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ORIGINAL ARTICLE

Incidence of Causative Organisms of Vaginitis in Females with Intrauterine Device

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Abstract

Background: ***Vaginitis is a common gynecological condition that affects many women of reproductive age, including bacterial vaginitis, yeast infection, and trichomonas vaginalis. While intrauterine devices (IUDs) can be an effective method of contraception, they may also influence the vaginal environment by increasing the pH, making it more alkaline, making it more hospitable to bacteria, increasing the amount of cervical mucus, decreasing the diversity of bacteria in the vagina leading to overgrowth of certain types and potentially increase the risk of vaginitis. Additionally, IUDs may facilitate the movement of microorganisms from the lower genital tract to the upper genital tract, potentially leading to infections and complications.***

Patients and Methods: ***Vaginal swabs were collected from women exhibiting signs and symptoms of vaginitis who had an intrauterine device (IUD) inserted before the symptoms appeared after ensuring the IUD was in place using transabdominal or transvaginal sonography. These swabs were subsequently analyzed in a laboratory setting to isolate and identify the causative organisms responsible for the infection. The incidence of these organisms was assessed.***

Results: ***A study was conducted on 503 women who had an intrauterine device (IUD) inserted for a specific period and reported various symptoms. The participants' ages were distributed as follows: 25% (n=125) were between 19 and 25 years old, 53.5% (n=269) were between 26 and 39 years old, and 21.5% (n=108) were between 40 and 45 years old. The average age of the participants was 32.06 years, with a standard deviation of 8.16 years. The average duration of IUD use was 4.85 years, with a standard deviation of 2.5 years. The participants reported a variety of symptoms, including vaginal discharge (8.34%, n=42), dyspareunia (painful intercourse) (8.54%, n=43), foul odor (8.36%, n=42), itching (8.15%, n=41), and watery discharge (66.6%, n=335).***

Conclusions: ***The study shows that the incidence of Bacterial vaginosis was among the highest (27.0%) in the assessed sample. The second was the yeast infection (20.0%). Trichomonas Vaginalis came in third place(6.0%). The remaining sample (47.0%) shows a lack of ongoing infection.***

Keywords: Intrauterine Device; Vaginitis; Microbial Agent

1. Introduction

Vaginitis, a common gynecological condition, affects a significant number of women during their reproductive years. It manifests as inflammation, itching, discharge, and a distinctive vaginal odor. Various microorganisms, including bacteria, fungi, and viruses, can cause vaginitis. While some of these organisms are naturally present in the vagina, others are introduced from external sources. The intrauterine contraceptive device is one of the most popular methods of contraception and planned parenthood, its recommended to be inserted during the menstrual period, and it takes 5 to 10 minutes after performing a bimanual examination or ultrasonography to figure out the position of the uterus (AVF/RVF) then using sterile speculum that keeps the vagina open and antiseptic solution is used to gently cleanse the vagina and cervix after which sounding the uterus and grasping the cervix with a vulsellum and inserting the IUD inside the uterus leaving the threads out and cutting the excess threads. The use of intrauterine devices (IUDs) is one factor that can disrupt the vaginal environment and increase the risk of vaginitis.[1]

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Additionally, IUDs may facilitate the movement of microorganisms from the lower genital tract to the upper genital tract, potentially leading to infections and complications. This thesis delves into the prevalence of causative organisms of vaginitis among women using IUDs. It also explores the different types of organisms associated with vaginitis.[1]

Bacterial vaginosis (BV) is the most prevalent form of vaginitis, affecting approximately 40% to 50% of women. It arises from an imbalance in the vaginal microbiome, leading to an overgrowth of certain types of bacteria.[2] BV, while not classified as a sexually transmitted infection (STI), can increase the risk of contracting or spreading STIs. It can be effectively treated with antibiotics. Yeast infections, also known as vulvovaginal candidiasis (VVC), are the second most prevalent form of vaginitis, affecting approximately 20% to 25% of women.[2] They arise from an overgrowth of a fungus called Candida, which naturally resides in the vagina in small quantities. Various factors, including antibiotics, pregnancy, diabetes, immunosuppression, or hormonal fluctuations can trigger yeast infections. They can be effectively treated with antifungal medications. Trichomoniasis, a parasitic vaginitis caused by a protozoan called Trichomonas vaginalis, is an STI that affects approximately 15% to 20% of women with vaginitis. It can cause symptoms such as greenish-yellow, frothy discharge, itching, burning, and odor. Trichomoniasis can be effectively treated with antibiotics.[3] Other less common causes of vaginitis include viruses (such as herpes simplex virus), chlamydia and gonorrhea (which are STIs), and non-infectious agents (such as chemicals, allergens, or irritants).[3] The current study aimed to address the incidence of different causative organisms of vaginitis in females with intrauterine devices at El-Hussein University Hospital – Al Azhar University.

