

Detection of sexually transmitted infections at a Brazilian gynecology center: high prevalence of co-infections

Detecção de infecções sexualmente transmissíveis em uma unidade ginecológica brasileira: alta prevalência de coinfeções

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ABSTRACT

Introduction: Sexually transmitted infections (STI) remain a major public health problem and surveillance is crucial for prevention and control strategies. **Objective:** Our aim was to assess the prevalence of STI in a reference center for gynecology in Rio de Janeiro, Brazil. **Materials and methods:** It is a cross-sectional study conducted between August 2016 and June 2017. Whole blood and cervical cells were collected from 62 women and tested for human papillomavirus (HPV), human immunodeficiency virus (HIV), syphilis, chlamydia, gonorrhea and herpes simplex virus 1 and 2 (HSV-1/2). Cervical lesions were diagnosed by cytopathology and in some patients by colposcopy (79%). Other STI were evaluated during clinical examination. **Results:** Cervical lesions were detected by cytopathology examinations in 46.8% of patients; those with a history of four sexual partners were at higher risk of developing them. There was moderate agreement between the cytopathology e colposcopy results ($Kappa = 0.69$). The prevalence of HSV (96.7%), syphilis (6.4%) and HIV (3.2%) were higher than that described in the literature, while the prevalence of chlamydia (6.4%) and gonorrhea (1.6%) were similar. HPV was detected in 53.2% of women, 32.3% of which were infected by HPV 16. In the context of co-infections, 38 women (61.3%) presented more than one STI. **Conclusion:** Since most of the women analyzed were affected by more than one STI, our results suggest that routine screening for these infections at health centers would help in early detection, treatment and prevention of these infections. These measures would also impact on patients' cervical cancer control.

Key words: sexual and reproductive health; co-infection; women; public health surveillance; sexually transmitted diseases; obstetrical and gynecological diagnostic techniques.

INTRODUCTION

Sexually transmitted infections (STI) can cause several genital symptoms or can be asymptomatic, leading to infertility, pregnancy complications, cancer and even death⁽¹⁾. STI are associated with significant morbidity and mortality; according to their causative agents they are grouped in bacterial (chlamydia, gonorrhea, syphilis), parasitic (trichomoniasis) or viral STI [human immunodeficiency virus (HIV), human papillomavirus (HPV), herpes simplex virus (HSV) and hepatitis B virus (HBV)]⁽¹⁾.

The estimated global prevalence of chlamydia, gonorrhea, trichomoniasis and syphilis (curable STI) among women aged 15-49 years, was 4.2%, 0.8%, 5%, and 0.5%, respectively, in 2012. These infections account for more than 190 million cases worldwide⁽²⁾. It is estimated that 67% of the world population under 50 years old were infected with HSV-1 and 267 million women were living with HSV-2, in 2012^(3,4). HPV affects 11.7% of the world population⁽⁵⁾ and depending on its potential to cause cancer, this virus can be epidemiologically classified as low risk (LR) and high-risk (HR)⁽⁶⁾ – the latter is detected in about 95% of cervical cancers⁽⁷⁾.

Studies indicate that STI such as gonorrhea, syphilis and HSV-2 increase the risk of HIV acquisition⁽⁸⁾. Moreover, patients co-infected with HPV and *Chlamydia trachomatis* are four times more likely to develop cervical cancer⁽⁹⁾. In such context, the World Health Organization (WHO) proposes that surveillance is an important mean to develop strategies to prevent and control STI⁽¹⁰⁾. Thus, our aim in this study was to assess the prevalence of the main STI in the Instituto de Ginecologia (IG) in Rio de Janeiro, Brazil.

MATERIALS AND METHODS

Statement on Ethics and study population

Between August 2016 and June 2017, women referred to the IG of the Universidade Federal do Rio de Janeiro (UFRJ), Brazil, either because they presented abnormal cervical cytology ($n = 54$) or due to other gynecologic disorders (such as myomas, ovarian cysts or abnormal vaginal bleeding; $n = 8$), were invited to participate in this cross-sectional study. These are convenience sampling collected for a study on innate immunity and HPV. Exclusion criteria were: pregnancy; < 18 years-old; actively menstruating in the day of sample collection; divergence between histopathology and colposcopy/cytology; absence of cytological exam result. Written informed consent was obtained from all 62 study participants. The study was approved by the Ethical Committee of the Instituto de Puericultura e Pediatria Martagão Gesteira, UFRJ.

