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GENITAL INFECTIONS IN COUPLE INFERTILITY IN DAKAR

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ABSTRACT: *Background: Couple infertility is a real public health problem affecting 8–15% of couples worldwide. The aim of this study was to investigate genital infections in infertile couples in Dakar. Methodology: This was an 8-month prospective study of infertile couples followed up in 3 health facilities in the Dakar region. Standard bacteriology was performed on genital swabs and Triplex PCR for the detection of Neisseria gonorrhoea, Chlamydia trachomatis and Mycoplasma genitalium. Data analysis was performed using SPSS IBM 25 software. Results: A total of 98 women (65.3%) and 52 men (34.7%) with an average age of 34 years and extremes ranging from 18 to 56 years were included. In men, the prevalence of genital infections was 17.3% (n=9), with a predominance of Mycoplasma hominis (5.8%), Ureaplasma urealyticum (5.8%) and Escherichia coli (3. 8%). In women, 70.3% (n=59) had an infection, and the most frequently isolated germs were G. vaginalis (19%), U. urealyticum (17%) and Candida albicans (17%). Neisseria gonorrhoeae and Mycoplasma genitalium were absent in all patients. Chlamydia trachomatis, on the other hand, was positive in 10 patients using antigenic tests, with confirmation in just one patient by PCR. Conclusion: The prevalence of genital infections in infertile couples was very high in our study. Good medical management of these infections necessarily requires good laboratory diagnosis.*

KEYWORDS: Infertility, genital infections, couple, Dakar.

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INTRODUCTION

According to the World Health Organization (WHO), infertility is defined as the inability of a couple to achieve conception and carry a pregnancy to term after a year or more of regular, unprotected sexual intercourse. Infertility can be primary or secondary [1]. Primary infertility occurs when the couple has not achieved pregnancy with the birth of a child, as opposed to secondary infertility when the couple has already had at least one child [1]. Couple infertility is a real public health problem worldwide. It affects an estimated 80 million people worldwide, with one couple in ten experiencing primary or secondary infertility [2]. In France, the prevalence of infertility is around 15%. In sub-Saharan Africa, marital infertility affects 25% to 40% of the population [3]. In Senegal, not enough studies have been carried out to assess the true prevalence of infertility.

Infertility has major negative social repercussions on the lives of the couples concerned, and in particular on the women, who most often suffer the consequences, such as violence, divorce, social rejection, emotional stress, depression, anxiety and low self-esteem [4]. Genital infections can play a major role in the etiology of infertility in both men and women [5]. Due to the complexity of its pathophysiology, multiple factors are incriminated in its genesis, such as endocrine and organic disorders. However, genital infections occupy a prominent place, due to the sequelae found in the absence of or ineffective treatment [6], [7]. The bacteria most implicated in infertility are *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT) and *Mycoplasma genitalium* (MG) [8].

It is in this context that we carried out this study to microbiologically document the infectious causes of infertility in couples in Dakar.

METHODOLOGY

Type and Setting of Study

This was a prospective, descriptive study of infertile couples including 3 health facilities in the Dakar region (Hôpital Aristide le Dantec, Hôpital Dalal Jam and the Caserne Samba Diery Diallo Health Center).

Sample Collection and Analysis

In compliance with the rigorous aseptic conditions required for genital sampling, cervico-vaginal sampling (endocervix and ectocervix) was performed in women, and first-draft urine and semen were collected in men. Vaginal flora typing, yeast culture on Sabouraud medium, direct microscopic examination for *Trichomonas vaginalis* (TV) and culture on Eosin Methylene Blue (EMB) medium for common germs such as *E. coli* were performed with the ectocervical swab. Semen was inoculated on standard media such as Cooked Blood Gelose (CBG) for *N. gonorrhoeae*, ordinary blood agar with nalidixic acid (GSN) for the detection of Gram-positive cocci (*Staphylococcus* and/or *Streptococcus*), thioglycolate broth (BT) for the detection of anaerobic germs, EMB medium for enterobacteria and Chapman medium for *Staphylococcus* species.

