



## Study of Infectious Agents in Vaginal Samples: Interest and Results

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**Abstract**

**Introduction:** Vaginal infections are a common health issue among women. They can be caused by various microorganisms, cytobacteriological diagnosis is an essential tool. It allows for the accurate identification of the causative organism(s), guiding clinicians toward targeted and effective treatment to preventing more serious complications, particularly during pregnancy. The main objective is to identify the microorganisms responsible for vaginal infections from samples collected from 75 patients, using a cytobacteriological approach based on microscopic examination, culture, and biochemical identification of the infectious species.

**Results:** Showed that among the samples analyzed, 34 tested positive, representing an infection rate of 45%. This rate confirms the high prevalence of vaginal infections, particularly among women aged 20 to 34.

**Discussion:** The analysis also revealed a predominance of yeast, particularly *Candida albicans*, followed by *Escherichia coli* and *Streptococcus agalactiae*. The study also highlights the significant role of factors such as age, pregnancy, and intimate hygiene in the occurrence of these infections.

**Conclusion:** Microbiological diagnosis is therefore an essential tool for the effective management of vaginal infections, helping to prevent potential complications, as these infections can have serious consequences if not treated in time.

**Keywords:** Vaginal Infections; Swab Samples; Cytobacteriological Examination; Age; Pregnancy

**Introduction**

Women's gynecological health largely depends on the balance of the vaginal flora, naturally present in women; it is mainly composed of lactobacilli (Döderlein flora), which maintain an acidic pH and thus play a key role in protecting the vagina from infections. Likewise, physiological vaginal secretions are normal. However, a disruption of this flora can lead to vaginal infections. Several factors may cause this imbalance, mainly: hormonal changes, sexually transmitted bacteria, insufficient or excessive intimate hygiene [1]. Consequences often appear as changes in vaginal discharge (color or odor), itching, or local pain.

Most vaginal infections, such as candidiasis or trichomoniasis, are generally not serious and can be treated effectively with appro-

priate therapy and proper intimate hygiene [2]. Diagnosis is based first on a clinical examination, then on a vaginal sample analyzed to identify the pathogen responsible. Vaginal cytobacteriological study is not limited to symptomatic women; it is also systematically carried out in pregnant women, mainly to screen for Group B *Streptococcus*, a bacterium that can cause complications during childbirth [3].

In this prospective study conducted in 2025 over two months at the bacteriology laboratory of the Moulay Ismail Military Hospital in Meknes (HMMIM), we followed the complete process of vaginal samples, from their reception at the laboratory to the identification of the pathogenic germ responsible for the infection [4-18].

Materials and Methods

This is a prospective study conducted in 2025 over two months at the HMMIM bacteriology laboratory. It included patients presenting with leukorrhea who underwent a vaginal swab for cytobacteriological study.

Sampling was performed outside menstruation, far from sexual intercourse, and before any local or general antibiotic treatment, with no urination for at least two hours, and no vaginal douching within the previous 24 hours. Multiple swabs of vaginal secretions from the posterior fornix were collected either at the laboratory or during gynecological consultation. Swabs were transported without delay (max two hours) to avoid drying and to allow fresh examination of *Trichomonas vaginalis*, which is highly sensitive to external conditions.

- **Fresh microscopic examination (first swab):** looked for leukocytes, red blood cells, epithelial cell shedding, bacterial morphology/abundance, motility, *T. vaginalis*, yeasts, and pseudohyphae.
- **Gram staining:** Allowed classification of bacteria into “Gram positive” and “Gram negative,” giving insight into vaginal flora and bacterial abundance, morphology, grouping, and affinity. Anaerobic infection was noted in cases of abundant, polymorphic flora.
- **Bacterial isolation:** Cultures on chocolate agar, blood agar, and simple Sabouraud agar.
- **Rapid immunochromatographic test:** Chlamydia trachomatis detection (CHLAMY-CHECK-1).
- **Mycoplasma detection:** Mycoplasma Zeakon Diagnostics test, based on bacterial growth in nutrient wells with antibiotics (antibiogram).

