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Isolation of pathogenic microorganisms from vaginal swabs at the N'Djamena University Hospital for Mother and Child.

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ABSTRACT

Vaginal infections represent a major public health issue, particularly in developing countries where access to diagnostic and treatment services remains inadequate. The vagina is a complex microbiological ecosystem, normally dominated by lactobacilli, which play a protective role by maintaining an acidic pH and preventing the proliferation of pathogenic bacteria. Any disruption to this balance, known as vaginal dysbiosis, promotes the development of infections. These infections are among the most common reasons for gynaecological consultations among women of childbearing age. The aim of this study was to characterise the pathogens isolated from vaginal swabs taken from women attending the Bacteriology Laboratory at the University Hospital Centre for Mother and Child (CHU-ME) in N'Djamena between 15 October and 15 November 2025, and to establish their antimicrobial susceptibility profiles. A total of 99 vaginal swabs were collected and analysed using routine microbiological techniques. Women aged 20–29 were the most affected group (61.6%), with a mean age of 26 years. The prevalence of confirmed vaginal infection was 36.4%, with an overall microbiological positivity rate of 60.6%. *Candida spp* was common, accounting for 40.4% of cases, and co-infection with this organism was found in 32.3% of cases. *Escherichia coli* accounted for 3% of vaginal infections. According to antifungal susceptibility testing, *Candida spp* showed 90.9% susceptibility to Miconazole and 97.8% to Econazole, as well as 66.7% susceptibility to Fluconazole. Resistance was observed to Amphotericin B (95.6%) and Griseofulvin (95.7%). According to the antibiotic susceptibility testing carried out, Amikacin showed 100% susceptibility against *Staphylococcus spp*., making this aminoglycoside the most active agent against the staphylococci isolated in this study. Erythromycin and Gentamicin showed lower susceptibility rates of 67.9% and 60.7% respectively, although a 25.0% resistance rate to Erythromycin limits its use as a first-line treatment. *Escherichia coli* showed 100% susceptibility to Imipenem and Gentamicin, as well as 50% susceptibility to Ertapenem and Ciprofloxacin. However, it was resistant to Ceftriaxone (100%), Ampicillin (100%) and Nalidixic Acid (100%).

Keywords: Vaginal infections, CHU-ME, N'Djamena.

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INTRODUCTION

Women's reproductive health is a major public health issue, particularly in developing countries where access to diagnostic and treatment services remains inadequate. The vagina is a complex microbiological ecosystem, normally dominated by lactobacilli which play a protective role by maintaining an acidic pH and preventing the proliferation of pathogenic bacteria (Sobel, 2007)[1].

Vaginal infections are among the most common reasons for gynaecological consultations among women of reproductive age. They are mainly characterized by bacterial vaginosis and vulvovaginal candidiasis. According to the World Health Organization (WHO), bacterial vaginosis affects approximately 23–29% of women of reproductive age, with a particularly high prevalence in low-resource countries (WHO, 2023)[2]. Furthermore, vulvovaginal candidiasis affects up to 75% of women at least once in their lifetime (3). These infections lead to pelvic inflammatory disease, obstetric complications due to preterm birth and preterm premature rupture of membranes (WHO, 2023; Workowski and Bachman 2021)[2,3].

In sub-Saharan Africa, the most common type of vaginal infection in women was caused by Candida. Of 72 isolates collected in the Republic of Benin, non-albicans species predominated, accounting for 70.83% of the total, with *Candida dubliniensis* (36.11%), *Candida albicans* (29.17%), *Candida glabrata* (12.50%) and *Candida krusei* (11.11%) were the most commonly isolated species (Fanou et *al.*, 2022)[6]. In 2023 in Senegal, a study reported a prevalence of female genital infections, dominated by *Candida albicans* and *Gardnerella vaginalis*, with a notable frequency of co-infections (Diop et *al.*, 2023)[5]. In Cameroon, the prevalence of infections was 70.59%. The organisms identified were *Candida albicans* 32.35%, *Gardnerella vaginalis* 30.39%, *Staphylococcus aureus* 8.82%, *Streptococcus spp* 1.96%, *Enterobacteriaceae* 11.78% and *Trichomonas vaginalis* 1% (Ngaba et *al.*, 2024). As for *Trichomoniasis*, it is an infection that affects many people in certain populations. It is estimated that 10–15% of these people are infected (Bautista et *al.*, 2016)[4].