Demographic data, such as age, marital status, educational level, illegal drugs use, smoking, age at first sexual intercourse, number of sexual partners in life, and condom use were collected through interviews. We grouped women with multiple partners (single, divorced or widowed) in the “single” variable, and those who are current or past smokers in the “smoking” variable.

Sample collection and processing

During medical consultation or colposcopy examination, cervical cells (CC) were collected with cytobrush scraping and endocervical curettage and were transferred to a tube containing Roswell Park Memorial Institute (RPMI) medium at 4°C. After washing with phosphate-buffered saline (PBS), CC were frozen in ribonucleic acid (RNA) (Life Technologies, California) at -80°C. Once thawed, we extracted the genomic deoxyribonucleic acid (gDNA) using HiYield™ Genomic DNA Mini Kit (Blood/Bacteria/Cultured Cells) (Real Genomics, Taiwan). The blood was transported at 4°C in an ethylenediaminetetraacetic acid (EDTA) tube and, after centrifugation, plasma was frozen at -80°C.

STI diagnosis

Whole blood was used for rapid testing for HIV (Determine HIV1/2, Alere, Massachusetts, USA) and syphilis (Alere Syphilis, Alere). The plasma was used to detect HSV-1/2 immunoglobulin class M and G (IgM and IgG) (HSV1&2 IgM and HSV1&2 IgG, DIA.PRO, Milano, Italy) by enzyme-linked immunosorbent assay (ELISA). The cervical cancer staging was based on the International Federation of Gynecology and Obstetrics nomenclature.

The quality of CC's gDNA was verified by polymerase chain reaction (PCR) for *GAPDH* gene with primers: GAPDH-747_F (5'-ACTGTGGATGGCCCTCCGG-3') and GAPDH-896_R (5'-GGGGACACGGAAGGCCATGC-3'). The primers HO1 (5'-GCTACGCATACCCGCGTTGC-3') and HO3 (5'-CGAAGACG1TCGAGCAGACA-3') were used to detect *Neisseria gonorrhoea* and primers KL1 (5'-TCCGGAGCGATTACGAAGA-3') and KL2 (5'-AATCAATGCCCGGATTGGT-3') were used for *C. trachomatis* detection, both in gDNA.

For HPV genotyping, we performed a nested PCR of gDNA. In first step, My9/My11 primers were used. When the expected 450 bp band was not observed by agarose gel electrophoresis, a second round PCR was performed using internal primers GP5+/GP6+ with 0.5 µl of first round PCR product as template. Samples that amplified in the first or second round PCR were purified with HiYield Gel/PCR purification kit (Real Genomics, Taiwan) and sequenced (Big Dye, Applied Biosystems, California) using My9/My11 or GP5+/GP6+ primers, respectively. Sequences were aligned and compared to HPV sequences available in the GeneBank database (NCBI, NIH, Bethesda, USA) by using the Basic Local Alignment Search Tool (BLAST), and the closest match of the HPV type was assigned to each query sequence.

Other STI and female genital tract infections, such as trichomoniasis, were diagnosed by clinical and speculum examination.

Statistical analyzes

For the statistical analyzes, women with abnormal cytology were grouped and compared with women with no lesions. Chi-square or Fisher's exact tests was used to compare categorical variables and t-test was used to compare continuous variables using Graph Pad Prism 5.02 (California, USA). We calculated the odds ratio of the cervical lesion development [variables: age (< 40 years); marital status; educational level; smoking; number of sexual partners; condom use] and the HPV presence (variables: HIV; syphilis; chlamydia; gonorrhea; trichomoniasis; HSV-1/2) with an online version of MedCalc [http://www.medcalc.org/calc/odds_ratio.php]. For concordance analysis between cytopathology

and colposcopy results, we used the Kappa coefficient with linear weighting at VassarStats website (<http://vassarstats.net/kappa.html>). In these tests, colposcopy results of normal transformation zone (NTZ), abnormal transformation zone grade 1 and 2 (ATZG-1 and ATZG-2) and invasion suspected (Invasion) corresponded to cytopathology results of no lesion, atypical squamous cell (ASC) + low-grade squamous intraepithelial lesion (LSIL), high-grade squamous intraepithelial lesion (HSIL) and tumor, respectively. The *p*-value < 0.05 was considered significant.

