

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

ABSTRACT

Aims: Analyze the prevalence of Vulvovaginitis in sexually active adult women, residents of riverside communities in Brazilian Amazonia, receiving health services by “Luz na Amazônia” program in 2013 and 2014.

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

Place and Duration of Study: “Luz da Amazônia” Program and *Laboratory of Clinical and Environmental Mycology* at Federal University of Para (UFPA), between January 2013 and December 2014.

Methodology: The analytical cross-sectional study was made with bacterioscopy and fresh examination of vaginal secretion and the results was statistically analyzed by software 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 vulvovaginitis.

Conclusion: Due the necessities of this population and the 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 if not diagnosed and treated properly, draw on a great chance to promote gynecological complications. Those infections can be distributed in three groups, according 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 vaginal microbiota 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 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, with repetitive episodes[12]. Some microbiologists suggest that *Candida spp.* is present on the normal microbiota of adults women in asymptomatic way. Thus, 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 x illness, which if not treated can worsen, making it important 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 "Luz na Amazônia" program, by agreement with Federal University of Pará (UFPA) tries to supply the need for clinical, laboratory assistance and treatment of the riverside population vulnerable to access to primary 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 of vulvovaginitis caused by *Gardnerella vaginalis*, *Candida spp.* e *Trichomonas vaginalis* in adult women, sexually actives, resident in Amazonian riparian communities, assisted by the "Luz na Amazônia" program, 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 which in the population was 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 assisted, between 2013 and 2014. Were excluded from this study women under 18 years, who have not started sexual life and pregnant women. 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 were in the inclusion criteria.

Because it is a research involving biological material and also collecting epidemiological information of individuals, were attended only women who agreed to participate in the study, through the free and informed consent, after informed its objectives. 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 applied. Women were questioned about age, marital status, rental, number of children, sexual activity, number of sexual partners, age of their first sexual relationship, 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 sac, 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 secretion and the physiological solution, between a glass slide and cover slip and checking an optical microscope at a 40x. The bacterioscopy by Gram stain was realized in the Clinical and Enviromental Micology Laboratory of Faculty of Pharmacy in UFPA. The results were based on: presence of "clue cells" and Gram variable bacilli in the characterization of *Gardnerella vaginalis*, presence of blastospores or pseudohyphae yeast in the vaginal secretion fresh examination 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 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 were in the inclusion and exclusion criteria in two riversides 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).

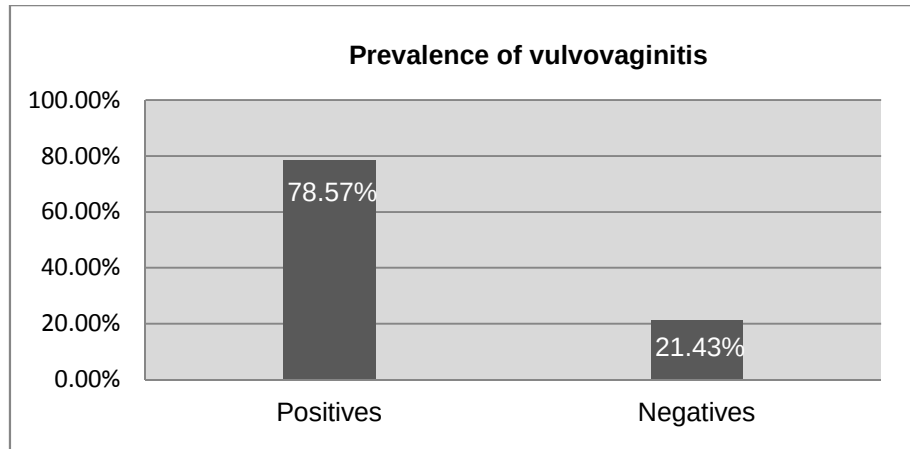


Figure 1: Prevalence of vulvovaginitis in women of riverside communities in the city of Belém, Pará, in the years 2013 and 2014.

