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Trichomonas vaginalis and *Chlamydia trachomatis* Prevalence, Incidence and Associated Factors in Pregnant Adolescents from Belém City, in the Brazilian Amazon

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Abstract

Background: Adolescents are disproportionally affected by sexually transmitted infections (STI). *Chlamydia trachomatis* (CT) and *Trichomonas vaginalis* (TV) are the most frequent curable STI in adolescents, causing serious consequences for their reproductive health. Therefore, we aimed to determine the prevalence and incidence of CT and TV, as well as their risk factors in pregnant adolescents from Belém, northern Brazilian Amazon. Methods: This prospective study enrolled 199 adolescents up to 20 weeks of pregnancy. They were scheduled for follow-up visit between 28 and 29 weeks of pregnancy. Sociodemographic and behavioral data were obtained by interview. Cervicovaginal samples were taken to test for TV, CT, *Neisseria gonorrhoeae* and bacterial vaginosis. Univariate and multivariate analyses were performed to test the association of prevalent/incident CT and TV with the variables. Results: Prevalence of cervical CT infection was 33.7% (n = 67/ 199), and for trichomoniasis it was 4.0% (n = 8/199). Cervical ectopy increased the risk for prevalent CT (OR, 1.93; 95% CI, 1.01 - 3.70), while having treated vaginal discharge in the past (OR, 0.51; 95% CI, 0.26 - 0.98) and being married (OR, 0.10; 95% CI, 0.01 - 0.83) were protective against

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current CT and TV, respectively. Among the 95 (47.7%) adolescents who completed follow-up, 15 cases of incident CT were identified. Incident CT was associated with having a formal or informal job (OR, 28.4; 95% CI, 2.1 - 391.6) and bacterial vaginosis treatment at the baseline (OR, 0.08; 95% CI, 0.01 - 0.69). Conclusion: Prevalence and incidence rates of TV and CT are high in this population devoid of STI routine screening. Treatment of bacterial vaginosis may benefit this population by reducing risk for CT acquisition.

Keywords

Adolescence, Pregnancy, Sexually Transmitted Infection, *Chlamydia trachomatis*, *Trichomonas vaginalis*

1. Introduction

Chlamydia trachomatis (CT) and *Trichomonas vaginalis* (TV) are the most common curable sexually transmitted infections (STI) worldwide [1]-[3]. These infections bring serious repercussions for women's reproductive health. While cervical chlamydial infection is associated with of pelvic inflammatory disease, infertility, ectopic pregnancy and perinatal infections [4], vaginal trichomoniasis has been already demonstrated to increase the risk for HIV acquisition, preterm delivery and low birth weight [5] [6].

Sexually active adolescents are at increased risk for both CT and TV, and consequently for the adverse reproductive health outcomes associated with such infections [3] [7]-[10]. This information is crucial considering the high STI rates in some regions, such as the Brazilian Amazon, in which screening programs for CT and TV are not available [11] [12]. Considering that STI rates in this region is poorly estimated, especially in the highly vulnerable population of pregnant adolescents, the objective of this study was to assess the prevalence and incidence of infection by CT and TV, as well as the factors associated with these infections in pregnant adolescents from Belém City, in northern Brazilian Amazon.

2. Methods

2.1. Study Population

From 2009 to 2011, a total of 199 pregnant adolescents attending outpatient clinics of adolescence-oriented obstetric care were enrolled. These clinics serve girls less than 21 years of age and cover all the metropolitan area of Belém, state of Pará, in the northern region of Brazil, with approximately 2.3 million inhabitants. This study was performed according to the recommendations for human studies and was approved by the Ethics Committee Board the Secretary of Health from Belém, Pará (#002/2009). All adolescents provided written consent term, and if younger than 18 years-old, the consent was signed by their mother or a legal representative.

Enrollment phase of this study occurred during 8 non-consecutive weeks in a 2 year-period. All adolescents attending the clinics in such weeks were invited to participate of the study if they were 19 years-old or younger, were less than 21 weeks pregnant, did not present seroconversion for HIV, did not take antibiotics or used vaginal cream in the previous 30 days and did not have sexual intercourse in the previous 72 hours before the visit. All the 199 adolescents enrolled were scheduled for a follow-up visit with gestational age between 28 and 30 weeks. A total of 100 pregnant adolescents attended the clinics at the follow-up visit and underwent the same protocol used at baseline visit for data and samples collection.

