



Urinary tract infections and vaginitis are widespread among pregnant women in Mosul

Abdalahim H. Eefan
Directorate of Education Nineveh
arhim640@gmail.com

Abstract:

To assess the prevalence and causes of urinary tract infections (UTIs) and bacterial vaginosis (BV) in pregnant women, a study was conducted with 440 pregnant women. Their data were analyzed based on questionnaires and the results of urine and vaginal examinations. The odds ratio (OR) and confidence interval (CI) were calculated to determine the relationship between UTIs and BV. The results showed that the prevalence of UTIs among pregnant women was 34.3%, while the prevalence of BV was 20.8%. The percentage of women with both infections was 30.1%, while the percentage without was 14.8%. The odds ratio was 1.44, and the confidence interval (CI) at a 95% significance level was 0.95–2.19. This demonstrates a relationship between the infections, where BV predisposes to UTIs and increases the likelihood of developing them.

Keywords: Vaginitis, UTI, Infection, Pregnancy, Lactobacillus bacteria

Introduction

Bacterial vaginosis (BV) is a common infection of women between the ages of 15 and 44 years due to accumulation of certain types of bacteria in the vaginal area, although this type of infection can be easily cured it is possible to harm the fetus in the case of pregnancy¹. Lactobacillus often colonize the healthy vagina of women, this bacteria play an important role in maintaining the health of the host from any infection may come from the urinary system. There is no doubt that the period of pregnancy affects bacterial flora in the vagina leading to a defect with the amount of lactobacillus. It becomes easy to occupy the area by anaerobic and gram-negative bacteria². Most cases considered by pregnant women to be moderate and not reported with the presence of symptoms such as increased milking secretions due to increased pH as well the hormone change that usually happens in pregnancy period. Like vaginosis, urinary tract infection is also a common problem in pregnant women which is universally defined as the occupation of urinary tracts by bacteria. The reason behind frequent spread among women is small and short urethra, the lateness of urination in addition to sexual activity and the use of contraceptives, Making the environment conducive for the control coliform bacteria³.

but the association between urinary tract infections and vaginosis can lead to serious complications at birth. The ignorance of such infections, miss diagnosis and untreated cases, lead to harm the newborn with permanent injuries and serious complications⁴.

And changes in the urinary tract and immune system during pregnancy enhance the occurrence of bacteriuria, posing substantial hazards to both the mother and the fetus. Parity, increasing age, sickle cell anemia, diabetes, urinary tract diseases, and a history of UTI may raise the risk of urinary tract infections in pregnant women.⁵.



In pregnancy, a urinary tract infection without antibiotic therapy can lead to major consequences such as low birth weight, premature labor, hypertension, pre-eclampsia, anemia, pyelonephritis, amnionitis, stillbirths, neonatal mortality, bacteremia, and toxic septicemia. Treatment for urinary tract infections may lower the risk of pregnancy problems. So, screening for early diagnosis and treatment of urinary tract infections in pregnant women is vital to avoid their consequences.⁶

The most prevalent pathogenic causes of urinary tract infections include *Escherichia coli*, *Staphylococcus* spp., *Streptococcus* spp., *Proteus* spp., and *Klebsiella* spp. *Corynebacterium*, *Neisseria*, and *Pseudomonas* species ". The severity of a urinary tract infection is determined by the virulence of the bacteria and the host's susceptibility. The most effective antibiotics for treating the majority of urinary tract pathogens are penicillin, amoxicillin, celtaxidime, norfloxacin, and cefoxitin.⁷

The current study is significant because urinary tract infections can pose a risk to pregnant women, with up to 50% of those with asymptomatic Bacteriuria (ABU) developing pyelonephritis. Consequently, women throughout pregnancy should be examined for predisposing factors and the causative organism of UTI during their antenatal follow-up. For maternal and fetal health safety, a urine examination for pathogens should be performed, as well as an appropriate antibiotic course. Antibiotic sensitivity and pregnancy-related adverse reactions should be examined. The goal of this study is to determine the prevalence of urinary tract infections with vaginal infections in pregnant women and the connection between these diseases and unfavorable pregnancy outcomes⁸.

MATERIALS AND METHODS

Four hundred and forty pregnant women visited Ibn Sina General Hospital in Mosul, Iraq, for routine prenatal checkups between December 2024 and March 2025. All pregnant women participating in this study were at least 12 weeks pregnant. Each woman filled out a questionnaire that asked about her age, occupation, reproductive status, smoking habits, and history of urinary tract infections (UTIs) or bacterial vaginosis. A sample of vaginal discharge was sent to the laboratory for vaginitis testing, while a urine sample was sent for UTI diagnosis. The connection between UTIs and bacterial vaginosis was determined by calculating the odds ratio (OR) and confidence interval (CI).