RESULTS

Sixty-two women were enrolled in this study. They were categorized into five groups according to the cytopathological exam: 33 presented no lesions; six presented atypical squamous cells of undetermined significance (ASC-US) (*n* = 5) or atypical squamous cells that cannot exclude high-grade squamous intraepithelial lesion (ASC-H) (*n* = 1); seven were classified as LSIL; 13 were HSIL; and three presented tumors (one invasive squamous cell carcinoma, degree I of stage IIB; one undifferentiated carcinoma, degree IV; one microinvasive carcinoma of stage IA1).

The mean age of the enrolled women was 41 years-old [standard deviation (SD) ± 12.2] and the first sexual intercourse was on average at 17.3 years of age. The mean number of sexual partners was 5.1. Only 29% of patients used condom during

sexual intercourse; the majority were married and had complete or incomplete high school education. Only one patient (who was in the LSIL group) used illicit drugs (marijuana) and less than 40% presented a past history of smoking or were current smokers, a characteristic more frequent among women that presented HSIL (*n* = 7 of 13; 54%). Women with no HPV lesions had fewer partners than those with lesions (mean 3.7 and 6.8, respectively; *p* = 0.0332) (**Table 1**). In our population, HPV lesions were more frequent in women that had ≥ 4 partners (**Table 2**) and this group presented a higher risk to develop lesions [odds ratio (OR) = 3.26, 95% confidence interval (CI) = 1.14 to 9.29, *p* = 0.0271].

Among the enrolled women, 12 (19.4%) have had biopsy [five underwent conization, five underwent excision of the transformation zone (ETZ) and two had biopsies of a small cervical fragment]. From these only two still showed cytological alterations (one ASC-US and one HSIL – Table 1 and 2). As expected, the biopsies were protective factors for the presence of cervical lesions (OR = 0.17, 95% CI = 0.03 to 0.86, *p* = 0.03), although these biopsies did not eliminate the HPV infection (OR = 0.56, 95% CI = 0.16-2.01, *p* = 0.38).

The colposcopy exam was performed in 49 (79%) women; all of them were patients from the cervical cytology ambulatory. Although we found some discrepancies between the colposcopy and cytopathology results, analyzes of Cohen's Kappa test of concordance showed moderate agreement [Kappa = 0.69,

TABLE 1 – Demographic data of enrolled women based on cytopathological analysis

Characteristic	All patients (<i>n</i> = 62)	No lesion (<i>n</i> = 33)	ASC (<i>n</i> = 6)	LSIL (<i>n</i> = 7)	HSIL (<i>n</i> = 13)	Tumor (<i>n</i> = 3)
Mean age (range)	41 (23-70)	42.9 (23-70)	43.3 (26-65)	35.8 (29-48)	37.2 (24-59)	44.5 (28-61)
Marital status (%)						
Single*	21 (33.9)	10 (30.3)	4 (66.7)	2 (28.6)	4 (30.8)	1 (33.3)
Married	41 (66.2)	23 (69.7)	2 (33.3)	5 (71.4)	9 (69.2)	2 (66.7)
Educational level (%)						
Middle school	22 (35.5)	13 (39.4)	1 (16.7)	1 (14.3)	5 (38.5)	2 (66.7)
High school	34 (54.8)	18 (54.6)	4 (66.7)	3 (42.7)	8 (61.5)	1 (33.3)
Undergraduate	6 (9.7)	2 (6)	1 (16.7)	3 (42.7)	0 (0)	0 (0)
Illicit drug use (%)	1 (1.6)	0 (0)	0 (0)	1 (14.3)	0 (0)	0 (0)
Smoking (%)						
Past/current	24 (38.7)	13 (39.4)	1 (16.7)	2 (28.6)	7 (53.8)	1 (33.3)
No	38 (61.3)	20 (60.6)	5 (83.3)	5 (71.4)	6 (46.2)	2 (66.7)
Mean age of first sexual intercourse (range)	17.3 (11-35)	16.9 (12-25)	19.7 (16-26)	20.7 (14-35)	15.5 (11-20)	15.7 (13-19)
No. sexual partners (%)						
< 4	35 (56.5)	23 (69.7)	3 (50)	2 (28.6)	6 (46.2)	1 (33.3)
≥ 4	27 (43.5)	10 (30.3)	3 (50)	5 (71.4)	7 (53.8)	2 (66.7)
Condom use (%)	18 (29)	8 (24.2)	3 (50)	3 (42.9)	3 (23.1)	1 (33.3)
Biopsy (%)	12 (19.4)	10 (10.3)	1 (16.7)	0 (0)	1 (7.7)	0 (0)