2.2. Study Design

A prospective study was developed. Based on the total number of 400 pregnant adolescents seen in the clinics over one year, power sample analysis showed that the prevalence of STI could be determined for the 199 adolescents with a power of 99%. For the incidence, for a sample of 100 women that followed-up, the power was 95%.

2.3. Questionnaire Data Collection and Laboratory Methods

Sociodemographic, behavioral and medical history data were obtained using a structured questionnaire by face-

to-face interview at baseline and at follow-up visit by 2 trained nurses. Cervicovaginal samples were taken during physical exam using a non-lubricated speculum. After visual inspection of the vaginal and cervical content and mucosa, vaginal pH was assessed (4.0 - 7.0, Merck, Darmstadt, Germany) and swabs taken from the mid-lateral vaginal wall and smeared on microscope slides. After Gram-staining, vaginal smears were evaluated according to Nugent's scoring system for classification of the vaginal flora in normal (scores 0 - 3), intermediate (4 - 6) and bacterial vaginosis (7 - 10) [13]. For detection of *T. vaginalis*, vaginal vault samples were taken with a spatula and inoculated on Diammond's liquid medium. Inoculated-medium was incubated for up to 72 hours at 35˚C - 37˚C and observed daily under light microscopy (Olympus CX31, Tokyo, Japan).

Samples from the endocervix were taken to test for NG and CT by culture and PCR, respectively. Cultures for NG were performed by spreading the endocervical samples in Thayer-Martin medium plate and incubating at 37ºC for 24 hours. NG-like colonies were Gram-stained for evaluating morphology and dye pattern. For CT detection by PCR two sets of primers were used: CTP1 (5'-TAG TAA CTG CCA CTT CAT CA-3'), CTP2 (5'-TTC CCC TTG TAA TTC GTT GC-3'), PL6.1 (5'-AGA GTA CAT CGG TCA ACG A-3') and PL62 (5'-TCA CAG CGG TTG CTC GAA GCA-3') resulting in products sizes of 201 bp and 130 bp, respectively [14]. Reactions were performed in a 25 uL final volume of 10 uL of GoTaq Green Master Mix (Promega, Madison WI), 1 uL of 25 mM $MgCl_2$, 0.2 uL of each primer at 10 uM, 4.2 of H_2O and 4 uL of DNA template. Cycling conditions were: 95˚C 5 min, 40 cycles of (95˚C 1 min, 55˚C 1 min, 72˚C 1.5 min) and final extension at 72˚C 5 min.

Therefore, bacterial vaginosis and candidosis were assessed by real-time microscopy during baseline visit. Treatments for these conditions were dispensed at enrollment visit, according to local protocol with oral metronidazole 500 mg twice a day for 7 days for bacterial vaginosis and 1.0% isoconazole nitrate cream for 7 days. When positive for TV or CT at baseline, adolescents were treated at follow-up visit. For those with incident infection contact by phone was tried and, when successful, they were asked to return to the clinics for treatment orientation.

2.4. Definitions and Statistical Analysis

Prevalence of infection by CT and TV were calculated considering the number of adolescents that were positive for these infections by the total number of 199 subjects enrolled in any assessment. Full sociodemographic, behavioral and medical history data were available for 178 (89.5%) of the adolescents and, therefore, only these subjects were considered for statistical analysis of factors associated with prevalent CT and TV. Incidence of CT and TV were defined as the number of new positive cases at second visit by the individuals that were previously negative at baseline and returned for follow-up. From the total of 100 women returned for follow-up, 95 (95.0%) had full data available for analysis and therefore were included in statistics for factors associated with incidence of CT. To test the factors associated with prevalence and incidence of CT and TV, simple logistic regression models were performed and those factors with $P \leq 0.25$ were entered in a conditional multiple regression model. Analyses were performed using the statistical IBM/SPSS statistical package (v.20.0).

3. Results

Among the 178 adolescents with full data available on sociodemographics, medical history and clinical findings, 84.3% (n = 150) of the pregnant adolescents were between 15 to 18 years old at enrollment, 56.7% (n = 101) of them were married or currently living together with a partner, only 7.9% (n = 14) had a formal or informal job, while 68.0% (n = 121) were attending school at the moment of enrollment. Additionally, most of them were between 11 and 14 years old at time of first sexual intercourse (61.2%), had at least 2 sexual partners at the lifetime (55.1%), were pregnant for the first time (87.6%) and complained of an abnormal vaginal discharge at baseline visit (68.5%). Microscopic analyses of vaginal smears showed that 105 (59.0%) adolescents had bacterial vaginosis and 38 (21.3%) vaginal candidosis at the moment of enrollment.