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Neisseria gonorrhoeae (NG) was detected by culture on cooked blood agar supplemented with Vancomycin, Colistin and Nystatin (VCN) from endocervical samples and first-draft urine, *Ureaplasma urealyticum* (UU) and *Mycoplasma hominis* (MH) were detected using the Mycoplasma IES detection kit and *Chlamydia trachomatis* by antigenic detection using the NADAL Chlamydia Test kit. Triplex PCR was also performed for CT, NG and MG using the extraction kit (Sacace, REF: SM006, LOT: 03B21L533) and the amplification kit (GeneProof CT/NG/MG Multiplex PCR Kit, Czech Republic).

Data Analysis

Data analysis was carried out using SPSS IBM25 software, which was used for both descriptive and analytical studies. For the descriptive study, the parameters used to summarize the information are the mean and standard deviation for quantitative variables, and the percentage for qualitative variables.

For the analytical study, Student's T-test is used for comparison of means for quantitative variables and Fisher's exact test for comparison of proportions for qualitative variables. A p-value < 0.05 is considered significant.

RESULTS

From October 1, 2020 to June 15, 2021, a total of 150 patients were included in our study with a mean age of 34 years and extremes ranging from 18 to 56 years. These patients comprised 38 couples and 74 other infertile participants with a sex ratio of 1.8. The socio-demographic characteristics of the patients are presented in Table I.

Pathogens Identified in Men and Women

In men, the prevalence of infections was 17% (n=9/52) and the most frequently isolated bacteria were *Mycoplasma hominis* (5.8%) and *Ureaplasma urealyticum* (5.8%). In women, the prevalence of infection was 62% (n=61/98), and the most frequently isolated germs were *G. vaginalis* (19%), *C. albicans* (17%) and *U. urealyticum* (17%). *Trichomonas vaginalis*, *Neisseria gonorrhoeae* and *Mycoplasma genitalium* were absent from the overall population. Antigenic tests for *Chlamydia trachomatis* yielded a positivity rate of 7% (10/150), but only one sample was positive after confirmation by PCR. We also noted 3 cases of infection by the same germ, 2 couples with *Ureaplasma urealyticum* and 1 with *Mycoplasma hominis* (Table II). The most frequent infections in women were candidiasis with 30 cases (27%), followed by bacterial vaginosis (n=24; 21%) and cervicitis (n=18; 16%). Among the 24 patients presenting with vaginosis, those aged between 26 and 36, n=11 (23.9%) were more affected, although p=0.33 was not significant. Cervicitis is considered to be inflammation of the cervix associated with the presence of Mycoplasma and/or specific germs, with an approximately equal prevalence in all age groups (p=0.90 not significant). (Table III). Mixed vaginal flora was noted in 15 patients, with a combination of vaginosis and candidiasis (n=6; 40%), vaginosis and cervicitis (n=3; 20%), candidiasis and cervicitis (n=5; 33%) (Table IV).

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DISCUSSION

The aim of this prospective study was to determine the prevalence of germs responsible for infertility among couples in 3 hospitals in the Dakar region.

The results showed a higher prevalence of infections in women (62%) than in men (17%). These results are similar to those obtained by Ruggeri et al. on a study carried out in Italy in 2016 involving 246 infertile couples, with a prevalence of 50% in women and 14% in men [9]. This greater vulnerability of women is undoubtedly linked above all to anatomical reasons. Indeed, vaginal opening and proximity to the anal region are two major factors favoring the occurrence of genital and even urinary tract infections [10].

In our study, we observed an absence of NG, MG and the confirmed presence of CT by PCR in only 1 case. These results are also similar to those of Ruggeri et al. where CT was positive in a single patient with an absence of NG and MG [9]. However, the work of Abusarah et al. in Jordan showed higher prevalences of *Neisseria gonorrhoeae* (6.5%), *Chlamydia trachomatis* (4.3%) and *Mycoplasma genitalium* (5.7%) in a study population of 93 men from infertile couples [11]. Contradictory results are also noted with the study by Sellami et al. in 2014 in Tunisia, which showed prevalences of *Chlamydia trachomatis* (15.2%), *Mycoplasma genitalium* and *N. gonorrhoeae* (5.8%) in 85 infertile couples [12]. The absence of these microorganisms in our study can be explained, on the one hand, by the limited size of our study population and, on the other, by the fact that it is not a target exposed to STIs. In addition, the difference in prevalence noted may be linked to variable social or behavioral factors.

