

## Epidemiology of *Gardnerella vaginalis* Infections at Thies Regional Hospital Center (Senegal)

Diagne Rokhaya<sup>1\*</sup>, Moussa Naimatou<sup>1</sup>, Ka Roughyatou<sup>1</sup>, Diop Halimatou<sup>2</sup>, Diop Oumar<sup>3</sup>, Diop Amadou<sup>2</sup>, Sarr Habibou<sup>4</sup>, Niang Aissatou Ahmet<sup>2</sup>, Dièye Baidy<sup>2</sup> and Sow Ahmad Iyane<sup>2</sup>

<sup>1</sup>UFR des Sciences de la Santé Université, de Thies BP 967 Thies, Senegal.

<sup>2</sup>Faculté de Médecine, Pharmacie et Odontologie; Université Cheikh Anta Diop, Dakar, Senegal.

<sup>3</sup>Hôpital Amadou Sakhir Ndiéguène Thies, Senegal.

<sup>4</sup>UFR des Sciences de la Santé, Université Assane Seck Ziguinchor.

**Citation:** Rokhaya D, Naimatou M, Roughyatou K, et al. Epidemiology of *Gardnerella vaginalis* Infections at Thies Regional Hospital Center (Senegal). *Microbiol Infect Dis.* 2020; 4(4): 1-5.

### \*Correspondence:

Rokhaya Diagne, Microbiologist, Teacher- researcher, Thies university, UFR des Sciences de la Santé, BP 967, Thies, Senegal.

**Received:** 30 October 2020; **Accepted:** 16 November 2020

### ABSTRACT

**Introduction:** Bacterial vaginosis is a very common infection in women, and is the most common form of genital infection. It results from the imbalance of the vaginal flora by the replacement of lactobacilli by anaerobic bacteria, mycoplasmas and *Gardnerella vaginalis*.

**Materials and Method:** This is a two-year retro prospective study between July 31, 2017 and July 31, 2019 in women for whom a vaginal swab was performed.

We performed a macroscopic and microscopic examination of the vaginal secretions. These are collected from the vaginal walls or from the posterior cul-de-sac with a sterile swab, trying to bring back as many secretions as possible.

**Results:** We collected a total of 2376 vaginal swabs from the Thiès RHC (Regional Hospital Center). We observed 608 cases of *Gardnerella vaginalis* vaginosis, a frequency of 25.5%. The average age of the patients was 32.7 years. The age group [25-34] years represents 40.9%, [35-44] 25.65% and the age group [15-24] years 17.26%. Married women represented 54.77% and single women 3%. Nulligest patients accounted for 28.78%, paucigests 40.62% and multigestates 28.94%. The frequency of carriage was 40% in nulliparous women, 42.1% in paucigests and 16.77% in multigestates.

**Conclusion:** *Gardnerella vaginalis* vaginosis is a common condition especially in women of childbearing age. It can lead to severe gynecological and obstetrical complications. For a more accurate diagnosis, it is necessary to reinforce the laboratory diagnosis.

### Keywords

*Gardnerella vaginalis*, Bacterial vaginosis, Genital infections.

### Introduction

Bacterial vaginosis is a very common infection in women, and is the most common form of genital infection. It results from the

modification of the vaginal flora with the replacement or association of lactobacilli by commensal bacteria such as *Gardnerella vaginalis*, *Mycoplasma*, anaerobic bacteria (*Mobiluncus spp*, *Bacteroides spp*.....). The causes of the abnormal multiplication of these microorganisms are not all known [1]. The main causative agent is *Gardnerella vaginalis*, a commensal bacterium of the

female vaginal mucosa. Under certain conditions, this bacterium proliferates abnormally, unbalances the vaginal flora and becomes pathogenic [2]. Both endogenous and exogenous risk factors can contribute to the development of bacterial vaginosis, including hormonal, pathological, ethnic factors, stress, smoking, certain medications, and sexual intercourse. It is a pathology that is generally benign but can lead to serious gynecological and obstetrical complications. In France, it is estimated that the prevalence of bacterial vaginosis is 15 to 20% [3]. A study in Nigeria showed that 40% of women had bacterial vaginosis [4]. In Morocco, Louzi L. et al found a prevalence of 16.1% [5]. Bacterial vaginosis is the second most common cause of vaginal infections (pathological leukorrhea) in women during genital activity [5]. According to studies, it is responsible for 16 to 29% of cases of prematurity, chorioamnionitis, spontaneous abortions, low birth weight [6]. Moreover, this pathology has an important psychological repercussion in women for whom bacterial vaginosis becomes chronic and recurrent. In Senegal, a study by Diagne R et al. showed a frequency of 21% out of 5928 samples [7].

