



# Genital Infection by *Gardnerella vaginalis* and *Candida* spp. among Women in Nova Iguaçu City, Rio de Janeiro Province, Brazil

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## Abstract

Vaginitis is the most common infectious disease diagnosed among women attended at gynecological outpatient clinics in the Primary Care Service. The aim of this research is to investigate the incidence of vaginitis caused by *Gardnerella vaginalis* and *Candida* spp. in women attended at the gynecological outpatient clinic of Dr. Vanderlei Pacini Gynecological Clinic in the city of Nova Iguaçu, Rio de Janeiro Province. The studied population consisted of 386 women. For the sample of the vaginal secretion, we use disposable speculum and sterile swabs were used. Material was removed from lateral vaginal walls and recto-uterine pouch. Two slides were prepared and sent to clinical pathology and histocytology laboratories. The preparations were stained with Gram and Papanicolaou staining methods, and examined under a light microscope with a 1000× magnification. Among the 386 examined women, 82 (21.24%) cases of infection by one of the investigated microorganisms were diagnosed: 60 of *Gardnerella vaginalis* (CP = 15.54%) and 22 of *Candida* spp. (CP = 5.44%). Infections and complications caused by *G. vaginalis* and *Candida* spp. constitute a serious health problem for women, which should carry out periodic examinations to safeguard gynecological health.

## Subject Areas

Epidemiology, Gynecology & Obstetrics, Infectious Diseases, Public Health, Women's Health

## Keywords

*Gardnerella vaginalis*, Candidiasis, Vulvovaginitis

## 1. Introduction

Microbial aggressions of the vaginal and vulvar cavity are frequent and often caused by microbial elements like bacteria, virus, fungi and protozoa. Infections caused by these microorganisms are much more frequent in patients with low socioeconomic conditions, promiscuous and active sexual life people. Infectious vaginitis is the most common infectious disease diagnosed among women attended at gynecological outpatient clinics in primary health care services. *Lactobacillus acidophilus* is one of the constituents of the normal vaginal microbiota, constituting the bacterial flora of Doderlein, which acts as a protective chemical barrier to infections, turning difficult the implantation of certain pathogens. Infections usually occur as a result of an environmental imbalance in the vaginal ecosystem or due to infection caused by a sexually transmitted microorganism. Nowadays there is an especial attention to the relation between infections or abnormal changes associated with the development of the microbiota constituted by anaerobic bacteria, mainly *Gardnerella vaginalis* and *Mobiluncus* spp. These bacteria are sexually transmitted and blamed for fetid leukorrhoea, pelvic inflammation and even abortus. In some cases it can cause balanitis [1] [2] [3].

Bacterial vaginosis was described by Gardner and Dukes [4] as a non-specific vaginitis characterized by foul-smelling vaginal discharge with gray color, pH above normal, with *Gardnerella vaginalis* as its main etiological agent. In pregnant women, they may cause unfavorable effects to pregnancy, including endometritis, pelvic and inflammatory diseases, premature birth and postpartum endometritis [5] [6]. There is still a possibility that the bacteria which cause vaginosis may ascend to the female tract through the cervix and cause infection to the concept [7] [8]. The bacterial flora that causes vaginosis is believed to produce toxins that make some women more susceptible to start a cascade of cytokines and prostaglandins that may trigger preterm labor [6]. The possibility of protease production by these microorganisms that would cause rupture of the membranes is also allowed, which would initiate premature labor [9].

*Candida* species are associated with vulvovaginitis, especially at certain stages of the menstrual cycle or when the patient was submitted to a prolonged antibiotic therapy, often presenting a characteristic flow like a “coagulated milk”, accompanied by pruritus, dysuria and stiffening of the vaginal mucosa and vulvar epithelium. It is estimated that up to 75% of sexually active women develop candidiasis at least once during their life and between 5% and 10% of them present the recurrent form, characterized by three or more episodes in a year [1].