The analysis was performed by taking a cotton swab from the pregnant woman and performing microscopic examination to identify the type of infection. fig 1&2&3 The swab was then sent to the laboratory for final pH analysis. Additional tests, such as the potassium hydroxide (KOH) test, which detects fungi or a fishy odor, indicate the presence of bacteria, leading to appropriate diagnosis and treatment.

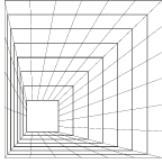
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The basic steps of the examination are:

Sample Collection: The doctor uses a cotton swab with a cotton tip to minimize the risk of allergic reactions to the discharge.

Direct Examination:

1. Under the Microscope: The sample is fixed in saline solution on a glass slide and examined directly using cells (e.g., pilot cells) and motility (e.g., trichomonads).
2. Potassium Hydroxide (KOH) Test: A drop of potassium hydroxide is added to dissolve the cells and detect fungi (yeast) or a fishy odor.



3. pH Measurement: The pH is measured using special paper. A normal pH range is between 3.8 and 4.5 (acidic), while a pH above 4.5 indicates an infection. 4. Laboratory File: The sample may be sent to a specialized laboratory for bacterial and fungal cultures or for testing for less common pathogens.

Urine analysis during pregnancy can also detect germs and infections by studying the sample under a microscope for white and red blood cells, as well as bacteria. A urine culture is also performed to correctly identify the type of bacteria and determine the best medication. This is critical during pregnancy for detecting silent urinary tract infections, which can cause major issues such as premature birth. To ensure accurate results, the sample is collected using the "clean urine" method. This involves thoroughly wiping and cleaning the genital area before collecting the urine in a sterile cup, avoiding touching the inside of the cup.



Fig 1&2 : Samples from pregnant women infected with vaginal bacteria



Fig 3 : A large collection of vaginal bacteria cultures

Results And Discussion

Cases involving 440 pregnant women aged over 20 and under 45 years of age, most of them housewives 68%, years of marriage were between 2 and 20 years, 37% of pregnant women were having their first pregnancy, 99% are non-smoking and 61% of pregnant women revealed having previous urinary tract infections only, while 23% were having previous infection of both UTI and BV.

Prevalence of infections

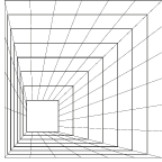
The rate of prevalence of UTI observed in pregnant women that had subjected to this study were 34.3% women, where the women who were suffering from vaginosis only were 20.8%, Percentage of women who suffer from both urinary tract infection and vaginosis were 30.1%, finally percentage of pregnant women, who were free from both infections were 14.8% as explained in Fig. 4.

Association between UTI & BV

The study showed that women with vaginitis can trigger urinary tract infections with an odds ratio (OR) equal to 1.44 and a confidence interval (CI) with 95% probability were 0.95 to 2.19.

Causes of infections

A set of questions were prepared to investigate the causes of these infections in pregnant women, 69% of pregnant women admitted to neglecting to drink water regularly and adequately during their pregnancy, While 10.8% women with UTI reported that gestational vomiting and pregnancy-related nausea were behind preventing them from drinking water in



adequate amount, 20.7% of infected women declared that the causes of infection are due to other reasons , including kidney disease , frequent consumption of fizzy drinks and pickled as shown in fig 5 .

