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Genital Infections and Associated Risk Factors in Women on Contraception Monitored at the Bacteriology and Virology Laboratory of Aristide Le Dantec Hospital

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ABSTRACT

Background: Contraception is a strategy of choice for spacing births but also for avoiding early and unwanted pregnancies. However, through hormonal modification, this contraception constitutes a favorable state for the proliferation in the genital tract of agents responsible for vaginal infections. The objective of this study was to evaluate the prevalence of genital infections in women on contraception followed up at the bacteriology-virology laboratory of Aristide Le Dantec Hospital.

Methods: This is a retrospective descriptive study conducted over a one-year period between January 2019 and December 2020. Microbial assessments were performed on genital secretions according to standard bacteriology laboratory procedures. Sociodemographic data and bacteriological examination results obtained were entered using File Maker Pro Advanced (version 16) software. Statistical analyses were performed using SPSS software (version 20).

Results: This research studied 1771 women, of whom 1609 were on contraceptives. The most represented age group was over 40 years (27.06%). The majority of patients were women on oral contraceptives (32.07%). Women with secondary education (31.45%) and women with 1 to 3 children (43.03%) were most often on contraception. The germs most frequently detected in women on contraception were Gardnerella vaginalis (51.78%) and Candida albicans (24.19%) and the use of intrauterine device (IUD) as a means of contraception was statistically associated with vaginal infection (p=0.0004).

Conclusion: This study showed a high frequency of vaginal infections in women on contraception and that the intrauterine device was significantly associated with the occurrence of these infections.

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Introduction

Maternal and neonatal mortality pose a significant public health challenges worldwide, especially in Africa where the rates remain distressingly high (1). On an average day, approximately 1,500 women lose their lives due to complications related to pregnancy or childbirth. The majority of these tragic deaths occur in developing countries, particularly within sub-Saharan Africa and South Asia, where maternal mortality range from 500 to 1000 per 100,000 live births (2).

In Senegal, the maternal mortality ratio for the preceding seven years stands at an estimated 236 maternal deaths per 100,000 live births (3). To address this pressing issue, various interventions are being implemented including contraception (4). Contraception involves an array of methods aimed at preventing unwanted pregnancy, serving as a crucial tool for family planning and abortion reduction in developed countries (5). However, the use of contraception can have repercussions in women, potentially disrupting vaginal flora's equilibrium and leading to genital infections (6-8).

Vaginal infections constitute a significant public health concern, with the World Health Organization (WHO) approximating over one million new cases of sexually transmitted infections individuals aged 15-49 daily. This translate more than 376 million new cases annually for four infections which are chlamydia, gonorrhea, trichomoniasis and syphilis (9). Globally, these infections exact a considerable toll on both health and economies, especially in developing countries, where they contribute to 17% of economic losses linked to health issues (10).

In Senegal, the provision of contraceptive services had a modest start, primarily in private facilities. It wasn't until 1970, at Blue Cross Clinic, a private facility, that contraceptive technology was first introduced to Senegalese women. It wasn't until 1990 that the Senegalese government

established the National Family Planning Program (PNPF) to consolidate various interventions supported by international donors (11). To the best of our knowledge, there exists no documented study on the incidence of vaginal infections in women using contraceptives in Senegal.

In the light of this, we conducted an investigation into the epidemiological aspects of vaginal infections among women under contraception, monitored at the bacteriology-virology laboratory of CHNU Aristide Le Dantec.

Materials and Methods

Type and period of study: This retrospective study was carried out at the bacteriology-virology laboratory of Aristide Le Dantec Hospital from January 1, 2017 to December 31, 2018.

Study population

The study included all women who met the criteria for vaginal sampling and underwent such sampling during the designated study period.

Laboratory diagnosis

Prior to sampling, an interview gathered pertinent epidemiological information (age, number of parities, type of contraception...etc). After positioning the patient gynecological and cleansing the genital area was cleaned with sterile physiological water-soaked cotton, a sample was obtained from the ectocervix and placed into a tube containing 1 ml of sterile physiological water for microscopic analysis, pH determination and culture on various media including Sabouraud medium for *Candida albicans*, Eosine-Methylen Blue (EMB) medium for enterobacteria, Chapman medium for staphylococci and Nalidixic acid blood agar (GSN) medium for streptococci. Another endocervical swab was taken with a sterile swab after careful cleaning of the ectocervix with a sterile compress. The swab was then placed in the

sterile dry tube for testing for *Neisseria gonorrhoeae* by culture on cooked blood agar containing vancomycin, colistin and nystatin. Also, with another endocervical swab the search for *Chlamydia trachomatis* and mycoplasma were performed using IDEIA™ and Myco View® kits respectively. Bacteria were identified following microbiological standard procedures based on morphological, cultural, biochemical or antigenic characters.

