

Prevalence of vulvovaginitis in sexually active women of riparian communities in Brazilian Amazonia

ABSTRACT

Aims: Analyze the prevalence of Vulvovaginitis in women, sexually active adults, residents of riverside communities in the Amazon, receiving health services program "Light in the Amazon" in 2013 and 2014 of the year

Study design: Population based cross-sectional and evaluative study.

Place and Duration of Study: Program Luz da Amazônia and Laboratory of *Clinical and Environmental Mycology* at the Federal University of Pará, between January 2013 and December 2014.

Methodology: The analytical cross-sectional study was made with realization of bacterioscopy and fresh examination of vaginal secretion, reaped from those women and the results was statistically analyzed by the BioEstat 5.0

Results: The prevalence of vulvovaginitis was 78,57%, and the prevalence of bacterial vaginosis, genital infection by *Candida spp* and vaginitis caused by *Trichomonas vaginalis* was 66,07%, 28,57% and 8,92%, respectively. **Statistically significant association was found between the signs and symptoms and the vulvovaginitis.**

Conclusion: Due the necessities of this population and high prevalence of vulvovaginitis found, becomes evident the importance of projects which aim at prevention, promote education in women health from these communities and encourage the realization of exams very often, in order to minimize the cases of vaginitis and vaginosis in these communities.

Keywords: prevalence, vulvovaginitis, riparian, Amazonia

1. INTRODUCTION

Vulvovaginitis are inflammatory and/or infectious manifestations of inferior feminine genital tract, which affect vulva, vagina and uterine cervix's scaly epithelium[1]. Nowadays, they represent one of the major causes of infectious vaginal discharge among sexually actives women and one of the principal reasons why women search for medical care[2]. They are the more frequent cause of vaginal leucorrhea and that if not diagnosed and treated properly, draw on a great chance to promote gynecological complications. Those infections can be distributed in three groups, accord to the microbial agents which promote them: bacterial vaginosis, candidiasis and vaginal trichomoniasis[3].

The bacterial vaginosis is considered the more prevalent infection among women in reproductive age, being defined as an alteration of normal vagina's microbial flora and characterized by proliferation of anaerobic bacteria[4]. Among these bacteria, it is particularly found *Gardnerella vaginalis* (*G. vaginalis*), which is in the form of coccobacilli, short, gram variable, pleomorphic, no capsulated, immobile and anaerobic facultative[5]. The increasing of pH and decrease of lactobacilli becomes propitious the growth of various bacteria in the vaginal microbiota, causing vaginosis[6]. The bacterial vaginosis are not considered sexually transmitted diseases[7].

The infection of vaginal *Candida* is the main cause of fungal vulvovaginitis[8]. Such infection is characterized by an inflammation due to gender of the microorganism *Candida*, normally *Candida Albicans*[9], responsible by 85% to 90% of cases[10]. The vaginal candidiasis has as principal clinical manifestations: itch, leucorrhea, whitish plates, edema and erythema of the vulva and vagina[11].

Throughout their lives, is estimated that 75% of women will have an episode of candidiasis, 40% a 50% may have the second infection and about of 5% can acquire a chronic pattern, so repetitive episodes[12]. Some microbiologists suggest that *Candida spp.* is present on the normal microbiota of adults women in asymptomatic way. By this way, the asymptomatic colonization can occur in 25 to 50% of women[13]. Some factors predispose to the disequilibrium of microbiota and appearance of candidiasis , such as: use of oral contraceptives; therapeutic with corticosteroids; use of antibiotic for a long time; inadequate personal hygiene; endocrine disorders; synthetic underwear which decrease ventilation and increase humidity and the local heat; sexual relationship, stress; immunodeficiency such as the infection of Human Immunodeficiency Virus (HIV)[1].

Concerning to trichomoniasis, it is the most common non-viral sexually transmitted disease around the world[14], caused by the protozoan *Trichomonas vaginalis* (*T. vaginalis*). *In vitro* studies related that adhesion of *T. vaginalis* to the host's target cell is essential for the infection maintenance and its cytopathogenicity, damaging cells after the release of soluble cytotoxins, which play a role in virulence and adhesion[15]. The symptoms include purulent vaginal discharges, vulvar irritation, inflammation and hemorrhagic lesions in the cervix[13].