2. Patients and methods

The current study is a prospective observational study assessing the 503 females having IUDs and suffering from vaginal infections during their visits to El Hussein University Hospital - Al Azhar University, Cairo, from August 2022 to July 2023. After explaining its importance, Written consent was given to participants to participate in the study. The Research Ethics Committee (REC) has reviewed and approved the following study.

The convenience sampling method was chosen while conducting the study in the Isolation hospital. Of approximately 617 Women, 503 have agreed to be included in this study. She was complaining of itching, dyspareunia, or vaginal discharge and having an IUD inserted before showing symptoms in the age group of 18-45.

2.1.Exclusion criteria: Females with systemic diseases or on antibiotic therapy, Have a history of vaginal infection; women with vulvar, vaginal, or cervical lesions, Patients with immunosuppressant therapy; postmenopausal women; and Females with diabetes mellitus.

2.2.Methodology: The study will be explained to all patients, and Full history will be taken to detect risk factors of vaginitis (personal history, complaints about any symptoms suggesting vaginitis, obstetric history of DM, HTN, Renal or Hepatic disorders, menstrual history, family history, and history)

2.3.Examination, including Mindray DC 30 ultrasound, was used to ensure that the IUD is in place & exclude pelvic causes of infection, General examination relative to the symptoms, Abdominal examination, and Local examination: By Cusco speculum to exclude vaginal or cervical lesions & infections. To exclude (vulvar lesions and local causes of infection).

2.4.Investigations: Culture and sensitivity to detect the causative organism.

High vaginal swab (HVS) was carried out in clean conditions and good light, using a speculum that is lubricated in warm water to look at the cervix and vagina while also protecting the swab from being contaminated by organisms on the vulva. After inserting the swab to the top of the vagina, The swab is inserted into the vagina and rotated for 10-30 seconds against the vaginal walls. The sample is then removed and analyzed for the presence of microorganisms such as bacteria, fungi, or viruses.

3. Results

3.1.Age

Table 1. age group

		FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
VALID	Age 18-25	149	29.6	29.6	29.6
	Age 26-35	171	34.0	34.0	63.6
	Age 36-45	183	36.4	36.4	100.0
	Total	503	100.0	100.0	

Table 2. shows the age groups included in the study with percentages.

Variable	Participants N=504	
	Mean	SD
Age	32.06	8.16
Duration	4.85	2.5

Table 2 shows the mean and SD of Age of patients and Duration of IUD

The study involved 503 women using intrauterine devices (IUDs). The average duration of IUD use was 4.85 years (Table 1). The participants' ages were distributed as follows: 25% (n=125) were between 18 and 25 years old, 53.5% (n=269) were between 26 and 39 years old, and 21.5% (n=108) were between 40 and 45 years old. The average age of the participants was 32.06 years, with a standard deviation of 8.16 years. The average duration of IUD use was 4.85 years, with a standard deviation of 2.5 years. The participants reported various symptoms, including vaginal discharge (8.34%, n=42), dyspareunia (8.54%, n=43), foul odor (8.36%, n=42), itching (8.15%, n=41), and watery discharge (66.6%, n=335). Additional details about the participants are provided in the form of descriptive statistics for age and duration, including means and standard deviations.

3.2.Symptoms

Table 3. percentages of symptoms.

	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
VALID DISCHARGE	42	8.3	8.3	8.3
DYSPAREUNIA	43	8.5	8.5	16.9
FOUL ODOR	42	8.3	8.3	25.2
ITCHING	41	8.2	8.2	33.4
WATERY DISCHARGE	335	66.6	66.6	100.0
TOTAL	503	100.0	100.0	

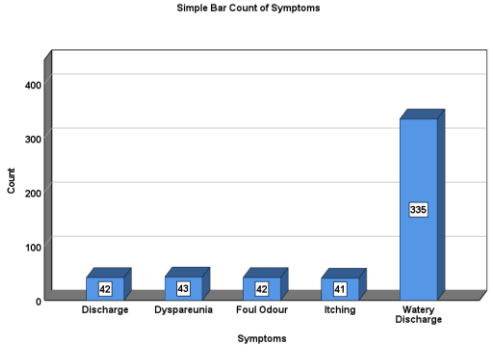

Figure 1. demography of symptoms.

3.3.Duration of IUD

Table 4. Duration of IUD.

