

Contraception as a Risk Factor of *Trichomonas vaginalis* Infection Among Women Attending Outpatient of Al-Batool Teaching Hospital for Maternity and Children-Baqubah-Iraq

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ABSTRACT

Background:The effects of contraception on *Trichomonas vaginalis* have important implications for women who suffer from infections associated with disruptions in the vaginal ecology, such as bacterial vaginitis and urinary tract infections.

Objective: To find the association of the common types of contraceptions with the *Trichomonas vaginalis* infection in women admitted to the Al-Batool Teaching Hospital for Maternity and Children in Baqubah city.

Type of study: Cross-sectional study

Methods: This study consist of 75 women with contraception use and 71 apparently healthy non contraception user women admitted to outpatient in Al-Batool Teaching Hospital for Maternity and Children in Baqubah City, Diyala. Iraq during the period from 1st January 2016 till 31th December 2016. After full history and clinical examination, high vaginal swab took from posterior fornix of vagina and general urine examination, all samples were examined by wet mount preparation under the microscope for the presence of *Trichomonas vaginalis* and gram-stained smears for the presence of *Candida albicans*, then all results were recorded.

Results: Minimum age was 18 year and maximum was 47 year, infection rate of *Trichomonas vaginalis* was 41(45.66%) among contraception user and 6(8.45%) among contraception non- user while *Candida albicans* was 18(24%) and 1(1.40%) respectively, the highest

frequency of infection 23 cases was diagnosed in the age group (29-39 year) among contraception user while 4 cases in age group (18-28) contraception non-user. On the other hand there was no significant correlation between age, parity, duration of marriage and infection and using of contraception. Marginal significant correlation between the type of contraception and infection with *Trichomonas vaginalis*. While no significant correlation between types of contraception, infection and duration of contraception use.

Conclusion: Infection with *Trichomonas vaginalis* significantly correlated to use of intrauterine contraceptive device and combined oral contraceptive pills, so great attention should be paid to those women for diagnosis and treatment.

Key word: Contraception, *Trichomonas vaginalis* High vaginal swab

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Contraception includes all measures, temporary or permanent, designed to prevent pregnancy due to the coital act [1]. Birth control methods include barrier methods, hormonal birth control, intrauterine contraceptive devices (IUCD), sterilization, and behavioral methods. They are used before or during sex while emergency contraceptives are effective for up to a few days after sex [2]. In many geographic areas with a high prevalence of sexually transmitted infections (STIs), hormonal contraceptive methods are commonly used. Based on estimates of married women of reproductive age during the year 2000, more than 75 million women worldwide use oral contraceptives and more than 27 million women use hormonal injectables or implants [3].

Trichomonas vaginalis is an anaerobic parasitic protozoan flagellated organism that adheres to epithelial cells of the urogenital tract. For the most part, infection is limited to the genitourinary tract. With infection, the

condition is referred to as Trichomoniasis [4]. In women the organism is found in the vagina, urethra and paraurethral glands. Urethral infection is present in 90% of infected women, although the urethra is the sole site of infection in less than 5% of cases. In men infection is usually of the urethra, although trichomonads have been isolated from the subpreputial sac and lesions of the penis [5]. It transmitted by sexual intercourse, contaminated towels, infection with *T. vaginalis* can be a marker for high-risk sexual behavior, and frequently occurs concomitantly with other sexual transmitted infection, including gonorrhoea and *Chlamydia* [6].