ASC: atypical squamous cells of undetermined significance (ASC-US) or that cannot exclude high-grade squamous intraepithelial lesion (ASC-H); LSIL: low-grade squamous intraepithelial lesion; HSIL: high-grade squamous intraepithelial lesion; *single: grouped single, divorced or widowed women.

standard error of the mean (SEM) ± 0.07 , CI = 0.54-0.83], suggesting coherence between these two clinical procedures.

The most prevalent STI found in this population was HSV infection (IgG detected in 59 from 62 study women) but only one patient was recently infected (both IgM and IgG positive). After HPV infection (53.2%), syphilis and chlamydia were the third most prevalent infections (6.4% each) and both infections were equally

distributed in women with or without cervical lesions. Two women were HIV-infected (prevalence of 3.2%), but they were already undergoing treatment. We also detected gonorrhea in one patient and diagnosed trichomoniasis in another one (Table 3).

We detected HPV in 33 women (53.2%), nine (27.8%) of them with no concomitant cervical lesion. Interestingly, we could not detect HPV in four women with cervical lesions and in one with

TABLE 2 – Comparison of demographic data between women with and without cytological alterations

Characteristic	No lesion (n = 33)	With cervical lesion (n = 29)	p-value
Mean age (range)	42.9 (23-70)	38.9 (24-65)	0.1972
Marital status (%)			0.5266
Single	10 (30.3)	11 (37.9)	
Married	23 (69.7)	18 (62.1)	
Educational level (%)			0.4924
Middle school	13 (39.4)	9 (31)	
High school/Undergraduate	20 (60.6)	20 (69)	
Illicit drug use (%)	0 (0)	1 (3.4)	0.4677
Smoking (%)			1
Past/current	13 (39.4)	11 (37.9)	
No	20 (60.6)	18 (62.1)	
Mean age of first sexual intercourse (range)	16.9 (12-25)	17.9 (12-35)	19.7 (16-26)
No. sexual partners (%)			0.0396*
< 4	23 (69.7)	12 (41.4)	
≥ 4	10 (30.3)	17 (58.6)	
Condom use (%)	8 (24.2)	10 (34.5)	0.4129
Biopsy (%)	10 (30.3)	2 (6.9)	0.0256*

Statistical tests: mean age and mean age of first sexual intercourse: t-test; marital status, educational level, illicit drug use, smoking, number of sexual partners, condom use: Chi-square or Fisher's exact test; *p < 0.05.

TABLE 3 – Colposcopy results, STI prevalence and HPV detection in enrolled women

Characteristics	All patients (n = 62)	No lesion (n = 33)	ASC (n = 6)	LSIL (n = 7)	HSIL (n = 13)	Tumor (n = 3)
Colposcopy (%)						
NTZ	21 (33.8)	17 (51.5)	4 (66.6)	0 (0)	0 (0)	0 (0)
ATZG-1	12 (19.4)	4 (12.1)	0 (0)	6 (85.7)	2 (15.4)	0 (0)
ATZG-2	13 (21)	1 (3.1)	1 (16.7)	1 (14.3)	9 (69.2)	1 (33.3)
Invasion	3 (4.8)	0 (0)	0 (0)	0 (0)	1 (7.7)	2 (66.7)
Not performed	13 (21)	11 (33.3)	1 (16.7)	0 (0)	1 (7.7)	0 (0)
STI frequency (%)						
HIV	2 (3.2)	0 (0)	0 (0)	1 (14.3)	0 (0)	1 (33.3)
Syphilis	4 (6.4)	2 (6)	0 (0)	1 (14.3)	1 (7.7)	0 (0)
Chlamydia	4 (6.4)	2 (6)	1 (16.7)	1 (14.3)	0 (0)	0 (0)
Gonorrhea	1 (1.6)	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)
Trichomoniasis	1 (1.6)	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)
HSV-1 and/or 2	60 (96.7)	31 (93.9)	6 (100)	7 (100)	13 (100)	3 (100)
HPV type (%)						
Negative	29 (46.8)	24 (72.7)	2 (33.3)	2 (28.6)	0 (0)	1 (33.3)
Low risk	2 (3.2)	0 (0)	0 (0)	1 (14.3)	0 (0)	1 (33.3)
High risk	31 (50)	9 (27.3)	4 (66.7)	4 (57.1)	13 (100)	1 (33.3)

