

Prevalence of the Use of Alternative and Complementary Medicine in the Management of Vaginitis in Mosul City

Saba Abdulateef Mahmood¹, Dalya Mudhafar Abdulrahman²

¹DGO, Ministry of Health, Alsalam Teaching Hospital, Mosul, Iraq

²College of Medicine, Nineveh University, Mosul, Iraq

ABSTRACT

Vulvovaginitis results with the loss of Lactobacillus- dominated normal vaginal flora, with the sexual activity pathogenic organisms are introduced into the vagina. Lactobacillus maintain normal vaginal PH of 3.5, and production of hydrogen peroxide which is bactericidal. Primarily vaginitis include three infections, Trichomoniasis, vulvovaginal candidiasis, and bacterial vaginosis (BV), desquamative inflammatory vaginitis (DIV), associated with estrogen deficiency. Cervicitis primarily endocervicitis caused by sexually transmitted pathogens. Vaginal pathogens include:

- *Candida albicans*
- *Trichomonas vaginalis*
- *Neisseria gonorrhoea*
- *C. trichomatis*
- *Gardnerella vaginalis*

Drugs of choice for Candidiasis, Fluconazole 150mg orally in a single dose with vaginal preparations, and metronidazole for Trichomoniasis. Patient history, complete examination, and laboratory tests are essential for diagnosis of vaginitis or cervicitis.

Keywords: Vaginitis, Trichomoniasis, Cervicitis, Treatment.

INTRODUCTION

Bacterial vaginosis, trichomoniasis, and vulvovaginal candidiasis are the most common infectious causes of vaginitis. Bacterial vaginosis occurs when the normal lactobacilli of the vagina are replaced by mostly anaerobic bacteria. Diagnosis is commonly made using the Amsel criteria, which include vaginal pH greater than 4.5, positive whiff test, milky discharge, and the presence of clue cells on microscopic examination of vaginal fluid. Oral and topical clindamycin and metronidazole are equally effective at eradicating bacterial vaginosis. Symptoms and signs of trichomoniasis are not specific; diagnosis by microscopy is more reliable. Features of trichomoniasis are trichomonads seen microscopically in saline, more leukocytes than epithelial cells, positive whiff test, and vaginal pH greater than 5.4. Any nitroimidazole drug (e.g., metronidazole) given orally as a single dose or over a longer period resolves 90 percent of trichomoniasis cases. Sex partners should be treated simultaneously. Most patients with vulvovaginal candidiasis are diagnosed by the presence of vulvar inflammation plus vaginal discharge or with microscopic examination of vaginal secretions in 10 percent potassium hydroxide solution. Vaginal pH is usually normal (4 to 4.5). Vulvovaginal candidiasis should be treated with one of many topical or oral antifungals, which appear to be equally effective. Rapid point-of-care tests are available to aid in accurate diagnosis of infectious vaginitis. Atrophic vaginitis, a form of vaginitis caused by estrogen deficiency, produces symptoms of vaginal dryness, itching irritation, discharge, and dyspareunia. Both systemic and topical estrogen treatments are effective. Allergic and irritant contact forms of vaginitis can also occur[1].

Vaginitis is defined as a spectrum of conditions that cause vaginal and sometimes vulvar symptoms, such as itching, burning, irritation, odor, and vaginal discharge. Vulvovaginal complaints are one of the most common reasons for women to seek medical advice.

Etiology and Diagnosis of Vaginitis:

The most common infectious causes of vaginitis are bacterial vaginosis, vulvovaginal candidiasis, and trichomoniasis. Physicians traditionally diagnose vaginitis using the combination of symptoms, physical examination, pH of vaginal fluid, microscopy, and the whiff test. When combined, these tests have a sensitivity and specificity of 81 and 70 percent, respectively, for bacterial vaginosis; 84 and 85 percent for vulvovaginal candidiasis; and 85 and 100 percent for Trichomoniasis when compared with the DNA probe standard [2].

Table 1 describes common causes, symptoms, and signs of vaginitis [3,4] and Table 2 lists risk factors that contribute to the development of the condition [4-12]. In a review of studies published between 1966 and 2003, bacterial vaginosis was diagnosed in 22 to 50 percent of symptomatic women, vulvovaginal candidiasis in 17 to 39 percent, and trichomoniasis in 4 to 35 percent. Approximately 30 percent of symptomatic women remained undiagnosed after clinical evaluation [3]. Among multiple individual symptoms and signs, only the following were found to be helpful for the diagnosis of vaginitis in symptomatic women:

- A lack of itching makes diagnosis of vulvovaginal candidiasis unlikely (range of likelihood ratios [LRs], 0.18 [95% confidence interval (CI), [0.05 to 0.70] to 0.79 [95% CI, 0.72 to 0.87]).
- A lack of perceived odor makes bacterial vaginosis unlikely (LR, 0.07 [95% CI, 0.01 to 0.51]).
- Presence of inflammatory signs is more commonly associated with vulvovaginal candidiasis (range of LR, 2.1 [95% CI, 1.5 to 2.8] to 8.4 [95% CI, 2.3 to 3.1]).
- Presence of a fishy odor on examination is predictive of bacterial vaginosis (LR, 3.2 [95% CI, 2.1 to 4.7]).
- Lack of odor is associated with vulvovaginal candidiasis (LR, 2.9 [95% CI, 2.4 to 5.0]) [3].

Individual symptoms and signs, pH level, and microscopy results often do of vaginitis. Laboratory tests perform better than standard office-based evaluation for diagnosing causes of vaginitis,[3] but they do not add substantially to the treatment threshold and are justified only in patients with recurrent or difficult-to-diagnose symptoms. Table 3 describes laboratory tests used to diagnose infectious causes of vaginitis [2,12-24].