In Chad, a study conducted in 2012 in N'Djamena reported a prevalence of 48.3% of vaginal infections among gynaecological patients, with bacterial vaginosis accounting for 29.7%, vulvovaginal candidiasis for 12.4% and *Trichomoniasis* for 6.2% (20). In 2025, a study conducted among women in N'Djamena found a prevalence of 13.33% for *Mycoplasma genitalium*, 5.14% for *Neisseria gonorrhoeae*, 0.95% for *Chlamydia trachomatis* and 4.57% for *Trichomonas vaginalis*. The prevalence of co-infections was 0.95% for *Mycoplasma genitalium* and *Trichomonas vaginalis*, and 0.38% for *Mycoplasma genitalium* and *Neisseria gonorrhoeae* (Saleh et *al.*, 2012; Mahamat et *al.*, 2025)[7,8]. The frequent use of empirical treatment, without guidance from antibiotic susceptibility testing or antifungal susceptibility testing, promotes the emergence and selection of antimicrobial-resistant strains (Ouedraogo et *al*., 2017)[9].

The overall objective of this study was to isolate pathogenic microorganisms from vaginal swabs at the CHU-ME in N'Djamena.

MATERIALS AND METHOD

Type and duration of the study

This was a prospective, descriptive study with an analytical focus, conducted over a one-month period from 15 October to 15 November 2025.

Study setting

The Bacteriology Laboratory of the University Hospital Centre for Mother and Child (CHU-ME) in N'Djamena, located in the Gardolé district in the 3rd arrondissement of the city of N'Djamena, at the following GPS coordinates: 12°06′30″ N and 15°02′45″ E, served as our study setting. All microbiological analyses of the vaginal swabs were carried out in this bacteriology laboratory at the CHU-ME.