Therefore, diseases of genital tract are caused by bacteria, fungi and protozoa, represent an important portion of the process health and illness, which if not treated can worsen, making it important to the attention of health professionals in the communities where the health service access is deficient and precarious. Women residing in Amazonian riparian communities are example of people who are impacted by the lack of access to information and health services, occurring more and more cases of aggravation of diseases in the genital tract.

This way, this study in partnership with the program *Luz na Amazônia*, by agreement with Federal University of Pará(UFPA) tries to meet the need for clinical, laboratory assistance and treatment of the riverside population vulnerable to access to basic health services, to improve or decrease the incidence and prevalence of infections and/or diseases of simplified diagnostic and treatment.

The objective of this study is to determine the prevalence vulvovaginitis caused by *Gardnerella vaginalis*, *Candida spp.* e *Trichomonas vaginalis* in adult women, sexually actives, resident in Amazonian riparian communities, served by the program *Luz na Amazônia*, evaluating the clinical and epidemiological status of the population and featuring hygiene habits and sexual activity, possibly associated with the incidence and maintenance of infections.

2. MATERIAL AND METHODS

The project can be described as an analytical cross-sectional study in which the population observed at each visit by boat "Luz na Amazônia" to the riverside communities Genipaúba and Furo do Aurá located on the outskirts of Belém, Pará, Brazil, respecting the service system developed by the program.

For this research, were select adult women, aged over 18 years, sexually active and residents in communities served, between 2013 and 2014. Were excluded from this study women under 18, who have not started sexual life and pregnant. The sample size was calculated according to the population number of women in the two riverside communities. The sample was constructed according to the women who met the inclusion criteria.

Because it is research involving biological material and also collecting epidemiological information of individuals, attended only women who agreed to participate in the study, through the free and informed consent, after information about the objective. The research protocol was analyzed and approved by Ethics Committee for Human Research of the Institute of Health Sciences of Federal University of Pará, in September 09th, 2008, according to the number of protocol 156/08 CEP-ICS/UFPA.

To delineate the socioepidemiological profile related to vulvovaginitis, an investigative questionnaire was administered. Women were questioned about age, marital status, rental, number of children, sexual activity, number of sexual partners, age of their first sexual relationship, about of use of contraceptives, number of partners, hygiene corporal and behavior habits, as well as complaints of leucorrhea, pain, strong odors and dysuria during the boat visit in their community.

Among the laboratorial tests for diagnosis of bacterial vaginosis, candidiasis and trichomoniasis, collected up the secretion of the vaginal sack background, using sterile cotton swab and disposable speculum. The gathering was carried out on the boat, by trained laboratory technician following all the semiotic protocols.

After gathering, the smear was performed in sterile glass slide and the swab deposited in a hemolysis tube, clear and sterile, containing 5 mL of physiological solution (NaCl 0,9%). Also in the boat, was realized the fresh examination, which consists of placing a drop of suspension formed by the vaginal secretions and the physiological solution, between a glass slide and cover slip and checking an optical microscope at a 40x. The bacterioscopy was realized in the Clinical and Environmental Microbiology Laboratory of Faculty of Farmacy in UFPA, by Gram stain. The results were based on: presence of "clue cells" and Gram variable bacilli in the characterization of *Gardnerella vaginalis*, the presence in the vaginal secretion fresh examination of blastospores or pseudohyphae yeast was characterized as *Candida* spp; and the presence of flagellated protozoa was characterized as *Trichomonas vaginalis*.

For the statistical analysis, Fisher exact test was used and the software used for this analysis was BioEstat software, version 5.0, applied in the areas of biological and medical sciences. The data were tabulated and presented in graphic and tables built in Microsoft Office Excel® program.

3. RESULTS

Within two years, the present studied evaluated vaginal secretion samples from 56 women who met within the inclusion and exclusion criteria in two coastal communities in the city of Belém, Pará. Ages ranged from 18 to 60 years, with a mean of 35.1 (SD ± 11.6).

Among the 56 vaginal secretion samples analyzed, 44 had infectious agents: *Gardnerella vaginalis*, *Candida* spp and *Trichomonas vaginalis*. These characterize the group of positive women to vulvovaginitis, with a prevalence of 78.57% compared to women with normal microbiota (Figure 1).