A cost-effectiveness analysis of diagnostic strategies for vaginitis undiagnosed by pelvic examination, wet-mount preparation, and related office tests showed that the least expensive strategy was to perform yeast culture, gonorrhea and chlamydia probes at the initial visit, and Gram stain and Trichomonas culture only when the vaginal pH exceeded 4.9. Other strategies cost more and increased duration of symptoms by up to 1.3 days [25].

Table 1: causes, symptoms, and signs of vaginitis [2,3]

Type	Etiology	Discharge	Pain	Pruritus
Bacterial vaginosis	Gardnerella vaginalis, Mycoplasma hominis Anaerobic bacteria: Prevotella species, Mobiluncus species	Malodorous; homogenous; clear, white, or gray; fishy odor	Not primary symptom	Not primary symptom
Trichomoniasis	Trichomonas vaginalis	Green-yellow, frothy	Pain with sexual intercourse, Vaginal soreness, dysuria	Not primary symptom
Vulvovaginal candidiasis	Candida albicans, candida krusei, candida glabrata	White, thick, lack of odor	Burning, dysuria, dyspareunia	Frequent
Atrophic vaginitis	Estrogen deficiency	Yellow, greenish, lack of odor	Vaginal dryness, pain with sexual intercourse	Rare
Erosive lichen Planus	Etiology is unknown	Yellow or gray	Intense pain, dyspareunia, postcoital bleeding	Intense
Irritant or allergic contact dermatitis	Contact irritation or allergic reaction with episodic flares	Minimal	Burning on acute contact, soreness	More likely in allergic reactions

Table 2: Risks factors contributing to vaginitis [3 to 11]

Type of vaginitis	Risk factors	Signs on vagina	Signs in vulva
Bacterial Vaginosis	Low socioeconomic status, vaginal douching, smoking, use of an intrauterine contraceptive device, new/multiple sex partners, unprotected sexual intercourse, homosexual relationships, frequent use of higher doses of spermicide nonoxynol-9	No signs of inflammation	Unaffected
Trichomoniasis	Low socioeconomic status, multiple sex partners, lifetime frequency of sexual activity, other sexually transmitted infections, lack of barrier contraceptive use, illicit drug use, smoking	Signs of inflammation, "strawberry cervix"	Vestibular erythema may be present
Vulvovaginal candidiasis	Vaginal or systemic antibiotic use, diet high in refined sugars, uncontrolled diabetes mellitus	Signs of inflammation, edema	Excoriations
Atrophic Vaginitis	Menopause, other conditions associated with estrogen deficiency, oophorectomy, radiation therapy, chemotherapy, immunologic disorders, premature ovarian failure, endocrine disorders, antiestrogen medication	Vagina mildly erythematous, easily traumatized	Vestibule thin and dry; labia majora lose their subcutaneous fat; labia minora irritated and friable
Irritant contact Dermatitis	Soaps, tampons, contraceptive devices, sex toys, pessary, topical products, douching, fastidious cleansing, medications, clothing	Erythema with friable epithelium	Erosions, white plaques
Allergic contact Dermatitis	Sperm, douching, latex condoms or diaphragms, tampons, topical products, medications, clothing, atopic history	Vulvar erythema possible	Erythema with or without edema; vesicles or bullae rare

Table 3: laboratory testing for infectious causes of vaginitis [2,12 to 24]

Tests	Bacterial vaginosis	Trichomoniasis
Point-of-care tests Amsel criteria	Sensitivity, 69%; specificity, 93%	Not applicable(NA)
pH	pH > 5: sensitivity, 77%; specificity, 35%	pH > 5.4: sensitivity, 92%; specificity, 51%
Whiff test (the amine odor produced by mixing 10% potassium hydroxide solution with a sample of vaginal discharge)	Positive test: sensitivity, 67%; specificity, 93%	Positive test: sensitivity, 67%; specificity, 65%
Fem Exam card (Cooper Surgical, Shelton, Conn(Two colorimetric strips: card 1 measures pH and amine levels; card 2 measures proline aminopeptidase activity	Cards 1 and 2 combined: sensitivity, 91% specificity, 61%. Rapid (two minutes), less subjective than whiff test, easily performed	NA
Microscopy (with 10% potassium hydroxide solution, saline)	Clue cells, bacilli with corkscrew motility, scant or absent lactobacilli Sensitivity, 53 to 90%; specificity, 40 to 100%	Motile protozoa with flagella; more leukocytes than epithelial cells Sensitivity, 50 to 70% (may be increased by vaginal lavage to 74%);

		specificity, 100%
pH, trimethylamine card	Sensitivity, 53%; specificity, 97% Rapid, simple, comparable with Ph and whiff test	NA
Polymerase chain reaction: based on DNA amplification	Effective at identifying bacteria responsible for bacterial vaginosis	Sensitivity, 80%; specificity, 97%
Culture	Predictive value of a positive Gardnerella vaginalis culture is less than 50%; generally not recommended, but may have value in recalcitrant cases	Combined wet-mount preparation and culture kit; can be kept at room temperature for up to 18 hours; samples taken during menses were not adversely affected Sensitivity, 81 to 100%

Bacterial Vaginosis:

Bacterial vaginosis is the most prevalent cause of vaginal discharge or malodor, occurring in up to 30 percent of women.²⁶ It occurs when the normal Lactobacillus species in the vagina are replaced with anaerobic bacteria, not lead to an accurate diagnosis resulting in reduced levels of hydrogen peroxide and organic acids usually present in the vagina.

The underlying cause of bacterial vaginosis is not fully understood. More than 50 percent of women with bacterial vaginosis are asymptomatic. The fishy odor caused by production of amines from anaerobic bacteria found in many of these patients is predictive of bacterial vaginosis [2]. When vaginal alkalinity increases after sexual intercourse (with the presence of semen) and during menses (with the presence of blood), the odor becomes more prevalent.²⁷ Vaginal discharge is a more common but less specific symptom. Bacterial vaginosis is not associated with vaginal mucosal inflammation and rarely causes vulvar itch [27].