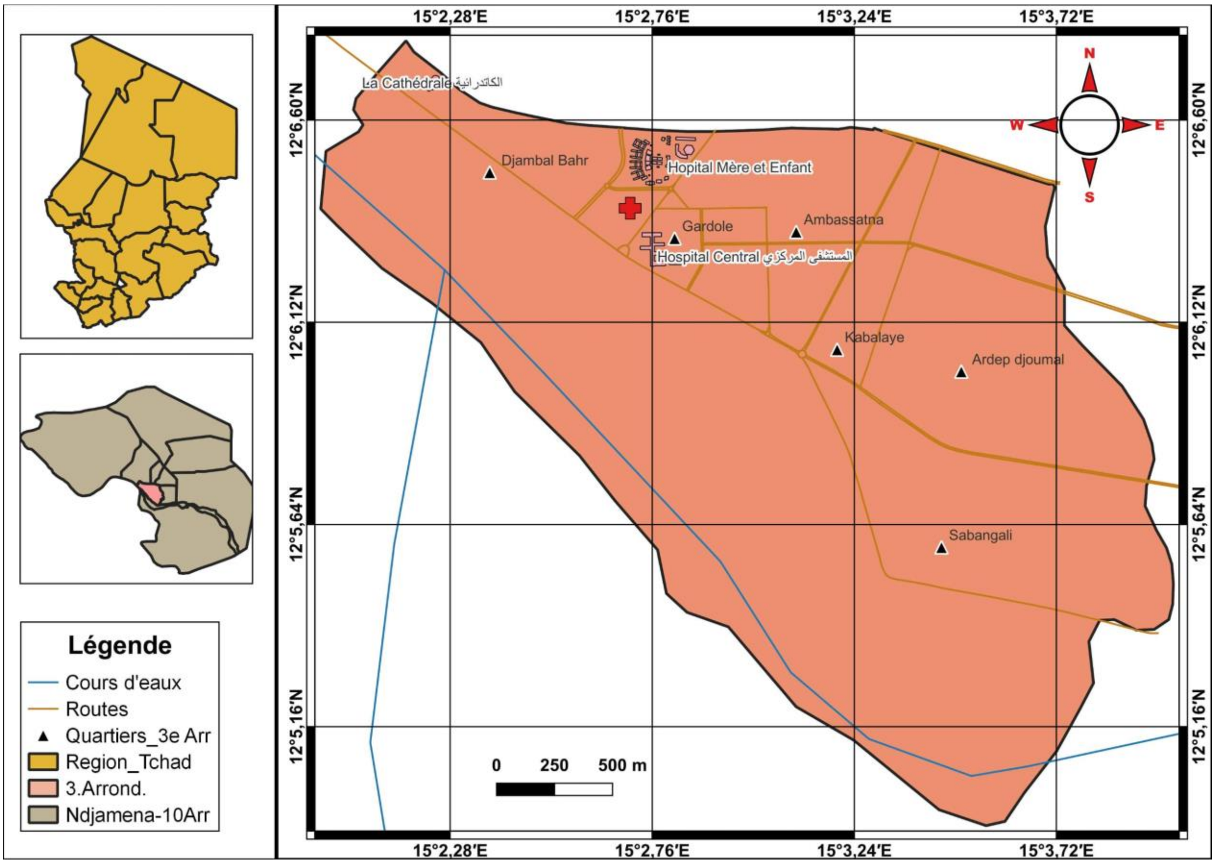

Figure 1: Study area

Sampling and study population

The sample was exhaustive and drawn on a voluntary basis from women of childbearing age presenting with a report on the results of vaginal swab tests. A total of 210 women were interviewed. Of these, 77 women were under 13 years of age and were therefore excluded, and 34 women did not give their consent to participate in this study. Consequently, 99 women of childbearing age consented to participate in this study. The study population consisted of women attending the CHU-ME in N'Djamena during the study period, regardless of whether or not they presented with signs of vaginal infection. These patients were recruited from the outpatient, gynaecology and gynaecological emergency departments.

Inclusion and exclusion criteria

The study included all women seen during the study period at the relevant departments who gave their verbal consent to participate in the study. The study excluded patients who were minors, those who did not consent to participate in the study, and those not attending the targeted departments.

Data collection

Primary data were collected using a structured questionnaire administered during an individual interview with each participant. The information collected covered sociodemographic characteristics (age, marital status), clinical data (presence of leucorrhoea, pruritus, odour of secretions) and medical history, particularly the use of antibiotics.

Materials

The materials used in this study included:

- Biological samples: vaginal swabs obtained using sterile swabs;
- Sampling equipment: sterile single-use swabs, gynaecological speculums and sterile gloves;
- Laboratory equipment: optical microscope, incubator set at 37 °C, Bunsen burner, slides and cover slips, sterile loops and Petri dishes;
- Culture media and reagents: Sabouraud agar, blood agar, saline solution and Gram stain reagents (Crystal violet, Lugol's solution, 95% Alcohol, Fuchsin); Muller-Hilton Agar (MHA), antibiotic and antifungal discs, API 20E®, API *Candida*®, API *Stapt*®

Sample collection and transport procedures

Prior to any sample collection, the patient was informed of the essential prerequisites for the validity of the test. The requirement to abstain from sexual intercourse and deep intimate hygiene for at least 24 hours was observed, in order to avoid any dilution or alteration of the target vaginal flora. Furthermore, samples must be taken outside of menstrual periods, in order to eliminate any interference from menstrual blood residues that could distort the macroscopic and microscopic results. Vaginal swabs were taken under aseptic conditions using a speculum and sterile swabs. After collection, the samples were immediately transported to the laboratory to preserve the viability of the microorganisms present in the vaginal swabs. The sample was collected using sterile swabs inserted against the vaginal wall and at the level of the cervix, targeting the endocervical and exocervical sites. Two separate swabs were used: one for direct examination (fresh and stained), the other for inoculation onto culture media.