The infection produce wide range of clinical symptoms varying from asymptomatic to severe inflammatory manifestations, around 25%-50% of infected females are symptomatic that characterized by vulvovaginitis, cervicitis, and urethritis [7]. Signs of infection include vaginal discharge (42%), offensive odor (50%), and

edema or erythema (22 to 37%). The discharge is classically described as frothy, but it is actually frothy in only about 10% of the patients [4,8]. In severe cases, the inflammatory reaction may be sufficient to produce a pathognomonic sign of *Trichomoniasis*, the "Strawberry Cervix", on which localized patches of increased vascularity are seen. Contact bleeding of the cervix is also common. These pathophysiologic effects resulting from *Trichomoniasis* would undoubtedly suggest further predisposition to other serious sexually transmitted infections, including HIV infection [9][10]. Some studies have not shown a significant relationship between the use of different methods of contraception and common vaginal infections [11][12]. In several researches, it was suspected that the presence of an IUD in the uterus may increase the infection risk because of host susceptibility. The projection of part of the device through the cervical canal is thought to allow easy access of vaginal bacteria to the upper genital tract [13][14].

In Iraq several studies were done in different places to detect rate of infection in general population such as in Basrah, Erbil and Baghdad city and they found that 13%, 3.18% and 85.5% respectively [15][16][17]. In our knowledge there is no Iraqi study done in Baqubah city and focused in correlation between different method of contraception and *Trichomoniasis*. So the present study aims to find if there is relation between type of contraception used and *Trichomonas vaginalis* infection.

Methods: Cross-sectional study conducted in out-patient (Gynecological and Family planning clinic) of Al-Batool Teaching Hospital for Maternity and Children in Baqubah City, Diyala. Iraq from 1st of January 2016 till 31th of December 2016 where total of 1300 female attending the out-patient clinic, 146 female fit with inclusion criteria (age 18-48 years, without medical diseases) enrolled in this study, (75 contraception users and 71 non-contraception users) age- matched. Exclusion criteria (any medical diseases, menopause, vaginal bleeding, pregnancy, history of primary or secondary infertility or unmarried these related to non-contraception user group).

Demographic, types of contraception, duration of use of contraception, duration of marriage were obtained after full history and examination, for each participant a sterile speculum examination was done and high vaginal swab took from posterior fornix of vagina by commercially prepared sterile swab stick and urine was collected, all samples were examined by wet mount preparation under the microscope for the presence of *Trichomonas vaginalis* and gram-stained smears for the presence of *Candida albicans*, then all results were recorded, negative wet mounts were examined for at least 10 minutes.

Statistical analysis: Data were analyzed using Statistical Package for the Social Sciences for Windows version 17 (SPSS, Armonk, NY: IBM Corp.) and Microsoft Excel for Windows 2010. Two-Way Analysis of Variance (ANOVA), Pearson's chi-square and Pearson's correlation coefficient were used for correlation between the variables of the two tests. P value of ≤ 0.05 and ≤ 0.01 (two tailed) was set to be statistically significant.

Results: As shown in table (1), Minimum age was 18 year and maximum was 47 year, the highest frequency of infection 23 cases was diagnosed in the age group (29-39 year) among contraception user while 4 cases in age group (18-28) contraception non-user.

On the other hand there was significant difference in age groups within contraception users and non-users while no significant difference occur in age groups between contraception users and non-users. Regarding absence of infection among studied groups, infection rate of *Trichomonas vaginalis* was 41(45.66%) among contraception user and 6(8.45%) among contraception non-user while *Candida albicans* was 18(24%) and 1(1.40%) respectively. Marginal significant difference in age groups between contraception users and non-users regarding single infection with *Trichomonas vaginalis*. On the other hand significant difference in age groups between contraception users and non-users regarding co-infection with *Trichomonas vaginalis* and *Candida albicans*. So no significant correlation between age, infection and using of contraception. There was no significant difference noticed between contraception users and non-users regarding the parity and absence of infection also no significant correlation between parity, infection and using of contraception as shown in table (2).

According to table (3), there was no significant difference noticed between contraception users, the duration of marriage and absence of infection also the difference was not detected between contraception non-users. No significant correlation between the duration of marriage, infection and using of contraception.

Of the 75 women with contraception use in the present study, 36 used C.O.C.P, 4 used DMPA and 35 used non-hormonal contraception. statistical analysis not showed significant difference between types of contraception. Marginal significant correlation between the type of contraception and infection with *Trichomonas vaginalis* as shown in table (4).