Bacterial vaginosis, even when asymptomatic, is associated with a high incidence of endometritis and pelvic inflammatory disease following abortion and gynecologic procedures in the general population. Among women with bacterial vaginosis, no overall increased risk of developing pelvic inflammatory disease has been found [28]. Bacterial vaginosis is associated with late miscarriages, premature rupture of membranes, and preterm birth [29]. Both symptomatic and asymptomatic bacterial vaginosis have been strongly linked with an increased risk of human immunodeficiency virus (HIV)-1 transmission (relative risk, 1.89; 95% CI, 1.46 to 2.43) [30].

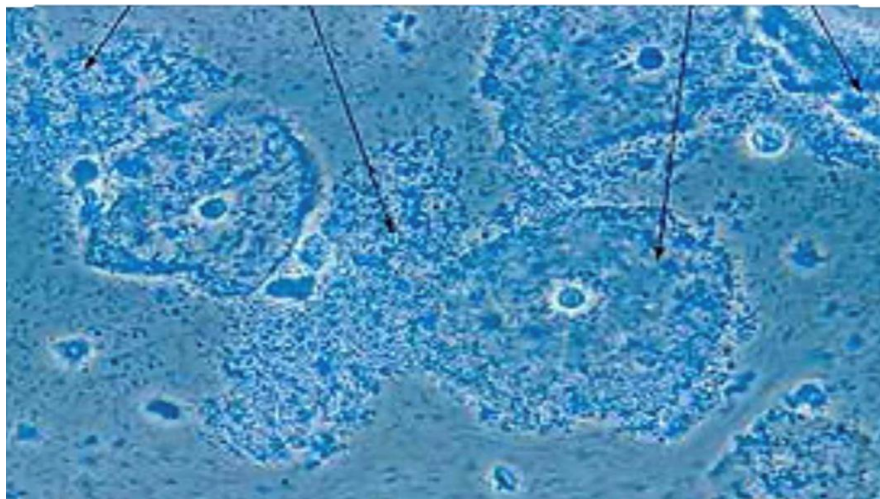


Figure 1. Clue cells (400 ×). Vaginal epithelial cells with borders obscured by adherent coccobacilli seen on saline wet-mount preparation.

DIAGNOSIS:

In clinical practice, bacterial vaginosis is diagnosed by the presence of three out of four Amsel criteria[31]:

- Thin, homogenous vaginal discharge
- Vaginal pH greater than 4.5
- Positive whiff test (fishy amine odor when 10 percent potassium hydroxide solution is added)

•At least 20 percent clue cells (vaginal epithelial cells with borders obscured by adherent coccobacilli on wetmount preparation or Gram stain; Figure 1. In a prospective observational study of 269 women, a vaginal pH of more than 4.5 was found to be the most sensitive (89 percent) and a positive whiff test was the most specific (93 percent) method of detecting bacterial vaginosis.¹² The positive presence of these two tests is as sensitive as three or more Amsel criteria^[12]. Culture of *Gardnerella vaginalis* is not recommended because of low specificity. Cervical cytology has no clinical value for diagnosing bacterial vaginosis, especially in asymptomatic women, because it has low sensitivity^[13].

TREATMENT IN NONPREGNANT WOMEN:

Current treatment recommendations from the Centers for Disease Control and Prevention (CDC) are listed in Table 4 [13,32]. Nonpregnant women with symptomatic disease require antibacterial therapy to relieve vaginal symptoms. Other benefits of treatment include decreasing the risk of HIV and other sexually transmitted infections and reducing infectious complications following abortion or hysterectomy^[13]. A Cochrane review of 24 randomized controlled trials (RCTs) showed that clindamycin and metronidazole (Flagyl) are equally effective, achieving clinical cure in 91 and 92 percent of cases, respectively, after two to three weeks of treatment.³³ Six RCTs showed topical and oral antibiotic preparations to be equally effective. One disadvantage of oral regimens is a longer duration of treatment^[33]. Intravaginal clindamycin cream is preferred in case of allergy or intolerance to metronidazole. Metronidazole in a single 2-g dose has the lowest effectiveness for treating bacterial vaginosis and is no longer recommended. Metronidazole, 500 mg twice daily for one week, is effective for treating bacterial vaginosis and trichomoniasis. Although lactobacillus probiotics are safe, there is no conclusive evidence that they are superior to or enhance the effectiveness of antibiotics in the treatment of bacterial vaginosis or prevent its recurrence^[34]. Treatment of sex partners and follow-up visits if symptoms are resolved are not recommended.

BACTERIAL VAGINOSIS IN PREGNANCY:

Bacterial vaginosis is present in up to 20 percent of women during pregnancy. The effect of treating bacterial vaginosis in symptomatic or asymptomatic pregnant women on subsequent preterm delivery has produced conflicting results in clinical trials^[13,35]. The U.S. Preventive Services Task Force (USPSTF) recommends against routine bacterial vaginosis screening of asymptomatic pregnant women at low risk of preterm delivery (USPSTF grade D recommendation)^[36].