Considering the importance of these microorganisms to the gynecological pathology, this study aimed to investigate the incidence of vaginitis caused by *Gardnerella vaginalis* and *Candida* spp in women attended at the gynecological outpatient clinic Dr. Vanderlei Pacini in the city of Nova Iguaçu, Rio de Janeiro Province, Brazil.

## 2. Methods

The design of this research is observational, cross-sectional and retrospective.

The research was conducted following data obtained from the medical records of the women attended at the Gynecology Clinic Dr. Vanderlei Pacini, in the city of Nova Iguaçu, Rio de Janeiro Province. 386 medical records from January to December 2015 were evaluated, each one constituting a sample unit. The inclusion criteria were: to live in Nova Iguaçu city, not to be in the menstrual phase and have active sexual life. Although being in the inclusion criteria, the following exclusion criteria were considered: women with local or systemic treatment for vaginitis or previous history of diseases associated with immunodeficiency. Express permission was requested to the patients for publication of the data without personal identification in a scientific paper.

To collect samples of vaginal secretion, material was obtained from the lateral vaginal walls and recto-uterine pouch. Two slides were prepared and sent to clinical pathology and histocytology laboratories. The preparations were stained by Gram and Papanicolaou staining methods and examined under a light microscope at 1000X magnification.

### 3. Results

82 (21.24%) of the 386 women examined were infected by one of the two microorganisms, which 60 were diagnosed with infection by *G. vaginalis* (Table 1), with a prevalence coefficient (PC) of 15.54% and 22 with *Candida* spp. (PC = 5.44%). The prevalence coefficients for infections by the two microorganisms indicates that the highest rate is in the 15 - 24 age group and 25 to 34, showing the age class that should be receive more attention (Table 1).

### 4. Discussion

One of the most common causes of vaginal infection in women of childbearing age is bacterial vaginosis (BV). At the puberty, high levels of estrogen are produced, both plasmatic as from tissue origin, that raises the levels of this hormone in epithelial cells. The metabolism of glycogen by some species of the genus *Lactobacillus* produces lactic acid, which reduces the normal pH of the vagina, which varies between 3.8 and 4.2. This rangerange is is unfit for the multiplication of *Gardnerella vaginalis* and other anaerobic microorganisms. Also some

**Table 1.** Number of diagnosed cases of vulvovaginitis, with identification of microbial agents, among 386 women examined by staining and Gram and Papanicolaou methods, in the city of Nova Iguaçu, from January to December 2015, with a prevalence coefficient (PC) of species and for age group.

Age class (years)	<i>Gardnerella vaginalis</i> (N°) [PC%]	<i>Candida</i> spp. (N°) [PC%]
15 <sub>H</sub> 24	(11) [16.17%]	(8) [11.76%]
25 <sub>H</sub> 34	(19) [14.72%]	(11) [8.52%]
35 <sub>H</sub> 44	(20) [19.60%]	(0) [0%]
≥45	(10) [11.49%]	(2) [2.29%]
Total	(60) [15.54%]	(21) [5.44%]

Source: Dr. Vanderlei Pacini Gynecological Clinic.

species of the genus *Lactobacillus* are toxins producers such as hydrogen peroxide, which inhibits the multiplication of other species of pathogenic microorganisms. Bacterial vaginosis occurs when there is a reduction in the number of *Lactobacillus* spp. and consequently the decrease of lactic acid production, resulting in elevation of the pH. This increase contributes to the growth of *Gardnerella vaginalis* as well as other anaerobic microorganisms. With the increase of these microorganisms, the production of organic acids as so of amines by the degradation of proteins takes place. This combination causes exfoliation of the epithelial cells of the vaginal wall, resulting in the formation of non-inflammatory exudate. As causes of the decrease of the beneficial flora constituted by *Lactobacillus* spp are the antibiotic therapy, vaginal showers and sexually transmitted diseases [8] [10] [11].