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 years, 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. 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 in a stable relationship, 19.64% (n = 11) are unmarried and 1.78% (n = 1) widows.

The age of sexual debut of these women ranged from 12-24 years with a mean of 14.8 (SD ± 2.22). The average number of partners was 1.8 (SD ± 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) reported 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.

Statistical significance was not found when comparing the groups (Table 3) about the association between vulvovaginitis and factors such as condom use, early sexual debut, number of partners and internal intimate hygiene.

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

Gynecological history	<i>G. vaginalis</i> (n)	<i>Candida</i> <i>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 ou mais	3	0	1
	p= 0.3971	p= 0.1769	p= 0.4387
Intimate Hygiene			
Yes	11	2	2

No	26 p= 0.5431	13 p= 0.1985	3 p= 0.6015
----	-----------------	-----------------	----------------

Most women reported having between 2 and 3 gynecological problems, wherein 66.07% (n = 37) said having discharge, 30.35% (n = 17) shows dysuria, 28.57% (n = 14) have pruritus and only 10.71% (n = 8) had no problems. An association was found between vulvovaginitis 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.

Table 4. 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]. Luppi *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 vulvovaginitis causes, 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 these women who tested positive, there is a predominance of cases in women in reproductive age. The normal vaginal microbiota in this age group is predominantly made up of a few species of lactobacilli. The metabolic products are responsible for maintain the normal flora by inhibiting other pathogens[17]. Other studies also showed prevalence of vulvovaginitis in the age group between 18 and 40 years, 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 treatment care of vulvovaginitis due to the lack of awareness of sexual habits and hygiene[24]. It is known that women living in riverside 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* is higher compared to candidiasis and trichomoniasis. The significant presence of the agent, 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 assisted by this program.

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 years, treated in primary care health service [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*, probably because of the difference of methods used for 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 behavior and sexual habits, such as number of partners, marital status, early sexual activity, 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 found with this variable. The early onset of sexual activity, under 18 years, 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

255 strong odor. Candidiasis is associated with pruritus, while trichomoniasis is associated with
256 dysuria and pain.

257
258 The high prevalence of vulvovaginitis in general and individually can be explained by
259 several factors such as susceptibility by young women and the lack of awareness of women
260 with low level of education, despite the lack of statistical correlation, mainly related to the
261 behavior.

262

263 **4. CONCLUSION**

264

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

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

273 The location of riverside communities of the state of Pará, founded along riverbanks, makes
274 it difficult access to health services located in urban centers. Due to the needs of this
275 population and the high prevalence of vulvovaginitis found, there is the importance of
276 extension and research projects aimed at preventing vulvovaginitis and promoting education
277 in women health's communities, and stimulate the examinations often. From the visit of the
278 *Luz da Amazônia* in these communities, these women could have access to health
279 education, care and treatment.

280 **CONSENT**

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

285

286 **ETHICAL APPROVAL**

287

288 All authors hereby declare that all experiments have been examined and approved by the
289 appropriate ethics committee. The research protocol was analyzed and approved by Ethics
290 Committee for Human Research of the Institute of Health Sciences of Federal University of
291 Pará, in September 09th, 2008, according to the number of protocol 156/08 CEP-ICS/UFGA.

292

293 **REFERENCES**

294

295 1. Ministério da Saúde (Br). Secretariat of Health Care. Care Notebook Basic 13.
296 Series A. Technical Standards and Manuals. Control of cervical and breast cancers. Brasília
297 (DF) : Ministry of Health; 2006 .

298

299 2. Hainer BI, Gibson, MV. Vaginitis: Diagnosis and Treatment. American Family
300 Physician, Charleston. 2011; 83(7): 808-15.

301

302 3. Ribeiro AA, et al. Microbiological agents in cytopathology: prevalence study.
303 ClinicalAnalysis. 2007; 38(3): 179-81.