RECURRENT BACTERIAL VAGINOSIS:

Most relapses of bacterial vaginosis occur within the first year and strongly correlate with new sex partners. Reported recurrence rates are 15 to 30 percent within three months.^{37,38} One RCT on persistent bacterial vaginosis indicated that metronidazole gel 0.75% (Metrogel), used twice weekly for six months after initial treatment, effectively maintained a clinical cure for six months.^[39]

Trichomoniasis:

Symptoms and signs of trichomoniasis are not specific, and diagnosis by microscopy is more reliable. Features suggestive of trichomoniasis are trichomonads seen with saline, leukocytes more numerous than epithelial cells, positive whiff test, and vaginal pH greater than 5.4 [2]. The wet-mount preparation is an inexpensive and quick test with variable sensitivity of 58 to 82 percent,^[40] and is influenced by the experience of the examiner and the number of parasites in the vaginal fluid sample (Figure 2). Adding examination of the spun urine specimen can increase the detection rate of *Trichomonas vaginalis* from 73 to 85 percent.^[41] Treatment should not be based on a Papanicolaou (Pap) smear finding of trichomonads. Newer point-of-care tests (Table 3) [2,12,24] are more accurate but costly. In one study, the sensitivities of wet-mount preparation, microbiologic culture, rapid antigen testing, and nucleic acid amplification testing were 51, 75, 82, and 98 percent, respectively. Specificity was close to 100 percent for each method.^[42] Polymerase chain reaction analysis of samples from tampons and introital specimens is more accurate than vaginal or cervical swabs and Pap smears, and may be preferable for patient comfort.^[4]



Figure 2: Trichomonis protozoa[19]

TREATMENT:

Almost any nitroimidazole drug given orally in a single dose or over a longer period results in parasitologic cure in 90 percent of cases[44]. A single 2-g dose of metronidazole is adequate but can cause dyspepsia and metallic taste; compliant patients may prefer a longer regimen at a lower daily dosage with fewer adverse effects. Metronidazole in a dosage of 500 mg twice daily for seven days will treat bacterial vaginosis and trichomoniasis. Metronidazole in a dosage of 2 to 4 g daily for seven to 14 days is recommended for metronidazole-resistant strains. The parasitologic cure rate of intravaginal nitroimidazole creams is an unacceptably low 50 percent. In RCTs, combined oral and intravaginal treatments have been more effective than oral treatment alone. Sex partners should be treated simultaneously [44]. To reduce recurrence, partners should avoid resuming sexual intercourse until both have completed treatment and are asymptomatic. Test of cure is not required [13].

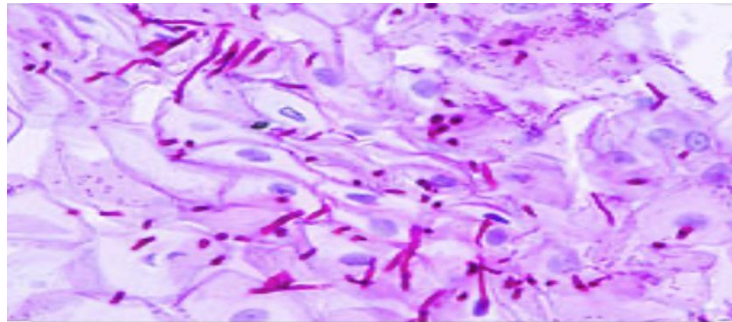


Figure 3: vaginal wet mount showing pseudo hyphae of *Candida albicans* [13].

DIAGNOSIS:

Although symptoms of vulvovaginal candidiasis such as pruritus, vaginal soreness, dyspareunia, and vaginal discharge are common, none of them are specific [2]. Most patients can be diagnosed by microscopic examination (Figure 3) of vaginal secretions with a 10% potassium hydroxide solution (sensitivity, 65 to 85 percent). Vaginal pH is usually normal (4.0 to 4.5). Vaginal culture should be considered in recurrently symptomatic women with negative microscopy and a normal pH. The Pap smear, although specific, is insensitive, with positive results in only about 25 percent of patients with culture-positive symptomatic vulvovaginal candidiasis [14]. Polymerase chain reaction testing is considered the most sensitive method, but is very expensive.

TREATMENT:

On the basis of clinical presentation, microbiology, host factors, and response to therapy, vulvovaginal candidiasis can be classified as uncomplicated or complicated [13]. Patients with uncomplicated vulvovaginal candidiasis are not pregnant, are otherwise healthy, and have all of the following:

- Mild to moderate disease
- Fewer than four episodes of candidiasis per year
- Pseudohyphae or hyphae visible on microscopy.

Treatment of uncomplicated vulvovaginal candidiasis involves a short course of antifungals[47] (Table 4); oral and topical preparations are similarly effective [13,48]. Patients with complicated vulvovaginal candidiasis have one or more of the following:

- Moderate to severe disease
- Four or more episodes of candidiasis per year
- Only budding yeast visible on microscopy
- Adverse host factors (e.g., pregnancy, diabetes mellitus, immunocompromise).

Treatment of complicated vulvovaginal candidiasis involves an intensive, longer course of antifungals (Table 4)

Noninfectious Causes Of Vaginitis:

Irritant contact dermatitis and allergic contact dermatitis are two noninfectious causes of vaginitis. They may be associated with use of feminine hygiene products or contraceptive materials, among many other causes. Atrophic vaginitis can manifest clinically with symptoms of vaginal dryness, itching, discharge, irritation, and dyspareunia. It affects 10 to 40 percent of women who have conditions associated with estrogen deficiency [4]. Diagnosis is based on history and physical findings, supplemented by vaginal pH levels, vaginal wet mount preparation (to exclude superimposed infection), and, rarely, culture or cytology. Both systemic and topical estrogen treatments are effective in relieving symptoms. Topical vaginal estrogen is preferred because of the low systemic absorption and reduced risk of adverse effects compared with oral therapy. Estrogen-containing creams, pessaries, intravaginal tablets, and the estradiol vaginal ring appear equally effective for the symptoms of atrophic vaginitis [49].