ASC: atypical squamous cells of undetermined significance (ASC-US) or that cannot exclude high-grade squamous intraepithelial lesion (ASC-H); LSIL: low-grade squamous intraepithelial lesion; HSIL: high-grade squamous intraepithelial lesion; NTZ: normal transformation zone; ATZG-1: abnormal transformation zone of grade 1; ATZG-2: abnormal transformation zone of grade 2; invasion: invasion suspect; STI: sexually transmitted infections; HIV: human immunodeficiency virus; HSV: herpes simplex virus; HPV: human papillomavirus.

cervical cancer (Table 3). The majority of women were infected by high-risk-HPV (HR-HPV) and only two by low-risk-HPV (LR-HPV) (70 and 54). In the context of HR-HPV, the most prevalent types were 16 ($n = 10$; 32.3%), 31 ($n = 8$; 25.8%), 58 and 66 ($n = 3$; 9.7% each). We also detected two patients with HPV18 and HPV52 (6.5% each) and found one case of each of the following HPV types: 51, 53 and 59 (3.2% each). Both LR-HPV-infected women were HIV+ and showed cytological alterations (LSIL or microinvasive carcinoma stage IA1 in HPV -70 and -54 infected patients, respectively).

Women were also grouped based on the HPV PCR results (HPV+, $n = 33$ and HPV-, $n = 29$) and assessed for other STI co-infections (Figure). Among HPV-negative patients, two women were infection-free and 22 had HSV-1/2 only. Co-infection was observed in HSV-1/2 and chlamydia (two cases), HSV-1/2 and syphilis (two cases) and HSV-1/2, trichomoniasis and syphilis (one case). Among HPV-positive patients, 28 were infected with HSV-1/2, two women were HSV-1/2 and HIV-positive; one patient presented HSV-1/2 and chlamydia; one patient presented HSV-1/2 and syphilis; and one woman was positive for HSV-1/2, chlamydia

and gonorrhoea. Thirty-eight women were STI co-infected (61.3%) and 8 women (12.9%) presented at least one curable STI. Seven from the 62 study women had previously been treated for syphilis, four of which were still positive for syphilis at the time of the study. These patients were asked to return for further tests and treatment, but none of them returned.

DISCUSSION

STI cause great impact in individual and public health, affecting social, sexual and economical aspects of life. The WHO suggests surveillance as an essential part of STI control; hence, we assessed the prevalence of the main STI in a specialized gynecology center in Rio de Janeiro, Brazil.

We found a high prevalence of HSV-1/2 seropositivity in the study (96.8%), which probably is because we could not differentiate the HSV infection type. HSV-2 is the causative agent of genital herpes, but the number of HSV-1 genital infections is increasing⁽¹¹⁾. Brazilian surveys in general population revealed prevalence of HSV-1 around 67% and for HSV-2 it was 11%⁽¹²⁾. Although HSV is associated with increased risk of HIV acquisition⁽⁸⁾, the role of HSV-2 as a co-factor for cervical cancer is controversial, with some studies showing an increased risk for the development of cervical squamous cell carcinoma or adenocarcinoma⁽¹³⁾, while others found no correlation⁽¹⁴⁾.

We also found an increased prevalence of HIV (3.2%) in our group of patients, which is much higher than the estimated prevalence in women in Brazil (0.4%-0.5%) and more similar to the prevalence found amongst female sex workers, considered a risk group (1.8%-5.1%)⁽¹⁵⁾. It is well established that HIV-positive women have not only an increased risk to acquire HPV, but HPV infection usually persists leading to the development of cervical intraepithelial lesions and cervical cancer more frequently than in HIV-negative women⁽¹⁶⁾. In this study, we observed one HIV-infected patient with LR-HPV that presented cervical tumor.