Regarding the duration of contraceptive use the present study which revealed that significant difference between C.O.C.P contraceptive users and absence of infection while no significant correlation noticed between the COCP type of contraception, infection with *Trichomonas vaginalis* and co-infection with *Trichomonas vaginalis* and *Candida albicans*. No significant difference and

correlation between IUCD contraceptive users regarding the duration of usage and absence of infection as shown in table (5).

Table (1): Comparison between studied groups regarding infection among different age groups.

Studied groups	Age (year)	Contraception user No.(%)	No infection No.(%)	Single infection No.(%)	Co infection No.(%)
Contraception user	18-28	27(36%)	13(48.14%)	7(25.92%)	7(25.92%)
	29-39	39(52%)	16(41.02%)	14(36.84%)	9(23.68%)
	40-50	9(12%)	5(55.55%)	2(25%)	2(25%)
	Total	75(100%)	34(45.33%)	23(31.50%)	18(24.65%)
Correlation	R		-0.025	0.007	-0.037
	P value		0.834	0.952	0.752
Contraception non- users	Age (year)	Contraceptive non user .No.(%)	No infection No.(%)	Single infection No.(%)	Co infection No. (%)
	18-28	32(45.07%)	28(87.5%)	3(9.37%)	1(3.12%)
	29-39	22(30.98%)	20(90.90%)	2(9.09%)	0(0%)
	40-50	17(23.94%)	17(100%)	0(0%)	0(0%)
Statistic	Total	71(99.99%)	65(91.54%)	5(7.04%)	1(1.40%)
Statistic	F	1.57	1.79	18.41	60
	P value	0.029532	0.378043	0.052183	0.016474
Correlation	R		-0.089	-0.129	-0.131
	P value		0.460	0.285	0.277

t-Test for Independent or Correlated Samples

Table (2): Distribution of studied group according to infection among different parity groups.

Studied groups	Parity	Contraception Users .No.(%)	No infection No.(%)	Single infection No.(%)	Co infection No.(%)
contraception users	Nulliparous	0(0%)	0(0%)	0(0%)	0(0%)
	Primiparous	4(5.33%)	1(25%)	2(50%)	1(25%)
	Multiparous	57(76%)	24(42.10%)	19(33.33%)	14(24.56%)
	Grand multiparous	14(18.66%)	9(64.28%)	2(16.66%)	3(25%)
	Total	75(99.99%)	34(45.33%)	23(31.50%)	18(24.65%)
	F		0.587	0.596	0.081
	P value		0.739	0.733	0.998
	R		-0.136	-0.115	-0.032
	P value		0.243	0.324	0.786
contraception non- users	Parity	Contraceptive Non users No.(%)	No infection No.(%)	Single infection No.(%)	Co infection No.(%)
	Nulliparous	21(29.57%)	18(85.71%)	2(9.52%)	1(4.76%)
	Primiparous	14(19.71%)	14(100%)	0(0%)	0(0%)
	Multiparous	27(38.02%)	24(88.88%)	3(11.11%)	0(0%)
	Grand multiparous	9(12.67%)	9(100%)	0(0%)	0(0%)
	Total	71(99.97%)	65(91.54%)	5(7.04%)	1(1.40%)
	F		0.318	0.441	0.273
	P value		0.956	0.892	0.972
	R		-0.042	-0.115	-0.124
P value		0.727	0.341	0.303	

*ANOVA test

Table (3): Comparison between studied groups regarding infection and duration of Marriage