Table 4: CDC recommended treatment of vaginitis[13,32]

Vaginitis cause	Medical dosage	Alternative regimen	Pregnancy
Bacterial vaginosis	Metronidazole (Flagyl) 500 mg orally twice daily for seven days Metronidazole gel (Metrogel) One full applicator (5 g) intravaginally once daily for five days Clindamycin 2% cream One full applicator (5 g) intravaginally at bedtime for seven days	Tinidazole (Tindamax) 2 g orally for two days or 1 g for five days Clindamycin 300 mg orally twice daily for seven days Clindamycin ovules 100 mg intravaginally once daily at bedtime for three days	Metronidazole 500 mg orally twice daily for seven days Metronidazole 250 mg orally three times daily for seven days Clindamycin 300 mg orally twice daily for seven days
Trichomoniasis	Metronidazole 2 g orally in a single dose Tinidazole 2 g orally in a single dose	Metronidazole 500 mg orally twice daily for seven days	Metronidazole 2 g orally in a single dose
Vulvovaginal candidiasis	Clotrimazole 1% cream 5 g intravaginally once daily for seven to 14 days Clotrimazole 2% cream 5 g intravaginally once daily for three days Miconazole 2% cream 5 g intravaginally once daily for seven days	Nystatin vaginal table 100,000-unit vaginal tablet once daily for 14 days Tioconazole 6.5% ointment 5 g intravaginally in a single dose Terconazole 0.8% cream 5 g intravaginally once daily for three days Terconazole vaginal suppository 80-mg vaginal suppository once daily for three days Fluconazole (Diflucan) 150 mg orally in a single dose	Any topical azole Intravaginally once daily for seven days
Complicated vulvovaginal candidiasis	Any topical agent Seven to 14 days Fluconazole 100, 150, or 200 mg orally once daily every third day for three doses Maintenance regimen Fluconazole 100, 150, or 200 mg orally once weekly for six months	Intravaginally once daily for seven to 14 days Fluconazole 150 mg orally once daily in two doses 72 hours apart	Vulvovaginal candidiasis non albicans: Nonfluconazole azole (oral or topical) Seven to 14 days Boric acid gelatin capsule Intravaginally once daily for 14 days

Herbal remedies in vaginitis:

The aim of treatment of vaginitis is to restore the vaginal pH below 4.5, as well preserve normal flora such as Lactobacillus species. Several plant species have been reported to prevent the risk of transmission and to treat vaginal infections. Several herbal remedies are available for treatment of infections ranging from bacterial, fungal, parasitic, and viral. The efficacy of some plant extracts and essential oils has been evaluated. Best remedies available for long term prevention of infections include cranberry, mannose, and probiotics, while berberine and uva ursi can be effective at first sign of infective or prophylaxis[78].

Herbal remedies for BV: the promising activity of lemon grass, tea tree, lavender, and palmarosa oils against both bacteria and fungi isolated vagina has been reported. Most available herbal remedies are effective against the three common types of vaginitis. The use of some herbs such as lemon has been discouraged due to the potential toxicity to vagina based on the concentration used. Some herbs with established activity against vaginitis have been reported (table 5).

Tea tree oil (TTO): is known as essential oil isolated from the leaves of the tea tree. Several studies conducted on TTO have proven its effectiveness on different organisms implicated in vaginitis especially lactobacilli species, C. and T. vaginalis (table 5). TTO has been shown to be very effective as an antibacterial, antifungal, especially against T.

vaginalis. TTO vaginal pessary was reported to cure anaerobic vaginosis in a patient who treated herself for five days with pessary containing 200 mg TTO in a vegetable oil base. Microscopic tests for susceptible pathogens were negative, which indicates the effectiveness of the treatment.

Garlic (*Allium sativum* L. fam. Alliaceae): Garlic preparations have been used in treating several diseases including infections. Its antibacterial, antifungal, and antiviral activities have been reported extensively. It has been stated to be either chewed or inserted in the vagina against BV. Garlic tablets have been shown to decrease Amsel criteria with similar efficacy but fewer side effects compared with metronidazole in treating BV. Aqueous garlic extract was also effective against 24 strains of *C. albicans* isolated from vaginal, cervix, and buccal swabs.

Zatraria multiflora: has been shown to be effective as a vaginal cream in BV similar to metronidazole. Both ZM and metronidazole reduce patient's complication and Amsel criteria following five nights of treatment. ZM cream was found to be active against BV and clinical symptoms associated with Trichomoniasis. The ZM cream exhibited a better efficacy comparing to clotrimazole cream. The cream reduced all symptoms except vaginal irritation and burning, and its effect on gynecological signs was superior compared to clotrimazole.

Persian shallot (*Allium hirtifolium*): this plant has been used as a spice in Iran for long time. Its activity against gram negative and positive bacilli, protozoa and yeast has been reported. The alcoholic and aqueous extracts were tested for anticandidal activity, where displayed activity against 33 species of candida isolated from a patient with chronic candidiasis.

Goldenseal (*Hydrastis Canadensis*): the isolated constituents (berberine and hydrastine) of this plant has demonstrated promising antimicrobial activity against wide range of bacteria . products obtained from dried root of this plant have been traditionally used in treating infections such as gonorrhea, eye infections, infectious diarrhea, and vaginitis [78].

Table 5: Herbs and their active components effective on vaginitis[78]

Type of vaginitis	Components	Type of extract	Herbs and parts used
BV, candidiasis, and Trichomoniasis	Terpinen-4-ol, α- pinene, and β- pinene	oil	Tea tree oil
BV and candidiasis	Allicin, alliin and ajoene	aqueous	Garlic
BV, candidiasis, and Trichomoniasis	Allicin, ajoene	Alcoholic	Persian shallot
BV, candidiasis, and Trichomoniasis	Carvacol, thymol, carvacrol and linalool	Oil and cream	Zataria multiflora
BV, candidiasis and Trichomoniasis	Hydrastine, berberine	-	Goldenseal (<i>Hydrastis Canadensis</i>)

PATIENTS AND METHOD:

It is a clinical trial involve one hundred ladies This study done among female that seek private clinic for their complains of vaginitis, done in Mosul city from the period of January 2020 till January 2021. The methodology of this study applied in this study involves direct questioning using questionnaires, and in addition to clinical assessment of the patients. Information on age, education, parity, occupation, obstetric, medical and surgical history was obtained from the women using a close ended questionnaire.