- 304
305 4. Leite MCA, Santos SMJ, Lima EQ, Rodrigues OG, Queiroga FE. Prevalence of
306 etiological agents of vulvovaginitis in operations of cervical screening: a study in the health
307 unit's family at Patos- PB. NewsLab. 2011; 104(18): 86-96
308
- 309 5. Mota DA, Monteiro CA, Monteiro SG, Figueiredo PMS. Prevalence of bacterial
310 vaginosis in patients who underwent vaginal secretion bacterioscopy in public health
311 laboratory. Clin Med. 2012; 10(1): 15-18
312
- 313 6. Martinez MJG. Microbiological diagnosis of sexually transmitted infections . Part II.
314 ITS virales. Chil Infect. 2010; 27.
315
- 316 7. Verstraelen H, Verhelst R, Vaneechoutte M, Temmerman M. The epidemiology of
317 bacterial vaginosis in relation to sexual behaviour. BMC. Infect. Dis. 2010; 10(81): 1-11
- 318 8. Trama JP, Martin AE, Raphaelli I, Stemmer SM, Mordechai E. Detection of Candida
319 species in vaginal samples in a clinical laboratory setting. Infectious Diseases in Obstetrics
320 and Gynecology. 2005; 13(2): 63-67.
- 321 9. Cassone A. Vulvovaginal Candida albicans infections: pathogenesis, immunity and
322 vaccine prospects. An International Journal of Obstetrics &Gynaecology. 2014; 122(6): 785
- 323 10. Feuerschuette OHM, Silveira SK, Feuerschuette I, Corrêa T, Grando L. Recurrent
324 vaginal candidiasis: Clinical management. Femina. 2010; 38(2): 31-36.
325
- 326 11. Boatto HF, et al. Correlation between laboratory results and clinical signs and
327 symptoms of patients with vulvovaginal candidiasis and the significance of sexual partners in
328 the maintenance of infection in São Paulo, Brazil. Ginecol. Obstet. 2007; 29(2):80-84.
329
- 330 12. Galle LC, Gianinni MJSM. Prevalence and susceptibility vaginal yeast. Brazilian
331 Journal of Medical Laboratory – Pathology 2004; 40(4): 229-36.
332
- 333 13. Mascarenhas REM, et al. Prevalence and risk factors for bacterial vaginosis and
334 other vulvovaginitis in a population of sexually active adolescents from Salvador, Bahia,
335 Brazil. Infectious Diseases in Obstetrics and Gynecology. 2012; 2012: 1-6.
- 336 14. Maciel GP, Tasca T, Carlide GA. Clinical features, pathogenesis and diagnosis of
337 Trichomonas vaginalis. Brazilian Journal of Medical Laboratory – Pathology 2004; 40(3):
338 152-60.
- 339 15. Midlej V, Benchimol M. Trichomonas vaginalis kills and eats- evidence for
340 phagocytic activity as a cytopathic effect. Parasitology. 2010; 137:65-76.
- 341 16. Ayres M, Ayres Junior M, Ayres DL, Santos AA. 2007. BIOESTAT - 5.0. Statistical
342 applications in the areas of bio- medical science. Belém: Ong Mamirauá; 2007
343
- 344 17. Bonfanti G, Gonçalves TL. Prevalence of Gardnerellavaginalis , Candida spp .
345 and Trichomonas vaginalis in cytological examinations of pregnant women treated at the
346 university hospital of Santa Maria- RS. Health. 2010; 36(1):37-48.
- 347 18. Ribeiro AL. Etiologic study of genital discharge in patients enrolled in the Health
348 Bureau of Santo Domingo [Monograph]. Cabo verde (Santiago): Jean Piaget University ,
349 Sector Analysis Clinical and public health; 2011.
350