The HR-HPV type 16 was found in about one third of the infected women (32.3%). This is in agreement with several studies, that show HPV16 as the most prevalent HPV type in cervical samples (13%-42%)⁽¹⁷⁻²⁰⁾, including samples from Rio de Janeiro, Brazil⁽²¹⁾. Global epidemiologic studies showed that HPV-16, 18, 31, 52 and 58, are involved in about 75% of patients' cervical cancers^(6, 7), and corresponded to 80% of HPV infected women in our population.

We could associate the presence of cervical lesion with the number of sexual partners, characteristic already associated to HPV detection⁽²²⁾ and we saw that previous biopsies reduced

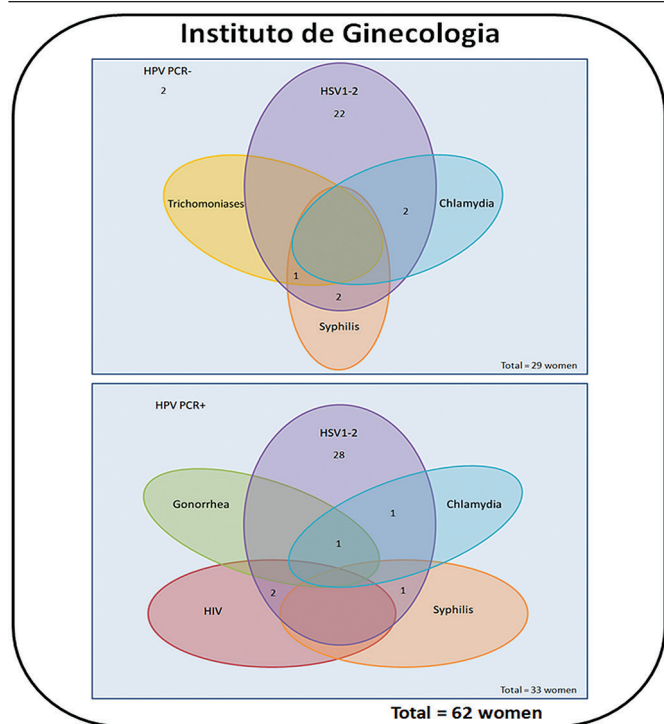


FIGURE – Venn diagram of co-infection in women from the Instituto de Ginecologia ($n = 62$)

Women were divided into two groups: HPV-negative ($n = 29$, upper square) and HPV-positive ($n = 33$, bottom square). Absence of number in intersections or geometric forms means that there were no women in the group.

HPV: human papillomavirus; PCR: polymerase chain reaction; HSV: herpes simplex virus; HIV: human immunodeficiency virus.

lesion's presence, although it did not affect the HPV detection. Concerning to the comparison of cytopathology and colposcopy, we found a moderate concordance between results (Kappa = 0.69), corroborating their complementarity and importance in screening of cervical lesions⁽²³⁾.

Interestingly, we could not detect HPV in some patients with cervical lesions, this has been described by other groups^(17, 24), probably due to PCR sensitivity and specificity. In developed countries such as Italy, HPV prevalence in women is 49% independent of cervical lesion⁽²⁵⁾. Studies in developing countries, such as Macedonia and Iran, HPV was found in approximately 42% of the women tested^(19, 26), while in Ecuador this prevalence was higher, reaching 68% of women with different stages of cervical lesion and cancer⁽²⁰⁾. Although HPV prevalence in our study population from Rio de Janeiro (53.2%) ranks between those found in both developed and developing countries, it was similar to those found in the general population from cities in Bahia, Brazil⁽¹⁸⁾. Nevertheless, HPV prevalence is higher than that found in smaller cities from the South of Brazil (15.7%), in a riverside Brazilian Amazon town (16.4%) and in towns around Rio de Janeiro (10.7% and 31.1% for low-risk and high-risk to develop cervical lesions population, respectively)^(17, 21, 24).

