but in Turkey and in developing countries vaginal douching is also used as a family planning method^{3,4,11} Despite douching association with negative health consequences, women continue to engage in this feminine hygiene practice in Turkey.

Although studies have shown that family planning methods such as IUD^{6,18} and oral contraceptive use¹⁴, behaviors such as wearing tight clothes^{4,17} and frequency of intercourse¹⁷, increase the risk of vaginal infections, we found no statistical relationship. A reason for these consequences could be the self reported answers which can be affected by recall bias, which may explain the lack of consistency between studies. Also some of the practices such as spermicides and female condom use for family planning are not a common practice in Turkey.

Table-II: Risk Factors Associated With Vaginal Infections

Behaviors	Study(n=100)	Control(n=100)	Total	OR (95%CI)	p
Toilet Behavior					
Wiping back to front or mixed	67 (67.0)	34 (34.0)	101 (50.5)	3.94 (2.19-7.10)	$p < 0.001$
Wiping by hand	95 (95.0)	80 (80.0)	175 (87.5)	4.75 (1.71-13.23)	$p < 0.001$
No drying after washing	27 (23.9)	13 (11.7)	40 (17.9)	2.83 (1.34-1.19)	$p < 0.01$
Bathing Behavior					
No shower during menstruation	33 (33.0)	16 (16.0)	49 (24.5)	2.59 (1.86-7.56)	$p < 0.01$
Bathing by sitting on the ground	9 (9.0)	7 (7.0)	16 (8.0)	2.33 (0.78-6.97)	$p > 0.05$
Bathing by sitting on a stool	64 (64.0)	44 (44.0)	108 (54.0)	2.64 (1.44-4.84)	$p < 0.01$
Behaviors related to Clothing					
Change underwear every 3 or more days	27 (27.0)	7 (7.0)	34 (17.0)	6.15 (2.43-5.55)	$p < 0.001$
Wear daily pad	66 (66.0)	47 (47.0)	113 (56.5)	2.34 (1.30 -4.21)	$p < 0.05$
Sexual Behavior					
Vaginal douching after intercourse	57 (31.4)	32 (16.0)	89 (23.3)	1.84 (1.09-3.07)	$p < 0.05$

Another important finding of this study was that women who changed underwear every three days or more had 6.15 times more risk for vaginal infections compared to women who changed their underwear every day. A previous study has suggested that frequent changes of underwear can decrease the risk of vaginal infections.⁴

CONCLUSION

Our findings are very important in planning preventive strategies for vaginal infections. An important part of the effort to prevent women from vaginal infections is the integration of behaviour change and medical treatment. It is suggested that women diagnosed with vaginal infections should not only receive medical treatment but also educated about the impact of behavioral risk factors on their diseases.

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