Also, in our study, *U. urealtyticum* and *Mycoplasma hominis* were present in men with a prevalence of 5.8%. This result is similar to that obtained by Rosemond et al. in a study of 100 infertile couples in France, with a prevalence of 5% for *U. urealyticum* [13]. However, different results were obtained by Salmeri et al. for a study of 250 men from infertile couples with a much higher prevalence of *U. urealyticum* (15.6%) [14]. This difference may be explained by the high disproportion of the two study populations.

In our study, we observed candidiasis, vaginosis and cervicitis in women, with prevalences of 27%, 21% and 16% respectively. These results are at odds with those of Casari et al. where the prevalence of vaginosis (26.6%) was higher than that of candidiasis (12.1%) [15], and with those of J.C. Konje et al. where vaginosis (9.8%) was more frequent than candidiasis (2.2%) [16]. This high prevalence of candidiasis supports the assertion that 75% of women will experience at least one episode of Candida vaginitis in their lifetime, with 40% to 50% having more than one episode [17]. Furthermore, vulvovaginal candidiasis is favoured by a disruption in the vaginal equilibrium and the mechanism of local immunity, allowing vaginal colonization by Candida [18].

The presence of these yeasts could lead to infertility through their adverse effect on sperm motility and ultrastructure. This was demonstrated by Tian et al.'s study in Wuhan in 2007 on the impact of soluble *C. albicans* factors on spermatozoa, showing possible adhesion and/or agglutination on microscopic examination after co-incubation [19]. Candidiasis also manifests itself as pathological discharge, impairing sperm motility and the quality of cervical mucus, which becomes impermeable to sperm[20]. *Gardnerella vaginalis*, responsible for bacterial vaginosis, has been associated with activation of pro-inflammatory cytokine production in the vagina, which may interfere with sperm viability [21].

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The prevalence of non-gonococcal and non-chlamydial cervicitis in our study was very high (16%). Among these cases, *Ureaplasma urealyticum* was much more prevalent (17%). These results differ from those of Lee et al. obtained in a study of 50 infertile couples with a prevalence of *Ureaplasma urealyticum* 40% higher [22].

CONCLUSION

Our study showed a high prevalence of genital infections, with a predominance of common germs. The inflammatory process engendered by these infections plays an important role in the genesis of infertility. Good microbiological diagnosis is therefore essential for the proper management of infertility.

Table I: Characteristics of the Study Population

Characteristics	Number (%)
Sex	
F	98 (65,3%)
M	52 (34,7%)
Average age (IQR)	
M	39,5 (35 – 45)
F	36 (30 – 47)

Table II: Prevalence of Germs Isolated in Men and Women

	H	F
	Number (%)	Number (%)
Négatif	43 (82,7)	39 (29,7)
Candida albicans	1 (1,9)	22 (17)
Candida spp	-	8 (6)
*Gardnerella vaginalis***	/	24 (19)
*Mobiluncus spp***	/	2 (1,4)
Ureaplasma urealyticum	3 (5,8)	22 (17)
Mycoplasma hominis	3 (5,8)	10 (7)
Chlamydia trachomatis	-	1 0,7)
E.coli	2 (3,8)	3 (2)
Total	52 (100)	131 (100)

** Only detected in women

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Table III: Prevalence of Vaginosis and Cervicitis by Age Group

	Vaginosis			Cervicitis		
Age group	No n (%)	Yes n (%)	p value	No n (%)	Yes n (%)	p value
[18 - 26[	19 (73.1)	7 (26,9)	0,33	21 (80,7)	5 (19,3)	0,9
[26 - 36[	35 (76.1)	11 (23,9)		38 (84,7)	8 (15,3)	
[36 - 45[	20 (80)	5 (20)		20 (80)	5 (20)	
> 45	0	1 (100)		1 (100)	0	
Total	74 (75.5)	**24 (24.5)**		80 (81.6)	**18 (18.4)**	

Table IV: Prevalence of Mixed Infections among Women

	Number	Pourcentage
Vaginosis + candidiasis	n=6	40%
Vaginosis + cervicitis	n=3	20%
Candidiasis + cervicitis	n=5	33%
Vaginitis + cervicitis	n=1	7%
	Total =15	**100%**

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