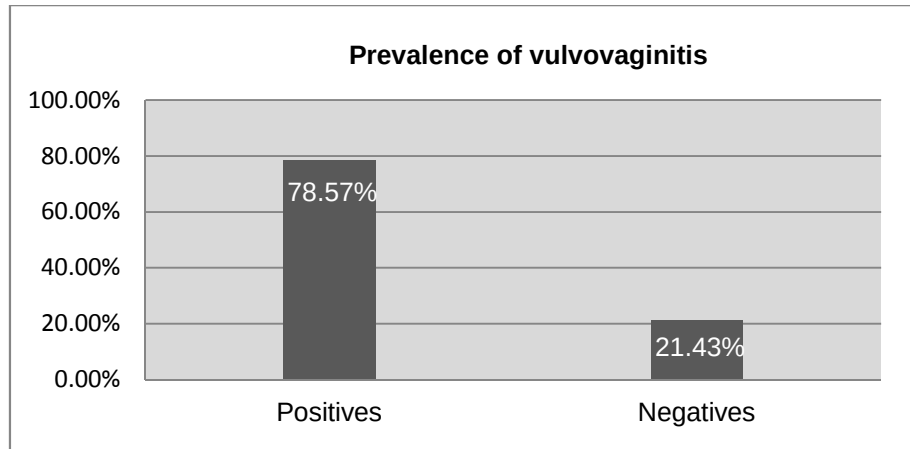


Figure 1: Prevalence of vulvovaginitis in women of riverside communities in the city of Belém, Pará, in the years 2013 and 2014.

Regarding the altered vaginal microbiota, there was a prevalence of 44.65% of *Gardnerella vaginalis*. Co-infections, which occur in the presence of two or more infectious agents, were found in 12 women of the positive group, representing 21.43%. Bacterial vaginosis and candidiasis were observed in 14.29%, vaginosis and vaginitis in 5.36% and only 1.78% of women presented the three infectious agents. All women with co-infection were positive for the presence of *Gardnerella vaginalis*(Table 1).

Table 1. Distribution as a percentage of the types of pathogens, co-infections and normal microbiota found in women of riverside communities in the city of Belém, Pará, visited in the years 2013 and 2014.

Infectious agents	n	%
<i>Gardnerella vaginalis</i>	25	44,65
<i>Candida spp</i>	6	10,71
<i>Trichomonas vaginalis</i>	1	1,78
<i>G. vaginalis. eCandidaspp</i>	8	14,29
<i>G. vaginalis. eT.vaginalis</i>	3	5,36
<i>G. vaginalis. Candidaspp e T. vaginalis</i>	1	1,78
Normal microbiota	12	21,43
Total	56	100

Within the group of women with positive results, aged 18 to 40, considered in the reproductive phase, there was a prevalence of 72.73% (n = 32). Only 27.27% (n = 12) represent the number of women above 41 years and the maximum age of the women seen in this study was 60 years. Table 2 shows the results of the samples, according to age group. Samples suggestive of *Gardnerella vaginalis*were identified in 54.05% in the age group of 18-40 years for positive women. Only the *Trichomonas vaginalis* was most prevalent in the age group at or above 41 years, with 80%.

Table 2. Association of age with the results found in women of riverside communities in the city of Belém, Pará, visited in the years 2013 and 2014.

Results	Age group		Total +/n	p value
	18 – 40 +/n	> 41 +/n		
<i>G. vaginalis</i>	20/29	17/27	37/56	0.4238
<i>Candida spp</i>	9/29	6/27	15/56	0.3302
<i>T. vaginalis</i>	1/29	4/27	5/56	0.1544

76.78% (n = 43) of riverside women did not complete elementary school and only 23.21% (n = 13) completed (Figure 2). There was no association between study time and the presence of vulvovaginitis (p = 0.567). It noted that 78.58% (n = 44) of women are married or station in a stable, 19.64% (n = 11) are unmarried and 1.78% (n = 1) widows.

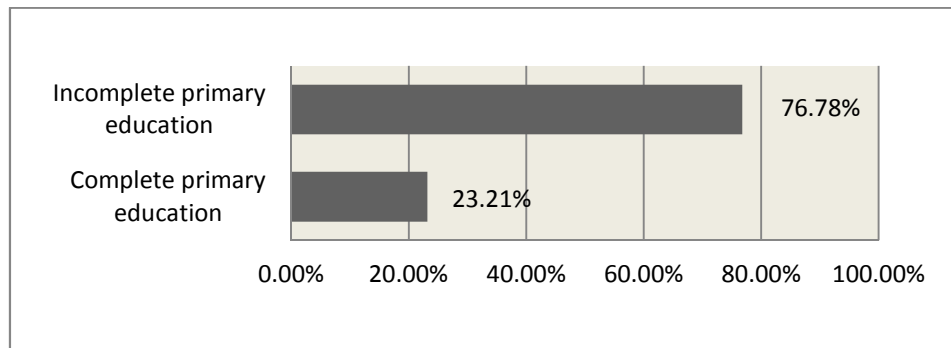


Figure 2: Positive group of women Education for vulvovaginites of riverside communities in the city of Belém, Pará, in the years 2013 and 2014