- 351 19. Desai B, Kosambiya JK, Mulla S, Verma R, Patel B. Study of sexual behavior and
352 prevalence of STIs/RTIs and HIV among female workers of textile industries in Surat city,
353 Gujarat, India. *Indian J Sex Transm Dis, Surat*. 2013; 34(1):14-18.
- 354 20. Luppi CG, et al. Early diagnosis and the factors associated with sexually
355 transmitted infections in women seeking care in primary care. *Brazilian epidemiology*. 2011;
356 14(3): 467-77.
- 357 21. Batista MLS, Cytological results of women who underwent cervical examination in
358 a laboratory school of the Federal University of Goiás, Goiânia- GO: prevalence study. *J*
359 *Health Sci Inst*. 2012;30(3):201
- 360 22. Diefenthaler VL, Zanella JFP, Coser J. Infectious Agents prevalence in cervical
361 screening women Answered in a Public Health Service in southern Brazil. *NewsLab*. 2012;
362 110; 142-50
- 363 23. Reis NROG, Costa AMC, Madi RR, Melo CM. Microbiological profile and cytological
364 changes associated in cervical-vaginal materials collected in nursing practice, from 2009 to
365 2011 in Aracaju/SE. *Scientia Plena*. 2014; 9(5): 2-8.
- 366 24. Oliveira AB, França CAS, Santos TB, Garcia MAF, Tsutsumi MY, Brito LCJ.
367 Prevalence of Gardnerella and Mobiluncus in Colpocytology tests in Tome -Acu , Para. *Para*
368 *Medicine*. 2007; 21(4): 47-51.
- 369 25. Bradshaw CS, et al. Prevalent and incident bacterial vaginosis are associated with
370 sexual and contraceptive behaviours in young Australian women. *Plos One, Victoria*. 2013;
371 8(3):1-8
- 372 26. Rathod, SD, Klausner JD, Krupp K, Reingold AL, Madhivanan P. Epidemiologic
373 features of vulvovaginal candidiasis among reproductive-age women in India. *Infect Dis*
374 *Obstet Gynecol*. 2012; 2012: 1-8.
- 375 27. Kalantari N, Ghaffari S, Bayani M. Trichomonas, Candida, and Gardnerella in
376 cervical smears of Iranian women for cancer screening. *N Am J Med Sci, Babol*. 2014; 6(1):
377 25-29
- 378 28. Silva LCF, Miranda AE, Batalha RS, Monte RL, Talhari S. Trichomonas vaginalis
379 and associated factors among women living with HIV/AIDS in Amazonas, Brazil. *Braz J Infec*
380 *Dis*. 2013; 6(17): 701-03.
- 381 29. Vijaya MND, Umashankar KS, Nagure AG, Kavitha G. Prevalence of the
382 Trichomonas vaginalis infection in a tertiary care hospital in rural Bangalore, Southern India.
383 *J ClinDiagn Res, Bangalore*. 2013; 7(7): 1401-03
- 384 30. Karaman U, Karadağ N, Atambay M, Arserim KNB, Daldal NU. A comparison of
385 cytological and parasitological methods in the diagnosis of Trichomonas vaginalis.
386 *TürkiyeParazitolojiDergisi*. 2008; 32(4): 309-312.
- 387 31. Costa, GP. A Prevalence of infectious vaginitis assessment caused by
388 Gardnerella vaginalis, Trichomonas vaginalis and Candida spp .in women enrolled in the
389 ESF the town of Lagoa Grande [monograph]. Paracatu (MG): College Tecsoma, Course of
390 Biomedicine;2012
- 391
392
393
394
395

- 396 32. Cordeiro SN. Socioeconomic, sexual and psychological factors associated with
397 women with recurrent vulvovaginitis[dissertation] .Campinas (SP): State University of
398 Campinas , Department of School of Medical Sciences ; 2003
399
- 400 33. Gama, DF. Prevalence and risk factors for *Trichomonas vaginalis* in women
401 attending public health facilities in the city of Uberlandia and compare techniques of
402 diagnosis [dissertation]Uberlândia (MG): Federal University of Uberlândia , Institute of
403 Biomedical Sciences;2011 .
404
- 405 34. WHO. World Health Organization. Sexually transmitted infections: fact sheet nº 110.
406 Geneva: World Health Organization (WHO), nov. 2013.