Ethical aspects

Confidentiality, anonymity, and informed consent of patients were respected.

Results

We analyzed 75 samples over two months. Data showed 34 positive samples (45%). Infectious leukorrhea affected all ages with variable prevalence, predominating in women aged 20–34 years (56%). No cases were recorded in women under 20.

Of the 34 positive samples, 9 were from pregnant women (26%) and 25 from non-pregnant women (73%).

Distribution of isolates:

- Yeasts: 41%
- Enterobacteria: 23%
- Streptococci: 15%
- Anaerobes (mainly *Gardnerella vaginalis*): 12%
- Staphylococci: 9%

Most common species:

- *Candida albicans* – 29%
- *Escherichia coli* – 17%
- *Streptococcus agalactiae* – 15%
- *Gardnerella vaginalis* – 12%
- *Candida non-albicans* – 12%
- *Klebsiella pneumoniae* – 6%
- *Staphylococcus haemolyticus* – 6%
- *Staphylococcus aureus* – 3%

Key observations:

- *C. albicans* was mostly found in women aged 20–34 (70%).
- *E. coli* strongly associated with women aged 34–50 (83%).
- *C. non-albicans* exclusively found in 34–50 age group (100%).
- *K. pneumoniae*: Equally in 34–50 and >50 age groups (50% each).
- *S. haemolyticus* and *S. aureus*: Equally between 20–34 and 34–50 (50% each), absent >50.
- *S. agalactiae* and *C. albicans* were mainly in pregnant women (100% and 70%).
- *G. vaginalis* and *C. non-albicans* predominant in pregnant women (60% and 75%).
- *E. coli*, *K. pneumoniae*, and *S. aureus* were only found in non-pregnant women (100%).

Discussion

Leukorrhea (vaginal discharge) is one of the most common reasons for gynecological consultation. Globally, about 1 billion women suffer annually from lower genital tract infections, with 376 million contracting one of four STIs: chlamydia, gonorrhea, syphilis, or trichomoniasis.

Infectious leukorrhea generally results from vaginal flora imbalance. Normally, the vagina is protected by lactobacilli, but when replaced by excessive growth of other microorganisms, abnormal discharge, itching, burning, or pain occur.

Complications include pelvic inflammatory disease, infertility, pregnancy complications (preterm birth, neonatal infections), and psychosocial impacts.

Our study:

- Infectious leukorrhea mainly affected women aged 20–34 (50%), mean age 35.
- Similar findings in Morocco, Tunisia, Benin, France.
- Lower prevalence in menopausal women (>50 years, 9%), explained by reduced estrogen, atrophy, higher vaginal pH, and polymorphic anaerobic flora.
- Infections in pregnant women (26%) – lower than Rabat (39%) and Algeria (33%), higher than Cameroon (17.65%). Pregnancy predisposes due to glycogen release, low vaginal pH, reduced mobility, and hormonal changes.
- *C. albicans* very common in pregnancy due to estrogen and lowered immunity.
- *S. agalactiae* common, screened systematically in pregnancy to avoid neonatal sepsis or meningitis.
- *G. vaginalis* strongly linked to bacterial vaginosis, influenced by hormonal fluctuations.
- *E. coli* often from intestinal contamination, more in non-pregnant women.
- Other pathogens (*C. non-albicans*, *K. pneumoniae*, *S. aureus*) opportunistic, linked to vaginal douching, antibiotics, diabetes, or immunosuppression.

## Conclusion

The cytobacteriological study of vaginal swabs at the HMMI bacteriology laboratory in Meknes confirmed the high frequency of vaginal infections, particularly in women aged 20–34 years. *Candida albicans* was the most isolated pathogen, followed by *E. coli* and *S. agalactiae*.

These results highlight

- The importance of screening (especially in pregnant women),
- The need for proper intimate hygiene,
- Targeted treatment,
- And microbiological diagnosis as an essential tool for effective management and prevention of complications.

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