In the total of 199 pregnant adolescents enrolled in the study, prevalence of CT was 33.7% (n = 67). From the total of 132 (66.3%) of CT-negative individuals, 54 returned at follow-up visit and 15 (27.8%) of them showed an incident CT infection. Regarding TV infection, a total of 8 out of 199 (4.0%) women yielded positive cultures for this protozoan at baseline. Incidence of TV was calculated in 1%, considering a single new case of this infection among the 98 adolescents who were negative for TV at baseline and that returned for follow-up. Variables related to incidence of TV were not tested, since there was only one incident case. In relation to cervical infection by *N. gonorrhoeae*, no one case of prevalence or incidence was observed in this population.

Considering all factors which association was tested with prevalent CT, univariate analyses showed that ado-

lescents who reported already had treated any type of vaginal discharge in the past presented lower risk for current infection (OR, 0.52; 95% CI, 0.27 - 0.99). In agreement with these findings, multivariate analyses showed having reported a treated discharge in the past caused by any vaginal disorder was protective against CT (OR, 0.51; 95% CI, 0.26 - 0.98). Additionally, the presence of cervical ectopy was identified as an independent risk factor for current CT infection (OR, 1.93; 95% CI, 1.01 - 3.70) (**Table 1**).

The overall incidence of CT in this population was 27.0% and associated with having a formal or informal job (OR, 12.80; 95% CI, 2.70 - 62.30) and with having been treated for bacterial vaginosis at baseline visit (OR, 0.16; CI, 0.03 - 0.73) by univariate analysis. Both variables were confirmed as independent factors associated with CT incidence in the multivariate analysis, as having a formal or informal job increased 28 fold the chance of CT acquisition (95% CI, 2.10 - 391.60) and having treated bacterial vaginosis at enrollment protected against incident CT (OR 0.08; 95% CI, 0.01 - 0.69) (**Table 2**).

Prevalence of TV in this population was 4.0% and it was associated with self-report of a genital wound in the past (OR, 7.70; 95% CI, 1.32 - 45.77) and being married or living together (OR, 0.10; 95% CI, 0.01 - 0.83) in the univariate analysis. However, only marital status remained independently associated with prevalent TV in multivariate analyses, as those adolescents who were married or were living together with partner at the time of enrollment had significantly lower risk for TV infection (OR, 0.10; 95% CI, 0.01 - 0.83) (**Table 3**).

Table 1. Factors associated with prevalent *C. trachomatis* (CT) infection by univariate and multivariate analyses.

Variables	Prevalent CT	Univariate analysis		Multivariate analysis	
	No. positive/total (%)	Odds ratio (95% CI)	P	Odds ratio (95% CI)	P
Age, yr					
13 - 14	10/28 (35.7)	0.99 (0.43 - 2.29)	0.98		
15 or older	54/150 (36.0)	Ref			
Marital status					
Married or cohabiting	32/101 (31.7)	0.65 (0.35 - 1.21)	0.17*		
Single	32/77 (41.6)	Ref			
Formal or informal job					
Yes	3/14 (21.4)	0.46 (0.12 - 1.72)	0.24*		
No	61/164 (37.2)	Ref			
Attending school					
Yes	47/121 (33.9)	1.49 (0.76 - 2.94)	0.24*		
No	17/57 (29.8)	Ref			
Attending school at age-compatible grade					
Yes	37/87 (42.5)	1.75 (0.95 - 3.26)	0.07*		
No	27/91 (29.7)	Ref			
Age at first sexual intercourse, yr					
11 - 14	37/109 (33.9)	0.80 (0.43 - 1.49)	0.48		
15 or older	27/69 (39.1)	Ref			
No. of partners lifetime					
1	33/80 (41.3)	1.52 (0.82 - 2.81)	0.18*		
2 or more	31/98 (31.6)	Ref			
No. of partners previous year					
1	53/151 (35.1)	0.79 (0.34 - 1.82)	0.57		
2 or more	11/27 (40.7)	Ref			