	PERCENT	FREQUENCY	VALID PERCENT	CUMULATIVE PERCENT
VALID 1	55	10.9	10.9	10.9
2	51	10.1	10.1	21.1
3	65	12.9	12.9	34.0
4	72	14.3	14.3	48.3
5	56	11.1	11.1	59.4
6	54	10.7	10.7	70.2
7	53	10.5	10.5	80.7
8	47	9.3	9.3	90.1
9	50	9.9	9.9	100.0
TOTAL	503	100.0	100.0	

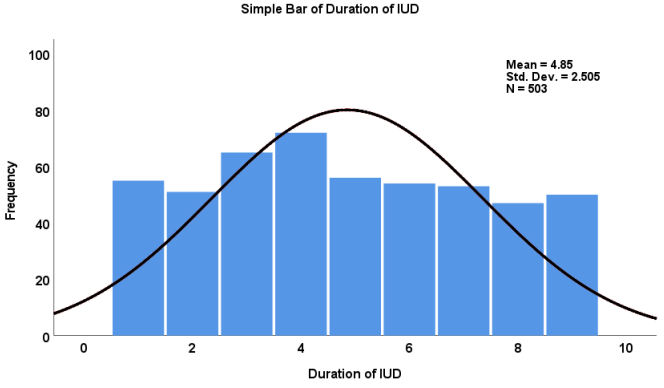

Figure 2. Demography of Duration of IUD.

3.5.Bacterial Vaginosis

Table 5. Showing Valid Percent of Bacterial vaginosis in the sample.

	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
VALID YES	299	59.4	59.4	59.4
NO	204	40.6	40.6	100.0
TOTAL	503	100.0	100.0	

3.6.Trichomonas Vaginalis

Table 6. Showing Valid Percent of positive Trichomoniasis in the sample.

	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
VALID YES	304	60.4	60.4	60.4
NO	199	39.6	39.6	100.0
TOTAL	503	100.0	100.0	

3.7.Yeast Infection

Table 7. Showing Valid Percent of positive yeast infection in the sample.

	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
VALID YES	297	59.0	59.0	59.0
NO	206	41.0	41.0	100.0
TOTAL	503	100.0	100.0	

Table 8. Correlation between all variables (Spearman Rank Correlation coefficient)

			Age	Symptoms	Duration of IUD	Bacterial Vaginosis	Trichomonas Vaginalis	Yeast Infection
Spearman's rho	Age	Correlation Coefficient	1.000	.838	.016	.850	-.026	-.047
		Sig. (2-tailed)		<.001	.719	<.001	.563	.294
		N	503	503	503	503	503	503
	Symptoms	Correlation Coefficient	.838	1.000	.027	.570	-.025	-.089
		Sig. (2-tailed)	<.001	.	.553	<.001	.574	.045
		N	503	503	503	503	503	503
	Duration of IUD	Correlation Coefficient	.016	.027	1.000	.003	.036	.016
		Sig. (2-tailed)	.719	.553	.	.953	.414	.719
		N	503	503	503	503	503	503
	Bacterial Vaginosis	Correlation Coefficient	.850	.570	.003	1.000	-.056	-.005
		Sig. (2-tailed)	<.001	<.001	.953	.	.214	.920
		N	503	503	503	503	503	503
	Trichomonas Vaginalis	Correlation Coefficient	-.026	-.025	.036	-.056	1.000	.021
		Sig. (2-tailed)	.563	.574	.414	.214	.	.644
		N	503	503	503	503	503	503
	Yeast Infection	Correlation Coefficient	-.047	-.089	.016	-.005	.021	1.000
		Sig. (2-tailed)	.294	.045	.719	.920	.644	.
		N	503	503	503	503	503	503

Table 9. Showing Incidence of Causative organisms in the study.

Causative organism	N	Incidence
Bacterial Vaginosis	134	27%
Trichomonas Vaginalis	32	6%
Yeast Infection	103	20%
Normal Samples	234	47%

Among the 503 women evaluated for vaginal infections in a gynecological clinic setting, Bacterial vaginosis (BV) emerged as the most prevalent infection, affecting 134 women (27%). This was followed by yeast infection, primarily caused by Candida species, which affected 103 women (20%). Trichomonas Vaginalis ranked third, affecting 32 women (6%). The remaining participants did not exhibit signs of ongoing vaginal infections. This study aimed to investigate the incidence and types of vaginal infections among women attending a gynecological clinic. A vaginal swab test and a questionnaire were administered to each participant. The test results in Table 9 indicated that BV, characterized by an imbalance in the normal vaginal flora, was the most common isolated vaginal infection, affecting 134 women (27% of the sample). BV is associated with an increased risk of other sexually transmitted infections and adverse pregnancy outcomes. Yeast infection, caused by Candida species, was the second most prevalent infection, affecting 103 women (20% of the sample).