Comparing the prevalence of bacterial and parasitic STI in our population, we observed that trichomoniasis was less frequent (1.6%) when compared with rates found in primary health care services countrywide (3.2% and 12.7%)^(27, 28). We believe that the differences detected in trichomoniasis prevalence were due the different diagnostic methods. We based our results on clinical examination, while other studies used more sensitive approaches, such as PCR, to detect infection. The prevalence of chlamydia and gonorrhea (6.4% and 1.6%, respectively) were similar to those described by Rodrigues *et al.* (2011)⁽²⁹⁾ who collected cervical samples from patients in Belo Horizonte, Brazil.

Surprisingly, in our population, the prevalence of syphilis (6.4%) was higher than those found in women from both reference centers for STI and HIV, in Londrina (4.3%), Southern Brazil⁽³⁰⁾, and in Alagoas (3%), one of the poorest state in Brazil⁽²⁸⁾. Although we were not able to verify whether those syphilis infections were current or past infections, we noticed a high prevalence of curable STI (12.9%). A study conducted in Alagoas, Brazil, searched for several STI and showed that 12% of women were STI co-infected⁽²⁸⁾. Similarly, an Italian study with undocumented female immigrants showed a STI co-infection prevalence of 8.4%⁽³¹⁾. In our study population, we found a higher prevalence of STI co-infection (61.3%), regardless of HSV-1/2 infection (16.1%). These results

indicate the importance of testing all patients, regardless of the cause that has led them to seek gynecological medical assistance. Thus, they could all be treated properly, reducing transmission and persistence rates of STI.

We are aware that our study is limited due to the small sample size; lack of more sensitive testing for some of the STI; and the biased population, since most patients were enrolled in a cytopathological clinic. However, because of the number of patients attended at the IG ambulatory (300 new women/year), we believe that our sample is an accurate representation of the female population using this center, therefore our results can be used to support the development of a broader STI control and prevention strategy.

CONCLUSION

We found HPV at lower than expected prevalence, while other STI and STI co-infections were high in the study population. Therefore, it would be useful if women were tested for all STI when they come to health centers for treatment of gynecological problems, since adding diagnostic tests for multiple STI could improve women's sexual health. We believe that surveillance and early diagnosis are essential for STI prevention and control.

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CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest. All authors had full access to all study data, they can take full responsibility for the integrity of the data and the accuracy of the data analyzes.

RESUMO

Introdução: As infecções sexualmente transmissíveis (ISTs) ainda são um importante problema de saúde pública, e a vigilância é essencial para sua prevenção e seu controle. **Objetivo:** Avaliar a prevalência das ISTs em uma unidade de referência ginecológica no Rio de Janeiro, Brasil. **Materiais e métodos:** Trata-se de um estudo transversal realizado entre agosto de 2016 e junho de 2017. Foram coletados sangue total e células cervicais de 62 mulheres e realizados testes para detecção de papiloma vírus humano (HPV), vírus da imunodeficiência humana (HIV), sífilis, clamídia, gonorreia e vírus do herpes simples 1 e 2 (HSV-1/2). As lesões cervicais foram diagnosticadas por citopatologia, e em algumas pacientes, por colposcopia (79%). Outras ISTs foram avaliadas durante o exame clínico. **Resultados:** Foram encontradas lesões cervicais pelo exame citopatológico em 46,8% das pacientes; aquelas com história de quatro parceiros sexuais tiveram mais risco de desenvolvê-las. Houve concordância moderada entre os resultados da citopatologia e colposcopia ($Kappa = 0,69$). A prevalência de HSV (96,7%), sífilis (6,4%) e HIV (3,2%) foi maior que a descrita na literatura, enquanto a prevalência de clamídia (6,4%) e gonorreia (1,6%) foi similar. O HPV foi detectado em 53,2% das mulheres, sendo 32,3% delas infectadas pelo HPV 16. No contexto das coinfeções, 38 mulheres (61,3%) tinham mais de uma IST. **Conclusão:** Visto que a maioria das mulheres analisadas era acometida por mais de uma IST, nossos resultados sugerem que uma triagem rotineira dessas infecções nas unidades de saúde poderia auxiliar na detecção precoce, bem como no tratamento e na prevenção. Essas medidas também impactariam no controle do câncer cervical das pacientes.

Unitermos: saúde sexual e reprodutiva; coinfeção; mulheres; vigilância em saúde pública; doenças sexualmente transmissíveis; técnicas de diagnóstico obstétrico e ginecológico.

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