The aim of this work was to study the epidemiology and prevalence of *Gardnerella vaginalis* infections in women received for vaginal sampling in the Biology Laboratory of the Regional Hospital of Thiès.

## Materials and Methods

This is a two-year retro prospective study between July 31, 2017 and July 31, 2019 in women for whom a vaginal swab was performed.

### Study population

Our sampling concerned all the female outpatients or hospitalized women, received at the laboratory of the RHC of Thiès during the study period to carry out a genital sampling.

The patients selected for this study met the following criteria:

To be admitted to the laboratory of the Thiès RHC for a vaginal sampling.

To be with *Gardnerella vaginalis* for microscopic examination of the vaginal smear.

To be admitted to the study period.

### Sampling

The following pre-analytical conditions were required for sampling:

No participation in samplings during monthly periods,

No vaginal cleansing performed on the day of collection,

Not be under local or general treatment (antibiotics, lubricants, antiseptics).

No sexual intercourse 24 hours prior to collection.

The secretions are collected from the vaginal walls or from the posterior cul-de-sac with a sterile swab, trying to bring back as many secretions as possible. Microscopic examinations and identification of the germs involved will be performed on these samples taken.

## Study of samples

Macroscopic examination assessed the color, consistency and odor of the secretions.

Microscopic examination of the vaginal swab after Gram staining revealed the replacement of lactobacilli, which are Gram-positive bacilli, by a mixed flora: small Gram-positive corynemorphic bacilli reminiscent of *Gardnerella*, Gram-positive coccobacilli reminiscent of *Atopobium vaginae*, small Gram-negative bacilli reminiscent of *Prevotella*, curved Gram-positive bacilli reminiscent of *Mobiluncus*.

The exploration by direct examination, after Gram staining, of vaginal secretions collected at the level of the posterior or lateral cul-de-sac of the vagina allowed to establish the type of flora divided into 4 groups:

Flora type 1: exclusive presence of Döderlein flora

Flora type 2: predominance of the Döderlein flora, presence of another flora

Flora type 3: predominance of a flora other than Döderlein

Flora type 4: absence of Döderlein flora

## Results

We collected a total of 2376 vaginal swabs from the Thiès RHC. We observed 608 cases of *Gardnerella vaginalis*, with a frequency of 25.5%.

**Age distribution:** The figure below shows the distribution of patients according to their age. The average age of the patients is 32.7 years. The [25-34] age group represents 40.9%, [35-44] 25.65% and [15-24] age group 17.26%.

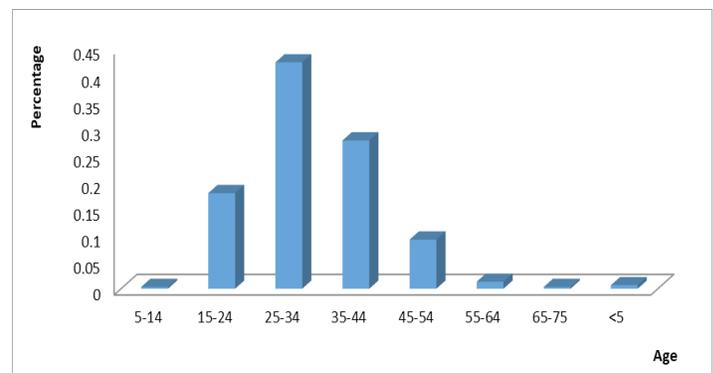


Figure 1: Distribution according to patient's age.