Studied groups	Duration of Marriage (years)	contraception Users .No.(%)	No infection No.(%)	Single infection No.(%)	Co infection No.(%)
contraception users	>5	5(6.66%)	2(40%)	2(40%)	1(20%)
	5-10	39(52%)	17(43.58%)	10(25.64%)	12(30.76%)
	11-21	28(37.33%)	12(46.15%)	11(42.30%)	5(17.85%)
	22-32	3(4%)	2(66.66%)	1(33.33%)	0(0%)
	Total	75(99.99%)	33(45.20%)	33(45.20%)	18(24%)
	F		1.254	0.672	0.898
	P value		0.244	0.862	0.608
	R		-0.113	0.006	-0.141
P value		0.335	0.960	0.229	
contraception non user	Duration of Marriage (years)	Contraceptive non users. No.(%)	No infection No.(%)	Single infection No.(%)	Co infection No.(%)
	>5	34(47.88%)	31(91.17%)	2(5.88%)	1(2.94%)
	5-10	14(19.71%)	13(92.85%)	1(7.14%)	0(0%)
	11-21	18(25.35%)	16(88.88%)	2(11.11%)	0(0%)
	22-32	5(7.04%)	5(100%)	0(0%)	0(0%)
	Total	71(99.98%)	65(91.54%)	5(7.04%)	1(1.40%)
	F		0.833	1.456	ND
	P value		0.701	0.134	ND
R		-0.027	-0.048	-0.120	
P value		0.823	0.693	0.320	

*ND: not detected

Table (4): comparison between different types of Contraceptives regarding infection type

Type of contraception		contraception user No.(%)	No infection No.(%)	Single infection No.(%)	Co infection No.(%)
Hormonal contraceptives	C.O.C.P	36(48%)	18(50%)	9(25%)	9(25%)
	DMPA	4(5.33%)	2(50%)	0(0%)	2(50%)
Non hormonal	IUCD	35(46.66%)	13(37.14%)	15(42.85%)	7(20%)
Total		75(99.99%)	33(44%)	24(32%)	18(24%)
Statistic	F		0.611	1.990	0.911
	P value		0.545	0.144	0.407
	R		-.120	-.223	0.109
	P value		0.305	0.054	0.351

COCP= combined oral contraceptive pills, **DMPA**= depot medroxy progesterone acetate, **IUCD**= intrauterine contraceptive device

Table (5): Types of infection and related with type of contraception and duration of usage

type of contraception		total no.	duration of contraception usage no.(%)	single infection no.(%)	co infection no.(%)	χ^2	p value	r	p value
hormonal contraception	cocp	18	≥ 6months	1(5.88%)	1(5.88%)	23.746	0.022	0.264	0.120
			<6- ≥ 1year	2(11.76%)	2(11.76%)				
			<1year	6(35.29%)	6(35.29%)				
			total	9(52.94%)	9(52.94%)				
	dmpa	2	≥ 6months	0(0%)	0(0%)	nd	nd	nd	nd
			<6- ≥ 1year	0(0%)	2(100%)				
<1year			0(0%)	0(0%)					
		total	0(0%)	2(100%)					
non hormonal	iucd	22	≥ 6months	2(9.52%)	1(4.76%)	14.992	0.379	0.236	0.172
			<6- ≥ 1year	2(9.52%)	3(14.28%)				
			<1year	3(14.28%)	11(50%)				
			total	7(33.33%)	15(66.66%)				

ND=Not detected

Discussion: In the present study we investigated the correlation between types of contraception and *Trichomonas*, infection rate of *Trichomonas vaginalis* was comparably higher 41(45.66%) among contraception user and less common (8.45%) among contraception non- user while *Candida albicans* was 18(24%) and 1(1.40%) respectively. This was higher than that of data previously reported by Sehhatie-Shafaie in Hamadan city, Iran who found during assessment microbial changes in IUD users and other contraceptive methods that *Candida albicans* (7.0%) and low indices of trichomoniasis (5.0%) [18]. Also these rates are higher to those observed by other authors [19] [20]. But the infection rate of present study was lower than reported in Bagdad city and Basrah [17][21]. And comparable with result done by Merdaw *et al.*, (2016) in Baghdad[22]. The difference could be related with the source of patients used in this study; we included only out-patients attending the obstetrics and gynecology, or related with type of techniques were used in detection of microorganisms

So there was significant difference found with single infection with *Trichomonas vaginalis* and co-infection between *Trichomonas vaginalis* and *Candida albicans* among age group (29-39 y) within studied groups but there was no significant correlation between age, infection and use or non-use of contraception, this result agreement with study done in Iran [23]. Also may be related with fact all women were exposed to chance of infection due to all of them were living under the same conditions. But disagreement with several studies done in different areas that observed infection were significantly reported in (30-40y) [9][24][25][26]. This may be related with high sexual activity and frequent visit to health care also related to difference in religious believes regarding sexual activity and hygiene.