All females involve in our study as volunteers will received compensation for what is going on, plan how we get sample, who to manage which mean related medical care, follow up we start from physical examination, laboratory test and all female with no any coasty embarrassment. All female under ethical consideration at whole time of study and consents taken from all.

Inclusion and exclusion criteria planed and the strategy of study put, so the inclusion data involved: female at reproductive age group, from 20 to 45 years, BMI from 18 to 24, marital state, residence, their social habit for smoking and bathing, drugs and medical history taken, and contraceptive used.

For exclusion data: pregnant one, those under treatment and those under vaginal douching less than 24 hours from examination.

Sample size collection and data collection:

One hundred twenty ladies included in our study, all randomly collected, we invited female with inclusion and exclusion criteria discuss with them the value that they gain.

For data collection we involved social demographic characteristic features of female. Life style habits as smoking and bath habit, routine hygiene practice, how they can do deal with such problem if they do have it.

Vaginal examination:

Any female involve in study we examine for discharge, colour, consistency odour via dry, good sterile speculum. PH included after we excluded her sexual relation and with great caution not to touch cervix just the vagina by PH paper.

Laboratory investigation:

The samples collected from the vaginal wall with cotton tipped swabs and then taken to tube contain 2-3 ml of normal saline and we send to microscopical examination of the hospital and nearby private laboratory, and so for BV we depend on the criteria depend on scoring system and BV improved by standardized method of gram stain [50,51]. Ten percent potassium chloride as wet mounts were examined for VVC and cultivation to the results finding or culture media for diagnosis. Diagnosis of Trichomonis vaginalis, saline wet mounts to see it is morphological characterizes via the stained smear.

Data analysis:

Chi square test with P value of < 0.05 were the value significant statically. Score that obtained involved follow up of 100 female divided in 3 groups one herbal, medical treatment and mixed, follow up every 2 weeks. The treatment was given to medical and mixed groups, the herbal group based on herbal form of treatment.

RESULTS

One hundred were randomly collected from our private clinic complaint from different form of vaginitis, some use herbal method, other used herbal and medical management methods and followed them for three weeks by regular visits every weeks each visit we examine the patients and do swab to show number of inflammatory, epithelial, and clue cells and pH of the vagina.

Figure no. 4 shows the effect of medical only and mixed (medical and herbal) treatment on the no. of pus cells obtained from vaginal swab of some of patients in two consecutive visit. There was significant correlation between medical treatments only and reduce the no. of pus cell as the P value was < 0.01.

	>5	5--10	10<
medical1stvisit	8 (26.67)	20 (83.33)	23 (65.71)
medical3rdvisit	22 (73.33)	4 (16.67)	12 (34.29)
Chi ²	3.45	10.66	3.45
P value	0.05	0.001	0.05
mixed1stvisit	24 (61.54)	8 (36.36)	8 (40.00)
mixed3rdvisit	14 (38.46)	14 (63.64)	12 (60.00)
Chi ²	2.07	1.63	0.80
P value	0.15	0.20	0.37
herbal1stvisit	17 (62.96)	15 (46.88)	7 (50.00)
herbal 3rdvisit	10 (37.04)	17 (53.13)	7 (50.00)
Chi ²	1.81	0.12	0.00
P value	0.18	0.73	1.00

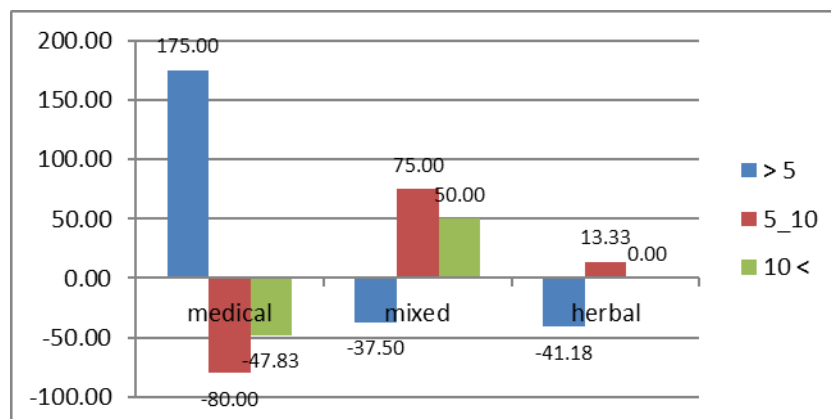


Figure 5: Shows the effect of medical only and mixed (medical and herbal) treatment on the number of pus cells

	>5	5--10	10<
medical1stvisit	10 (37.04)	10 (62.5)	16 (84.21)
medical3rdvisit	17 (62.96)	6 (37.5)	3 (15.79)
Chi²	1.81	1.00	8.89
P value	0.11	0.31	0.002
mixed1stvisit	21 (67.74)	13 (48.15)	4 (25.00)
mixed3rdvisit	10 (32.26)	14 (51.85)	12 (75.00)
Chi²	3.90	0.03	4.00
P value	0.04	0.84	0.04
herbal1stvisit	23 (71.88)	8 (33.33)	11 (37.93)
herbal 3rdvisit	9 (28.13)	16 (66.67)	18 (62.07)
Chi²	6.12	2.66	1.68
P value	0.01	0.10	0.19

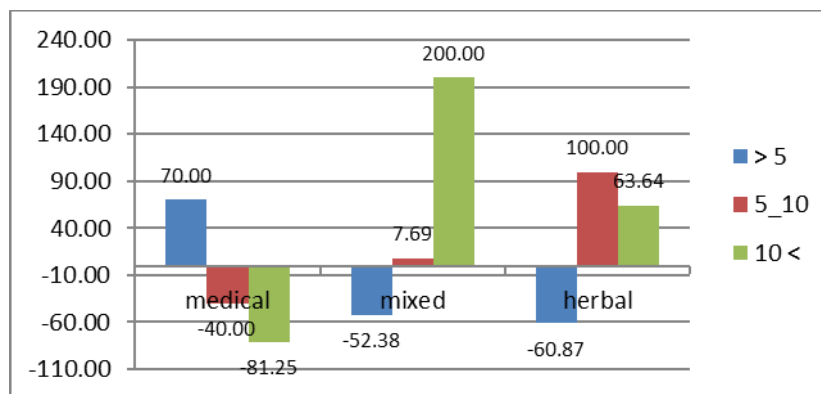


figure 6 : Show the correlation between uses of different methods of management medical, herbal or mixed on the number of bacterial cells .