The age of onset of sexual life of these women ranged from 12-24 years with a mean of 14.8 (SD $\pm$ 2.22). The average number of partners was 1.8 (SD $\pm$ 1.24), varying between one and six partners, 10.71% (n = 6) have been reporting above four partners. Regarding the intimate hygiene 73.21% (n = 41) said they did not perform correctly and only 26.79% (n = 15) yes. Regarding the use of contraceptive methods, 62.50% (n = 35) reported no use of a method and only 14.28% (n = 8) use condoms as contraception and prevention of sexually transmitted diseases.

The association between the vulvovaginitis and factors such as condom use, age of onset of sexual life, number of partners and intimate hygiene, statistical significance was not found when comparing the groups, as shown in Table 3.

Table 3. Gynecological history associated with vulvovaginitis in riverine communities of women in the city of Belém, Pará, visited in the years 2013 and 2014.

Ginecological history	<i>G. vaginalis</i> (n)	<i>Candida spp</i> (n)	<i>T. vaginalis</i> (n)
Condom use			
Yes	4	2	1
No	33	13	4

	p= 0.6784	p= 0.9885	p= 0.4896
Beginning of sex life			
Up to age 18	36	15	5
Above 18 years	1	0	0
	p= 1.000	p= 1.000	p= 1.000
Number of sexual partners			
1 – 3	34	15	4
4 oumais	3	0	1
	p= 0.3971	p= 0.1769	p= 0.4387
Intimate Hygiene			
Yes	11	2	2
No	26	13	3
	p= 0.5431	p= 0.1985	p= 0.6015

Most women said they had between 2 and 3 gynecological problems, and 66.07% (n = 37) reported having discharge, 30.35% (n = 17) dysuria, 28.57% (n = 14) and pruritus only 10.71% had no problems (n = 8). An association was found in relation to vaginitis and dysuria and strong odor of vaginosis, vaginitis and candidiasis, which is the combination of these symptom to vulvovaginitis. Other signs and symptoms were not statistically significant and can be seen in Table 4.

Table4. Signs and symptoms associated with vulvovaginitis in women of riverside communities in the city of Belém, Pará, visited in the years 2013 and 2014.

Signs and symptoms	<i>G. vaginalis</i> (n)	<i>Candida spp</i> (n)	<i>T. vaginalis</i> (n)
Discharge			
Yes	27	10	5
No	10	5	0
	p= 0.1477	p= 1.000	p= 0.1547
Pruritus			
Yes	10	5	2
No	27	10	3
	p= 0.7508	p= 0.4887	p= 0.5892
Dysuria			
Yes	13	5	5
No	24	10	0
	p= 0.3644	p= 0.9999	0.0016
Strong odor			
Yes	23	9	4
No	14	6	1
	p= 0.0000	p= 0.0301	p= 0.0497
Pain			
Yes	14	3	3
No	23	12	2
	p= 0.5526	p= 0.2195	p= 0.3237

4. DISCUSSION

The prevalence found in this study was considered high in comparison to other [17, 18, 19]. Luppieri et al, 2011[20] in his study in Sao Paulo found a prevalence of only 13% compared to vaginitis caused by other etiologic agents, showing that the three agents, aim of this study, are the most common causative agents of vulvovaginitis. There are other less common causes of vulvovaginitis, such as atrophic vaginitis occurring by the hormone estrogen deficiency and vulvovaginitis non-infective causes such as irritative or allergic contact dermatitis, which can be associated with the use of feminine hygiene products absorbers, contraceptives, preservatives, and other causes[2].

Considering the age of the women who tested positive, there is a predominance of cases of vulvovaginitis in women of reproductive age. The normal vaginal flora in this age group is predominantly made up of a few species of lactobacilli. The metabolic products are responsible for this important role to maintain the normal flora by inhibiting other pathogens[17]. Other studies also showed prevalence of vulvovaginitis in the age group of 18 and 40, similar to this research[4, 21, 22]. The possible increased susceptibility in young women may be due to biological factors such as age, hormonal changes, cervical ectopic and beyond sexual behavior of high risk, with more partners and unprotected sex[23].