Data analysis

Statistical analysis of the data was performed using SPSS software (version 20) and graphing was performed using Excel software. Differences between groups were tested using a non-parametric test (Kruskal-Wallis test). The results are considered statistically significant for values of $p < 0.05$.

Result

Population characteristics

The characteristics of the study participants are summarized in Table 1. A majority were over 40 years older (27.06%, $n=453/1674$); and 31.45% ($n=495/1574$) had reached secondary education. Additionally, 43.03% ($n=725/1685$) had between 1 and 3 children, with the oral contraceptives being the most common method used 32.07% ($n=516/1609$). The overall prevalence of vaginal infections among women using contraceptives was 58.64% ($n=1038/1770$).

Prevalence of isolated microorganisms

Among 988 women using contraceptives, at least one vaginal infection-causing microorganism was isolated (Table 2). Bacterial vaginosis due to *Gardnerella vaginalis* was most prevalent (51.78%, $n=512/988$), followed by *Candida*

albicans candidiasis (24.19%, $n=239/988$) (Figure 1).

Risk factors for vaginal infection

The association between patient characteristics and risk of vaginal infections is presented in Table 2. While the prevalence of vaginal infections was higher in women using oral contraception (58.91%; $n=304/516$), this association was not statistically significant. However, a robust connection was observed between vaginal infection and use of Intrauterine Device (IUD) as contraceptive (69.37%; p -value < 0.00004). Age group, education level, and number of children were associated with risk of vaginal infection but without statistical significance (Table 2).

Discussion

The study comprised a sample size of 1771, with 1609 using contraceptives. Notably, oral contraceptives were the prevalent (32.07%, $n=516/1609$), which contrast with the results reported by a study conducted by Barry NY in 2015 in Dakar where oral contraceptives were the least used method (17.7%) (12). The age group most represented among contraceptives users was those over 40 years, with a prevalence of 27.06% ($n = 453/1674$). This contradicts results from Cameroon by Mogtomo et al. who reported a prevalence of 49% of contraception among women aged 20-35 years in 2016 (13). Women with secondary education level were most likely to practice contraception (31.45%, $n = 495/1574$). A similar result was observed by Koanga et al. in Cameroon where 60.7% of this category of women were using contraception (13).

Current contraceptive users were often women with parity of 1 to 3 children (43.03%, $n = 725/1685$). These findings align with a 2015 in Dakar study where the majority of contraceptives users had 1 – 4 children (60%) (12).

Table 1. Population Characteristics.

Characteristics	Number	Percentage (%)	Confiance interval 95%
Total	1771	-	-
Age group (years) (1674)			
[17 – 25]	173	10.33	8.97 – 11.88
[25 – 30]	319	19.06	17.25 – 21.01
[30 – 35]	387	23.12	21.16 – 25.20
[35 – 40]	342	20.43	18.57 – 22.43
>40	453	27.06	24.99 – 29.24
Study level (1574)			
No study	458	29.16	26.91 – 31.39
First level	366	23.25	21.23 – 25.40
Second level	495	31.45	29.20 – 33.79
Hight level	255	16.20	14,46 – 18,10
Number of child (1685)			
0	165	9.79	8.46 – 11.30
[1 – 3]	725	43.03	40,68 – 45,40
[3 – 6]	643	38.16	35.87 – 40.50
[6 – 9]	134	7.95	6.75 – 9.34
>9	18	1.07	0.68 – 1.68
Type of contraceptives (1609)			
Oral Contraceptives	516	32.07	19.83 – 34.39
Injectables contraceptives	395	24.55	22.51 – 26.71
IUD	284	17.65	15.87 – 19.59
Implants	388	24.11	22.09 – 26.16
Tubal ligature	14	0.87	0.52 – 1.46
Condom	12	0.75	0.43 – 1.30
Vaginale infections (1770)			
Yes	1038	58.64	56.33 – 60.92
No	732	41.36	39.08 – 43.67
Diabetes (1696)			
Yes	39	2.53	1.71 – 3.17
No	1657	97.67	96.83 – 98.29
Antibiotics treatment (1757)			
Yes	100	5.69	4.70 – 6.87
No	1657	94.31	93.13 – 95.30
Antifongics treatment (1753)			
Yes	161	9.18	7.92 – 10.63
No	1592	90.82	89.37 – 92.08
Antirétroviral treatment (1753)			
Yes	5	0.29	0.12 – 0.67
No	1748	99.71	99.33 – 0.67
Antiseptics treatment (1753)			
Yes	108	6.16	5.13 – 7.39
No	1645	93.84	92.61 – 94.87

Table 2. Risk factor associated with vaginal infection in women on contraceptives.