Techniques for the microbiological analysis of samples

The analysis takes an average of three days if the cultures are positive. It begins with a macroscopic examination, which involves noting the appearance of the samples (fluid, thick, lumpy), their colour, consistency and odour. Next, a fresh mount is prepared by placing a drop of the sample between a slide and a coverslip and observing it under an optical microscope at 40X magnification, without prior staining. The purpose of this examination is to allow cytological analysis (presence or absence of leukocytes, epithelial cells, mycelial filaments) and to observe the motility and morphology of the microorganism's present (*Trichomonas vaginalis*).

A smear of the raw sample was prepared on a slide, heat-fixed and then subjected to Gram staining. The purpose of this technique is to assess bacterial morphology, the density and diversity of the flora, and to note the presence or absence of yeasts.

The endocervical and exocervical swabs were simultaneously inoculated onto Blood Agar (an enriched medium for fastidious bacteria), Sabouraud's Agar (Sabouraud's Agar + chloramphenicol), and a selective medium for yeasts (*Candida spp*.) and fungi. After incubation, positive cultures were selected for Gram staining confirmation. Based on the results of the Gram stain, enzymatic tests were performed to guide identification to the bacterial genus. These included the catalase test for Gram-positive cocci (*Staphylococcus* and *Streptococcus*) and the oxidase test for Gram-negative bacilli (*Enterobacteria* and *Non-Enterobacteria*).

Biochemical identification using API 20E®, API *Candida*®, API *Stapt*®

was carried out in accordance with the protocol provided by Biomérieux. To determine the susceptibility of the bacteria to drugs, we carried out two tests: an antibiogram for the bacteria and an antifungogram for the yeasts. The disc diffusion method as described by Kirby-Bauer on Müller-Hinton agar was used to perform the antibiogram and antifungogram.

Statistical analysis

The data were collected using a form designed for this purpose and were subsequently entered into an Excel spreadsheet using Microsoft Office 2013, then analysed using SPSS version 16.0. Qualitative variables were expressed as percentages with their 95% confidence intervals. Comparisons of proportions were carried out using Pearson's chi-square (χ^2) test, in accordance with the conditions of application. The threshold for statistical significance was set at $p < 0.05$.

Ethical considerations

Two authorisations enabled us to carry out the study. The first authorisation, No. 573 EIFS/DG/SG/DSS/2025, was approved by the Academic Board of the International School of Health and Training. The second authorisation was obtained from the administrative department of the CHU-ME under number: No. 10260/MSP/SE/SG/CHU-ME/DAFM/SRH/2025. In addition, verbal or oral consent was obtained from the participants prior to their inclusion in the study. The data were processed anonymously and confidentially, in accordance with the ethical principles of biomedical research.

RESULTS AND DISCUSSION

Sociodemographic characteristics of the study population

This section presents the results obtained during the study on vaginal infections, describing the sociodemographic characteristics of the patients, their clinical profile, the prevalence of infections, the isolated pathogens, their antimicrobial susceptibility profile, and the factors associated with the occurrence of these infections.

Distribution by age

The 20–29 age group was the most represented, with 61 women, accounting for 61.6% of the total sample. The patients' ages ranged from 15 to 53 years, with a mean of 26 ± 8.4 years and a median of 24 years.

Breakdown by department of origin

The breakdown of patients by department of origin enabled an assessment of the circumstances of their consultation and the level of care provided. The majority of patients came from the outpatient clinic (OPD), accounting for 80.8%, 14.4% from the gynaecology and obstetrics clinic (GOC), 2% from the obstetrics clinic (OBST), and 1% each from the and obstetric departments (UGO).

Breakdown by patients' clinical profile

Table 1 showed that abdominal pain was the most frequently observed symptom (85.9%). Vulvovaginal pruritus was present in 44.4% of patients. Regarding vaginal discharge, 66.7% of patients had scanty leucorrhoea, compared with 33.3% who had profuse leucorrhoea.