Women with low level of education are the most responsible for care for treatment of vulvovaginitis due to the lack of awareness of sexual habits and hygiene[24]. It is known that women living in coastal communities suffer from a lack of access to information and health services, which contributes to the worsening of conditions such as infections, confirming the results presented in this study.

The prevalence of bacterial vaginosis caused by *Gardnerella vaginalis* higher compared to candidiasis and trichomoniasis. The significant presence of the germ, including cases of co-infection, consistent with other studies conducted in Brazil and other countries, who report *G. vaginalis* as the bacteria most commonly found in smears stained by Gram[2, 5]. The result found was higher compared to other studies of prevalence of bacterial vaginosis[24, 25]. Comparing the studies, it is observed that these were conducted in cities where women have low-income conditions; however, they had minimal access and affordability, unlike riverside women served by this project.

Positive results for *Candida* were similar to those found in the study Rathod et al, 2012[26]. However, prevalence was higher than that found in another study[27].

Regarding trichomoniasis, this population revealed a high prevalence compared to other studies. In Brazil, the prevalence of *T. vaginalis* is 3.2% of women aged between 18 and 40 met the basic service health[20]. In a survey conducted in the state of Amazonas, Brazil, the prevalence was 4.1% in patients with a mean age of 32 years old and HIV-positive patients[28]. Vijaya et al, 2003[29], presented in their study, prevalence of 2.1% of trichomoniasis in a rural community in South India. The literature reveals a variation in the prevalence of infection with *T. vaginalis*. This is the difference of methods used diagnostic. The vaginal cytology has a low rate of sensitivity and specificity when compared to the direct examination under the microscope, the method used in this study, in addition to the Gram stain[30].

The lack of association between the vulvovaginitis and some behavioral and sexual habits, such as number of partners, marital status, early sexual activity old, intimate hygiene and condom use was unexpected and surprising. These variables are cited in other studies as dependent associations of the presence of vulvovaginitis[20, 31].

In the study, we evaluated the number of sexual partners over a lifetime and no

statistical association was not found with this variable. The early onset of sexual activity, under 18, predisposes to a higher risk of genital infections and STDs, mainly due to increased exposure[32, 33].

The condom is considered the most effective contraceptive method for the prevention of various STDs. The population studied had a low frequency in condom use, behavior that can increase the risk of STDs[13, 34].

In this study, most women who tested positive for the evaluated disorders reported some clinical signs, the most prevalent presence of discharge. But this sign was not statistically associated with any infection, unlike the study of Gama, 2011[33]. Was no association between the occurrences of strong odor related to the three infections and dysuria associated with vaginitis, corroborating other studies[20, 33]. It is known that vulvovaginitis is characterized by discharge, in particular bacterial vaginosis, which have a strong odor. Candidiasis is associated with pruritus, while trichomoniasis is associated with dysuria and pain.

The high prevalence of vulvovaginitis in general and individually can be explained by several factors such as susceptibility by young women and the lack of awareness of women with low level of education, despite the lack of statistical correlation, mainly related to the behavior.

4. CONCLUSION

The results showed a high prevalence of vulvovaginitis in adult women sexually active, residents of riverside communities of Genipaúba and Furo do Aurá, assisted by program Luz da Amazônia. Among the studied vulvovaginitis, bacterial vaginosis had the highest prevalence, including being even prevalent in co-infections, followed by candidiasis.

In the present study, there was no statistically significant correlation between the vulvovaginitis and apparently important factors, such as age, education, marital status, number of sexual partners, early sex life of age, condom use and personal hygiene. If undiagnosed and untreated, can vulvovaginitis acarrear in gynecological damage.

The location of coastal communities of the state of Pará found along river banks makes it difficult access to health services located in urban centers. Due to the needs of this population and the high prevalence of vulvovaginitis found, there is the importance of extension and research projects aimed at preventing vulvovaginitis and promoting education on women's health of communities, and stimulate the examinations often. From the visit of the Luz da Amazônia in these communities, these women could have access to health education, care and treatment.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee. The research protocol was analyzed and approved by Ethics

Committee for Human Research of the Institute of Health Sciences of Federal University of Pará, in September 09th, 2008, according to the number of protocol 156/08 CEP-ICS/UFGA.

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