Continued

Previous episode of treated discharge					
Yes	18/67 (26.9)	0.52 (0.27 - 0.99)	0.05*	0.51 (0.26 - 0.98)	0.04
No	46/111 (41.4)	Ref			
History of genital wound					
Yes	1/9 (11.1)	0.21 (0.26 - 1.72)	0.11*		
No	63/169 (37.3)	Ref			
History of genital warts					
Yes	2/11 (18.2)	0.38 (0.08 - 1.80)	0.21*		
No	62/167 (37.1)	Ref			
First time pregnant					
Yes	56/156 (35.9)	0.98 (0.39 - 2.48)	0.96		
No	8/22 (36.4)	Ref			
History of abortion					
Yes	7/14 (50.0)	1.88 (0.63 - 5.62)	0.26		
No	57/164 (34.8)	Ref			
At baseline					
Discharge complaint					
Yes	44/122 (36.1)	1.10 (0.53 - 1.96)	0.96		
No	20/56 (35.7)	Ref			
Dyspareunia					
Yes	17/50 (34.0)	0.89 (0.45 - 1.76)	0.73		
No	47/128 (36.7)	Ref			
Vaginal bleeding after sex					
Yes	1/5 (20.0)	0.44 (0.05 - 3.99)	0.45		
No	63/173 (36.4)	Ref			
Vaginal pH					
< or equal 4.5	46/124 (37.1)	1.18 (0.60 - 2.31)	0.63		
> 4.5	18/54 (33.3)	Ref			
Cervical ectopy					
Yes	27/59 (45.8)	1.87 (0.98 - 3.56)	0.05*	1.93 (1.01 - 3.70)	0.05
No	37/119 (31.1)	Ref			
Endocervicitis sign**					
Yes	8/16 (50.0)	1.89 (0.67 - 5.31)	0.22*		
No	56/162 (34.6)				
Bacterial vaginosis					
Yes	35/105 (33.3)	0.97 (0.54 - 1.75)	0.92		
No	29/73 (39.7)				
Vaginal candidosis					
Yes	10/38 (26.3)	0.65 (0.30 - 1.44)	0.29		
No	54/140 (38.6)				

CI: Confidence interval; Yr: years; *included in multivariate analysis; **Endocervical mucopurulent discharge and/or easily induced bleeding.

Table 2. Factors associated with incident *C. trachomatis* (CT) infection by univariate and multivariate analyses.

Variables	Incident CT	Univariate analysis		Multivariate analysis	
	No. positive/total (%)	Odds ratio (95% CI)	P	Odds ratio (95% CI)	P
Age, yr					
13 - 14	1/12 (8.3)	0.45 (0.05 - 3.76)	0.45		
15 or older	14/83 (16.9)	Ref			
Marital status					
Married or cohabiting	12/59 (20.3)	2.81 (0.74 - 10.74)	0.12*		
Single	3/36 (8.3)	Ref			
Formal or informal job					
Yes	5/8 (62.5)	12.80 (2.70 - 62.30)	<0.001*	28.4 (2.1 - 391.6)	0.01
No	10/87 (11.5)	Ref			
Attending school					
Yes	10/71 (14.1)	0.62 (0.19 - 2.05)	0.43		
No	5/24 (20.8)	Ref			
Attending school at age-compatible grade					
Yes	6/53 (11.3)	0.47 (0.15 - 1.44)	0.18*		
No	9/42 (21.4)	Ref			
No. of partners previous year					
1	14/77 (18.2)	3.78 (0.46 - 30.80)	0.19*		
2 or more	1/18 (5.6)	Ref			
At baseline					
Treated bacterial vaginosis					
Yes	2/42 (4.8)	0.16 (0.03 - 0.73)	0.01*	0.08 (0.01 - 0.69)	0.02
No	13/53 (24.5)			Ref	
Vaginal candidosis					
Yes	1/16 (6.2)	0.31 (0.04 - 2.54)	0.25		
No	14/79 (17.7)	Ref			
At follow-up visit					
Dyspareunia					
Yes	2/23 (8.7)	0.43 (0.09 - 2.01)	0.28		
No	13/72 (18.1)	Ref			
Discharge complaint					
Yes	13/81 (16.0)	1.15 (0.23 - 5.74)	0.87		
No	2/14 (14.3)	Ref			
Cervical ectopy					
Yes	5/52 (9.6)	0.35 (0.11 - 1.12)	0.07*		
No	10/43 (23.3)	Ref			
Bacterial vaginosis					
Yes	2/22 (9.0)	0.45 (0.09 - 2.12)	0.30		
No	13/73 (17.8)	Ref			
Vaginal candidosis					
Yes	4/28 (14.3)	0.82 (0.24 - 2.83)	0.75		
No	11/67 (16.4)	Ref			
Persistent bacterial vaginosis					
Yes	1/16 (6.3)	0.30 (0.04 - 2.46)	0.24*		
No	14/79 (17.7)	Ref			

CI: Confidence interval; Yr: years; *included in multivariate analysis.