Table 1: Distribution of patients by clinical symptoms

Symptôm	Effectif (N)	Percentage (%)
Abdominal pain	85	85,9
Vulvovaginal itching	44	44,4
Light vaginal discharge	66	66,7
Heavy vaginal discharge	33	33,3

Distribution according to history of antibiotic treatment

Of the 99 vaginal swabs analysed, 36 patients were either taking antibiotics or antifungal medication. Only 63 patients were taking neither antibiotics nor antifungal medication.

Distribution according to the prevalence of vaginal infections

Of the 99 vaginal swabs analysed, 36 were positive on microbiological examination, representing an overall prevalence of vaginal infection of 36.4%. In contrast, the remaining 63 swabs, representing 63.6%, yielded sterile cultures, i.e. no confirmed vaginal infection.

Distribution of samples by isolated organisms

In this study, *Candida spp*. were the most commonly isolated organisms, accounting for 60.6% (60/99). Taking co-infections into account, they were present in 40 cases (40.4%). *Staphylococcus spp*. was found in 32 cases (32.3%), either alone or in combination. *Escherichia coli* was isolated in 3 cases (3.0%).

Table 2: Distribution of isolated organisms in vaginal swabs

Isolated germ(s)	Effectif (n)	Percentage (%)
Candida spp (alone)	25	25,3
Staphylococcus spp (alone)	18	18,2
Candida spp + Staphylococcus spp	14	14,1
Candida spp + Escherichia coli	1	1,0
Escherichia coli (alone)	2	2,0
No pathogenic organisms detected	39	39,4
Total	99	100,0

Distribution by antifungal susceptibility

The susceptibility profiles observed reveal significant variations between pathogens, highlighting the need for tailored treatment based on microbiological results.

Candida spp.

Candida spp. showed 90.9% susceptibility to Miconazole and 97.8% to Econazole, as well as 66.7% susceptibility to Fluconazole. Resistance was observed to Amphotericin B (20.0%) and Griseofulvin (95.7%).

Table 3: Antifungal susceptibility test results for *Candida spp.* Strains

Antifongic	Code	N	(S)	S %	(I)	I %	(R)	R %
Econazole	ECN	46	45	97,8%	1	2,2%	0	0,0%
Miconazole	MCL	44	40	90,9%	3	6,8%	1	2,3%
Fluconazole	FLU	45	30	66,7%	3	6,7%	12	26,7%
Amphotericin B	AMB	45	2	4,4%	34	75,6%	9	20,0%
Griseofulvin	AGF	46	0	0,0%	2	4,3%	44	95,7%

Key: S: Sensitive, I: Intermediate, R: Resistant

***Staphylococcus spp*.**

Based on the results of the susceptibility testing carried out on the 28 strains tested, we found a variable susceptibility profile depending on the antibiotics tested. Amikacin showed 100%

susceptibility against *Staphylococcus spp*., making this aminoglycoside the most active compound against the staphylococci isolated in this study. Erythromycin and Gentamicin showed susceptibility rates of 67.9% and 60.7% respectively; however, a 25.0% resistance rate to Erythromycin limits its use as a first-line treatment. Tetracycline showed a susceptibility rate of 57.1% with a low resistance rate of 3.6%. Ciprofloxacin has a susceptibility rate of 39.3% and a resistance rate of 21.4%, reflecting a notable spread of resistance to fluoroquinolones among the isolated staphylococcal strains, likely linked to the frequent use of this class in the community. Fusidic Acid presents the most concerning profile, with a high resistance rate of 64.3% (18/28 strains) and a low susceptibility rate of 10.7% (Table 4).

Table 4: Antibiogram results for *Staphylococcus spp*. strains.