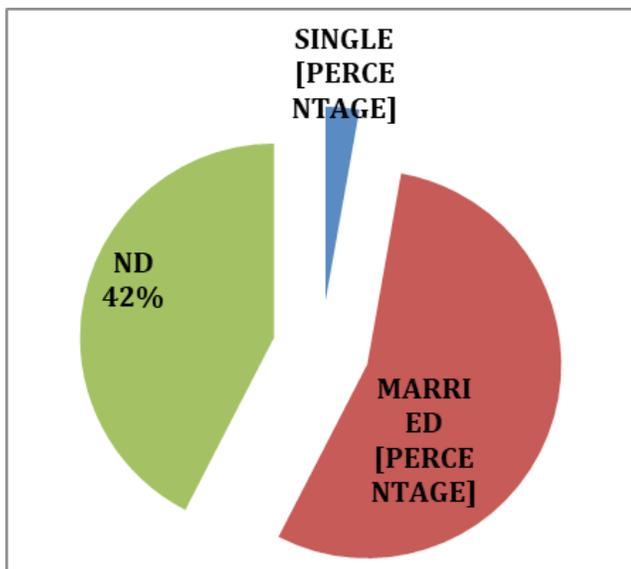
**Distribution according to patient's origin:** This table shows us the origin of the patients. The number of outpatient samples was 89.31%; the outpatient service concerns women who came in for outpatient consultations. The inpatient service represents women who are hospitalized, mainly in maternity wards.

Service	Number of patients	Percentage
External	543	89,31%
Internal	41	6,74%
ND	24	3,95%
<b>Grand Total</b>	<b>608</b>	<b>100,00%</b>

**Table 1:** Distribution according to patients' origin.

**Distribution according to marital statuses:** The figure below shows the distribution of patients by marital status.

Married women represented 54.77%, ND represents the number of women for whom we could not determine marital status because it was not specified in the laboratory records.



**Figure 2:** Distribution of Patients according to their Marital Status.

**Distribution of patients according to gestational age:** The following table allows us to classify women according to the number of pregnancies carried. The nulligest patients represent 28.78%, the paucigest 40.62% and finally the multigestes 28.94%. The non-determined ones represent the number of women in whom the gestational age was neither specified by the prescriber nor by the sampler.

Number of Pregnancies	Number of Patients	Percentage
Nulligestes (0)	175	28,78%
Piggest (1-3)	247	40,62%
Multigestes ( $\geq 4$ )	176	28,94%
ND	11	2%
<b>Total</b>	<b>608</b>	<b>100%</b>

**Table 2:** Distribution of Patients according to Gestational Status.

**Patient's distribution according to parity:** The following table breaks down women by the number of children conceived. The portage frequency is 40% in nulliparous women, 42.1% in pauparous women and 16.77% in multiparous women. Non-determined (ND) represents the number of women for whom we were unable to obtain parity data.

Number of Children	Number of Women	Percentage
Nulliparous (0)	241	40%
Paucipares (1-3)	256	42,1%
Multiparous ( $\geq 4$ )	102	16,77%
Nd	9	1,48%
<b>Grand Total</b>	<b>608</b>	<b>100%</b>

**Table 3:** Distribution of patients according to parity.

## Discussion

During our study, the overall prevalence of *Gardnerella vaginalis* vaginosis at Thies RHC was 25.5%. Our results are comparable to those of Lassey et al in Ghana, who obtained a prevalence of 25%. Sihavong A and colleagues also found 25% prevalence of bacterial vaginosis in their study in Laos [8] and in Harare, Tolosa JE et al found 24.4% prevalence [9]. In Senegal (at the Fann University Hospital and the RHC of Saint Louis) Diagne R and colleagues found a prevalence of 21%. These results are slightly lower than those of our study [7]. We find significantly higher results in South Africa in a study by Dols JAM et al. who found a prevalence of 58% in the USA, and Koumans EH et al. found a prevalence of 29.1% [10]. Lower results than in our study were also reported in Burkina Faso by Kirakoya-Samadoulougou F et al. who found a prevalence of 6.4% and in New Guinea Passey M et al found a prevalence of 9% [11]. Bacterial vaginosis is therefore a common condition with a prevalence generally ranging from 15-40% [1]. And is a public health issue for the mother and the fetus because of the gynecological complications it can cause.