Table 3. Factors associated with prevalent *Trichomonas vaginalis* (TV) infection by univariate and multivariate analyses.

Variables	Prevalent TV	Univariate analysis		Multivariate analysis	
	No. positive/total (%)	Odds ratio (95% CI)	P	Odds ratio (95% CI)	P
Age, yr					
13 - 14	1/28 (3.6)	0.76 (0.09 - 6.41)	0.80		
15 or older	7/150 (4.7)	Ref			
Marital status					
Married or cohabiting	1/101 (1.0)	0.10 (0.01 - 0.83)	0.01*	0.10 (0.01 - 0.83)	0.03
Single	7/77 (9.1)	Ref		Ref	
Formal or informal job					
Yes	2/14 (14.3)	4.39 (0.80 - 24.1)	0.07*		
No	6/164 (3.7)	Ref			
Attending school					
Yes	5/121 (4.1)	0.78 (0.18 - 3.37)	0.73		
No	3/57 (5.3)	Ref			
Attending school at age-compatible grade					
Yes	3/87 (3.5)	0.61 (0.14 - 2.65)	0.51		
No	5/91 (5.5)	Ref			
Age at first sexual intercourse, yr					
11 - 14	6/109 (5.5)	1.96 (0.38 - 10.0)	0.41		
15 or older	2/69 (3.0)	Ref			
No. of partners lifetime					
1	3/80 (1.3)	0.71 (0.16 - 3.06)	0.64		
2 or more	5/98 (5.1)	Ref			
No. of partners previous year					
1	8/151 (5.3)	-	-		
2 or more	0/27 (0.0)				
Previous episode of discharge treated					
Yes	1/67 (1.5)	0.23 (0.03 - 1.78)	0.13*		
No	7/111 (6.3)	Ref			
History of genital wound					
Yes	2/9 (22.2)	7.70 (1.32 - 45.77)	0.01*		
No	6/169 (3.6)	Ref			
History of genital warts					
Yes	0/11	-	-		
No	8/167				
First time pregnant					
Yes	7/156 (4.5)	0.98 (0.12 - 8. 24)	0.99		
No	1/22 (4.5)	Ref			
History of abortion					
Yes	1/14 (7.1)	1.73 (0.19 - 15.1)	0.62		
No	7/164 (4.3)	Ref			

Continued

At baseline			
Discharge complaint			
Yes	4/122 (3.3)	0.44 (0.11 - 1.83)	0.24*
No	4/56 (7.4)	Ref	
Dyspareunia			
Yes	4/50 (8.0)	2.70 (0.65 - 11.2)	0.16*
No	4/128 (6.3)	Ref	
Vaginal bleeding after sex			
Yes	0/5 (0.0)	-	-
No	8/173 (4.6)		
Vaginal pH			
< or equal 4.5	0/124 (0.0)	-	-
> 4.5	8/54 (14.8)		
Cervical ectopy			
Yes	4/59 (6.8)	2.10 (0.50 - 8.69)	0.30
No	4/119 (3.4)	Ref	
Endocervicitis sign**			
Yes	1/16 (6.3)	1.48 (0.17 - 12.82)	0.72
No	7/162 (4.3)	Ref	
Bacterial vaginosis			
Yes	4/105 (3.8)	0.89 (0.22 - 3.67)	0.87
No	4/73 (5.5)	Ref	
Vaginal candidosis			
Yes	1/38 (2.6)	0.55 (0.07 - 4.63)	0.58
No	7/140 (5.0)	Ref	

CI: Confidence interval; Yr: years; *included in multivariate analysis; **Endocervical mucopurulent discharge and/or easily induced bleeding.

4. Discussion

Despite of their high frequency and their serious consequences for reproductive health [4]-[6], cervicovaginal infections by CT and TV are still neglected in most parts of the world, particularly in lower socioeconomic regions [2] [11] [15] [16]. The current study provides important information regarding the high rates of prevalence and incidence of these STI in a highly vulnerable population of pregnant adolescents from a city located in the Brazilian Amazon. Particularly for CT, the assessment of this infection in adolescents is important because it disproportionally affect young women [2] [7] [17]. The rate of 33.7% on the prevalence of CT reported hereby is higher than those found on pregnant and non-pregnant adolescents from developed countries [2] [9] [18] [19]. However, this prevalence is similar to other studies that evaluated pregnant adolescents in the United States in another Brazilian region and being even comparable to the rates reported in adults sex-workers from Africa [8] [20]-[22].