Antibiotic	Code	N	(S)	S %	(I)	I %	(R)	R %
Amikacin	AK	28	**26**	100,0%	2	0,0%	0	0,0%
Gentamicin	CN	28	17	60,7%	7	25,0%	4	14,3%
Ciprofloxacin	CIP	24	11	39,3%	7	25,0%	6	21,4%
Tetracycline	TE	26	16	57,1%	9	32,1%	1	3,6%
Fusidic Acid	AR	28	**3**	10,7%	7	25,0%	18	64,3%
Erythromycin	E	28	19	67,9%	2	7,1%	**7**	25,0%

Escherichia coli

The *Enterobacteriaceae* isolated were *Escherichia coli*, with 100% susceptibility to Imipenems and Gentamicin. However, they also showed 50% susceptibility to Ertapenems and Ciprofloxacin. Both strains were resistant to Ceftriaxone (100%), Ampicillin (100%) and Nalidixic Acid (100%) (Table 5).

Table 5: Antibiogram results for *Escherichia coli*

Antibiotic	Code	N	(S)	S %	(I)	I %	(R)	R %
Imipenem	IMI	5	**5**	100,0%	0	0,0%	0	0,0%
Ertapenem	ETP	4	2	50,0%	1	25,0%	1	25,0%
Gentamicin	CN	6	**6**	100,0%	0	0,0%	0	0,0%
Ciprofloxacin	CIP	6	3	50,0%	1	16,7%	2	33,3%
Ceftriaxone	CRO	5	0	0,0%	3	60,0%	2	40,0%
Ampicillin	AMP	5	0	0,0%	1	20,0%	**4**	80,0%
Nalidixic Acid	ACIS	5	1	20,0%	3	60,0%	1	20,0%

Factors associated with vaginal infection

Vaginal discharge and infection

In this study, 29.3% of women had light vaginal discharge associated with an infection, and 7.1% had heavy vaginal discharge associated with infections.

Table 6: Association between vaginal discharge and infection

Vaginal discharge	No Infection	Infection	Total
Light	37	29	66
Heavy	26	7	33
Total	63	36	99

Antibiotic treatment and vaginal infection

Among the patients who consented to participate in this study, 26 women had known vaginal infections and had taken antibiotics without a prescription; 27.3% were self-medicating.

Table 7: Association between antibiotic treatment and vaginal infection

Antibiotic treatment	No Infection	Infection	Total
NO	37	9	46
YES	26	27	53
Total	63	36	99

Chi-square test

Pearson's chi-square test revealed a statistically significant association between the amount of vaginal discharge and the presence of a confirmed vaginal infection ($\chi^2 = 4.911$; df = 1; p = 0.027). Patients with scant discharge were more likely to test positive on microbiological examination.

The association between prior antibiotic treatment and vaginal infection was highly significant ($\chi^2 = 10.478$; df = 1; p = 0.001). Patients who had received prior antibiotic treatment, i.e. self-medication, had a significantly higher prevalence of vaginal infection (50.9% vs 19.6%), suggesting that antibiotic therapy disrupts the commensal vaginal flora.

Table 8: Statistical Tests (Khi²)

Tests Statistiques (Khi²)		
Association	**Valeur χ^2**	**p-value**
Discharge × Infection	χ^2=4,911	p=0,027 *
Antibiotic treatment × Infection	χ^2=10,478	p=0,001 **

DISCUSSION

In our study, the most represented age group was that of 20–29-year-olds, accounting for 61.6% of patients, with a mean age of 26 ± 8.4 years. This result is similar to the 53.98% found in the 25–35 age group reported by Coulibaly (2023)[10] in the Republic of Mali among 113 women of childbearing age attending antenatal clinics. According to Muzny and Schewebke (2019)[11], this predominance of the younger age group is explained by the high level of sexual activity during this period of life, which is associated with more frequent exposure to risk factors for vaginal infection, notably unprotected sexual intercourse, pregnancy and cyclical hormonal changes (Muzny and Schwebke, 2016)[11].

The majority of patients came from the Outpatient Department (OPD) at 80.8%, followed by the Gynaecology and Obstetrics Department (GOD) at 14.1%. This distribution reflects the reality at the CHU-ME in N'Djamena, where the outpatient department is the main point of entry for symptomatic patients.