Characteristics	Vaginal infections	Percentage (%)	P-value
Age groupe (years)			
[17 – 25]	110	63.58	0.11
[25 – 30]	205	64.26	
[30 – 35]	251	64.86	
[35 – 40]	206	60.23	
>40	258	56.95	
Study level			
No staudy	273	59.61	0.402
First level	234	63.93	
Second level	297	60.00	
Hight level	164	64.31	
Number of child			
0	111	67.27	0.072
[1 – 3]	452	62.54	
[3 – 6]	377	58,63	
[6 – 9]	80	59.70	
>9	15	83.33	
Type of contraceptives (988)			
Oral	304	58.91	0.0004
Injectables	216	54.68	
IUD	197	69.37	
Implants	258	66.49	
Trompes ligature	6	42.86	
Condoms	7	58.33	
Diabetes	27	69.23	
Antibiotics treatment	50	50	0.075
Antifongics treatment	87	54.04	0.24
Antiseptics treatment	66	61.11	0.61
Antirétroviral treatment	3	60.0	0.71

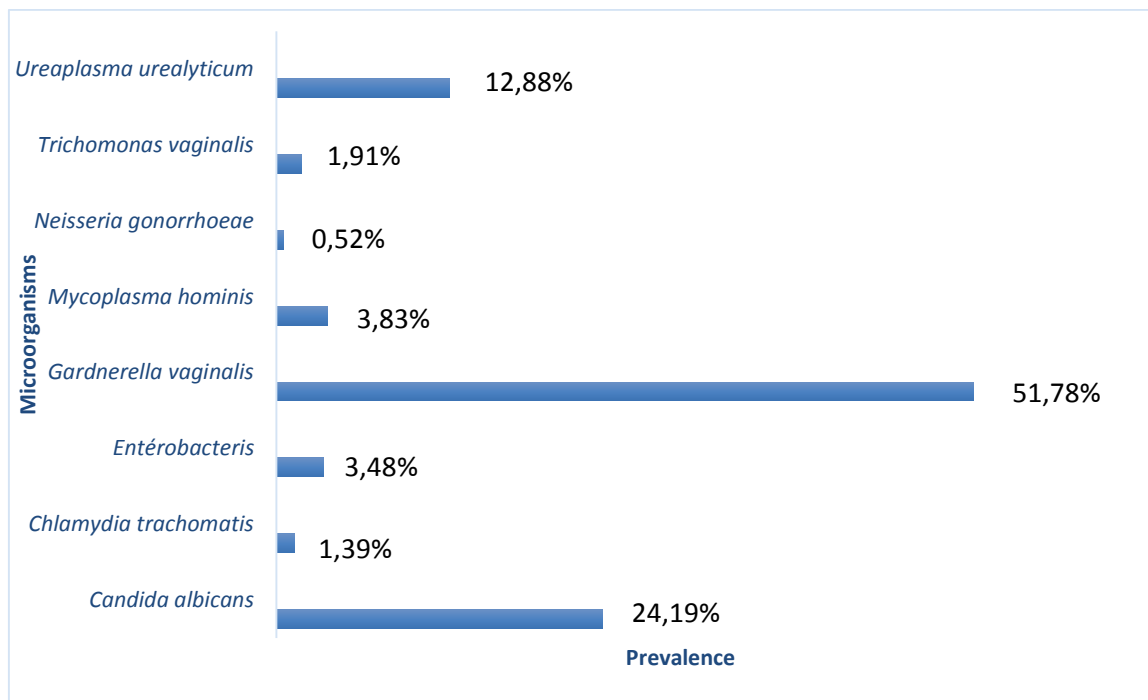


Figure 1. Prevalence of microorganisms isolated from vaginal swabs in women on contraceptives.

A prevalence of 58.64%, (n = 1038/1770) of genital infections was observed in our study, with a statistically significant association (p= 0.0004) between vaginal infection and IUD contraception. This contrasts with a similar study in Cameroon showing a lower prevalence (28%) (13).

Predominantly, bacterial vaginosis caused by *G. vaginalis* (51.78%) was observed, akin to Adane et al.'s findings in Ethiopia (48.6%) (14). Notably, a French study by Denis et al. in 2016 found a higher prevalence (90%) (15). Additionally, candidiasis due to *Candida albicans* was found at a frequency of 24.19%. Similar studies in Dakar demonstrated prevalence ranging from 27.22% to 71.51% (16, 17).

Conclusion

This study showed the high frequency of vaginal infections in women on contraception and that the intrauterine device was significantly associated with the occurrence of these infections. These results highlight the need to implement a systematic surveillance for a better management of contraception in order to prevent vaginal infections.

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Ethics approval and consent to participate

Not relevant.

Conflict of interest

There have been no conflict of interest.

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