In our sampling, the women were between 09 and 75 years of age. The presence of *Gardnerella vaginalis* was highest in the 24-35 age groups, followed by the 35-44 age groups. The overall mean age was 32.7 years. These results are consistent with those of Diagne. R et al. in Dakar, who in their study found that the 24-29 year-old age group followed by the 30-35 year-old age group were those who had more VG portage with an average age of 31 years [7]. Lassey et al. in their study in Accra, Ghana, found an average age of 28 years and the majority age range was 19-48 years [11]. Msuya et al. in Tanzania found an average age of 26 years and in their series women ranged from 16 to 46 years old [12]. In the Japanese study by Shimano et al. the average age was 27.6 years, slightly lower than ours [13]. In Canada in the series of Wenman et al, the average age was 29.1 years [14]. Anukam et al. in their study found an average age of 32 years identical to our average. In contrast, Yen et al in the USA found an average age of 19.1 years with an age range of 17-33 years [15]. The average age sometimes differs in these cited studies, but the age ranges are generally close and correspond to the period of full female genital activity. This could be explained by the fact that it is during this period that women are more sexually active. The epidemiological profile of women with bacterial vaginosis is similar to that of women with STIs. Bacterial vaginosis is significantly associated with having a recent sexual partner or multiple sexual partners [16]. In our series, bacterial vaginosis is rare after the age of 55 and exceptional before the age of 15. Only one woman in our series was less than 15 years old, she was 09 years old and was a victim of sexual abuse.

Paucigeste and paucipare women were the most affected. In fact, the frequency of portage was 28.28% in nulligeste women and 40.62% in paucigestes, it was 40% in nulliparous women and 42.1% in paucipares. Anagounou et al found a maximum risk of bacterial vaginosis between the second and third pregnancy [17], which is consistent with our results. Faye-Kette et al, in their study in Abidjan, found similar values with 55.11% of patients who were nulliparous [18]. The high frequency of this condition among nulligeste and nulliparous women could suggest a link between gestational, parity and bacterial vaginosis. However, Wessel et al. explain that the high risk of BV in pregnant women is rather related to the young age of the patients and their celibacy. The number of pregnancies, tobacco, alcohol and drug use are not related to the occurrence of BV [19]. Faye - Kette et al found a majority of single women with GV infection in their cohort [18].

It can therefore be concluded that there is no physiological explanation between the occurrence of bacterial vaginosis and the number of parity and gestations. The only explanation would be that these paucipare and paucigeste women are mostly young and therefore sexually active and exposed to risky sexual behaviors.

In our study, married women represented 54.77% and single women 2.8%. Out of 43.42% of the cases, we could not determine the marital status of the women. It is likely that married women were as exposed to bacterial vaginosis as single women. In the study by Marconi et al 58.2% of women with bacterial vaginosis were married, which is close to the result of our study [20]. It is therefore reasonable to assume that married women would be at higher risk, except that the same study found that factors independently related to bacterial vaginosis included celibacy, partner infidelity, STIs and vaginal candidiasis. Indeed, in single women the possibility of having more than one partner is greater. We could hypothesize that married women are as exposed as unmarried women. The results showing a higher percentage of married women could be explained by whether or not they have multiple partners. Among unmarried women, condom use and low frequency of sexual intercourse may be protective [21].

Kanlika et al. in their study showed that in early pregnancy, it was more common to find an unbalanced flora in single women [22]. In all cases, Marconi et al concluded that bacterial vaginosis is a sexually transmitted disease [20].

## Conclusion

GV is the main agent of bacterial vaginosis. Diagnosis of this condition is easy to make in routine laboratory practice.

Untreated, this condition can lead to endometritis, premature rupture of membranes and repeated abortions. This study allowed us to show the place of bacterial vaginosis in infections of the female genital sphere in the Thies region with a frequency of 25.5%. The age group from 25 to 34 years old is the most affected but also among paucigestes and nulligestes.

For a better management of this disease, we recommend the reinforcement of its diagnosis in the laboratory through training and sensitization of the personnel, the introduction of culture and antibiotic susceptibility testing of this bacterium over well-defined periods to detect the appearance of resistance to antibiotics.