Figure 7 show the correlation between the uses of different methods of managements medical, herbal or mixed on the number of candida cells obtained from vaginal swabs. The correlation was not significant as the P value was <0.01.

	>5	5--10	10<
medical1stvisit	19 (45.24)	9 (56.25)	7 (87.5)
medical3rdvisit	23 (54.76)	7 (43.75)	1 (12.5)
Chi²	0.38	0.25	4.50
P value	0.53	0.61	0.03
mixed1stvisit	17 (56.67)	6 (35.29)	47 (78.33)
mixed3rdvisit	13 (43.33)	11 (64.71)	13 (21.67)
Chi²	0.53	1.47	19.26
P value	0.46	0.22	0.001
herbal1stvisit	16 (55.17)	18 (58.06)	6 (50.00)
herbal 3rdvisit	13 (44.83)	13 (41.94)	6 (50.00)
Chi²	0.31	0.80	0.00
P value	0.57	0.36	1.00

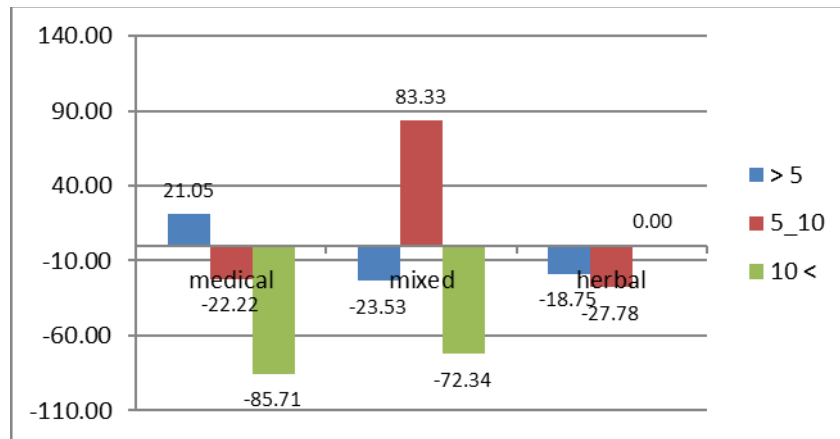


Figure 7 : The correlation between the uses of different methods of managements medical, herbal or mixed on the number of candida cells

Table 11 show the correlation between the uses of treatment either medical, herbal or mixed and no treatment use on vaginal pH. The correlation was highly significant between uses of treatment and vaginal pH as the P value <0.01.

pH	Yes	No
medical1stvisit	4 (13.33)	17 (65.38)
medical3rdvisit	26 (86.67)	9 (34.62)
Chi ²	16.13	2.46
P value	0.001	0.11
mixed1stvisit	7 (58.33)	24 (61.54)
mixed3rdvisit	5 (41.67)	15 (38.46)
Chi ²	0.33	2.07
P value	0.56	0.14
herbal1stvisit	2 (28.57)	29 (63.04)
herbal 3rdvisit	5 (71.42)	17 (36.96)
Chi ²	1.28	3.13
P value	0.25	0.07

** mean the high significant correlation at (P < 0.01)

Vertically different letters mean high significant differences (P < 0.01) between these averages, according to Dunkin's test.

Table no. 13 show the changes in the no. of infectious cell as followed the patients in consecutive visits after use of treatment(medical or mixed). The correlation was significant as the P value <0.01.

	> 5	5-10	10 <
> 5	1.000	- 0.36	- 0.58 **
5-10		1.000	0.17
10 <			1.00

** mean the high significant correlation at (P < 0.01)

DICUSSION

Vulvovaginal symptoms are common and frequently result in encounter of patients with health care system, including use of folk remedies, purchase of over the counter (OTC) pharmaceuticals, and presentation to health care providers [52]. Cervicitis may be infectious or non-infectious is primarily an endocervicitis caused by *Neisseria gonorrhoea*, *C. trichomatis* or both of these sexually transmitted pathogens [53]. The normal vaginal secretions are a physiologically important biomass. Vaginal cells contain glycogen and are continually shed into the lumen of vagina. As the cells analyze, glycogen depolymerizes to glucose which serves as energy source for bacteria known as *Lactobacilli*. *Lactobacilli crispatus* and *Lactobacilli jensenii* are the predominant species [54]. *Lactobacilli* metabolize glucose lactic acid, which results in a normal vaginal pH of 3.5 to 4.6. *Lactobacilli* also produce hydrogen peroxide, which is bactericidal alone and highly bactericidal in combination with physiologic amounts of myeloperoxidase and chloride [55]. Loss of normal *Lactobacillus* dominated vaginal flora increases the likelihood of exogenous infection after exposure to sexually transmitted pathogens, as well as the risk of endogenous infection in association with pregnancy and gynecologic surgery [55, 56]. In addition to normal secretions, the differential diagnosis of vaginal discharge primarily include three infections, e.g. Trichomoniasis, vulvovaginal candidiasis and bacterial vaginosis (BV); an idiopathic condition known as desquamative inflammatory vaginitis (DIV); cervicitis, both infectious and non-infectious, and vulvovaginitis associated estrogen deficiency [57]. Patient medical history should include all of the usual gynecologic parameters, including menstrual history, pregnancies contraception, past and present sexual relationships, and prior genitourinary infections, underlying medical condition such as allergies, diabetes, malignancies, and immunodeficiency syndrome (primary human immunodeficiency virus HIV disease) that might be associated with vulvovaginal disease [58]. Common pathogen include: *Candida albicans*, *Trichomonas vaginalis*, *Neisseria gonorrhoea*, *C. trichomatis*, *Gardnerella vaginalis* and others. Treatment of Candidiasis, uncomplicated or complicated is different. Effective drugs for Candidiasis include Fluconazole 150mg orally in a single dose with vaginal preparations and metronidazole for Trichomoniasis, the paper reviewers pathogenesis, diagnosis and therapy of vaginitis and cervicitis.