In our clinical study, abdominal pain was the most frequently observed symptom (85.9%). Vulvovaginal pruritus was present in 44.4% of patients. With regard to vaginal discharge, 66.7% of patients had scanty leucorrhoea, compared with 33.3% who had profuse leucorrhoea. The results obtained in this study are lower than those from Gahungu in Dakar in 2018[21], which reported the following frequencies: 77.9% of cases of vaginal discharge, 57.2% of vulvar itching or burning, 38.4% of cases of abdominal pain, and 29.7% of cases of heavy vaginal discharge.

Cases of leucorrhoea were reported in all patients, with 66.7% of women in this study experiencing scanty leucorrhoea and 33.3% experiencing profuse leucorrhoea. The association between the volume of discharge and the presence of a confirmed infection was statistically significant in our study ($p = 0.027$). These results are consistent with the work of Coulibaly in 2023 in Bamako, which highlighted the predictive value of the volume of vaginal discharge in the diagnosis of vaginal infections in women of childbearing age.

In this study, 53.5% of patients were self-medicating, i.e. they had received a course of antibiotics prior to their consultation. The association between prior antibiotic treatment and the presence of a confirmed vaginal infection was highly significant ($p = 0.001$). According to Muzny and Schwebke in 2016, these results may be explained by the fact that broad-spectrum antibiotic therapy disrupts the protective lactobacilli flora of the vagina, thereby promoting the proliferation of opportunistic yeasts such as *Candida spp* (Muzny and Schwebke, 2016)[12.]

Candida spp. accounted for 40.4% of the most frequently isolated pathogens, either isolated alone or in co-infection with other pathogens. These results are lower than the 56.25% reported in women (with 1,336 cases of leucorrhoea due to *Candida spp*.) published by Fanou et al. (2022)[6] in Benin. According to Mushi et al. (2022)[13], in sub-Saharan Africa, yeasts predominate in vaginal infections among women of reproductive age. Furthermore, the climatic conditions (high heat and humidity) in N'Djamena, as well as the fact that some patients participating in this study practised inappropriate intimate hygiene, create an environment conducive to their proliferation.

Staphylococcus spp. was the second most commonly isolated pathogen in our study, accounting for 32.3% of all strains (either alone or as part of a co-infection). Its prevalence in aerobic bacterial infections is consistent with the profile of aerobic vaginitis described by

Donders et *al*. (2002)[14], characterised by the colonisation of the vaginal mucosa by aerobic bacteria replacing the protective *Lactobacilli*. These findings may support our results.

Escherichia coli accounted for 3% of the bacterial strains isolated from vaginal swabs in women who consented to participate in this study. Our results are lower than the 1.2% of *Escherichia coli* strains reported by Coulibaly in 2023 in the Republic of Mali among women of childbearing age.

The antifungal susceptibility testing carried out on *Candida spp*. strains revealed excellent sensitivity to Econazole (97.8% of 28 strains tested) and Miconazole (90.9% of 28 strains tested). Our results are comparable to the 74.07% susceptibility rate to Econazole found by Ngaba et *al*. (2024) in Cameroon. These two topical azoles are therefore the first-line agents for the treatment of vulvovaginal candidiasis at the CHU-ME, in line with WHO recommendations for resource-limited countries (WHO, 2016)[15].

However, resistance to Fluconazole was observed in 26.7% of the 29 strains tested. This rate is higher than the figures usually reported by the Antibiogram Committee of the French Society of Microbiology for *Candida albicans*, where the resistance rate varies between 2% and 5% (CASFM, 2023)[16]; however, these results may be explained by the lack of formal identification. This is because strains of *Candida glabrata* or *Candida tropicalis*, which are naturally less susceptible to Fluconazole, may have contributed to this rate. Our results are similar to those published by Mushi et *al*. in 2022, who reported a Fluconazole resistance rate of between 15 and 30% in certain African populations. However, this contrasts with the 46.88% resistance rate of *Candida* to Fluconazole reported by Ngaba et *al*. in 2024.