Corroborating with increased susceptibility of adolescents to CT, data on low-risk adults show that the prevalence of this infection is the highest of all other curable STI in group of women between 18 and 20 years-old, while for all other age groups the most prevalent infection is trichomoniasis [17]. In fact, studies have been consistent in showing that older women are at increased risk for TV [17] [23] [24]. However, when studies are limited to adolescents, positivity for TV is similar, or even higher than those found in adult women [3] [10] [25]. Prevalence of TV in the current study is inferior to two former investigations on pregnant adolescents in the United States, however both of them used DNA-amplification methods for detecting TV, that was already demonstrated to yield higher TV-positivity when compared to culture [3] [10] [26]. Few data on TV infection are

available from Brazilian studies, but the current prevalence of 4.0% is higher to those reported in pregnant adults, low-risk non-pregnant woman, while it is similar to the rate previously found in HIV-positive women from Amazon region (4.1%) [11] [27]-[29].

Because treatment for CT and TV was made only at follow-up visit, it was not possible to evaluate the rates of re-infection and treatment failure. Despite of this, incident cases could be identified among the 100 adolescents who returned for follow-up visit. We are aware of the study limitation regarding the low rate of adolescents who attended follow-up visit, but this is an intrinsic characteristic of this population that mostly live in remote areas and have low financial resources to consistently attend the all prenatal visits. A total of 15 new cases of CT infection were detected among the 54 adolescents that returned for follow-up and were CT-negative at baseline. Incidence of CT is not a topic addressed in most of the studies, however it is estimated that there were 3 million new cases of CT in 1996 in the United States [1]. The current finding on CT incidence is superior to those found in pregnant [18] and non-pregnant adolescents [8]. Regarding TV incidence, only one case among 98 women at risk could be identified, which is a significantly lower rate when compared to high-risk adult population [30] and to those previously reported in non-pregnant and sexually active adolescents [3] [10]. Nevertheless, it worth mentioning that the former studies on sexually active adolescents were conducted for at least 1 year and followed a larger number of individuals, while the present data are based at most on a 3-months period of observation.

Although CT infection is asymptomatic in up to 90.0% of the cases [31], Chacko *et al.* [20] demonstrated that genitourinary symptoms are associated with CT. The current study failed to demonstrate this association; however it showed that adolescents who reported having treated an abnormal vaginal discharge in the past had a significant lower risk for current CT. This finding is particularly interesting because it either can reflect a major concern about sexual health of those adolescents that sought medical care for their discharge complaints or even that they presumably were treated for bacterial vaginosis, condition that recognizably increases the risk for CT acquisition [32]. Presence of cervical ectopy was another factor independently associated with prevalent CT infection in this population. This association was already demonstrated by previously and highlights the importance of the screening of CT infection in adolescence, when cervical ectopy is frequently observed [20].

In agreement with the current data showing a protective effect of a previous treated discharge for prevalent CT, this study also demonstrates that having an episode of bacterial vaginosis treated at baseline was strongly protective against an incident CT infection. Regarding the test of sociodemographic factors with the incidence of CT, adolescents that had a formal or informal job at time of enrollment were at increased risk for CT acquisition. This finding may reflect a lower socioeconomic status of these adolescents, as at their age they were still expected to be attending school. In fact, literature has shown that women living in poorest area are disproportionally affected by CT [2] [15].

Although the current study enrolled exclusively adolescents, 57.0% of the subjects referred to be married or living with partner at time of enrollment. This marital status category was strongly protective against prevalent TV (OR, 0.10; CI 95%, 0.01 - 0.83). In fact, this was the only variable that could be associated with prevalence of TV. Because only one case of incident TV was found in this study, statistical analyses for determining the risk factors associated with incident TV were not performed.

5. Conclusion

In summary, the current data point out the high prevalence and incidence rates of TV and CT in a highly vulnerable population in Brazilian Amazon, for which screening programs are not available. Additionally, this study provides evidences that treatment of bacterial vaginosis in pregnant adolescents may benefit this population by reducing risk for CT infection.

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