Complications of vaginitis:

Women with BV are at increased risk of acquiring sexually transmitted infections. They have a 2-fold increased risk of HIV acquisition [59], 1.5 to 2-fold risk of chlamydia [60] and gonorrhoea [61], a 9-fold risk of TV [62] and a 2-fold risk of HSV-2 [63] compared to women without BV. HIV positive women with BV have a 3-fold risk of transmitting HIV [64]. Monthly prophylaxis with metronidazole reduces the incidence of STIs by almost 50% [65]. The BV-associated bacteria are probably also implicated in the aetiology of pelvic inflammatory disease. A prospective study of women with clinically suspected pelvic inflammatory disease (PID) reported significant correlations between the presence of BV associated bacteria and the presence of endometritis and recurrent PID [66]. There is an association with BV and post-hysterectomy vaginal cuff infection [67,68], post-abortion endometritis [69,70], and an increased risk of spontaneous miscarriage and preterm birth [71,72]. Symptomatic pregnant women with BV should be treated in the usual way but the latest Cochrane review concludes there is insufficient evidence to recommend routine screening and treating all pregnant women for asymptomatic bacterial vaginosis to prevent preterm birth [73]. Multiple reports support an epidemiological association between HIV and trichomoniasis. There is growing evidence that trichomonas infection enhances HIV transmission [74,75] and there may be an increased risk of TV infection in those that are HIV positive [76]. Trichomoniasis is associated with adverse pregnancy outcomes [77,70]. The literature on metronidazole treatment during pregnancy and preterm birth is not conclusive. The most recent Cochrane review found that metronidazole is effective against trichomoniasis when taken by women and their partners during pregnancy, but it may harm the baby due to early birth [76]. Screening of asymptomatic individuals for TV infection is therefore not currently recommended. Although only recently described, moderate/severe AV is associated with an increasing number of co-infections and complications [67]. An increased risk of preterm delivery and chorioamnionitis in women with first trimester AV has been shown [68]. ***Several studies in the last decade have shown a decrease in preterm birth, if vaginal Candida colonisation or infection had been treated with clotrimazole [69].*** In a study by Holzer et al women who were colonized with *Candida* spp. during the second trimester of pregnancy had higher rates of preterm birth and lower neonatal birthweight than those who were colonized during the first trimester of their pregnancy [70]. According to old studies the vaginal treatment of an asymptomatic *Candida* colonisation during the last 6 weeks of pregnancy reduces the *Candida* colonisation of the newborn during vaginal delivery and thus reduces oral thrush and napkin dermatitis of the baby during the first 4 weeks of life [71]. Modern studies are urgently needed to confirm these findings.

In a study conducted on indigenous plants from Tanzania, some species possessed antibacterial and antifungal activity against *C. albicans* and *Staphylococcus aureus*.

Natural remedies rather than herbs: Probiotics:

Are not considered as herbal remedies, but they are a natural way of treating or preventing vaginitis. In clinical trial, Falagas et al., has reported the ability of some strains of *Lactobacilli* to prevent the adherence of *Gardnerella vaginalis* to the vaginal epithelium, and also hydrogen peroxide, lactic acid, and bacteriocins which inhibit the growth of bacteria that causes BV. They also describe that the intra-vaginal administration of probiotics can cure and prevent reappearance of BV, by increasing the vaginal *Lactobacilli* and restoring normal vaginal microbiota [78].

RECOMMENDATIONS

More research is needed to better characterize the cause and treatment of inflammatory vaginitis. Some studies have demonstrated improvement in symptoms with application of topical clindamycin or steroids; however, the ideal duration of treatment and superiority of one agent over the other have not been established. Herbal remedies have been mostly considered safe and effective especially in developing countries. Non-infectious vaginitis has also been treated using phytoestrogens from plants. Most of these herbs have been formulated into pessaries or suppositories, which makes them more accessible. Further studies on the mechanisms of their action would be imperative for adequate drug delivery and minimized toxicity. Probiotics are also natural resources that can treat or prevent reappearance of vaginitis

CONCLUSIONS

1. Bacterial Vaginosis is the most common condition of vaginitis (40-50%), then followed by vaginal candidiasis (20-25%) and Trichomoniasis (15-20%).
2. A number of factors can change the composition of the vaginal flora, includes, Age, Sexual activity, Hormonal status, Hygiene, Immunologic status and underlying skin diseases.
3. The normal postmenarchal and premenopausal vaginal pH is 3.8-4.2. At this pH, growth of pathogenic organisms usually is inhibited.
4. The causative agent in 85-90% of cases is *C. albicans*, and in 5-10%, is caused by *C. glabrata* or *C. parapsilosis*.
5. Antibiotics that may be used in the management of bacterial vaginosis include ceftriaxone (Rocephin), erythromycin, metronidazole (Flagyl), clindamycin (Cleocin), cefixime (Suprax), doxycycline (Doryx), and azithromycin (Zithromax). Mild or moderate infections can sometimes be treated with a single dose of oral antifungal medication.
6. Vaginitis due to STDs can be prevented by practicing safe sex, and complete internal hygiene.

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