4. Discussion

Bacterial vaginosis was the most prevalent vaginal infection among the study participants, followed by yeast infection and trichomoniasis. Nearly half of the women in the study exhibited a healthy vaginal microbiome, in line with previous findings on the normal range of vaginal microbiota. This normal range encompasses the diversity and balance of bacteria that reside in the vagina and protect it from infections.7 Age, hormonal status, sexual activity, hygiene, and diet can influence the normal range. Generally, a healthy vaginal microbiome is dominated by lactobacilli, which produce lactic acid and hydrogen peroxide to maintain a low pH and suppress the growth of pathogens.[4]

A study reported that half of IUD users experienced gynecological symptoms. Aggarwal et al.[5] documented perceived symptoms in 183 IUD users; nearly 80% (79.9%) of patients had a positive microbial test. Nearly half (47.0%, or 86 cases) were diagnosed with bacterial vaginosis. The most common symptom reported by patients was a large amount of foul-smelling, yellow discharge. With 20% reporting no problems, 18% reporting excessive bleeding, 54% reporting backache, 34% reporting abdominal pain, 14% reporting dysmenorrhea, 6% reporting psychosexual problems, 22% reporting dyspareunia, and 46% reporting vaginal discharge. Additionally, a follow-up study of 223 IUD users found that women with bacterial vaginosis were more likely to experience abnormal bleeding (30.4%) and dysmenorrhea (34.8%) compared to women without bacterial vaginosis (17.2% and 13.9%, respectively).[6] Neale et al.[7] reported that women were significantly more likely to develop abnormal vaginal discharge 4-6 weeks after IUD insertion. Our study found that 12.0% of IUD users had bacterial vaginosis, 7.0% had candida albicans, and 5.0% had trichomoniasis. These rates are consistent with those observed by other researchers.[8] Auler et al. indicated that biofilm on the IUD surface was a significant risk factor for recurrent vulvovaginal

candidiasis.[9] Another study of 360 women (aged 18-45 years) with abnormal vaginal discharges who presented to a gynecology outpatient clinic found that Bacterial Vaginosis was detected in 33.3% of IUD users. Bacterial vaginosis is the pathogen responsible for vulvovaginitis, and women experiencing abnormal vaginal discharge should be assessed for possible vaginosis infection. The elevated detection rate of Bacterial vaginosis infection among IUD users in our study implicates IUD usage as a potential risk factor for BV infection. These findings corroborate those reported in other published studies. Bacterial vaginosis is the most common vaginal infection among women of reproductive age, and several studies have demonstrated a higher prevalence of this infection among IUD users across various countries.[10] Given the heterogeneity of the studied populations and the employed diagnostic tests, it is understandable that estimates of disease prevalence have varied significantly across studies. [10]

Emerging evidence suggests that IUDs may influence the vaginal microbiome, potentially increasing the risk of BV in some IUD users. As a result, most guidelines recommend pre-insertion screening for cervical infections. However, menorrhagia and dysmenorrhea are significant concerns that can lead to IUD discontinuation, warranting the development of effective therapies to alleviate these symptoms. The IUD tail, as a potential source of chronic irritation, may contribute to cervical erosion and serve as a conduit for ascending vaginal infections. While cervical erosion is generally considered benign, it can cause vaginal discharge and other symptoms in IUD users. These findings support the hypothesis that IUDs may alter the cervicovaginal environment, potentially increasing the risk of vulvovaginal infections. IUDs' local irritating and inflammatory effects primarily induce reactive and regenerative changes, particularly in glandular cells. IUDs disrupt the genital flora and significantly increase the frequency of genital infections due to a foreign body reaction. Therefore, pre-insertion screening for cervical infections is recommended by most guidelines.[11] It is recommended that women with IUDs undergo a routine follow-up at any time of unusual cramping during menses or at a regularly scheduled time.

Limitations of the study: It should be noted that this sample was taken from the Hospital of El Hussein. More samples need to be assessed in different hospitals across Egypt, involving a larger sample size.

Raising awareness among females with low socio-economic standards and low education increases the time needed to obtain consent after a full explanation. It ensures that the patient knows the whole procedure and the point of the study.

4. Conclusion

The study shows that the incidence of Bacterial vaginosis was among the highest (27.0%) in the assessed sample. The second was the yeast infection (20.0%). Trichomonas Vaginalis came in third place(6.0%). The remaining sample (47.0%) shows a lack of ongoing infection.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article

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Conflicts of interest

There are no conflicts of interest.

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