Canales and Castillo [12] accounted the prevalence of etiological agents of vaginal infections in pregnant and non-pregnant women in the city of Talca, Chile. They collected vaginal secretion from 176 volunteers, prepared smears stained by the Gram method for direct bacterioscopy and seeded in artificial culture media to identify microbial agents. *Gardnerella vaginalis* 18.18% and *Candida albicans* (11.6%) were isolated. The authors emphasized that the highest prevalence of vaginal infection was found among the age groups between 21 and 30 years, since it maintains partial identity with the findings of now, mainly because the age groups worked were not the same. The authors emphasizes that the highest prevalence of vaginal infection was found among the age groups between 21 and 30 years, which maintains partial identity with our results, mainly because the range of the age groups were not the same.

A research to determine the prevalence of vaginitis and vaginosis among police officers from the Province of Ica, Peru, was performed by Hernández-Ríos [13]. The author examined vaginal secretion of 80 women through Giemsa staining method and found positivity in 77.5% of the samples. In 27.5% of the women found *Trichomonas vaginalis*, 12.5% *Gardnerella vaginalis*, and 11.2% *Candida* spp, higher incidence than we found in our research related to vaginitis by *G. vaginalis*. The author considered as possible predisposing factors was the fact that these women work standing up for hours controlling the traffic, the use of uniforms made with synthetic material, the heat of the city that registers high temperatures and the lack of knowledge about vaginal infections by the affected women.

The prevalence of *Trichomonas vaginalis*, *Candida albicans* and *Gardnerella vaginalis* in women without clinical symptoms of vaginitis treated at family clinics of the province of Mayabeque, Cuba, was investigated by Rodrigues *et al.* [1] 100 (55.87%) of 127 samples were negative and 79 were positive (44.13%). Candidiasis was the most frequent infection observed (25.14%) corresponding to 56.96% of the total positive diagnostics performed. Bacterial vaginosis was diagnosed in 33 (15.44%) of the women examined, and trichomoniasis was detected in only five patients (2.79%). The authors concluded that there is a significant contingent of women with vaginal infections despite being asymptomatic. It is

possible that similar situation happens in the city of Nova Iguaçu, which demands more investigations.

Sexually transmitted infections were studied by Garaycochea *et al.* [14] in a penitentiary establishment in Lima, Peru. A total of 168 samples of cervicovaginal secretion were analyzed and the most prevalent etiological agents were *Chlamydia trachomatis* (42.3%), *G. vaginalis* (24.4%) and *T. vaginalis* (10.11%). The authors concluded that there is a high prevalence of sexually transmitted infections among prisoners of the Chorillus I penitentiary complex in the city of Lima and suggested to the health authorities the need to implement a female prison health assistance program to control the treatment of sexually transmitted diseases.

Vasconcelos *et al.* [15] performed a documentary and retrospective research involving women attended at family health centers in the city of Fortaleza, Ceará, Brazil, and identified in colpocytological examinations vaginal affections suggestives of an inflammatory process were caused by *G. vaginalis* (25.3%), *Candida albicans* (10.2%) and *T. vaginalis* (3.1%), with a higher incidence than we found in the city of Nova Iguaçu. These authors commented that in 66.7% of reports of cervical intraepithelial neoplasia type I/HPV, *G. vaginalis* was present, suggesting a significant association between Human Papilloma Virus DNA and bacterial vaginosis microbiota. Following this warning association, it is important to consider the opposition of Andrade *et al.* [3] when they explains the lack of scientific researches focusing on vaginal infections, In this way, new research should be encouraged to collaborate with the scientific community in order to provide knowledge and guide professional practices.

## 5. Conclusion

From the analysis of the results, the conclusion is that the infections and complications caused by *Gardnerella vaginalis* and *Candida* spp. are a serious health problem in the city of Nova Iguaçu. We believe that all women should perform periodic controls with the gynecologist with inspection of vaginal secretions in order to obtain early diagnosis and specific treatment for the diagnosed etiological agents. Further attention is advised for adolescent women beginning sexual activity, and those over the age of 45 who may be neglecting gynecological health actions.

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