Type of infection result and parity were revealed that no-correlation between infection with *Trichomonas* or co-infection with *Candida* among studied groups even there were higher incidence of infection observed with multiparity compared with low parity and very high parity, these findings in consistence with study done in Basrah [17]. And with study done in India by Simernjeet *et al*[7]. This may be related to good hygiene during delivery regarding sterilization of instrument, teaching the women how to care of themselves after delivery or may be related to small sample size obtained and specific patient included in our study who attended one hospital not all the community, but disagree with another studies done in other parts of the world [27][28][29]. That found strong relationship between parity and risk of *Trichomonas* infection and other sexually transmitted infection and explained that due to availability of good environment for parasite to grow as contamination of medical instruments or gloves and equipment. Regarding duration of marriage there was no significant correlation between it and infection in users and non-users of contraception, these findings in consistence

with study done by Shahinfar *et al.* [23]. This may be related with limited sample size.

The present study demonstrated that contraception non users had the lowest incidence of infection compared with contraception user regardless to different methods used and this agreement with study done in Malaysia during the period 2000-2005 and the authors did not revealed any positive result with *Trichomonas* [30]. Also this may be related to similarity in diagnostic method (wet mount preparation) and number of factors like improvement in protection against sexually transmitted infection in these population but not comparable with findings of number researchers [7][17]. They found higher incidence of infection among non-contraception users.

Marginal significant correlation was found in this study between different types of contraception and single and co-infection, as higher incidence of infection was found in IUCD user followed by COCP and lastly DMPA which had the lowest rate of infection and co infection, this explained that the projection of tail of IUCD in the vagina allow ascending of vaginal infection to upper genital tract [13][14]. In addition that it also lead to disrupt with normal vaginal flora and this lead to increase the rate of infection by creating foreign body reaction[18][31]. The decrease in incidence of infection among oral contraceptive pills this may be related to progestin component of pill that make the cervical mucus thick so can't be penetrated by sperm and bacteria or parasite or due to decrease in menstrual flow duration that theoretically reduce interval that required for bacterial colonization[15]. On the other hand very low rate of infection absent of infection with (DMPA) some of hypothesis demonstrate that it had specific androgen and estrogen receptors and the former receptor is closely related to the progesterone receptors so high progestins dosage in DMPA can block the androgen receptor and prevent infection with *Trichomonas* [32]. These findings agree with multiple studies in different countries [25][33].

In this study infection with *Candida albicans* was detected as a co infection with *Trichomonas vaginalis* in different types of contraception with slight increase in users of COCP this may be due to effect of these hormones on availability of glycogen and adherence of *Candida* to epithelial cells with yeast virulence [34]. And this support the findings that *Trichomonas* is enhanced the presence of other sexually transmitted infection[9]. These finding also agreement with Egbe *et al.*[26]. Statistical analysis did not revealed any significant

correlation between different types of contraception and single infection or co-infection, these findings was not agreement with the study done in Nigeria by Egbe *et al* (2011) they found longer duration of use of COCP lead

to lower risk of infection and they explained the cause that early use of contraceptive pills reduce immunity of body but once duration of use increase this increase immunity of body make it more resistant to invasion by microorganism [26].

In conclusion, infection with *Trichomonas vaginalis* neither correlated to age, parity, duration of marriage in user and non- user of contraception nor to duration of contraception use but it significantly correlated to use of IUCD and COCP, so great attention should be paid to those women for early diagnosis and treatment of this infection. Further study need to be performed to include all community to know the real prevalence of this infection in our province.

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