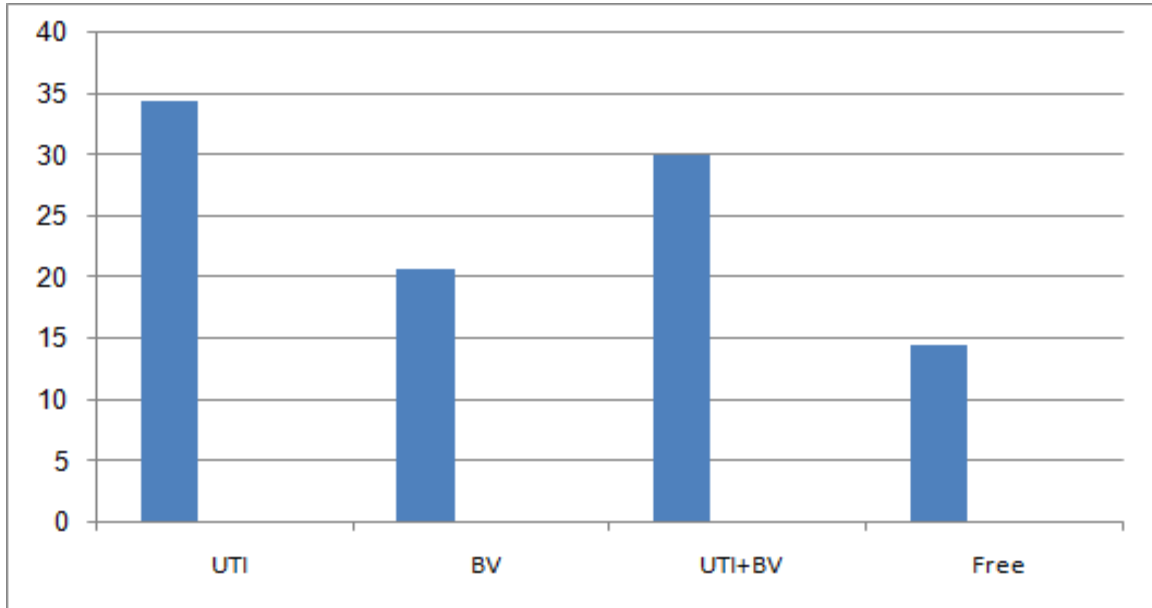
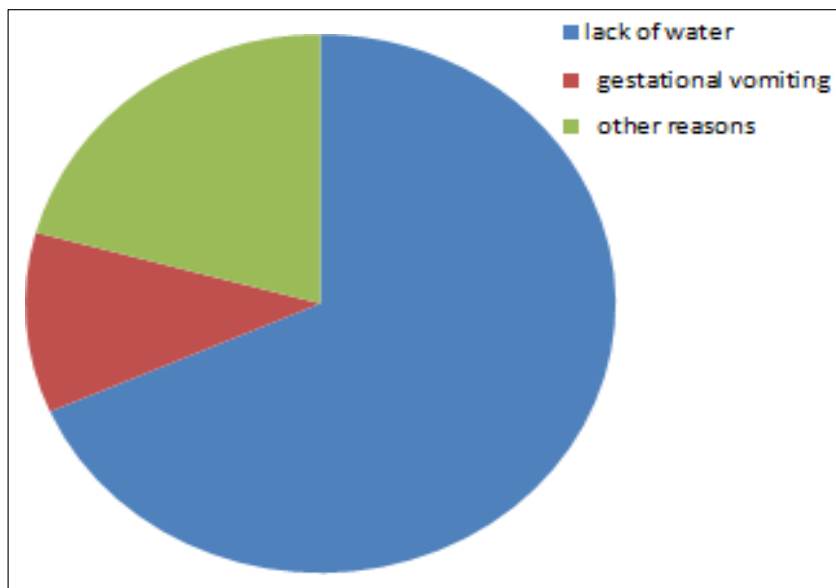


Fig. 4 : The percentages of prevalence of infections among pregnant women.



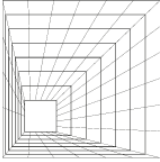


Fig. 5 : Causes of infection of UTI & BV.

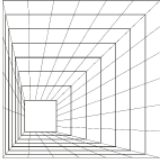
Anatomically, the woman's body is more susceptible to urinary tract infection due to the vaginal proximity of the urethra, lack of drinking water and increased concentration of urine in pregnancy, where hormones and sugar are thrown with urine, which encourages bacteria to exist and multiply⁹. A pregnant woman body needs water for its essential role in transferring nutrition to the fetus in addition to its importance in preserving the body from dehydration and for preventing pregnancy complications, such as headaches and nausea and even the incidence of contractions that lead to preterm labor¹⁰. Asymptomatic of urinary tract infections and omission parental visits followed up with a specialist physician that will lead to the development of kidney diseases, acute cystitis and the birth of a little weighty child. Bacterial changes in the vagina were studied in a chromatographic pattern, It found that E.coli bacteria which is not a normal flora of the vaginal area were colonizing the vagina entrance; they also found that those who suffer from severe symptoms and urinary tract infections were using the diaphragm to prevent pregnancy¹¹.

Conclusion

- Bacterial vaginitis stimulates and increases urinary tract infection
- Most pregnant women were not aware of having bacterial vaginosis.
- Because of the increased incidence of urinary tract infections without symptoms, many women have been getting wrong in diagnosing premature births, putting their lives at risk.
- Periodic review of maternal and child health centers is necessary throughout pregnancy.
- Drinking sufficient amounts of water and minimizing the consumption of fizzy drinks and pickles has a significant impact on reducing the incidence of pregnancy.

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