## References

1. Spurbeck RR, Arvidson CG. Lactobacilli at the front line of defence against vaginally acquired infections. *Future Microbiol.* 2011; 6: 567-582.
2. Hardy L, Jespers V, Van den Bulck M, et al. The presence of the putative *Gardnerella vaginalis* sialidase A gene in vaginal specimens is associated with bacterial vaginosis biofilm. *PLoS One.* 2017; 12: e0172522.
3. Bohbot JM. Prevegyn® dans le traitement des vaginoses bactériennes. *La Lettre du Gynécologue* Avril. 2005; 301: 36.
4. M Abdullateef R, Ijaiya AM, Abayomi F, et al. Bacterial vaginosis: Prevalence and associated risk factors among non-pregnant women of reproductive age attending a Nigerian tertiary hospital. *Malawi Medical Journal.* 2017; 29: 290-293.
5. Louzi L, Charkioui A, Jana M. Infections vaginales dues à des germes non exigeants: place de *Gardnerella vaginalis*. *Maroc Médical.* 2005; 27.
6. Bohbot JM. Extrait des Mises à jour en gynécologie médicale. 2007.
7. Diagne R, Lo S, Dia ML, et al. Genital Infections with *Gardnerella vaginalis* at Fann University Hospital (Dakar) and Saint-Louis (Senegal). *Austin Journal of Surgery.* 2019; 6: 03.
8. Sihavong A, Lundborg CS, Sayabounthavong K, et al. Reproductive tract infections among women attending a gynecology outpatient department in Vientiane, Lao PDR. *Sex Transm Dis* 2007; 34:791.
9. Tolosa JE, Chaithongwongwatthana S, Daly S, et al. The international infections in pregnancy (IIP) study: variations in the prevalence of bacterial vaginosis and distribution of morpho-types in vaginal smears among pregnant women. *Am J Obstet Gynecol.* 2006; 195: 1198-1204.
10. Koumans EH, Sternberg M, Bruce C, et al. The prevalence of bacterial vaginosis in the United States, 2001-2004; associations with symptoms, sexual behaviors, and reproductive health. *Sex Transm Dis.* 2007; 34: 864-869.
11. Passey M, Mgone C, Lupiwa S, et al. Community based study of sexually transmitted diseases in rural women in the highlands of Papua New Guinea: prevalence and risk factors. *Sex Transm Infect.* 1998; 74: 120-127.
12. Msuya S, Mbizuo E, Stray-Pedersen B, et al. Reproductive tract infections among women attending primary health care facilities in Moshi, Tanzania. *East Afr Med J.* 2004; 79: 16-21.
13. Shimano S, Nishikawa A, Sonoda T, et al. Analysis of the prevalence of bacterial vaginosis and Chlamydia trachomatis infection in 6083 pregnant women at a hospital in Oturu, Japan. *J Obstet Gynaecol Res.* 2004; 30: 230-236.

- 
14. Wenman WM, Tataryn IV, Joffres MR, et al. Demographic, clinical and microbiological characteristics of maternity patients: a Canadian clinical cohort study. *Can J Infect Dis.* 2002; 13: 311-318.
  15. Anukam KC, Osazuwa EO, Ahonkhai I, et al. Lactobacillus vaginal microbiota of women attending a reproductive health care service in Benin city, Nigeria. *Sex Transm Dis.* 2006; 33: 59-62.
  16. BélecL. Défenses non immunes, pré-immunes et immunes du tractus génital féminin contre les infections. *Journal de Gynécologie Obstétrique et Biologie de la Reproduction.* 2002; 31: 45-59.
  17. Sy A, Ndjoumessi G, Makoutode M, et al. Vaginose bactérienne chez la femme enceinte à Cotonou (Bénin). *Méd Af Noire.* 1994; 41: 239-242.
  18. Faye-Kette AVH, Sylla-Koko OF, Cisse ALF, et al. Aspects épidémiologiques et cliniques de la vaginose actérienne à Abidjan. *Medicine d'Afrique Noire.* 1992; 39: 8-9.
  19. Chokephaibulkit K, Patamasucon P, List M, et al. Genital Chlamydia trachomatis infection in pregnant adolescents in east Tennessee: a 7-year case-control study. *J Pediatr Adolesc Gynecol.* 1997; 10: 95-100.
  20. Marconi C, Duarte MTC, Silva DC, et al. Prevalence of and risk factors for bacterial vaginosis among women of reproductive age attending cervical screening in southeastern Brazil. *Int J Gynaecol Obstet.* 2015; 131: 137-141.
  21. Calzolari E, Masciangelo R, Milite V, et al. Bacterial vaginosis and contraceptive methods. *Int J Gynaecol Obstet.* 2000; 70: 341-346.
  22. Kalinka J, Hanke W, Wasiela M, et al. Socioeconomic and environmental risk factors of bacterial vaginosis in early pregnancy. *J Perinat Med.* 2002; 30: 467-475.