Griseofulvin showed resistance in 95.7% of cases. These results may be explained by the drug's accessibility. Griseofulvin is cheaper than other antifungals and is readily available to the population of N'Djamena. These observations may support the findings of this study.

Amphotericin B showed a predominantly intermediate profile (75.6%), with only 4.4% sensitivity. These results differ from the 90% sensitivity rate against *Candida* reported by Pfaller et *al*. (2012)[17,22]. However, our results are comparable to those published by Ngaba et al. (2024) in Cameroon, who reported 94% resistance to *Candida albicans* with Amphotericin B.

The susceptibility testing of the available *Staphylococcus spp*. strains (17 out of a total of 30 strains) revealed mixed results. Amikacin showed complete susceptibility (100% of the 13 strains tested), confirming its value as a drug of last resort in staphylococcal infections. Ciprofloxacin showed resistance in 33.3% of cases (out of 18 strains tested), and Erythromycin in 58.3% (out of 12 strains tested). These high rates reflect selection pressure linked to the uncontrolled use of these drugs for self-medication, a phenomenon documented in numerous African studies (Kesah et *al*., 2003; Shittu et *al*., 2022).[18,19]

The results of the *Escherichia coli* susceptibility testing must be interpreted with extreme caution due to the very limited sample size (n = 6 strains with susceptibility data available). Imipenem and gentamicin showed complete susceptibility in the tested strains, confirming their role as drugs of last resort for infections caused by resistant *Enterobacteriaceae*. Resistance to Ampicillin reached 80% (4/5) and resistance to Ceftriaxone (a third-generation cephalosporin) was 40%. These profiles, combined with the presence of *Escherichia coli* exhibiting multiple resistances, are suggestive of strains producing extended-spectrum beta-lactamases (ESBLs).

The prevalence of ESBL-producing bacteria is rising rapidly in sub-Saharan Africa, with an estimated prevalence of 20.76% for *Escherichia coli* in the region, according to a recent meta-analysis (Olaitan et *al*., 2014)[20]. Although our sample size does not allow for statistical conclusions, these results call for systematic screening for ESBL-producing *Escherichia coli* at the CHU-ME laboratory.

CONCLUSION

Women aged 20–29 were the most affected group (61.6%), with a mean age of 26 years. The prevalence of confirmed vaginal infection was 36.4%, with an overall microbiological positivity rate of 60.6%. The prevalence of Candida spp was 40.4% and co-infection 32.3%, with 3% *Escherichia coli*. *Candida spp* showed a sensitivity of 90.9% to Miconazole and 97.8% to Econazole, as well as a sensitivity of 66.7% to Fluconazole. Resistance was observed to Amphotericin B (95.6%) and Griseofulvin (95.7%). Amikacin showed 100% susceptibility to *Staphylococcus spp*, making this aminoglycoside the most active compound against the staphylococci isolated in this study. Erythromycin and Gentamicin showed susceptibility rates of 67.9% and 60.7% respectively, although a 25.0% resistance rate to Erythromycin limits its use as a first-line treatment. *Escherichia coli* showed 100% susceptibility to Imipenem and Gentamicin. However, it also showed 50% susceptibility to Ertapenem and Ciprofloxacin. But also 50% susceptibility to Ertapenem and Ciprofloxacin. However, *Escherichia coli* was resistant to Ceftriaxone (100%), Ampicillin (100%) and Nalidixic Acid (100%).

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Conflicts Of Interest

The authors declare that they have no conflicts of interest related to this study.

Statement Of Authors' Contributions

Conception of the draft article carried out by NKA; Conduct of research activities by NKA. Data collection carried out by KMR, HMA, MKA; Processing of collected data carried out by KMR, HMA. Statistical analysis of data carried out by NKA, MKA, KMR; Drafting of the article carried out by NKA, MKA; Participation in the drafting of the article; Reading and correction of the article carried out by NKA, MKA, KMR, HMA.

Disclaimer (Artificial intelligence)

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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